Course Title and Code	
Disaster Management: IL1203	
Hours per Week	**L-T-P: 3-1-0**
Credits	**4**
Students who can take	B. Tech Sem VI sem (2017-2021) (OE)

Course Objective: This course aims to develop understanding of various natural and manmade disasters. Natural disasters include earthquake, Tsunami, Flood, forest fires and Land Slides. Manmade disasters include fire, Industrial Pollution, embankment failure, structural failure and due to electric supply. Topics includes the causes for these disasters and remedial measures which can minimize the losses to the life and property. The course also includes the identification and description of electric supply resilience and restoration.

Learning Outcomes

On completion of the course, the student should be able to:

1) Asses the types of disasters, causes and their impacts.
2) Assess vulnerability and various methods of risk reduction measures and mitigation.
3) Draw the hazard and vulnerability profile of a given region.
4) Analyze a power grid collapse.
5) Plan and execute framework to black start and restoration procedure with considering security criteria and power system reliability.

Syllabus (Theory)

Unit-1 Introduction to Disasters, Various types of disaster, Natural: Flood, Earthquake, cyclone, Land slide, Manmade: Fire, Industrial Pollution, embankment failure, structural failure and due to electric supply. Loss of resources.

Unit-2
Risk and Vulnerability:
Risk: Its concept and analysis, Risk reduction, Vulnerability: Its concept and analysis, strategic development for vulnerability reduction

Unit 3
Disaster Management in Power Utilities and Power grid collapse:
Sectoral impacts, System Impact of the Loss of Major Components, Vulnerability Program, Options to reduce impacts of disaster, Power system operation security, Security criteria, System security function, Power System Reliability, Black start and restoration Procedure, Black start facilities, Impact of Blackout in day to day life, Role of Utility staff, Speeding recovery

Unit – 4

Management- Objectives, Processes, Events, analysis, base-line data, forecasting and Warnings. Disaster preparedness plan concept and nature, Emergency operation center and IT aids- physical environment, Applications. Public-private agency co-ordination- federal, state and local disaster response organization and network, Citizen and community role in disaster response and recovery.

Syllabus (Practical)

1. A Case study on flood Hazard
2. A case study on Tsunami Hazard
3. A case study on Earthquake
4. A case study on Forest fire
5. A case study on structural failure
6. A case study on grid challenges for Indian grid system on blackout plan (05 April 2020)
7. A case study on Indian blackout on July 30-31, 2012

Quiz

Quiz were taken to improve the course understanding.

J K Lakshmipat University

Department of Civil Engineering

Disaster Management

Quiz 1

1. What is the major difference between drought, flood, earthquake and Tsunami in terms of strike and its response?

2. What is the importance of using triage in disaster like earthquake, landslide or gas leak? Is this triage will work in case of drought?

3. Is this Covid19 is also a disaster? If yes write a note on the spread of COVID19 in India with giving importance to disaster management?

4. Recently super cyclones were strike in Odisha and Maharashtra. How the IT tools are useful in minimize the impacts of such disasters?

5. What is the impact of climate change on the disasters? (Not directly from slides but you should know about this)

Project Reports

Students submitted project reports on various disasters occurred in the past and presented in the class. It will enhance the understanding of all the students.

Few examples are attached below.

2015 HINDU KUSH EARTHQUAKE

PREPARED BY
KAUSHIKI PATEL (2017BTECHCSE015)

FACULTY SUPERVISOR
DR. KEDAR SHARMA

Department of Computer Science Engineering
Institute of Engineering and Technology
JK Lakshmipat University, Jaipur.

March 2020

INDUSTRIAL DISASTERS

JAIPUR OIL DEPOT FIRE 2009

PREPARED BY

Shruti Sharma (2017btechcse218)

FACULTY GUIDE

Dr Kedar Sharma

Department of Civil Engineering

Institute of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

April 2020

EARTHQUAKE IN GUJARAT

PREPARED BY
DIKSHA YADAV (2017BTECHCSE102)

FACULTY SUPERVISOR
DR. KEDAR SHARMA

Department of Computer Science Engineering
Institute of Engineering and Technology
JK Lakshmipat University, Jaipur.

Syllabus (Theory)

Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods.

Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6.Transport Layer: Transport Layer - Design issues, connection management,

Session Layer- Design issues, remote procedure call. Presentation Layer-Design issues, Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals etc.

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem

IEEE 802 Standards for Networks, RFC Standards, Energy Efficient routing algorithms, Energy efficient distributed systems.

Textbook(s)

1. Forouzan, B. & Fegan, S. C. (2011). Data communication and Networking (4th ed.). New Delhi: McGraw HIll.
2. Tanenbaum, A. S. & Wetherall, D. J. (2014). Computer networks (5thed.). New Delhi: Pearson.
3. Stallings, W. (2014). Data and Computer Communications (9thed.). New Delhi: Pearson
4. Pradeep K.Sinha . Distributed Operating Systems. Concepts and Design.
5. Schaum's Outline of Theory and Problems of Computer Networking, McGraw Hill Education (India) Pvt. Ltd.

Syllabus (Theory)

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4. Pradeep K.Sinha . Distributed Operating Systems. Concepts and Design.
5. Schaum's Outline of Theory and Problems of Computer Networking, McGraw Hill Education (India) Pvt. Ltd.

CS1204 Information Retrieval and Data Mining

Syllabus (Theory)

Overview of the fields: Study some basic concepts of information retrieval and data mining, such as the concept of relevance, association rules, and knowledge discovery. Understand the conceptual models of an information retrieval and knowledge discovery system

Indexing: Building an inverted index, Processing Boolean Queries, Ranked Retrieval. Document delineation and character sequence decoding, determining vocabulary of terms. Positional posting and phrase queries, dictionary retrieval, Index construction. Indexing Techniques, Parametric and Zone indexing, frequency and weighting, vector space model for scoring.

Retrieval Methods: Study popular retrieval models: Boolean, Vector space, Binary independence, Language modelling. Probability ranking principle. Other commonly-used techniques include relevance feedback, pseudo relevance feedback, and query expansion

Mining Techniques: Mining class comparisons, Mining Association rules: single dimensional, boolean association rule, Apriori and FP-tree algorithm, Classification and prediction: issues, classification by decision tree induction, by back propogation, by association rule mining, Bayesian Text Classification, Vector Space Classification. KNN classifier, Linear Classifiers, Classification of documents using SVM model. Prediction, classifier accuracy. Cluster Analysis: introduction, type of data, clustering methods, Clustering in IR, evaluation of clustering, k-means, model-based learning, hierarchal clustering.

Google Sitemap standards for crawling, Porter stemming standards, Data Mining Group (DMG) standards for data mining. Design a sustainable approach of data collection of environmental data with minimal human resource.

Text Book(s)

Manning, Christopher, Prabhakar Raghavan, and Hinrich Schütze. "Introduction to information retrieval." Cambridge University Press.
Jiawei Han, Micheline Kamber, Jian Pei, "Data Mining: Concepts and Techniques" Third Edition, Morgan Kaufman Publisher

Reference Book(s)

Ricardo Baea-Yates, Berthier Riberio-Neto "Modern Information Retrieval", Pearson
Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Addison-Wesley, 2006
Gigabytes (2nd Ed.) Ian H. Witten, Alistair Moffat and Timothy C. Bell. (1999), Morgan Kaufmann, San Francisco, California.
Pattern Recognition and Machine Learning, Christopher M. Bishop, Springer (2006)

Course Code: FN28
Credit: 4
Semester: V
Course Description:
This course is a comprehensive introduction to how banks work. It discusses the role, operations, risks and remedial actions of managing risks of banking sector in the current era of globalization, privatization and liberalization. The financial sector constitutes one of the major components of the service sector and within the financial sector Banking has a significant role to play. There has been a manifold increase in the demand for banking services to cover various commercial and personal risks arising out of increasing complexities of modern life. Resultantly, these in turn have thrown up numerous opportunities as well as challenges for banking companies in India. This course intends to impart real life knowledge about organization, operation and regulation of banking sector in India and expects to increase conceptual and practical learning of students.

Course Objectives:
This course would help students to
- Acquire and exhibit an understanding of banking sector and its role in Indian and global economy.
- Learn about credit creation ability of Commercial banks.
- Attain professional perspective to assess various risks (special focus on credit risks) pertaining to banking and managing them.
- Critically evaluate the operational efficiency of commercial banks operating in India.

Course Learning Outcomes:
After completion of this course, students are expected to be able to:
- Understand and analyze the organizational structure, functioning and working of commercial banks in India.
- Critically evaluate impact of monetary policy of RBI on commercial bank's credit creation ability.

- Assimilate understanding of credit risk control mechanism of Indian commercial banks.
- Critically analyze capital adequacy of Indian banks in relation to global standards.

Topics to be Covered:
- Introduction to banking business
- Credit creation
- Commercial Banking in India
- E Banking
- Credit risk monitoring, Management and Recovery
- Capital Adequacy (Basel Norms)

Activities Related to Skill Development and Employability

Case Study 1- 5 C analysis of Uplift Solution Inc.

Case study 2 – Management of NPA of Regional Rural Bank viz J&K Grammen Bank

Assignment 1 on credit creation capacity of SCBs.

Assignment 2 on Basel norms and presentation on Comparative Capital Adequacy Ratio and Tier I & II capital of Public & Private Indian Banks using financial statements.

In class room discussion and presentation on Analyzing Bank performance using research paper titled: Determination of CAMELS model on Banks Performance.

In class room discussion on Banking Sector Reforms in India using Research Paper: Banking Sector Reforms: A critical Overview.

In class room discussion on Credit risk & Recovery using research paper titled: Assets Quality of Indian Banks, Recent Downtrends-Causes and Their Challenges.

Course Code: MA2105
Credits: 2
Trimester: II

Course Description:

500 mn + consumers in India have gone online - a majority through smart phones and the rest through computers, tablets and other AI enabled devices. This number is expected to grow to 850 mn by the end of 2022. This has changed the way marketing done and particularly the way digital marketing and communication is conducted. This course aims at providing an overview of the changes the 4Ps of marketing, have seen in a digital world with special emphasis on the Promotion "P". This is an introductory course and should be followed up by a more detailed course on digital communications (what is popularly known as digital marketing)

Course Learning Objectives:

1. Understand the changes that the advent of digital technologies have brought about in the practice of Marketing (the 4 Ps), why and how
2. Broadly understand the process and channels involved in the practice of digital marketing (Promotion "P")
3. Understand the importance and use of data that drives digital marketing

Topics to be Covered:

1. Characteristics of the digital world
2. Managing the 4Ps in a digital world (1+2 = 5 hours)
3. The Promotion "P" (Digital Marketing) (15 hours)
   a. Handholding consumers through their decision journey using digital channels
      i. Digital methods and channels (Overview of SEO, email marketing, Social media marketing and PPC)
      ii. Inventory buying methods
   b. importance of data and its use in the handholding process

Activities Related to Skill Development and Employability

Assignment 1: on Managing the 4Ps in a digital world
Assignment 2: on importance of data and its use in the handholding process
Certificate1: Google Analytics for Beginners
Certificate 2: Google Ads Certification

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
Cases in Sales & Marketing

Course Code: MA2202
Credits: 2
Trimester: VI

Course Description and Objectives:
This course is meant to prepare final term MBA students for their upcoming work life. This is done by revisiting the sales and marketing concepts that they would have learnt over the course of the MBA programme and, through a series of India-based examples and case studies, enabling them to understand how to apply these concepts to real-life work situations.

Class Schedule:

Hours	Topics	Reading Material	Case Study
0-2	How to analyze case studies		
3-4	Digital marketing recap		
4 - 5.15	Case study discussions		Case study 1: Drishti Eye Care
5.15 - 6.45	Recap of sales and marketing - key terms to know	Glossary of terms to be given to students	
6.45 - 8	Case study discussions		Case study 2: Amul Camel Milk
45 min	Quiz 1 on marketing & sales terms	On Wednesday, 19/02/2020	
9 - 10.15	Case study discussions		Case study 3: Castroll
10.15 - 11	Quiz 2 on marketing & sales terms		
11 -14	Case study discussions		Case study 4: Dr. Reddy's Laboratries - A Case study 5: Teracom Limited
14 - 16	Marketing assignment presentations		
16 - 17.15	Case study discussions		Case study 6: Farm Harvest
17.15 - 18	Quiz 3 on marketing & sales terms		
18 - 19.30	Case study discussions		Case study 7: Sales Performance Management in KRC
19.30 - 20	Recap/feedback session		

Activities Related to Skill Development and Employability

Case Studies to be used in the course

- TERACOM LIMITED: APPOINTING A CONSUMER DISTRIBUTOR - Rajeev Kum- ra - W16457
- FARM HARVEST: A DISTRIBUTION DILEMMA - Semila Fernandes, Pooja Gupta, and Vidyasagar A - W18698
- DRISHTI EYE CENTRE: MANAGING A SALES FORCE - Rajeev Kumra - W17129
- AMUL DAIRY: CAMEL MILK LAUNCH IN INDIA1 - Sandeep Puri, Brij Mohan Taneja, Prati- bha Gupta, and Anirudh Menon - W16098
- HEALTH FOR ALL: DR. REDDY'S LABORATORIES AND RURAL INDIA (A) -
- Chandrasekhar Sripada, Padma Rajeswari Tata and Athanasios Kondis - IMD848
- SALES PERFORMANCE MANAGEMENT IN KRC - Jaydeep Mukherjee - Vision 17(1) 63–71 © 2013 Mdi Sage Publications
- CASTROL INDIA LIMITED: AN INNOVATIVE DISTRIBUTION CHANNEL - Renu- ka Ka- manth - W16643

Course Code: MA2202
Credits: 2
Trimester: VI

Course Description and Objectives:
This course is meant to prepare final term MBA students for their upcoming work life. This is done by revisiting the sales and marketing concepts that they would have learnt over the course of the MBA programme and, through a series of India-based examples and case studies, enabling them to understand how to apply these concepts to real-life work situations.

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Hours	Topics	Reading Material	Case Study
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16 - 17.15	Case study discussions		Case study 6: Farm Harvest
17.15 - 18	Quiz 3 on marketing & sales terms		
18 - 19.30	Case study discussions		Case study 7: Sales Performance Management in KRC
19.30 - 20	Recap/feedback session		

Activities Related to Skill Development and Employability

Case Studies to be used in the course

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- SALES PERFORMANCE MANAGEMENT IN KRC - Jaydeep Mukherjee - Vision 17(1) 63–71 © 2013 Mdi Sage Publications
- CASTROL INDIA LIMITED: AN INNOVATIVE DISTRIBUTION CHANNEL - Renu- ka Ka- manth - W16643

Course Code: MA2211
Credits: 3
Trimester: IV

Course Description:
The course is designed to give students an in-depth understanding of the challenges in managing a brand which may comprise a single product or a portfolio of products operating either in a single product category or multiple product categories. Students will learn how product opportunities are identified, decisions are taken on product design, target audience selection, positioning and pricing and how marketing support is deployed across various stages of the product life cycle. Related to this are the strategic decisions around branding, packaging, brand equity building, communication development and post launch monitoring and fine tuning of brand building programmes. The design, building and long term management of a brand's equity will be addressed throughout the course. The course will also deal with issues that Marketers grapple with when creating a brand positioning strategy, the complexity in evaluating brand extension opportunities, the branding of commodities and strategic challenges in managing long term brand equity.

Course Learning Objectives:
1. Understanding of the challenges and choices in creating a winning product and managing a portfolio of products (identifying and selecting a product launch opportunity, product design, packaging, pricing, positioning, launch strategy and promotion)
2. Provide students with a working knowledge of the financial aspects of managing a product or portfolio of products
3. How a brand's positioning should be developed, established, protected and evolved and the role of communication programs in the same
4. The process of sustaining and managing a brand's equity over the long term while facing short term business pressure

Tentative Session Plan:

Session No (2 hours/ session)	Topic	Reading Material
1 & 2	What is Product Management & Brand Management? Marketing Planning: Category, Consumer & Com- petition Analysis. Market Potential & Sales Fore- casting	1. Core Text (Product Management): Chapters 2, 3 and 5 2. Principles of Product Policy by Anita Elberse 3. Marketing Analysis Toolkit: Market Size & Market Share Analysis by Thomas Steenburgh & Jill Avery
3	What is Brand Equity – Definitions and Models of Brand Equity	1. Core Text (Strategic Brand Management): Chapters 2 &3 2. The Brand Report Card by Kevin Lane Keller – HBR Article 3. Brand Equity: An Overview by Paul W. Farris
4	Developing Product Strategy	Core Text (Product Management): Chapter 8
5	Designing the Right Product	• Core Text (PM): Chapter 8 • Defeating Feature Fatigue by Roland Rust, Deborah Viana Thompson & Rebecca Hamil- ton

		(HBR)
6	Product and Brand Position-ing	1. Core Text (PM): Chapter 8 and Core Text (SBM): Chapter 2 & 3 2. Market Segmentation, Target Selection and Positioning by Miklos Sarvary and Anita Elberse 3. Brand Positioning by Sunil Gupta and Jill Avery, HBR
7	Integrating Communications into building of brand equity	Conceptual Models of How Advertising works to Persuade Individuals by Paul W Farris and Tania de la Pena Calderon
8	Brand Strategies & Brand Architecture	Core Text (SBM): Chapter 11
9	Introducing New Products	• Managing the new product development process – Robert Dolan • Eager Sellers & Stony Buyers – Understanding the Psychology of New Product Adoption; John T. Gourville, June 2006 oland Trust, Zeithaml, Lemon • Note on Innovation Diffusion - John Gourville
10	Growing through product and brand extensions	• Core Text: Core Text (SBM): Chapter 12 • Extend Profits, Not Product Lines: John Quelch & David Kenny; HBR Sep 1994
11	Product Life Cycle: What it is and how to manage it	Exploit the Product Life Cycle – Theodore Levitt Nov 1965
12	Managing Brand Equity over time	• Core Text (SBM): Chapter 13 • Managing Brands for the Long Term by Kevin Lane Keller
13	The Challenge of Managing Global Brands Locally	Core Text (SBM): Chapter 14 2. Global Brand Management: Best Practices and Learnings From Efforts to Build the Business "Over There" by Julie Hennessey, Eric Leininger and Evan Meagher
14	Introduction to Services Marketing – 1	Book: Services Marketing by Valarie A. Zeithaml, 7th Edition
15	Introduction to Services Marketing – 2	Book: Services Marketing by Valarie A. Zeithaml, 7th Edition

Activities Related to Skill Development and Employability

Case 1 : Cottle-Taylor: Expanding the Oral Care group in India by John A. Quelch & Aisa Zalosh; HBS Oct 2011

Case 2: Chase Sapphire – Creating a Millenial Cult Brand by San- tana, Avery and Snively

Case 3: Brand Revitalizing and Brand Reinforcement: The Case of Arrow Shirts in the Indian Context - S. Ramesh Kumar and Amod Choudhary

Case 4: Taj Hotels Resorts & Palaces

Case 5: GoPro: Brand Extension by Michael Marks and Jaclyn C. Foroughi

Case 6: Maggi Noodles in India: Creating & Growing the category

Case 7: Dove: Evolution of a Brand

Case 8: L'Oreal: Global Brand Local Knowledge

In-Class Exercise: Discussion on "The Brand Report Card" by Kevin Lane Keller

Group Project: Students will undertake a project on New Brand Launch and Brand Refresh. This will be a group project allocated and group is expected to complete the same as per guidelines.

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
B2B Marketing

Course Code: MA2212
Credits: 2
Trimester: V

Course Description:
Business-to-business (B2B) turnover and sales volumes constitute a major portion of any market economy's output. This course tries to focus on the skill sets students need to understand the unique requirements of business customers and succeed in marketing and management roles within B2B businesses and enterprises. The sessions on B2B marketing shall delve further on the skills required for succeeding in this environment, including: organizational buying and selling models; launching B2B products and services; pricing a product line; sales management and support; managing distribution partners; and social media for B2B promotion.

Course Objectives:
The specific objectives of the course are:
- To develop an appreciation for the significance of B2B marketing scenarios in any business enterprise.
- To understand the intricacies of solving managerial problems for Industrial Marketers.
- To sensitise the participants regarding the specifics and nuances of B2B, vis-à-vis B2C scenarios.

Tentative Session Plan:

Session No.	Topic	Reference Readings
1-2	B2B Marketing-Overview and framework of the topic	Class slides/ pre- read articles
3-4	Planning and performance assessment (internal): How to approach a B2B scenario?	Class slides/ pre- read articles
5-6	Product and pricing strategies in B2B markets	Class slides/ pre- read articles
7-8	Customer behaviour in B2B markets: Purchasing process and functions	Class slides/ pre- read article/cases*
9	Marketing Channels and their role in B2B environments	Class slides/ pre-read article/cases*
10-11	Market and competitor analysis (external): How to evaluate the ecosystem in any B2B environment?	Class slides/ pre- read article/cases*
12-13	Communication strategy and the importance of Business Marketing Communication (Promotion)	Class slides/ pre- read article/cases*
14-15	The art of selling in a B2B ecosystem: Direct and indirect sales perspectives	Class slides/ pre-read article/cases*

16	B2B marketing dynamics in a Global Framework (Brief layout)	Class slides/ pre- read article/cases*
17-20	Group presentations/ assignments/ submissions	To be announced in-class

Note: Sessions 1 to 6 will cover the basic introduction and scope of the subject. Sessions 7 to 16 would delve further into the concepts and have class discussions based on cases and sessions 17 to 20 would cover the group assignments and presentations.

Activities Related to Skill Development and Employability

Case 1- Nucor Corporation and the US steel industry
Case 2 - Compaq in crisis
Case 3- Southwest Airlines, 1996
Case 4 - Pacific Dunlop: Caught on the half volley

Project 1: Topic: Give the internal and external product manager's perspective for launching any Indian Product Brand of a big conglomerate.

FUNDAMENTALS OF HUMAN RESOURCE MANAGEMENT
BS2101
Credit: 2
MBA-Term-II

COURSE DESCRIPTION:

This course examines the evolving human resources function within today's organizations. A number of recent developments, including demographic changes in the labour force, increased global competition, experiments with new organizational arrangements, and public policy attention to work force issues have made human resource management increasingly important for organizations. The purpose of this course is to bring out issues involved in the management of human resources (HRM), both from current theory as well as practice. The course will examine humans at work and discuss various aspects which are basic to human motivation at work and in fulfilling career aspirations within organisations.

COURSE LEARNING OBJECTIVES:
On completion of the course the students will be able to

- Critique the impact of external environment on the enterprise's HR system.
- Evaluate the connect between business and HR deliverables
- Identify contemporary issues in HRM and change in human resource practices with changing business environment.
- Analyze the application of HR concept and tools in a case setting.

TOPICS TO BE COVERED

1. HRM : Introduction
2. HR as business partner
3. Planning and acquiring HR
4. Managing performance and engagement.
5. Training and Development
6. Employee compensation and benefits
7. Employee relations
8. Transformation in HR

Session Plan

Session	Topics
1-2	HRM : Introduction • Evolution of HRM • Objectives, scope and function • The HR Competencies

3-5	Human Resource as Business Partner (HRBP) • Factors influencing corporate strategy • Linking corporate strategy to HR Functions. • Models of SHRM
6-7	Planning and Acquiring HR • Process of Human resource Planning • Recruiting and selecting
8-10	Performance and engagement • Purpose, process and criteria for effective performance management • Methods for measuring performance • Employee engagement
11	Quiz/ Assessment
12	Training and Developing Talent
13-15	Employee Compensation and Benefits • Factors influencing pay structure • Establishing pay structure
16-17	Ethics, Employee Relations and fair treatment at work Workplace legislations and regulations
18	Transformation in HR • HR Analytics, HR metrics and HRIS
19-20	HR simulation

Assessment:

Assessment Components	% Weightage
Mid Term Exams	20
End Term Exams	40
Quizzes	10
Assignments/presentations	20
Class participation	10

Course Requirement:

The course will involve more of interactive sessions and open discussions within the class. The students are expected to come prepared to the class and actively participate in classroom discussions. The knowledge is incomplete without its practical application. Therefore, at the end of each chapter students would be

required to do certain exercises or solve the real life cases considering the theories taught in the class as the guidelines. Surprise quizzes may also be conducted at times. Therefore students are expected to have all lessons, assignments, presentations, etc., prepared on the dates due. Assignments turned in late will receive one-half grade lower than they would earn if on time.

Reference Book:

Sengupta, A. (2018). Human resource management: Concepts, Practices, and New Paradigms. New Delhi: Sage Texts.

Hollenbeck, N. & Wright, G. (2015). Fundamentals of Human Resource Management. New Delhi, McGraw Hill, 3rd eds.

Dessler, G. and Varkkey, B. (2009). Human Resource Management, New Delhi: Pearson

Aswathappa K. (2008. Human Resource Management Text and Cases, New Delhi: Tata McGraw.

Rao, VSP (2002). Human Resource Management, Text and Cases, New Delhi: Excel Books.

Ivansevich, J. M (2010) – Human Resource Management, New Delhi: Tata McGraw Hill.

Activities related to Employability:

1. **Case Study:** HR-An enabler or a crippler?
2. **Case Study:** You call this selection Interview!
3. **Activity:** Develop a forecast for next three years of occupational market conditions for the following occupation: Engineers, Doctors and Employers
4. **Presentation:** Prepare and Present on-How to orient new employees.
5. **Activity:** HR as a strategic business partner: identify various HR activities undertaken by your chosen organization and explain how each activity is part of its strategy

Course Title: Organizational Behaviour and Human Resource Management|MBA
Course Code: BS2102
Credits: 3
Trimester: V
Course Instructors: Dr. Richa Mishra

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Course Description:
People are core to the organization. The course will introduce the people-related challenges of organizational life within and outside organizational boundaries and the fundamental concepts of human resource management, including its nature, scope, functions and importance. The focus of this course will be on increasing one's awareness of, and to build proficiencies in dealing with the challenges effectively. The course also intends to familiarize students to the principles and practice of human resource management as it is essential to manage enterprise effectively.

Course Learning Outcomes:
Upon completion of the course, students are expected to be able to:
1. Appreciate the multiple dimensions of individual variations in Human behavior.
2. Interpret organizational problems in terms of individual, interpersonal and group processes.
3. Explain and analyze the importance various functions of human resource management.
4. Exhibit an understanding of the important role that human resources play in an organization

Course Content:

1. Introduction to Organizational Behavior • What Is Organizational Behavior? The importance of interpersonal skills. Management functions, roles, skills. • Approaches to OB-Scientific, Behavioral and Contingency Approaches
2. Individual Determinants of Behavior • Demographic differences as a predictor of behavior. • The facets of personality and how it reflects individual differences: Personality traits and its effect on employee behavior. • Perceptual Interpretation and its role on employee and behavior. Behavioral Responses as an outcome of learning. • Attitude Formation and Change as a result of changing motivational function, resolving cognitive dissonance and assigning causality of behavior. (attribution theory) • Motivational theories and process
3. Foundations of Group Behavior • Dynamics of group behavior • Conflict Management • Leadership
4. The Organization • Organization structure and design • Change and Development • Culture and Climate

5. **Introduction to HR, Linking OB and HR, Challenges to HR**
6. **Human Resource Planning** • Process of HRP and Factors affecting HRP • Demand and Supply forecasting • Recent Trends in HRP
7. **Recruitment and Selection** • Sources of Recruitment & Factors affecting • Recruitment • Job Analysis & Job Specification • Purpose and Techniques of Job Description
8. **Training and Development** • Need and Importance of Training • Techniques of Training • Benefits of Training and MDP • Job Enlargement & Job Enrichment • Job Evaluation
9. **Compensation Management** • Objectives and Factors Influencing it, Steps in establishing Pay Rates, Components of Pay. • Managerial compensation & other trends in Compensation • Determining Pay Rates for Positions • Hourly, Salary and Incentive-Based Pay
10. **Performance Appraisals** • Need, Importance and Benefits of Performance • Techniques of Performance Appraisal
11. **Career Planning** • Career Planning and succession planning • Retaining and Motivating

Reading Materials:

1. Robbins, S. P. Timothy.A.,J.,&Vohra.N,. (2014). Organizational Behavior: 15Th Edition. Pearson Education India.
2. Luthans, F. (2015). Organizational behavior: An evidence-based approach. 12th Ed.McGraw-Hill Education.
3. Rao, V.S.P. (2002). Human Resource Management: Text and Cases. New Delhi: Excel Books.

Reading List for HRM Topics:

1. Huselid, M. 'The impact of human resource management practices on turnover, productivity, and corporate financial performance', Academy of Management Journal 38(3) 1995, pp.645–70.
2. Barclay, J. 'Improving selection interviews with structure: organisations' use of "behavioural" interviews', Personnel Review 30(1) 2001, pp.81–101.
3. Barrick, M., M. Mount and T. Judge 'Personality and performance at the beginning of the new millennium: what do we know and where do wego next?', International Journal of Selection and Assessment 9 (1/2) 2001pp.9–30

4. Bretz Jr., Robert D.; Ash, Ronald A.; Dreher, George F., Do people make the place? An examination of the attraction-selection-attrition hypothesis.; Personnel Psychology, 1989, 42, p561, 21p

5. Campion, Michael A.; Palmer, David K.   A review of structure in the selection interview. Personnel Psychology, Autumn97, Vol. 50 Issue 3, p655, 48p, 3 charts

6. Alliger, George M.; Tannenbaum, Scott I., A meta-analysis of the relations among training criteria.; Personnel Psychology, Summer97, Vol. 50 Issue 2, p341, 18p

7. Baldwin, Timothy T.; Ford, J. Kevin., Transfer Of Training: A Review And Directions For Future Research.; Personnel Psychology, 1988, Vol. 41 Issue 1, p63, 43p

8. Dulebohn, James H.; Ferris, Gerard R.   The Role of Influence Tactics in Perceptions of Performance Evaluations' Fairness. Academy of Management Journal, Jun99, Vol. 42 Issue 3, p288, 16p

9. Balkin, D. B., Markman, G. D., & Gomez-Mejia, Luis R. (2000). Is CEO pay in high-technology firms related to innovation? ACADEMY OF MANAGEMENT JOURNAL, 43, 1118-1129.

10. Bloom, M. & Michel, J.G. (2002). The relationships among organizational context, pay dispersion, and managerial turnover. The Academy Of Management Journal, 45, 33-42.

11. Kirchmeyer, C. (1998). Determinants of managerial career success: Evidence and explanation of male/female differences. Journal of Management, 24, 673-692.

Assessment Plan:

Components	Weightage
Assignments (oral and written)	15%
Class Participation	15%
Presentation	20%
Exam I	20%
Exam II	30%

Activities Related to Skill Development and Employability

1. All the wrong Move -HBR Case Study
2. Assignment -Develop a questionnaire for a job interview of Accountant and the CEO of Car Manufacturing Organization
3. Conduct TNA for ant organization and make a presentation

JK Lakshmipat University, Jaipur

Institute of Management

Pinnacle MBA

Academic Year- 2019-20

Learning and Development Strategies

Course Code: BS2103

Credit: 3

Trimester: V

Activities Related to Skill Development and Employability

Case 1: In search of Self-Management Dimensions

Case 2: Searching for leaderships styles

Case3: Turning individuals into team players--- Apollo Engineering Works

Case4: Misappropriation of power

Case5: Need for behavior Modification.

Course Title– Communication and Identity
Institute of Management-B.com/BBA

Course Code & Credits - CC1104-2 credits, (2-0-0)
Batch- 2017-
Semester-V 2019-20
Instructor: Ms. Anushree Dixit

Course Description

This course enables students to explore their personal and professional identities, to create their distinctive presence. It intends to help them gain an understanding of the basic purpose, benefits, and responsibilities of self-presence, and to begin the process of defining their values, strengths, and goals.

Learning Outcomes

The students will be able to:

- Analyse their personal identities, both private and social
- Identify their different values, strengths and areas of professional interest
- Articulate their personal statement and use it to craft an influential pitch
- Express themselves through various communication formats, on different platforms

Course Contents :

Module	Topics/ Session	Sub Topics to be Covered
Identifying Self	Factor that shape our identity	The 3 Types of Diversity That Shape Our Identities. Three things: demographic diversity (our gender, race, sexual orientation, and so on), experiential diversity (our affinities, hobbies, and abilities), and cognitive diversity (how we approach problems and think about things).
	Internal confidence or "principle-centred living"	Living a principle-centred life is the key to excelling in all other areas of our living. A principle is based on the fundamental idea that there is learned behavior that governs human effectiveness.
	Personal Statement	Use of story map to create a personal statement.
Persuasive Communication	Steps to build a Personal Brand	Personal branding: meaning, importance and how to create and use it; the three Cs' of personal branding and
	Online presence	Creating an online presence for professional and personal branding through social media.(LinkedIn, Facebook etc.)
	Elevator Pitch, Cover Letter	Elevator Pitch: Meaning and use of an elevator pitch in interview and workplace; techniques to craft and improve their pitch Purpose of a cover letter, types of the cover letter, the structure of a cover letter and tips on the cover letter, to craft their cover letter to be used for placements
	Presence in Group Discussion and Personal Interviews	Practice different types of group discussions, dos and don'ts of group discussions and use of techniques to perform well in GDs
Assessments		

Session Plan

Topics	S. No.	Session
Self- identity	1	Understanding Self Part-1
	2	Understanding Self Part-2
	3	Value System
	4	Prioritizing the Values
Personal Statement	5	Introduction & Importance
	6	Application & Cover Letter
	7	Activity Based Discussion
	8	Resume Writing
	9	Activity Based Discussion
Steps to build Personal Brand	10	Introduction to Personal Branding
	11	Personal Brand Development - XYZ Methodology
Online Presence	12	Creating & Nurturing a Professional Online Presence
	13	Developing Online Presence & Reputation
	14	How to improve profile on Linkedin
Elevator Pitch	15	Concept of Elevator Pitch & its importance & relevance
	16	Elevator Pitch Presentation Day-1
	17	Elevator Pitch Presentation Day-2
Presence in Personal Interviews	18	Key Soft Skills including body language needed for cracking an interview
	19	How to handle skill based questions effectively
	20	Interview Practice Session-I
	21	Interview Practice Session-II
Presence in Group Discussion	22	Key Soft Skills needed in a group discussion
	23	Types Of GD and approach to understand each type.
	24	How not to get eliminated in a through practice sessions

Activities Related to Skill Development and Employability

S. No.	Activity	Module
1	Psychometric assessment was conducted	Self Awareness
2	Each Participant was asked to draft their cover letters, which was evaluated with respect to the company	Elevator Pitch
3	Each participant was asked to draft their resumes, which was evaluated with respect to the company	Elevator Pitch
4	Participants were instructed to read newspapers	Group Discussions
5	Mock Group Discussions were held	Group Discussions
6	Mock PIs were held.	Personal Interviews
7	Each Participant created their IDs on professional media such as LinkedIN.	Personal Branding /Online
8	Each participant was encouraged to review their peers' LinkedIN profiles	Online Presence/Personal Branding
9	Participants were asked to write blogs on dofferent platforms suchs as blogspot/ LinkedIN etc.	Online Presence/Personal Branding

Employability Skills coloured in Yellow.

CRITICAL THINKING FOR DECISIONS AT WORKPLACE
CODE: CC1106
BBA
LESSON PLAN

L-T-P: 2-0-0
COURSE CREDITS: 2

COURSE DESCRIPTION

In today's world, the idea of right and wrong is being challenged by businesses, use of technology, economic conditions, and norms of societies. The relevance of a well-reasoned decision is crucial. This course intends to make students take better decisions keeping in mind purpose, context, and ethics.

LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

- Apply techniques of Critical Thinking to analyse organisational problems through positive inquiry
- Describe and analyse appropriate problem-solving and ethical decision-making processes
- Choose the most effective and logical decision among multiple alternatives
- Evaluate solutions and anticipate likely risks based on purpose, context and ethics

SYLLABUS

	Topic	Sub-topics
1	Decision Making: Definition and Type	• Organisational decision-making • Concept of thinking triangle • Importance of decision-making at work place
2	Steps of Decision Making	• Factors impacting decision-making • Concept of enquiry circle • Understanding arguments in business parlance
3	Ethics and Decisions	• Theories of ethics (Teleological, Deontological, Virtue Ethics, Conduct Ethics, Rights based, Utilitarianism, Hedonism, Egoism) • Concept of Moral reasoning

		• Role of ethics and values in Decision Making
4	Importance of purpose and context	• Role of Stakeholders in decision making .
5	Problem analysis best practices	• Root cause analysis • Identifying questions at the heart of a problem • Thinking checklist
6	Decision Implementation Techniques	• Developing intellectual virtues • Paul Elder's model (Intellectual humility, courage, empathy, integrity and confidence.
7	Barriers to Sound Reasoning	• Identifying barriers to Critical Thinking • Biases, prejudices, facts, opinions, assumptions. • Overcoming the obstacles
8	Comparing alternative solutions	• Ladder of Inference • Meta-thinking • Perspectives

Activities Related to Skill Development and Employability

1. Organizational decision making: Case studies
2. Importance of decision making at workplace: Discussion
3. Root cause analysis: HBR Case studies and discussions
4. Developing intellectual traits: Discussions
5. Identifying barriers to critical thinking: HBR cases and discussion
6. Identifying questions at the heart of the problem: Discussion

Course Code: CC2105
Credit: 2
Course Instructors: Mr. Promit Basu

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General Description:
The course on Design Thinking is aimed at developing a basic understanding of collaborative innovation seeking approach to systems, structures, innovation areas and problem solving and solutions development to business challenges. Students will be introduced to the basics of design thinking, processes, approaches, thinking tools and methodologies along with case studies and design thinking-led solution oriented models.

Course Learning objectives:
1. To have an understanding of design thinking methodology and its application in businesses.
2. Convergent, divergent and Visual thinking in context of design thinking.
3. Empathy and ethnography in the context of design thinking. and design thinking resource.
4. Exposure to diverse design thinking approaches (IDEO: Human Centered Design, D School, Double Diamond).
5. Visualization, mind mapping, value chain, rapid prototyping.

Course Structure:
The course structure would consider and emphasize on the following topics:
• Background • Concept note explanation and preparation • Hands on process • Design Thinking models • Design Thinking Resource • Application on contextual models • Prototypes and learning launch.

Reading Material:
- Change by Design by Tim Brown.
- The Design Thinking Playbook by Michael Lewrick.
- The Design of Business by Roger Martin.
- Thinking Design. Author by S Balaram.
- Human Centered Design Toolkit by IDEO 2009.
- The Design of Everyday Things by Don Norman.

Evaluation Scheme:

Understanding (MM: 25)	Process & Management (MM: 25)	Communication (MM: 25)	Overall Output (MM: 25)

Activities Related to Skill Development and Employability

Assignment/ Case Study:

Case Analysis : Indian Context and Design: The Eames India Report and specific requirements of India in terms of design thinking and action.

Case Analysis : Thinking Design – S. Balaram - Analysis of unique Indian products and the design thinking that led to their inception to solve grassroot level as well as urban problems through design intervention. Specific stress was given on the thinking process, Indian collective unconscious, and the thinking skills that consider the scenario and take into account the abstract as well as the concrete in order to result in product solutions for daily life.

Assignment on Mind mapping: Skill-based assignment to use design thinking in specifying the problems clusters and segregating them for finding effective and targeted solutions.

Assignment on Design solution – Scenario study : Skill based assignment to find unique solutions for problem clusters that students face in their daily lives.

JK Lakshmipat University, Jaipur
Institute of Management
MBA (2018-20)
Academic Year- 2019-20
Creativity in Business

Course Code: CC2106
Credits: 2
Trimester: V

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Course Description:
"Creativity is bringing into existence an idea that is new to you." Carl Kinsey Goman.
In an ever changing business environment, it is important to be creative. This elective will look at ways in which creativity can be harnessed to create better businesses. This will be done through interactive sessions, presentations and short assignments.

Topics to be Covered:
1. Introduction to Creativity
2. Your creativity quotient. How to assess how creative one is.
3. Creative thinking processes.
4. Blocks to creativity, identifying them and try getting over them with the understanding of Block busters.
5. Techniques for Idea generation. Examples of using them.
6. Group Creativity. Dynamics of ideating in a group. PPR technique.
7. Case studies. Milk Basket, Amazon.
8. Design thinking : What's it and how does one engage with it to get innovative.
9. Problem perception. Mapping the pain points. Understanding them. Developing empathy.
10. Creative marketing case studies. Indigo airlines.
11. Start up Creativity. Case studies.
12. Systems thinking for problem solving.
13. Final Assignment.

Activities Related to Skill Development and Employability

Project Brief: The final assignment was a group project, where students had to understand an existing business, identify problems in the customer experience in different stages : pre-service, service delivery and post delivery. One group worked on Online business (Flipkart) and two groups worked on Offline businesses: Café Coffee Day and Bata.

Course Title –Fundamentals of Communication- 2 credits (2-0-1)
Course Code- CC2111
Program- MBA (2019-21)
Trimester- I
Course Instructor: Dr. Vijaylakshmi

Course Description

This course provides an introduction to the importance of effective communication, the consequences of poor communication, and the different elements of verbal and non-verbal communication. Students learn about, and enhance, the components of communication: kinesics, paralanguage (voice) and language.

Learning Outcomes

The students will be able to:

- Identify different cultural differences and their impact on communication.
- Compose grammatically correct sentences and paragraphs.
- Deliver effective oral presentations following appropriate kinesics and paralinguistic features.
- Identify impact of cultural differences on communication.
- Apply appropriate communication skills across settings, purposes, and audiences.

   Topics to be Covered

1. Nature and importance of communication
2. Mehrabian's Communication Theory
3. Ethos, Pathos, Logos: The three pillars of persuasive communication
4. English as a Foreign Language
5. Consequences of poor communication
6. Writing Strategy
7. Basic of Effective Presentation
8. Influence of culture on communication
9. Formats of Public speaking (oral narration, conversational skills)
10. Common Errors in English

Activities Related to Skill Development and Employability

1. Understanding the nature and importance of communication: Discussion
2. Consequences of poor communication: Case studies
3. English as a foreign language: Discussion

4. Communication and Culture: Debate
5. Effective Presentation: Conducting events on electronic platforms

6. Conversational Skills: Role plays
7. The Writing Strategy: Practice exercises and discussions
8. Ethos, Pathos, Logos: The three pillars of persuasive communication: Conducting events on social platforms
9. Formats of Public speaking: presentations

Critical Thinking and Storytelling

Course Code: CC2112
Semester: 2
Credit: 2
L-T-P: 2-0-1
Course instructor: Ms Shraddha Bharatiya

Course Description:
The modern world offers confounding opinions and choices that need to be navigated judiciously. This course explores frameworks and processes to critically examine narratives, reconstruct them, and craft well-reasoned stories that can be told using impactful communication.

Course Outcomes:
The students will be able to:
- Formulate intelligent questions to investigate.
- Evaluate information and evidence for correctness, consistency, and relevance.
- Compose well-structured and well-reasoned arguments.
- Articulate and evaluate the impact of narratives.
- Distinguish between facts, assumptions and opinion.

Topics to be Covered:
Introduction to Critical Thinking- Definitions of Critical Thinking, its applications and the methods to think critically. Paul & Elder model will be used.

Importance of questioning-The key to critical thinking is the ability to formulate intelligent questions. Students will be able to create, improve and prioritize their questions. They will be able to use different types of question by using Bloom's taxonomy to understand the root of any situation, problem or subject.

Examine data Critically-Students will be able to filter information, separate fact from opinion, identify cognitive biases and become aware of the ladder of inference. They will also be taught to conduct responsible research and basics of bibliography and citation.

Construct and reconstruct argument- Students will be taught to construct arguments with sound reasoning. They will be able to support their claims and opinions with compelling data and facts, and present well-informed arguments.

Building a compelling Narrative- Stories that we create and narrate influence how we see ourselves and our association with others. The students will be able to observe, think, create and narrate their stories in an effective manner.

References:

- **Critical Thinking: An Introduction.** Author : Alec Fisher. Published by Cambridge
- **Critical Thinking: Its Definition and Assessment.** Author : Alec Fisher and Michael Scriven. Published by University of East Anglia,Centre for Research in Critical Thinking (1 November 1997)
- **The Art of Thinking Clearly.** Author : Rolf Dobelli. Published by Hodder And Stoughton; Latest Edition edition (28 March 2013
- **Critical Thinking Skills: Developing Effective Analysis and Argument.**
- Author :Stella Cottrell. Published by Palgrave Macmillan; Second edition (20 May 2011
- **Thinking Skills: Critical Thinking and Problem Solving.** Author : John Butterworth & Geoff Thwaites. Published by Cambridge University Press; 2 edition (18 April 2013)

Note: Latest edition of the readings will be used.

Evaluation Scheme:

Sr. No	Specifications	Weightage
01	Assignment	30
02	Class Participation	20
03	Theory Exam	30
04	Report-1	20
	Total (100)	**100**

Activities Related to Skill Development and Employability

In Class Activity: -1- Using Ladder of Inference coming to a well-reasoned inference/Decision

2-Analyzing of argument, using famous speeches.

3-Critiquing news articles & Op-ed.

4-Techniques of how to conduct credible research.

Assignment: - 1-Group presentation using various critical thinking tools

2-Writing argumentative essay

3- Analyzing Case Studies using ladder of inference

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JK Lakshmipat University, Jaipur
Institute of Management
Post Graduate Diploma in Analysis and Research
Academic Year- 2019-20
Cognition & Critical Thinking

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Course Code: CC2170
Credit: 2
Semester: I

Course Description

The course aims to provide a macro level understanding of the principles critical thinking and improve cognitive behavior in the context of sustainability.

Course Learning Outcomes:

The course has been designed to achieve the following outcomes:

1. Understand the principles of sustainability and how they apply to business / life
2. Appreciate the elements of critical thinking and how they help in creative problem solving
3. Understand the importance of raising vital questions and importance of articulation to receive accurate data
4. Understand how to translate data into useful and well-reasoned information
5. Apply the elements of critical thinking to build more sustainable business and systems

Tentative Session Plan:

The course will have total of 20 contact hours.

Topic	Description	Relevance to Cognitive Skills and Critical Thinking	Number of hours
Introduction to Sustainability	Three pillars of Sustainability. SDGs and how they apply to organizations and individuals. Importance of being sustainable in work and life.	Introductory session	2
Sustainability and Behavior Change	Key elements of conservation psychology and behavior change strategies as well as community engagement tools that are designed to produce results.	Critical thinking / Elements of Thought (Reasoning) / Developing Intellectual Standards	2
Measurement of change	Theory of Change, Logic model framework, essentials of measuring sustainability and social change. Difference between Outputs and Outcomes. How to question intelligently? Understanding implications and assumptions. Understanding the difference between Efficiency and Effective-	Critical Thinking / Examine data critically / Elements of Reasoning	6

	ness		
Critical Thinking Model	Paul Elder Critical Thinking Model and its application to sustainability practices	Critical thinking Model and application to business and everyday life	4
Application of Intellectual traits to solve critical problems (related to the three pillars of sustainability)	Case studies where Humility, Empathy, Integrity, Courage, Perseverance, Confidence and Fair-mindedness helped solve issues	Application of Intellectual Traits to solve practical problems in business and everyday life	6

Reading Material:
1. https://open.umn.edu/opentextbooks/textbooks/sustainability-a-comprehensive-foundation
2. https://www.academia.edu/36997171/Critical_Thinking_for_Global_Peace_A_key_for_Sust ainable_Development
3. http://samples.jbpub.com/9781449645311/14867_ch01_chiras.pdf
4. Courtice, P. 'The critical link: strategy and sustainability in leadership development', in CPSL
   (2012) The Future in Practice – the State of Sustainability Leadership, University of Cambridge Programme for Sustainability Leadership, Cambridge.
   http://digital.edition- on.net/links/6431_the_future_in_practice_cpsl.asp
5. Gore, A (2013) *The Future*, W.H. Allen, New York.
6. SDSN (2103) An Action Agenda for Sustainable Development – Report for the UN Secretary-
   General, Leadership Council of the Sustainable Development Leadership Council.
   http://unsdsn.org/resources/publications/an-action-agenda-for-sustainable-development/

Assessment Scheme:
Each student will be assessed on class participation and one written assignment/ presentation. The aim is to understand comprehension level of students on the topics taught so far and their ability to apply.

Sr. No	Specifications	Marks
01	Presentation	60
02	Class Participation	40
	Total (100)	**100**

Programme –UMass- 2019-20
Credit -3
Course Name :Critical Thinking for Developing Perspectives
Course Code:CC2171
Faculty: Richa Mishra

Course Description

The ability to clearly reason through problems and to present arguments in a logical, and compelling way, have become a key skill for survival in today's world. In this course, students will learn to dissect and evaluate the components of argument. Students will learn to raise vital questions, think from multiple perspectives, become aware of their biases, gather and assess information and come to a well-reasoned position.

Learning Outcomes:

The students will be able to:

- Explain the relevance of critical thinking
- Formulate significant questions for inquiry.
- Evaluate information and evidence for correctness, consistency, and relevance.
- Compose well-structured and well-reasoned arguments.
- Recognize their own beliefs, biases, claims and assumptions by viewing the issues from multiple perspectives

Reference Books:
1. Moore, B. N., & Parker, R. (2009). Critical thinking. Boston, MA: McGraw-Hill. eBook
2. Sinnott-Armstrong, W., & Fogelin, R. J. (2014). Cengage Advantage Books: Understanding Arguments: An Introduction to Informal Logic. Cengage Learning eBook

Pedagogy

This course will be an amalgamation of lectures and activity based learning i.e. films, group discussions, debates, and case studies. The objective behind utilizing activity based learning is for the learners to have a more hands on experience.

Topics to be Covered

I. **Introduction to the concept of critical thinking: (6 hours)**

- *Evolution of the concept: Philosophy and Cognitive psychology as origins of critical thinking*
- *Revisit Paul-Elder Critical Thinking Framework*

II. **Questioning for Critical Thinking (6 hours)**

- *Importance of questioning*
- *Models of Questioning: Questioning Circles Model, Christenbury and Kelly (1983), Webb's Depth of Knowledge (1997). Elder & Paul (2007). Socratic Questioning Taxonomy.*

III. Understanding Arguments (18 hours)

The sessions under this topic will make use of the context of current media, social and political debates to comprehend the topics.

- *Meaning and Elements of Reasoning*
- *Formation of Arguments: Premise and Conclusion*
- *Inductive –Deductive reasoning*: *Difference between valid and invalid arguments/ between sound and unsound arguments.*
- *Evaluating Arguments: Examining data and information critically*
- *Cognitive Biases and Fallacies: Distinguishing between fact and opinion*

Readings/Video(s)

1. The Evolution of Critical Thinking (Research project by Barba Albers, Washington, State University ,2004
2. Bowker, M. H., & Fazioli, K. P. (2016). Rethinking Critical Thinking: A Relational and Contextual Approach. Pedagogy and the Human Sciences, 6(1), 1-26.
3. Bauer, N. J. (1991). Dewey and Schon: An Analysis of Reflective Thinking.
4. Nappi, J. S. (2017). The importance of questioning in developing critical thinking skills. Delta Kappa Gamma Bulletin, 84(1), 30.
5. https://cpb-us e1.wpmucdn.com/cobblearning.net/dist/6/3101/files/2018/05/The-Importance-of-Questioning-2aqkc5j.pdfBloom, B. S. (1956). Taxonomy of educational objectives. Vol. 1: Cognitive domain. New York: McKay, 20-24.
6. Paul, R., & Binker, A. J. A. (1990). Socratic questioning. Critical thinking. Center for Critical Thinking and Moral Critique. http://www.criticalthinking.org/files/SocraticQuestioning2006.pdf
7. The Art of Asking Questions | Dan Moulthrop | TEDxSHHS https://www.youtube.com/watch?v=hZSY0PssqH0
8. Analyzing the argument - Part 1 of 2 (Video)

Evaluation Scheme

Sr. No	Specifications	Weightage (in percentage)
01	**Class Participation**	30
02	**Theory Exam**	30
03	**Report & Presentation**	40
	Total	100

Activities Related to Skill Development and Employability

In Class Activity: -1- Using Ladder of Inference coming to a well-reasoned inference/Decision.

2-Discussion on topics such as CAA/NRC from the perspectives of different stake holders.

3-Critiquing news articles & Op-ed.

4-Techniques of how to conduct credible research.

Assignment: - 1-Analysing of a topic from multiple perspective (Global, National and Local). Presenting the perspectives and writing research paper.

2-Writing argumentative essay.

Perspectives on Contemporary Issues

Course Code: CC2201
Semester: 4
Credit: 2
L-T-P: 2-0-1
Course Instructor: Ms. Shraddha Bharatiya

Course Description:
In an era of globalization, there is an increasing need for the youth to be able to empathize with others, value diverse perspectives and cultures and understand how events around the world are intertwined. Global issues revolve around social, economic and environmental factors which ultimately add to the interconnectedness of countries. In this course, students will employ key critical thinking concepts to analyze contemporary issues from multiple perspectives. They will explore the impact at micro and macro levels.

Course Outcomes:
The students will be able to:
- Identify different perspectives objectively.
- Explain interconnectedness of the issues and their impact at micro and macro levels.
- Recognize their own beliefs, biases, claims and assumptions.
- Evaluate sources, argue and defend effectively.

Teaching Pedagogy:
This course will be an amalgamation of brief lectures and activity based learning i.e. films, group discussions, debates, and case studies. The objective behind utilizing activity based learning is for the learners to have a more hands on experience. This will encourage and ensure active participation and longer retention. The idea is for learners to feel engaged and also express their views in a conducive environment. The takeaway from this course will not only be awareness about certain issues but equipping learners with skills of decision making and reasoning in alignment with certain global contexts.

Course Content:

Introduction to contemporary perspective	Introduction to the course, skills and the topics. Revision of critical thinking.
Research, analysis & evaluation of a topic from local, national and global perspectives	**Climate Change and Sustainability** *Understanding the magnitude of the issue, its impact and future challenges.* *How we can meet our current needs without diminishing the quality of the environment or reducing the capacity of future generations to meet their own needs.*
	Globalization *With increasing development throughout the world, the focus of this theme will be on the impact of globalization in India.*
	Nationalist Movement *There is a sense that excesses of globalization have created an identity crisis across the world, facilitating the rise of nationalist movements. Rising nationalism is seen everywhere, from the election of Donald Trump to Brexit, the success of far-right parties in Italian, German and Austrian elections in 2017 and 2018, nationalism appears to be on rise globally. We will look at its reasons and implication.*
	Technology *Impact of unprecedented technological growth, challenges and opportunities.*
	Social justice and human rights *An understanding of the impact of inequality and discrimination, the importance of standing up for our own rights and our responsibility to respect the rights of others*

Evaluation Scheme:

Sr. No	Specifications	Weightage
01	Assignment	20
02	Class Participation	20
03	Theory Exam	15
04	Theory Exam	25
05	Report-1	20

	Total (100)	100

Readings

1. Harari, Y. N. (2019). *21 Lessons for the 21st century*. Toronto: CELA.
2. GUHA, R. (2019). *India After Gandhi: the history of the world's largest democracy*. NEW YORK: ECCO.
3. Rosling, H., Rosling, O., & Rönnlund Anna Rosling. (2019). *Factfulness: ten reasons were wrong about the world -* and why things are better than you think. London: Sceptre.
4. Kolbert, E.(2015). *The Sixth Extinction: An unnatural History.* Bloomsbury

Activities Related to Skill Development and Employability

In-Class Activity-1- Discussions & Debate on Issues such as Globalization and its after effects
2-Oxford Style debate
3- Block and Tackle debate
4-Panel Discussion

Assignment: - Group Presentation & Report – Research on a topics from multiple angles such as political, economic, social, technological, environmental and legal

CS1106

Course Title and Code : Database Systems; CS1106	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	Sem IV(2018-2022)

Course Objective: This course introduces the fundamental concepts of database systems and modelling of real world problems using ER-model /UML and to convert ER model into relational model. This course helps students to work with Database management system to develop and manage database. This course helps students to implement SQL and to normalize a given database. It also includes transaction management and methods of concurrency control.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Outline database system components and their functions
2. Model the real world systems from the given requirements specification using Entity Relationship Diagrams/Unified Modelling Language
3. Convert the ER model into a relational logical schema using various mapping algorithms
4. Apply SQL commands to define, query and manipulate a relational database
5. Apply SQL coding standards to embed SQL in an application program
6. Write relational algebra expressions and optimize the same for given query
7. Convert relational algebra expressions into SQL commands and vice versa
8. Normalize a given database up to Boyce Codd Normal Form (BCNF) based on identified keys and functional dependencies
9. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
10. Determine the deadlock in transaction-processing system. Apply the method of deadlock avoidance and deadlock detection and recovery
11. Apply various concurrency control protocol like two phase locking, timestamping and the method of log base recovery in case of failure

Prerequisites	**Nil**
Evaluation Scheme	

Sr. No	Specifications	Marks
01	Attendance	Nil
02	Assignment	Nil

03	Class Participation	Nil
04	Quiz	Nil
05	Theory Exam-I	10
06	Theory Exam-II	15
07	Theory Exam-III	25
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	20
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation I (Continuous)	10
15	Lab Evaluation II	20
16	Course portfolio	Nil
	Total (100)	**100**
Evaluation Scheme for Retest		
1	Theory Exam-III	25
2	Lab Evaluation II	20
	Total	**45**

Syllabus (Theory)

UNIT I: Basic Concepts: data, database, database systems, database management systems, instance, schema, Database Applications, Purpose and Advantages of Database Management System (over file systems); Dynamic web applications, Database design standards, Web design standards;
View of Data (Data Abstraction, Data Models), Database Languages (DML, DDL), Relational Databases (Tables, DML, DDL), Data Storage and Querying (Components, Storage Manager, Query Processor), Database Architecture, Database User and Administrators

UNIT II: Design Phases, Design Alternatives (Major Pitfalls), Entity Relational Model (Entity Sets, Relationship Sets, Attributes), Constraints (Mapping Cardinalities, Keys, Participation Constraints), Entity Relationship Diagram, Weak Entity Set, Extended E-R features (Generalization, Specialization and Aggregation), E-R Notations, Examples of ERD

UNIT III: Features of Good Relational Design, Atomic Domain and First Normal Form, Decomposition Using Functional Dependency (Key and Functional Dependency, BCNF, 2NF, 3NF), Functional Decomposition Theory (Closure Set of

Functional Dependency with Armstrong Rules, Canonical Cover and Loseless Decomposition), Dependency Preservation, Comparison of 3NF and BCNF, Decomposition Using Multi-Valued Dependencies (Multi-Valued Dependency and 4 NF);

UNIT IV: Structure of Relational Databases (Basic Structure, Database Schema, Types of Keys), Fundamental Relational Algebra Operations (Select, Project, Union, Set Difference, Cartesian Product and Rename Operator), Additional Relational Algebra Operators (Set Intersection, Natural Join, Division Operator, Assignment Operator), Examples

UNIT V: (Transaction State, Basic Definitions, ACID Property), Implementation of Atomicity and Durability (Shadow Paging Concept), Concurrent Execution (Reasons of Concurrent Execution, Serial and Concurrent Schedule), Serializability (Conflict and View Serializability), Recoverability of Schedules (Recoverable Schedule and Cascade- less Schedule), Lock-based Protocol (Types of Lock and Deadlock Concept), Two-Phase Locking Protocol, Deadlock Handling (Deadlock Prevention Techniques like Wait-Die, Wound-Wait), Recovery of Deadlock (Selection of victim, Rollback, and Starvation), Insert and Delete Operations (Delete, Insertion, Phantom Phenomenon), Transaction Failure, Storage Structure and Transaction Log and Log-Based Recovery (Deferred Database Modification, Immediate Database Modification, Checkpoints).

Syllabus (Practical)

Introduction to SQL, Advantages of using SQL, SQL concepts and tools, The generic SQL Sentence Construct, Create Table, Insertion of Data into tables, Viewing data in the tables, Delete Operations, Update Operations, Modifying the structure of tables, Renaming Tables, Destroying Tables, Examining Objects created by a User, Arithmetic Operators, Logical Operators, Range Searching, Pattern Matching, Column Alias, Aggregate Functions, Scalar Functions, Date Conversion Functions, Data Constraints, Defining integrity constraints in the alter table command, Dropping integrity constraints in the alter table command, Default Value Concept, Grouping Data from tables, Manipulating dates in SQL, Subqueries, Joins, Union, Intersect and Minus Clause, Index, View, Sequence
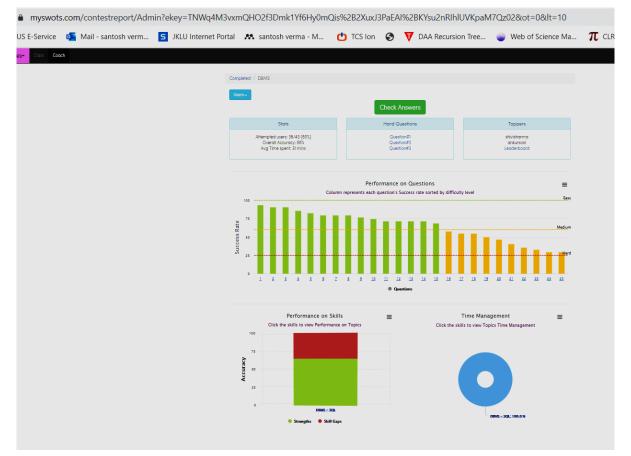
Reference Books:

1. Silberschatz, Abraham, Henry F. Korth, and Shashank Sudarshan. *Database system concepts*. Vol. 4. New York: McGraw-Hill, 1997.

2. Date, Christopher John. *An introduction to database systems*. Pearson Education India, 2006.

3. Singh, Shio Kumar. *Database systems: Concepts, design and applications*. Pearson Education India, 2011.

4. Elmasri, Ramez, and Shamkant Navathe. *Fundamentals of database systems*. Addison-Wesley Publishing Company, 2010.

5. Coronel, Carlos, and Steven Morris. *Database systems: design, implementation, & management*. Cengage Learning, 2016.

Activities Related to Skill Development and Employability

Quiz: Each student has to participate in online quiz on mySwots.com. Sample images of quiz dashboard, statistics, and performance metrics are presented below.

DBMS on 4/18/2020 (IST)
Questions: 25 | Time: 40 mins
Time spent: 0-15% 16-30% 31-50%

Excel PDF CSV Print

Show 10 entries   Search:

Index	User	Correct/Total	Status	Time Used	Start Time	End Time
24	tanishaupadhyay	8/25	Completed	34 mins and 2 secs	12:00:58 PM	12:35:24 PM
29	shivisharma	23/25	Completed	39 mins and 35 secs	12:00:33 PM	12:40:57 PM
32	ankursoni	23/25	Completed	38 mins and 29 secs	12:00:17 PM	12:41:48 PM
10	shreyasingh	21/25	Completed	39 mins and 51 secs	12:10:16 PM	12:50:30 PM
36	mohilgupta	21/25	Completed	37 mins and 53 secs	12:00:03 PM	12:52:53 PM
18	adityamathur	20/25	Completed	23 mins and 28 secs	12:02:11 PM	12:26:31 PM
31	rishabhsinghal	20/25	Completed	38 mins and 28 secs	12:00:18 PM	12:40:03 PM
35	adityarathore18	20/25	Completed	38 mins and 15 secs	12:00:10 PM	12:41:17 PM
21	samyakbhagat	19/25	Completed	37 mins and 7 secs	12:01:42 PM	12:40:06 PM
22	kritikasharma	19/25	Completed	36 mins and 49 secs	12:01:06 PM	12:39:30 PM

Showing 1 to 10 of 36 entries

Previous 1 2 3 4 Next

Quiz Activity | mySWOTs

Index	User	Total(20)	Status	Time Used	Start Time	End Time
1	piyushtolumbia	8	Completed	8 mins and 55 secs	12:47:28 PM	12:57:49 PM
2	vanshikasharma	9	Completed	15 mins and 50 secs	12:41:14 PM	12:57:31 PM
3	akshatawasthi	13	Completed	27 mins and 25 secs	12:28:13 PM	12:57:15 PM
4	madhavyadav	14	Completed	24 mins and 52 secs	12:17:48 PM	12:44:07 PM
5	yashmishra	12	Completed	21 mins and 41 secs	12:15:04 PM	12:38:12 PM
6	avindhyashandlya	10	Completed	15 mins and 21 secs	12:12:50 PM	12:29:49 PM
7	vardansharma	14	Completed	30 mins and 58 secs	12:11:41 PM	12:43:52 PM
8	sureshpatel	14	Completed	26 mins and 46 secs	12:11:34 PM	12:40:11 PM
9	harshgauttam	14	Completed	20 mins and 55 secs	12:10:31 PM	12:42:00 PM
10	shreyasingh	17	Completed	39 mins and 51 secs	12:10:16 PM	12:50:30 PM
11	sanyuktatanwar	11	Completed	39 mins and 42 secs	12:05:33 PM	12:56:05 PM
12	nikitakhoj	14	Completed	35 mins and 39 secs	12:04:55 PM	12:41:16 PM
13	deekshagupta	13	Completed	28 mins and 29 secs	12:03:50 PM	12:32:18 PM
14	harshitsinghal	10	Completed	28 mins and 56 secs	12:03:43 PM	12:34:09 PM
15	kunalsharma18	14	Completed	28 mins and 35 secs	12:03:12 PM	12:35:56 PM
16	sanketsharma	14	Completed	33 mins and 3 secs	12:02:58 PM	12:42:31 PM
17	Harsh Udai	14	Completed	35 mins and 12 secs	12:02:16 PM	12:42:44 PM
18	adityamathur	16	Completed	23 mins and 28 secs	12:02:11 PM	12:26:31 PM
19	raghavsoni	14	Completed	32 mins and 46 secs	12:02:00 PM	12:36:41 PM
20	aishwaryadityajha	14	Completed	39 mins and 14 secs	12:01:49 PM	12:42:29 PM
21	samyakbhagat	15	Completed	37 mins and 7 secs	12:01:42 PM	12:40:06 PM

Project Presentations and Viva:

| **CS1106 (Schedule of Project Presentation& Viva)** |
Group No.	Roll No.	Project	Date and Time
1	Pradhuman Singh Rathore(11)	Title: Blood Donation Management System Front End: HTML, CSS, JavaScript, Java Back End: MySql	Date: 21-05-2020
	Naveen Pratap Singh Rathore(9)		Time: 12PM-1PM
	Piyush Tolumbia(25)		
	Vanshika Sharma(120)		
2	Deeksha Gupta(CSE126)	Title:Housing Management System Desc: Front End: HTML, Css, JavaScript Back end : MySQL, PHP	Date: 20-05-2020
	Ankur Soni(CSE125)		Time: 1PM-2PM
	Manan Pareek(CSE110)		
	Mehul Khandelwal(CSE127)		
3	Kritika Sharma (CSE108)	Title:Intern Manager Desc: Front End: Python(Tkinter) Back end : Python(SQLite)	Date: 20-05-2020
	Shivi Sharma (CSE118)		Time: 1PM-2PM
	Aditya Mathur (CSE102)		
	Kunal Sharma (CSE109)		
4	Rishabh Singhal(cse013)	Title:Insurance Company Front End :Html,css,java script Back end : MY SQL ,PHP	Date: 20-05-2020
	Sushil Dubey(cse016)		Time: 1PM-2PM
	Suresh Patel(cse015)		
5	Harsh Udai (CSE106)	Title: Code Collector/manager (Just Like GITHUB) Frontend: HTML, CSS(Bootstrap,Materialize), JAVASCRIPT , JQUERY. BACKEND: PHP,MY SQL	Date: 21-05-2020
	Yash Goyal (CSE121)		Time: 12PM-1PM
	Varun Rawat (CSE018)		
	Yash Mishra (CSE019)		
6	Harshit Singhal(CSE107)	Title : Item Searching System for customers in Supermarket	Date: 21-05-2020
	Aayush Sharma(CSE101)	Front End: HTML, CSS	Time: 12PM-1PM
	Harshit Sharma(CSE124)	Backend: php and MySQL	
7	CSE028(Nikita)	Title - Musicplayer Frontend - Javascript(with JQuery), HTML Backend - Php and MySQL	Date: 23-05-2020
	CSE022(Aditya Rathore)		Time: 12PM-1PM
	CSE029(Mohil Gupta)		
8	Aishwary aditya jha(CSE123)	Title: Banking management system	Date: 23-05-2020
	Saksham Bairathi(CSE114)	Front end: JavaScript,Java,HTML, CSS	Time: 12PM-1PM
	Shreya Singh(CSE119)	Back-end: JSP, MySql	
	Sanket Sharma(CSE116)		
9	sanyukta tanwar (cse026)	Title: Helpenzo ; Front end:HTML,CSS, Java Script ; Backend:php,MySQL	Date: 27-05-2020
	gauranshi seth (cse004)		Time: 1PM-2PM
	tanisha upadhyay(cse151)		
10	Samyak Bhagat (CSE030)	Title:- Supermarket inventory and bill management system Front end:JAVA,Swing, AWT ; Backend:MySQL	Date: 27-05-2020
	Harsh Gautam(CSE021)		Time: 1PM-2PM
	Raghav Soni(CSE027)		
	Avindhya Shandlya(CSE023)		
11	Vardan Sharma(CSE020)	Title : College placement management system	Date: 23-05-2020
	Madhav Yadav(CSE006)	Front end : Java	Time: 12PM-1PM
	Akshat Awasthi(CSE024)	Back end : Mysql	

Project Report Format:

Title page

TABLE OF CONTENTS

Chapter1. Introduction

The introduction part will include the brief introduction about the project to be developed, Need for the new system, Presently Available Systems for the same, About the technology used, Any special technical terms about the project.

Chapter2. Analysis and Requirement Specification

Purpose, Scope, Functional requirements, Non Functional requirements, Assumptions.

Chapter3. Design of the Project

ER diagram, Schema diagram, Database Dictionary (normalized tables should be there).

Here use some tools such as star UML etc. to draw ER, Schema diagram.

Chapter4. Implementation

Chapter5. Snapshots

Chapter6. Conclusion

References: Here specify the description of the study material referred for the development of the project.

> **Line Spacing** : 1.5 Line
> **Font** : Times New Roman
> **Size** : 12 point

Format: When writing a reference list in the Harvard style you need to remember the following:
• Arrange your list alphabetically according to surname and Start the reference list on a new page.
• Cite the references in the text in brackets as (Surname, Year); e.g. (Watson, 2007)
• Use italics for title of journals, URL and book title

SPECIFICATIONS FOR REPORTS

1. The Report shall be computer typed and printed on A4 size paper.

   Fonts:

   Regular text – Times Roman 12 pts.
   Chapter heading- Times Roman 16 pts., bold print and all capitals
   Section headings- Times Roman 12 pts., bold print and all capitals
   Subsection headings – Times Roman 12 pts., bold print and leading capitals i.e. only first letter in each word should be in capital. Single line spacing should be used for typing the general text.

2. The Report should be typed neatly only on one side of the paper with 1.5 spacing on an A4 size paper. The margins should be: Left - 1.25", Right - 1", Top and Bottom - 0.75".

3. In the Report, the title page [Refer sample sheet] should be given first. This should be followed by abstract, list of tables, list of figures, table of contents, chapters.

4. The caption for Figure must be given at the BOTTOM of the Fig. and Caption for the Table must be given at the TOP of the Table.

5. **Header:**   Title- CSE-IET, JKLU JAIPUR

        Font **-**Right hand **-** Times New Roman
           Size **-** 12 point

- **No header should be applied to cover page, front page, abstract, list of tables/figures, table of contents.**

   Footer: Title-left hand- Project title
       Right hand-page no (only integer)
      Font **-** Times New Roman
       Size **-** 12 point

6. Soft copy of project report is required.

PROJECT TITLE (22pt. bold)

SUBMITTED BY

NAME OF STUDENTS (14pt)
ROLL NO……………..

JKLU Logo

**DEPARTMENT OF COMPUTER SCIENCE & ENGG.
INSTITUTE OF ENGINEERING & TECHNOLOGY
JK LAKSHMIPAT UNIVERSITY, JAIPUR (16pt. bold)
April, 2020**

CS1110 Artificial Intelligence and Machine Learning

Course Title and Code: Artificial Intelligence and Machine Learning: CSE1110	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem VI (2017-2021)

Course Objective: This course introduces the fundamental concepts of artificial intelligence along with state-of-the machine learning algorithms. The course will cover the development of AI models to solve new as well as classical critical problems, and ML models to understand the real dataset to predict the future outcome. This course helps the students to pursue project related to AI and ML with real-world research problems.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.

2. Implement intelligent agents for making computers solve critical problems the way human beings do.

3. Analyze the usage of Game theory and role of heuristics for building Intelligent Agents.

4. Apply AI techniques in applications which involve perception, reasoning and learning.

5. Acquire the knowledge of real-world knowledge representation.

6. Identify machine learning techniques suitable for a given problem.

7. Interpret fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.

8. Use the standards and energy efficient ML algorithms.

9. Apply dimensionality reduction techniques.

10. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

11. Utilize state-of-the art algorithms of Machine Learning for building applications related to SDG goals.

Syllabus (Theory)

UNIT – I:Introduction to Artificial Intelligence, Intelligent Agents, Solving Problems by Searching, uninformed search, Informed search, Heuristics, Adversarial Search, Graph Pruning, Alpha-Beta Pruning, Min-Max Algorithm, Constraint Satisfaction Problems,

UNIT – II: First-Order Logic, Inference in First-Order Logic, Classical Planning, Planning and Acting in the Real World, Need of Representing and Reasoning Knowledge (Predicate, Prepositional and Fuzzy Logic)

UNIT – III: Introduction to Machine Learning, Supervised and Unsupervised Learning, Simple and Multiple Linear Regression, Support Vector Regression, Decision Tree Regression, Fitting dataset and evaluating their performance set, Evaluation of selected features, Model evaluation metrics, making predictions on new data

UNIT – IV:K-Nearest Neighbor, Support Vector Machine, Decision tree Classification Train/test split, Confusion matrix for evaluation, Class probabilities and class predictions, ROC Curve, Model evaluation metrics. Clustering; K-Means, Hierarchical Clustering, Introduction to artificial neural network

UNIT – V:Applications of Artificial Intelligence and Machine Learning; Usage of AI and ML Techniques for achieving sustainable practices, NIST and IEEE standards for AI and ML libraries, tools and techniques

Syllabus (Practical)

Informed (Heuristic) Search and Exploration, Greedy best first search, A* search, Memory bounded heuristic search, Heuristic functions, Adversarial Search, Games, The minimax algorithm, Alpha-Beta pruning, Games that include an Element of Chance Representing Knowledge; Classification; Clustering; Regression; Feature selection.
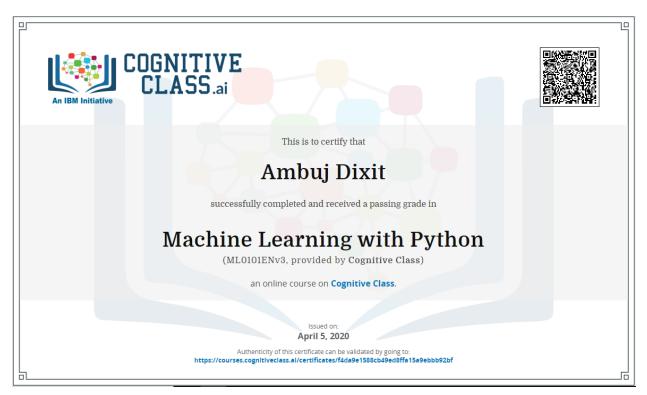
Activities Related to Skill Development and Employability

Each Student has developed two projects, one related to AI and another related to Machine Learning. Sample List of Projects.
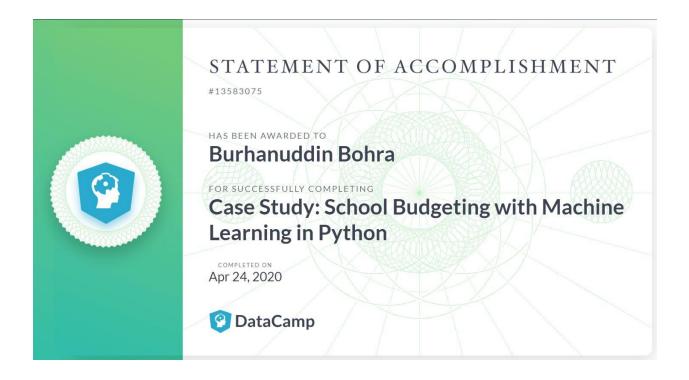
ML Project	AI Project
Job Recommendation System	Guess What
A review of covid-19	Bot Fruit hunt
Perception Quotient for Second hand apparel	Saade satti
Coronavirus Prediction	Finding Path in Maze
Querying Image Dataset: Machine Learning Approach	T Rex run, 2048 charm
Breast Cancer Detection	Titan Clash
Equation solver	Chop sticks
Epilectic Seizure Recognition	Coin It
Persona Identification: Techno-logical Approach	Space Invader

Persona Identification: Techno-logical Approach	Gin Rummy
Popularity prediciton of News article	Quoridor
Fake news detection.	T Rex
Bengaluru House Price Prediction	Hexawar
Bengaluru House Price Prediction	Connect-4 dots
Named Entity Processing on Historical Newspapers	Words Buzz
Analysis and clustering Restaurants in Jaipur	Stone, Paper, Scissor
Sentiment Analysis of Brand reputation	Sudoku Game
Heart Disease Prediciton	Box Game
Crime prediction	Tic Tac Toe with GUI
Credit Card Approval Prediction	Catch Fruit with gui
Housing Prices Prediction	T Rex run, sudoku with gui
Social Media Sentiment Analysis	Tic Tac Toe with GUI
Image Processing: Hindi(Vayanjan) Character Recognition	Corona Annilation
Analysis of Covid-19 dataset: Arima Approach	8 puzzle with GUI
Human activity recognition using smartphones	Ping Pong
TV Series Recommender System	Snake Game using A*
Object Recognition in Images	Stone, Paper, Scissor, thanos and snake

Certificates acquired on Coginitive.ai Platform.

Certificates acquired on Datacamp Platform.

Students were asked to work on Collaborative tools like Google Colab and Github widely accepted platforms in industry.

	Enrolment Number	Name	Github links
1	2016BTechCSE210	Prajjval govil	https://github.com/prajjval30/Ai-Lab
2	2017BTechCSE107	Pravesh Bisaria	https://github.com/pbisaria007
3	2017BTechCSE212	Hitika Ailani	https://github.com/hitika26/AI-LAB
4	2017BTechCSE015	Kaushiki Patel	https://github.com/Kaushiki121?tab=repositories
5	2017BTechCSE102	Diksha yadav	https://github.com/bittu2812?tab=repositories
6	2017BTechCSE108	Ritvik Tak	https://github.com/ritviktak
7	2017BTechCSE201	Aditya Tiwari	https://github.com/adityatiwari20

Sr.No.	Name	Title of Project	Google Co-Lab Link
1	Prajjval govil	Job Recomendation System	https://colab.research.google.com/drive/14crh0Vi3xXhnH0Uf0fVy2_LaN9zhmQto
2	Kaushiki Patel	A review of covid-19	https://colab.research.google.com/drive/1BQ3GhkoDaO9BGDIs2NcLU3UA0G587lGW
3	Aditya Tiwari	Perception Quotient for Second hand apparel	https://colab.research.google.com/drive/1Dw2xcko9pWiidZJRAbktcOUigQ-f8vVW
4	Harshal Jaju	Coronavirus Prediction	https://colab.research.google.com/drive/1vMydtFDAJlFzlem7-m3ZR79bLOa_azxv
5	Burhanuddin Bohra	Querying Image Dataset: Machine Learning Approach	https://colab.research.google.com/drive/1_QLzk_fzgWqfv-NL0RqJHNp5we_GM0iY
6	Akshat Sharma	Breast Cancer Detection	https://colab.research.google.com/drive/1Tu6u8JB2mUHsW2tK-tEowoN2XP_3Ec8m
7	Ashish k sharma	Equation solver	https://colab.research.google.com/drive/1bJruRBctNibl5OiTmXNlN8AjVFlRR_bN

CS1114: Advanced Data Structures and Algorithms

Course Title and Code **CS1114**: Advanced Data Structures and Algorithms	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech. Odd Sem (VII)

Course Objective-

- The course aims to develop deeper understanding about algorithm design paradigms and advanced data structures for solving complex algorithmic problems.

Learning Outcome:
On successful completion of this course, the students should be able to:

- Argue the correctness of algorithms using inductive proofs and loop invariants.
- Analyse algorithms using amortized analysis, including the accounting method and the potential method, as required.
- Write program to solve algorithmic problems using divide-and-conquer paradigm.
- Write program to solve algorithmic problems using dynamic-programming paradigm.
- Implement variants of self-balancing tree.
- Analyse, implement and use heap structures.
- Analyse, implement and use hashing techniques.
- Apply and implement the disjoint set data structures to solve problems modelled by graph.
- Evaluate and apply appropriate energy efficient algorithmic design technique for solving complex algorithmic problem.

Prerequisites		**Nil**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignments	20
03	Class Participation	Nil
04	Quiz (4)	20
05	Theory Exam	Nil
06	Theory Exam	10
07	Theory Exam (End-Term)	20
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project-1	Nil
12	Project-2	Nil
13	Project-3	Nil
14	Lab Evaluation1	15
15	Lab Evaluation2 (End-Term)	15
16	Course portfolio	Nil
	Total (100)	**100**

Retest

1	Quiz	20
2	Theory Exam (End-Term)	20

Syllabus (Theory)

Unit 1: Amortized Analysis: Aggregate, Accounting and Potential Method, Dynamic tables, **External Sorting**: Introduction to external sorting. Selection trees & k-way merging. Run generation. Optimal merging of runs.

Unit 2: Trees Variants: B Tree (2-3/2-3-4 Tree), RB Tree, Optimal Binary Search Tree, Splay tree, AA-Tree, Treap. **Indexed Tree**: T-tree, Queaps

Unit 3: String Matching Algorithms: Naïve, Rabin Carp, Knuth Morris Prat, and Boyer Moore. **String Processing Data Structures**: Rope, Tries, Suffix Tree, **Disjoint Set Data Structures:** Disjoint-set operations, representation of disjoint sets, Disjoint-set forests

Unit 4: Heaps: Binomial Heap, Fibonacci Heap, Pairing heap, Beap, Leftist tree, **Space partitioning tree**: Binary space partitioning, KD tree, Quad tree, Interval Tree, Segment Tree, Priority Search Tree.

Unit 5: Hashes: Introduction, Perfect hash function - Cuckoo hashing, Coalesced hashing, Universal Hashing. **Applications**: Searching, Memory Indexing, Computer Graphics, Image Data Structures, Computational Biology.

Syllabus (Practical)

1. Write a program in C to sort a small sequence using recursive merge sort algorithm.
2. Write a program in C to sort a small sequence using iterative merge sort algorithm.
3. Write a program in C to implement a K-way merge sort for external sorting of divide conquer and combine approach. Analyze and compare the complexity of it with any other sorting technique using asymptotic and amortized analysis.
4. Write a program in C to check if a binary tree is subtree of another binary tree.
5. Write a program in C to implement a BST with menu driven operations using array/linked list.
6. Write a program in C/C++ to implement a Splay tree for 20 user defined integers. Search for a specific key and display the preorder traversal on splay tree to see the search effect on self-balancing BST.
7. Write a program in C/C++ to implement Rope data structure most widely used for long string concatenation efficiently.
8. Write a program in C to search a pattern P in a text T using Boyer Moore pattern matching algorithm.
9. Write a program to implement a suffix tree for pattern matching, use the same pattern P and text T as in question 8.

10. Write a program in C++ to implement KD tree and search the minimum in tree. Compare the running time complexity with minimum search in BST of similar elements.
11. Use C++/Python STL to implement Hash/Map/Dictionary for optimal searching.

Text Books:

1. Samet, Hanan. Foundations of multidimensional and metric data structures. M. Kaufmann, 2006.
2. Mehlhorn, Kurt. "Sorting and Searching, volume 1 of Data Structures and Algorithms." (1984).
3. Mehta, Dinesh P., and Sartaj Sahni. Handbook of data structures and applications. Chapman and Hall/CRC, 2004.
4. Langsam, Yedidyah, Moshe Augenstein, and Aaron M. Tenenbaum. Data Structures using C and C++. Vol. 2. New Jersey: Prentice Hall, 2001.
5. Sartaj, Sahni. "Data Structures, Algorithms and Applications in C++." Computer Science, Singapore: McGraw-Hill (1998), reprint 2005.
6. Robert, L. Krune, Clovis L. Tondo, and Bruce P. Leung. "Data structures & Program Design in C." In O'Dougherty (production process staff workers)(second (hc) textbook ed.). Prentice-Hall, Inc. div. of Simon & Schuster, 2002.

Reeference Books:

1. Allen, Weiss Mark. Data structures and algorithm analysis in C++. Pearson Education India, 2007.
2. Cormen, T. H., Charles E. Leiserson, R. L. Rivest, and C. Stein. "Introduction to algorithms 2nd edition. chpater 9: Medians and order statistics."
3. Hopcroft, John E., and Jeffrey D. Ullman. Data structures and algorithms. 1983 reprint 2001.
4. Standish, Thomas A. Data structures in Java. Addison-Wesley Longman Publishing Co., Inc., 1997. Reprint Pearson Education Asia (Adisson Wesley), New Delhi, 2000
5. Knuth, Donald E. "The art of computer programming. Vol. 1: Fundamental algorithms." Atmospheric Chemistry & Physics (1978).
6. Heileman, Gregory L. "Data Structures, Algorithms, and Object-Oriented Programming. 1996.", Tata Mc-Graw Hill, 2002

Tremblay, Jean-Paul, and Paul G. Sorenson. "An introduction to data structures with applications." McGraw-Hill Computer Science Series, New YorK

Employability Related Activities

Check Answers

Stats	Hard Questions	Toppers
Attempted users: 31/31 (100%)	Question#1	amitbohra
Overall Accuracy: 51%	Question#2	tarundhawan
Avg Time spent: 18 mins	Question#3	Leaderboard

Performance on Questions

Column represents each question's Success rate sorted by difficulty level

Performance on Skills

Click the skills to view Performance on Topics

Data Structures & Algorithms in C

● Strengths ● Skill Gaps

Time Management

Click the skills to view Topics Time Management

Data Structures & Algorithms in C: 100.0 %

Quiz Activity | mySWOTs

Index	User	Correct/Total	Status	Time Used	Start Time	End Time
1	aakashsharma	4/20	Completed	16 mins and 18 secs	2:58:12 PM	3:15:55 PM
2	mayankbhimrajka	9/20	Completed	12 mins and 58 secs	2:56:28 PM	3:12:12 PM
3	karanpratap	8/20	Completed	14 mins and 9 secs	2:56:24 PM	3:11:01 PM
4	shubhamsharma16	6/20	Completed	17 mins and 2 secs	2:55:07 PM	3:12:30 PM
5	vibhoremathur	10/20	Completed	17 mins and 44 secs	2:54:00 PM	3:12:03 PM
6	asitsharma	12/20	Completed	13 mins and 20 secs	2:53:18 PM	3:09:52 PM
7	rajeshwarsingh	8/20	Completed	20 mins and 24 secs	2:52:53 PM	3:13:44 PM
8	namandhingra	5/20	Completed	14 mins and 41 secs	2:52:27 PM	3:07:23 PM
9	somdurgeshgupta	10/20	Completed	20 mins and 11 secs	2:52:10 PM	3:12:48 PM
10	raghavtambi	10/20	Completed	20 mins and 39 secs	2:51:42 PM	3:13:30 PM
11	shivanshkashyap	12/20	Completed	20 mins and 30 secs	2:51:37 PM	3:13:32 PM
12	roshankumawat	7/20	Completed	22 mins and 40 secs	2:51:29 PM	3:14:51 PM
13	astharai	12/20	Completed	17 mins and 51 secs	2:51:29 PM	3:09:54 PM
14	kapiljain	14/20	Completed	17 mins and 6 secs	2:51:20 PM	3:08:46 PM
15	mridularora	6/20	Completed	14 mins and 17 secs	2:51:17 PM	3:11:13 PM
16	anishgupta	10/20	Completed	22 mins and 31 secs	2:51:00 PM	3:15:16 PM
17	ayushdadhich	7/20	Completed	18 mins and 49 secs	2:50:52 PM	3:10:15 PM
18	soniyasoni	10/20	Completed	23 mins and 41 secs	2:50:46 PM	3:14:59 PM
19	amitbohra	16/20	Completed	9 mins and 41 secs	2:50:46 PM	3:00:43 PM
20	ritikaverma	9/20	Completed	20 mins and 20 secs	2:50:24 PM	11:56:01 PM
21	seeratsobti	10/20	Completed	18 mins and 34 secs	2:50:23 PM	3:09:55 PM
22	raveenakodwani	7/20	Completed	18 mins and 3 secs	2:50:22 PM	3:09:35 PM
23	jogendrachoudhary	11/20	Completed	23 mins and 52 secs	2:49:27 PM	3:13:59 PM
24	dishanshukla	13/20	Completed	21 mins and 14 secs	2:49:24 PM	3:10:50 PM
25	surabhitomer	11/20	Completed	21 mins and 55 secs	2:49:09 PM	3:11:53 PM
26	kamalappujani	10/20	Completed	25 mins and 46 secs	2:48:47 PM	3:16:19 PM
27	priyanshusharma	10/20	Completed	24 mins and 43 secs	2:48:33 PM	3:13:36 PM
28	tarundhawan	16/20	Completed	12 mins and 55 secs	2:48:08 PM	3:01:17 PM
29	madhavichauhan	10/20	Completed	16 mins	2:48:06 PM	3:04:44 PM
30	tusharsharma	13/20	Completed	24 mins and 14 secs	2:48:04 PM	3:15:39 PM
31	amanbhargava	13/20	Completed	24 mins and 54 secs	2:47:38 PM	3:16:27 PM

Check Answers

Stats	Hard Questions	Toppers
Attempted users: 23/24 (95%) Overall Accuracy: 34% Avg Time spent: 21 mins	Question#1 Question#2 Question#3	ashutoshgupta ayushmisra Leaderboard

Performance on Questions

Column represents each question's Success rate sorted by difficulty level

Performance on Skills

Click the skills to view Performance on Topics

Data Structures & Algorithms in C

■ Strengths   ■ Skill Gaps

Time Management

Click the skills to view Topics Time Management

Data Structures & Algorithms In C: 100.0 %

Index	User	Correct/Total	Status	Time Used	Start Time	End Time
1	rakshitjayaswal	4/20	Completed	14 mins and 37 secs	10:44:07 AM	11:00:51 AM
2	ashutoshgupta	9/20	Completed	21 mins and 46 secs	10:37:35 AM	11:01:38 AM
3	pranjaltripathi	4/20	Completed	20 mins and 7 secs	10:37:30 AM	11:02:03 AM
4	prateekdhalwal	1/20	Completed	22 mins and 11 secs	10:37:05 AM	10:59:30 AM
5	ankitjain	6/20	Completed	14 mins and 40 secs	10:36:54 AM	10:52:28 AM
6	roopeshsharma	8/20	Completed	21 mins and 34 secs	10:36:21 AM	11:00:23 AM
7	pallavibhandari	8/20	Completed	21 mins and 45 secs	10:36:10 AM	11:00:14 AM
8	anuragsoni	9/20	Completed	21 mins and 8 secs	10:35:41 AM	10:57:35 AM
9	vipinagarwal2016	7/20	Completed	23 mins and 47 secs	10:35:29 AM	11:00:46 AM
10	ayushmisra	9/20	Completed	20 mins and 20 secs	10:35:28 AM	10:56:20 AM
11	devanshaggarwal	6/20	Completed	23 mins and 35 secs	10:35:25 AM	11:00:14 AM
12	divyanksingh	8/20	Completed	23 mins and 17 secs	10:35:10 AM	10:58:58 AM
13	shwetasharma	6/20	Completed	24 mins and 50 secs	10:34:44 AM	11:00:23 AM
14	himanshurathore	5/20	Completed	20 mins and 3 secs	10:34:26 AM	10:54:46 AM
15	rajkumargupta	7/20	Completed	15 mins and 34 secs	10:34:00 AM	10:49:46 AM
16	kunalkumawat	6/20	Completed	20 mins	10:33:49 AM	10:54:09 AM
17	rishabhjain16	8/20	Completed	25 mins and 58 secs	10:33:15 AM	11:01:53 AM
18	kanikabhatia	7/20	Completed	23 mins and 38 secs	10:33:10 AM	10:57:14 AM
19	mukulsharma	6/20	Completed	23 mins and 34 secs	10:33:02 AM	10:57:19 AM
20	adhishagupta	7/20	Completed	23 mins and 19 secs	10:32:55 AM	10:56:58 AM
21	chetanasinghal	8/20	Completed	19 mins and 13 secs	10:32:22 AM	10:51:56 AM
22	satyamsingh	9/20	Completed	27 mins and 16 secs	10:32:13 AM	11:00:20 AM
23	divyasharma	5/20	Completed	22 mins and 36 secs	10:31:57 AM	10:55:05 AM

Showing 1 to 23 of 23 entries

Previous 1 Next

CS1202 Soft Computing

Course Title and Code: Soft Computing: CSE1202	
Hours per Week	**L–T–P: 3-0-2**
Credits	**4**
Students who can take	Sem VII (2016-2020)

Course Objective: This course introduces the fundamental concepts of soft computing techniques and their applications in building intelligent machines. The course will cover fuzzy logic, genetic algorithms, neural networks and their applications to handle uncertainty, optimization, classification and regression problems.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Recognize the feasibility of applying a soft computing techniques for a particular problem
2. Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
3. Apply genetic algorithms to combinatorial optimization problems
4. Apply neural networks to pattern classification and regression problems
5. Effectively use existing software tools to solve real life problems using a soft computing approach

Course Syllabi (Theory):

- Introduction; Introduction to Soft Computing, Concept of computing systems."Soft" computing versus "Hard" computing, Characteristics of Soft computing, applications of Soft computing techniques

- Introduction to Fuzzy logic. Fuzzy sets and membership functions, Operations on Fuzzy sets. Fuzzy relations, rules, propositions, implications and inferences. Defuzzification techniques. Fuzzy logic controller design. Applications of Fuzzy logic.

- Genetic Algorithms: Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques, Basic GA framework and different GA architectures.GA operators: Encoding, Crossover, Selection, Mutation, etc. Solving single-objective optimization problems using GAs. Multi-objective Optimization Problem Solving. Concept of multi-objective optimization problems (MOOPs) and issues of solving them. Multi-Objective Evolutionary Algorithm (MOEA).

- Artificial Neural Networks: Biological neurons and its working, Simulation of biological neurons to problem solving. Different ANNs architectures. Training techniques for ANNs. Applications of ANNs to solve some real life problems.
- Deep Learning: Recurrent Neural Network Tensorflow, Convolution Neural Network, Application of Deep Learning.

Activities Related to Skill Development and Employability

Each Student has developed two projects, Sample List of Projects.

- Handwritten Digit Recognition system using CNN
- Hyper parameter tuning of Decision Tree Classifier
- Movie Genre Prediction
- Dino Game using Genetic Algorithm
- Game Rating System
- Interest Recommendation System using Fuzzy Logic
- Project Grading System using Fuzzy Logic
- Image Classification using Convolution Neural Network
- Predicting Customer's Profitability
- Qualitative Bankrupt Prediction
- Movie Rating System
- Credit Card Fraud Detection
- Car Simulator using Fuzzy Logic
- Performance Prediction of Students
- Video Game Ranking using Neural Network
- Youtube Spam detection System
- Design of Smart Washing Machine using Fuzzy Logic
- Stock Price Analysis
- Smart Brake System using Fuzzy Logic

CS1203: Block Chain Technology and Applications

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
CS1203 (Departmental Elective-1,2)	Block Chain Technology and Applications	3	0	2	0	4

Syllabus (Theory)

Introduction to Block chain History: Digital Money to Distributed Ledgers, Design Primitives: Protocols, Security, Consensus, Permissions, Privacy. Blockchain Architecture and Design :Basic crypto primitives: Hash, Signature, Hashchain to Blockchain, Basic consensus mechanisms: Requirements for the consensus protocols, Proof of Work (PoW),Scalability aspects of Blockchain consensus protocols. Permissioned Blockchains: Design goals, Consensus protocols for Permissioned Blockchains. Ethereum network, EVM, Transaction fee, Ether, gas, Solidity - Smart contracts, Truffle, Web3, Design and issue Cryptocurrency, Mining, DApps.
Blockchain in Financial Software and Systems (FSS): Settlements, KYC, Capital markets, Insurance. Blockchain in trade supply chain: Provenance of goods, visibility, trades supply chain finance, invoice management discounting, etc. Blockchain Cryptography. Research aspects I : Scalability of Blockchain consensus protocols, Case Study various recent works on scalability, Research aspects II : Secure cryptographic protocols on Blockchain, Case Study Secured Multi-party Computation, Blockchain for science: making better use of the data-mining network, Case Studies: Comparing Ecosystems - Bitcoin, Hyperledger, Ethereum and more, Coding and Documentation standards in Smart Contract Development. Energy saving programming practices.

Course Title and Code
Blockchain Technology and Applications CS1203
Course Description
The Blockchain Technology and Applications course provides a broad overview of the essential concepts of blockchain technology – by initially exploring the Bitcoin protocol followed by the Ethereum protocol – to lay the foundation necessary for developing applications and programming. You will be equipped with the knowledge needed to create nodes on your personal Ethereum blockchain, create accounts, unlock accounts, mine, transact, transfer Ethers, and check balances.

You will learn about the decentralized peer-to-peer network, an immutable distributed ledger and the trust model that defines a blockchain. Content includes the hashing and cryptography foundations in Smart Contracts and Decentralized Applications (Dapps).

Prerequisites	Basic Programming
Hours per Week	L-T-P: 3-0-2
Credits	4

Sr. No	Specifications	Marks
01	Attendance	Nil
02	Assignment	10
03	Class Participation	5
04	Quiz	10
05	Theory Exam – 1	10
06	Theory Exam – 2	20
07	Theory Exam	Nil
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	10
12	Project -2	15
13	Project -3	20
14	Lab Evaluation	Nil
15	Lab Evaluation	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Learning Outcomes

On completion of this course, students should be able to:
1. Evaluate the setting where a blockchain based structure may be applied, its potential and its limitations.
2. Develop, Test and Execute a "smart" contract, what are its legal implications and what it can and cannot do, now and in the near future.
3. Develop, Test and Execute Decentralized Application for various use cases.
4. Recognize the differences between the most prominent blockchain structures and permissioned blockchain service providers, as well as rising alliances and networks considering sustainability issues like power saving.

Syllabus
– Introduction to Blockchain (a) History: Digital Money to Distributed Ledgers (b) Design Primitives: Protocols, Security, Consensus, Permissions, Privacy. Blockchain Architecture and Design (a) Basic crypto primitives: Hash, Signature (b) Hashchain to Blockchain (c) Basic consensus mechanisms. Consensus (a) Requirements for the consensus protocols (b) Proof of Work (PoW) (c) Scalability aspects of Blockchain consensus protocols. Permissioned Blockchains (a) Design goals (b) Consensus protocols for Permissioned Blockchains. Ethereum network, EVM, Transaction fee, Ether, gas, Solidity - Smart contracts, Truffle, Web3, Design and issue Cryptocurrency, Mining, DApps. Use case I: Blockchain in Financial Software and Systems (FSS): (a) Settlements, (b) KYC, (c) Capital markets, (d) Insurance. Use case II: Blockchain in tradesupply chain: (a) Provenance of goods, visibility, tradesupply chain finance, invoice managementdiscounting, etc. Blockchain Cryptography. Research aspects I (a) Scalability of Blockchain consensus protocols (b) Case Study various recent works on scalability, Research aspects II (a) Secure cryptographic protocols on Blockchain (b) Case Study Secured Multi-party Computation, Blockchain for science: making better use of the data-mining network, Case Studies: Comparing Ecosystems - Bitcoin, Hyperledger, Ethereum and more.

Reference / Text Books
(1.) Imran Bashir: Mastering Blockchain. O'Reilly, Packt Publishing, 2017.
(2.) Narayanan, Arvind, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. *Bitcoin and cryptocurrency technologies: A comprehensive introduction.* Princeton University Press, 2016.
(3.) Mougayar, William. *The business blockchain: promise, practice, and application of the next Internet technology.* John Wiley & Sons, 2016.

Project

Step -1 : Initially entered two passwords then clicked on Create Accounts and then screen shown as follows.

Step-2 : Two accounts created.

Step-3: Create the Genesis files

Enter the contents for the custom Genesis file in the box below. The content here will be used to initialize both of your Ethereum nodes in the next step.

Contents of the Genesis file

```
{
    "config": {
        "chainId": 13,
        "homesteadBlock": 0,
        "eip155Block": 0,
        "eip158Block": 0
    },
    "difficulty": "0x20000",
    "gasLimit": "0x2fefd8",
    "alloc": {},
    "nonce": "0x0000000000000042",
    "timestamp": "0x0",
    "parentHash": "0x0000000000000000000000000000000000000000000000000000000000000000",
    "extraData": "",
    "mixhash": "0x0000000000000000000000000000000000000000000000000000000000000000",
    "coinbase": "0x0000000000000000000000000000000000000000"
```

}

Step-4 Create Genesis file

Genesis File Status

Created the Genesis Files with the name customGenesis.json in both nodes

Step -5 Initialize a new Genesis Block for both the Nodes

In this step, we will initialize the Ethereum nodes using the custom Genesis file that you created in the previous step. If you did not create a file, please complete step 2 before performing step 3.

Initialize genesis block

Genesis Block Status

Initialized both Ethereum nodes. You may start them now.

Step – 6 Finally, we will start the Ethereum nodes to be able to join the Blockchain and transact on it. To do so, simply click the button below and then wait for the status to change. Then, move to the next step.

Ethereum Node Status

Ethereum started successfully. Move to Part 2 now.

Node 1

Enode
enode://5c3d704696496a0ba1a32b7d915c26d78d0f2bdcf48f327da0719b15a2969caa4893eb544a345cfd5ae0d7e91eefb7c1be879f0ddd3ca6d8f262988b7d9713d9@[::]:30301?discport=0

Node 2

Enode
enode://4901fef1c3aae88d2a9459c737587fdd341fbf2d6d43f6bb9ad0d97fcde75503b5103d1c28c00f0e066077073674444b2afdfd3a7f337a0ee2b8b1392d4e238b@[::]:30302?discport=0

Step 1: Connect Peers

Connected Peer Status

Enode added. You can check the connectivity using peer count or peers.

Step-2 : Check Peer Count

Step- 3 : Check Peer Details

Node_1

[

 {

    "id":
"4901fef1c3aae88d2a9459c737587fdd341fbf2d6d43f6bb9ad0d97fcde75503b5103d1c28c00f0e066077
073674444b2afdfd3a7f337a0ee2b8b1392d4e238b",

   "name": "Geth/v1.7.3-stable-4bb3c89d/linux-amd64/go1.9",

   "caps": [

    "eth/63"

   ],

   "network": {

    "localAddress": "[::1]:42294",

    "remoteAddress": "[::1]:30302"

   },

   "protocols": {

    "eth": {

     "version": 63,

     "difficulty": 131072,

     "head": "0x5e1fc79cb4ffa4739177b5408045cd5d51c6cf766133f23f7cd72ee1f8d790e0"

    }

   }

  }

]

Node_2

[

 {

   "id":
"5c3d704696496a0ba1a32b7d915c26d78d0f2bdcf48f327da0719b15a2969caa4893eb544a345cfd5ae0d
7e91eefb7c1be879f0ddd3ca6d8f262988b7d9713d9",

   "name": "Geth/v1.7.3-stable-4bb3c89d/linux-amd64/go1.9",

```
    "caps": [

      "eth/63"

    ],

    "network": {

      "localAddress": "[::1]:30302",

      "remoteAddress": "[::1]:42294"

    },

    "protocols": {

      "eth": {

        "version": 63,

        "difficulty": 131072,

        "head": "0x5e1fc79cb4ffa4739177b5408045cd5d51c6cf766133f23f7cd72ee1f8d790e0"

      }

    }

  }

]
```

Create new accounts

List Accounts and Check Balance

If you want to check your balance, press the button below to query and return the result for all the accounts.

Node_1	Node_2
Check Balance	Check Balance

Account and balances fetched.			Account and balances fetched.		
Account Address	Balance (in Weis)	Balance (in Ethers)	Account Address	Balance (in Weis)	Balance (in Ethers)
0xf007d46b22628616ef6f988a475(	0	0	0x8d8fcb165131d03f97923ebc1c6-	0	0
0x99399fabbee459e27106975f899:	0	0	0x1df0c72178b0078fdf7ab77c980:	0	0
0x38662063bc6c9963859c587849t	0	0	0x7904e9fab6bf587487f0e8e01c4f	0	0
0xec607f92a5f3dcfd8d1d9e9db69d	0	0	0xf0bc74f440dadb86d922b4f2e9b:	0	0
0xcf2cff0453add46d714c67635e91	0	0	0x6a5ef076e60ae9d6318d187c262:	0	0

List Accounts and Check Balance

Miner

If you want to Start or Stop a miner, use the buttons below to do so for either of the two nodes.

Before you start your miner, make sure you check the account balances. Then start the miner and wait for the timer. Then check your balance again.

Start Miner

Stop Miner

Miner Response

Miner Response

Unlock Account

Send Transaction

Waiting for DAG to be generated...
Checking if DAG has been generated or not. If it has not been generated, please wait a maximum of **9m 43s** for them to be generated. If it is completed before that, this screen will disappear and you can continue ahead.

Then Miner Started

Then again clicked on check your balance

List Accounts and Check Balance

If you want to check your balance, press the button below to query and return the result for all the accounts.

Node_1			Node_2		
Check Balance			Check Balance		
Account and balances fetched.			Account and balances fetched.		
Account Address	Balance (in Weis)	Balance (in Ethers)	Account Address	Balance (in Weis)	Balance (in Ethers)
0xf007d46b22628616ef6f988a475(	1000000000(	10	0x8d8fcb165131d03f97923ebc1c6<	0	0
0x99399fabbee459e27106975f899:	0	0	0x1df0c72178b0078fdf7ab77c980:	0	0
0x38662063bc6c9963859c587849k	0	0	0x7904e9fab6bf587487f0e8e01c4f	0	0
0xec607f92a5f3dcfd8d1d9e9db69d	0	0	0xf0bc74f440dadb86d922b4f2e9b:	0	0
0xcf2cff0453add46d714c67635e91	0	0	0x6a5ef076e60ae9d6318d187c262'	0	0

Then stop miner and "true" is shown in response.

Miner

Unlock Account

If you want to unlock your account, please enter the account address and the password you used to create the account and submit the form.

You can get the account addresses from the list accounts and balance section above.

Node_1		Node_2	
0xf007d46b22628616ef6f988a475(	a	Enter the account address here	Enter your Password here
Unlock Account		Unlock Account	
Unlock Status		Unlock Status	
Account Unlocked		Account Unlock Status	

Send Transaction

Check Transaction Status

Check Transaction status : Pending Transaction is 1

Start the miner

Now Pending Transaction is 0

Click on submit project

CS1206 Competitive Programming

Course Title and Code: Competitive Programming:CS1206	
Hours per Week	L-T-P: 1-0-2
Credits	2
Students who can take	B.Tech Sem VI (2017-2021)

Course Objective:

This Course is designed to equip learners with skills of computational problem solving with a focus on time and space efficiency. It includes analysis, selection, implementation, optimization and scalability of algorithms.

Learning Outcome:

On successful completion of this course, the students should be able to:

- Identify the algorithmic way of solving problem
- Select an effective data structure and algorithm to efficiently solve the problem
- Analyze Time and Space Complexity of Solution
- Analyze Scalability of Solution
- Attempt an online/onsite national/international computational problem-solving contest.
- Organize an online/onsite national/international computational problem-solving contest/event
- Adapt Ethical Coding Practices

Syllabus (Theory):

Review of Concepts of programming (C/Java/C++/Python); Preparing Game Plan for a Contest; Programming Language selection for a contest;

Essential Data Structures for Implementing Solution to a problem (Array, Linked list, Stack, Queue, Trees (Binary, BST, AVL), Heap, Hashing;

Input /Output Techniques and constraints; Test Case analysis of a problem; Hands-on problem-solving approaches (Brute Force Method, Greedy Algorithms, Dynamic Programming); Complexity analysis of an algorithm; Importance of Graph algorithms; Meet-up on ACM/Competitive Programming Problems; Common Codes/Routines for Programming; Time Savor: use of various libraries like Standard Template Library (STL) and python supported libraries;

Exploring the working of programming judges; Setting up the online and onsite judge (Codechef, Hackerrank, Hackerearth, Geeksforgeeks, CodingNinjas, PC², SPOJ etc.); Contest Administration; Ethical coding (awareness of Plagiarism).
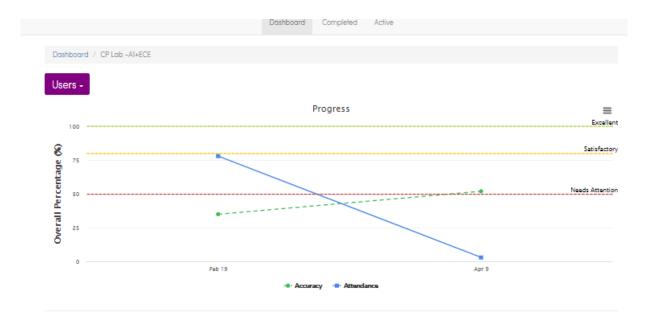
Syllabus (Practical): Lab practice is mostly based on DSA course as.
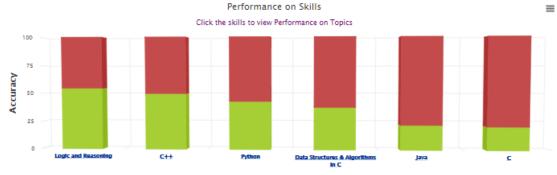
1. Sieve of Eratosthenes.
2. Modular arithmetic and combinatrics.
3. Knapsack (Dynamic + Greedy)
4. Greedy Algorithms.
5. Dynamic Programming.
6. Standard Template Library.
7. Introduction of Trees and Graphs.
8. DFS and BFS Algorithms
9. Shortest Path Algorithms
10. Euler's totient function
11. Segment Trees

Activities Related to Skill Development and Employability

Each student has to participate in online quiz on mySwots.com. Sample images of quiz dashboard, statistics, and performance metrics are presented below.

Dashboard / CP Lab -AI+ECE

Users ▾

Progress

≡

Overall Percentage (%)

Excellent

Satisfactory

Needs Attention

Feb 19   Apr 9

── Accuracy ── Attendance

Performance on Skills

≡

Click the skills to view Performance on Topics

Accuracy

Logic and Reasoning   C++   Python   Data Structures & Algorithms in C   Java   C

● Strengths ● Skill Gaps

Skills Covered

≡

Click the skills to view Topics Covered

C: 5.3 %
Java: 4.0 %
Logic and Reasoning: 26.7 %
C++: 5.3 %
Python: 4.0 %
Data Structures & Algorithms in C: 54.7 %

Time Management

≡

Click the skills to view Topics Time Management

Logic and Reasoning: 8.4 %
C: 22.2 %
C++: 9.7 %
Python: 6.8 %
Java: 5.6 %
Data Structures & Algorithms in C: 52.8

Mail - santosh | Computing and | (1) WhatsApp | Inbox (816) - s | Contest Edit | H | Solve JKLU_Lab | Leaderboard | | Completed Qu

myswots.com/ContestManage/Listing?cStatus=Completed&ot=20&lt=10

Apps | ASUS E-Service | Mail - santosh verm... | JKLU Internet Portal | santosh verma - M... | TCS Ion | Web of Science Ma... | CLRS Solution

SWOTs | Courses | Class | Coach

Dashboard | Completed | Active

| CS1206 | Analytics Activity | Feb 18, 04:10 PM IST | CP Lab -A2+EE |
| CS1206 | Analytics Activity | Feb 17, 04:10 PM IST | CP Lab -B |

Quiz1	Analytics Activity	Oct 17, 02:45 PM IST	Advanced Data Structures (A2B2)
Quiz1	Analytics Activity	Oct 16, 03:00 PM IST	Compiler Quiz1
Quiz1	Analytics Activity	Oct 16, 10:30 AM IST	Advanced Data Structures (B1)
Quiz1	Analytics Activity	Oct 14, 03:30 PM IST	Advanced Data Structures (A1)
Tree	Analytics Activity	Jul 12, 04:15 PM IST	Programming Workshop
Pointers in C	Analytics Activity	Jul 11, 04:15 PM IST	Programming Workshop
Strings, Files in C	Analytics Activity	Jul 10, 04:15 PM IST	Programming Workshop
Functions in C	Analytics Activity	Jul 09, 04:15 PM IST	Programming Workshop

---

SWOTs | Courses | Class | Coach

Dashboard | Completed | Active

CS1206 on 2/18/2020 (IST)

Questions: 30 | Time: 45 mins

Time spent: 0-15% 16-30% 31-50%

Excel | PDF | CSV | Print

Show 10 entries   Search:

Index	User	Correct/Total	Status	Time Used	Start Time	End Time
1	GAJENDRASINGH	0/30	Closed	1 mins and 12 secs	4:32:20 PM	4:33:35 PM
2	praveshbisaria31	12/30	Completed	15 mins and 18 secs	4:25:28 PM	4:41:17 PM
3	RISHIKASINGH	10/30	Completed	23 mins and 25 secs	4:19:19 PM	4:43:12 PM
4	AKSHATMISHRA	4/30	Completed	17 mins and 16 secs	4:18:13 PM	4:35:57 PM
5	SHEETALSHARMA	12/30	Completed	24 mins and 37 secs	4:16:50 PM	4:41:44 PM
6	mistryparikshitharimohan	8/30	Completed	35 mins and 45 secs	4:14:54 PM	4:51:20 PM
7	UTKARSHVERMA	14/30	Completed	30 mins and 11 secs	4:14:44 PM	4:45:56 PM
8	vijaytak	14/30	Completed	33 mins and 18 secs	4:13:46 PM	4:47:34 PM
9	hiteshmali	12/30	Completed	35 mins and 46 secs	4:13:25 PM	4:49:35 PM
10	VIRALNATANI	16/30	Completed	19 mins and 20 secs	4:13:19 PM	4:37:40 PM

Showing 1 to 10 of 17 entries

Previous | 1 | 2 | Next

Students also have to participate in lab exam through online judge portal named Hackerrank.com. Few images to present the number of lab exams conducted, participation statics, and the leaderboard of the lab exams as following.

hackerrank.com/administration/contests

ASUS E-Service | Mail - santosh verm... | JKLU Internet Portal | santosh verma - M... | TCS Ion | DAA Recursion Tree... | Web of Science Ma... | CLRS Solutions | Student Theses | Adjacency

Administration

Manage Contests	Manage Challenges		search

Contests you can edit are below. For more info, visit our FAQ or join our discussion forum.

Create Contest

Contest Name	Contest Slug	Contest Owner	Start date	Signups	Participants
CodeWar 19.1	codewar-19-1	verma_jklu	Feb 25, 2019	5	1
Qualifier_AlgoRythm	qualifier-algorythm	verma_jklu	Mar 09, 2019	152	55
AlgoRythm 19.1	codewar-19	verma_jklu	Mar 16, 2019	0	0
Finale_AlgoRythm19	finale-algorythm19	verma_jklu	Mar 16, 2019	38	16
Code_Monk	code-monk	verma_jklu	Mar 30, 2019	0	0
JKLU_Prog_Workshop	jklu-prog-workshop	verma_jklu	Jul 08, 2019	27	18
JKLU_Final_Labtest	jklu-prog-ws-d2	verma_jklu	May 29, 2020	126	105
JKLU_LAB_24/3	jklu-lab-243	verma_jklu	Mar 24, 2020	126	59
JKLU_Lab_25/3	jklu-lab-253	verma_jklu	Mar 25, 2020	116	83
	jklu-lab-263	verma_jklu	Mar 26, 2020	119	60

kerrank.com/administration/contests/edit/52399

hackerrank.com/administration/contests/page/2

JS E-Service | Mail - santosh verm... | JKLU Internet Portal | santosh verma - M... | TCS Ion | DAA Recursion Tree... | Web of Science Ma... | CLRS Solutions | Student Theses | Adjacency

HackerRank | PRACTICE | CERTIFICATION ^{NEW} | COMPETE | JOBS | LEADERBOARD | Search | verma_jklu

Administration

Manage Contests	Manage Challenges		search

Contests you can edit are below. For more info, visit our FAQ or join our discussion forum.

Create Contest

Contest Name	Contest Slug	Contest Owner	Start date	Signups	Participants
JKLU_Lab_27/3	jklu-lab-273	verma_jklu	Mar 27, 2020	120	85
JKLU_Lab_28/3	jklu-lab-283	verma_jklu	Mar 28, 2020	122	77
JKLU_Lab_31/3	jklu-lab-313	verma_jklu	Mar 31, 2020	119	85
JKLU_Lab_11/04	jklu-lab-1104	verma_jklu	Apr 11, 2020	93	66
JKLU_Lab_12/04	jklu-lab-1204	verma_jklu	Apr 12, 2020	109	61
DSA_18.04.2020	dsa-18-04-2020	verma_jklu	Apr 18, 2020	109	84
DSA_19.04.2020	dsa-19-04-2020	verma_jklu	Apr 19, 2020	104	76

ASUS E-Service | Mail - santosh verm... | JKLU Internet Portal | santosh verma - M... | TCS Ion | DAA Recursion Tree... | Web of Science Ma... | CLRS Solutions | Student

HackerRank PRACTICE CERTIFICATION ^NEW **COMPETE** JOBS LEADERBOARD   🔍 Search   💬 🔔 **verma_jklu** ⌄

All Contests > JKLU_Lab_11/04

JKLU_Lab_11/04 Details ▶

Challenges   Current Rank: N/A

Matrix Chain Multiplication 4
Success Rate: **0.00%**   Max Score: **100**   Difficulty: **Medium**   **Solve Challenge**

Parentheses 1
Success Rate: **63.49%**   Max Score: **100**   Difficulty: **Medium**   **Solve Challenge**

🏆 Current Leaderboard
📊 Compare Progress
☰ Review Submissions

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Leaderboard

[All] [Friends]   Filter by [Select filter ⌄]   [Type username to compare] [**Compare**]

Rank	User		Score	Time	Country
1	viralnatani		150.00	1:54:08	🇮🇳
1	TheProlifer		150.00	2:06:13	🇮🇳
1	ambujdixit		150.00	2:15:09	🇮🇳
1	raghavigera		150.00	2:22:43	🇮🇳
1	anujgupta1		150.00	2:24:12	🇮🇳
1	akshatsharma1	Compare	150.00	2:29:57	🇮🇳
1	takvijay06		150.00	2:30:28	🇮🇳
1	ashishkumarshar3		150.00	2:30:36	🇮🇳
1	praveshbisaria31		150.00	2:31:29	🇮🇳
1	utkarshverma1		150.00	2:39:03	🇮🇳

⏮ ◀ [1] [2] [3] [4] [5] [6] [7] ▶ ⏭

Items per page: [10 ⌄]

Course Title and Code:	Cognitive Dashboards : CS1302
Hours per Week	**L-T-P: 2-0-2**
Credits	**3**
Students who can take	B.Tech Sem III (IBM Specialization)

Course Objective- This course will prepares students to understand the importance of dashboards as a summarized model of more complex realities and recognizes the use of natural language as the easiest input interface for humans. They will explore visualizations of data in IBM Cognos Analytics tool to discover patterns and relationships that impact businesses and communicate the insights that discovered in a dashboard and share it with others.

Learning Outcome:

On successful completion of this course, the students should be able to:
1. Highlights the importance of dashboards as a summarized model of complex realities.
2. Plan the dashboard which recognize and express the data in meaningful way.
3. Outline dashboards which interact using natural language and respond with graphics.
4. Represent the associated and filtered views following the request expressed as a text message by the user.
5. Explore powerful visualizations of data in IBM® Cognos Analytics.
6. Discover patterns and relationships that impact businesses.
7. Communicate the insights that discovered in a dashboard and share it with others

Prerequisites		-
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	20
03	Class Participation	10
04	Quiz	Nil
05	Theory Exam-I	Nil
06	Theory Exam-II	10
07	Theory Exam-III	10
08	Report-I	Nil
09	Report-II	Nil
10	Report-III	Nil
11	Project-I	30
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

Dashboard Overview, Dashboards, <mark>Cognos Analytics dashboard</mark>, Uploading data, Creating a dashboard , <mark>Cognos Analytics, Creating a dashboard, Templates, Changing the template on a tabbed dashboard, Visualization, Creating a visualization in a dashboard</mark>, Resetting a dashboard, Creating multilingual dashboards, Working with a data point, Relinking data source connections, Resolving ambiguous data source connections, Zooming in and out.

<mark>Visualizations</mark>, Using a different visualization type, Highlighting conditionally formatted data with color, Showing data as points in a visualization, Showing data as sizable points in a visualization, Repeating a visualization by row or column, Setting a timer to automatically refresh a visualization, Widgets, Filtering data, Sorting data, <mark>IBM Cognos Analytics</mark>, Data Preparation, Changing the axis, Improving the visibility of labels, Working with objects, Data properties, Changing how data is aggregated, Editing column headings, Enabling data caching
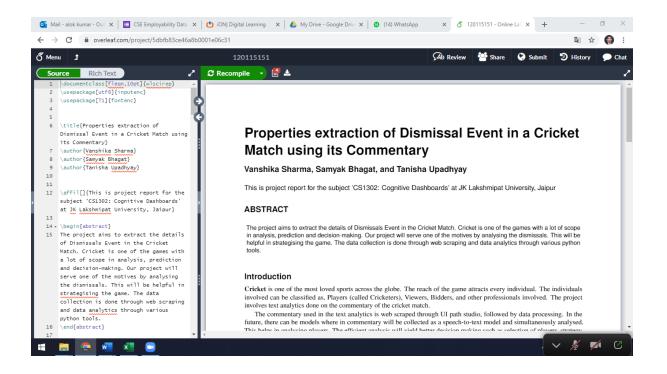
Reference Books:

1. Steve Wexler, Jeffrey Shaffer, Andy Cotgreave. *The Big Book Dashboards: Visualizing Your Data Using Real-World Business Scenarios*. Wiley, 2017.
2. Abhishek Sanghani. *First Guide to Dashboards using IBM Cognos Analytics*. Packt Publishing, 2017.

Activities Related to Skill Development and Employability

Each Student has developed one project in group. Sample List of Projects.

- Wagon Wheel Creation by Commentary of a Cricket Match
- Selection of Batsman's Shot by Commentary of a Cricket Match
- Properties extraction of a Ball Delivered by Commentary of a Cricket Match
- Static Information extraction of a Match by Commentary of a Cricket Match
- Properties extraction of Dismissal Event in a Match by Commentary of a Cricket Match
- Properties extraction of a Boundary Event by Commentary of a Cricket Match
- Properties extraction of Extra Run Event in a Match by Commentary of a Cricket Match
- Player Determination in a Match by Commentary of a Cricket Match

Mail - alok kumar - Out × | CSE Employability Data × | iON| Digital Learning × | My Drive - Google Drive × | (14) WhatsApp × | 120115151 - Online La × +

← → C   overleaf.com/project/5dbfb83ce46a8b0001e06c31

Menu   120115151   Review Share Submit History Chat

Source | Rich Text   Recompile

```
1  \documentclass[fleqn,10pt]{wlscirep}
2  \usepackage[utf8]{inputenc}
3  \usepackage[T1]{fontenc}
4
5
6  \title{Properties extraction of
   Dismissal Event in a Cricket Match using
   its Commentary}
7  \author{Vanshika Sharma}
8  \author{Samyak Bhagat}
9  \author{Tanisha Upadhyay}
10
11
12 \affil[]{This is project report for the
   subject 'CS1302: Cognitive Dashboards'
   at JK Lakshmipat University, Jaipur}
13
14 \begin{abstract}
15 The project aims to extract the details
   of Dismissals Event in the Cricket
   Match. Cricket is one of the games with
   a lot of scope in analysis, prediction
   and decision-making. Our project will
   serve one of the motives by analysing
   the dismissals. This will be helpful in
   strategising the game. The data
   collection is done through web scraping
   and data analytics through various
   python tools.
16 \end{abstract}
17
```

Properties extraction of Dismissal Event in a Cricket Match using its Commentary

Vanshika Sharma, Samyak Bhagat, and Tanisha Upadhyay

This is project report for the subject 'CS1302: Cognitive Dashboards' at JK Lakshmipat University, Jaipur

ABSTRACT

The project aims to extract the details of Dismissals Event in the Cricket Match. Cricket is one of the games with a lot of scope in analysis, prediction and decision-making. Our project will serve one of the motives by analysing the dismissals. This will be helpful in strategising the game. The data collection is done through web scraping and data analytics through various python tools.

Introduction

Cricket is one of the most loved sports across the globe. The reach of the game attracts every individual. The individuals involved can be classified as, Players (called Cricketers), Viewers, Bidders, and other professionals involved. The project involves text analytics done on the commentary of the cricket match.

The commentary used in the text analytics is web scraped through UI path studio, followed by data processing. In the future, there can be models where in commentary will be collected as a speech-to-text model and simultaneously analysed. This helps in analysing players. The efficient analysis will yield better decision making such as selection of players, strategy

Each Student must do the IBM case studies. Sample List of Case Studies.

1. Cognitive Digitization of Land Ownership Documents
2. Merger & Acquisitions – Strategic Analysis
3. KYC for a Major Bank
4. Resume Analyser
5. ABC Corporation Pvt Ltd
6. Analysis of Intelligence Reports
7. BookMyHotel.com – Analysis of User Reviews
8. Car Counselling – Choose the best drive for you
9. Game Summary

Course Title and Code:	CS1304 Cloud Computing
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem V(IBM Cloud Application Development)

Course Objective- This course will prepare students to develop, build, deploy, and test applications using a cloud platform to build Software as a Service (SaaS) solutions. This will require cloud application development skills, such as Node.js, REST architecture, JSON, Cloud Foundry and DevOps services.

Learning Outcome(Provided by IBM):
On successful completion of this course, the students should be able to:
1. Understand the architecture of IBM Cloud
2. Understand how to manage your IBM Cloud account with IBM Cloud CLI and Cloud Foundry CLI
3. Deploy an application from Eclipse to IBM Cloud
4. Build and Deploy code to IBM Cloud using DevOps
5. Understand the characteristics of REST APIs and JSON data format
6. Describe the role of Node.js for server-side scripting

Syllabus (Theory)

Module I - Cloud Application Foundations
- Understanding Cloud Computing technologies
- Introduction to HTML5 and JavaScript programming

Module II - Cloud Application Developer
- Cloud Service models (IaaS, PaaS, SaaS)
- Bluemix applications
- Building applications using Node.js, Eclipse, Cloud Foundry and
- DevOps Services
- REST architecture, JSON and Functional security
- Data Services in Bluemix
- Server side JavaScript
- Web Application framework

Activities Related to Skill Development and Employability

Each Student has developed two projects, Sample List of Projects.

- Passport Authentication System using Node.js
- Deploying Hospital Management System using Kubernetes
- Human Face detection on IBM Cloud
- Chatbot system based on IBM Watson
- Resume Organiser using Node.js

Course Title and Code:	Business Intelligence : CS1305
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem V (IBM BDA Specialization)

Course Objective- This course will prepares students to understand report building techniques using relational data models. They will also learn how to enhance, customize, and manage professional reports and will then further be explained about Active reports content and functionality.

Learning Outcome (Provided by IBM):

On successful completion of this course, the students should be able to:

1. Understand the importance of analytics and how its transforming the world today
2. Understand how analytics provided a solution to industries using real case studies
3. Explain what is analytics, the various types of analytics, and how to apply it
4. Understand how a business analysis software works, and its architecture
5. Describe a reporting application, its interface, and the different report types
6. Create different types of advanced reports
7. Understand Active Reports and how to create them

Prerequisites		-
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	Nil
03	Class Participation	10
04	Quiz	05
05	Theory Exam-I	Nil
06	Theory Exam-II (Certification Exam by IBM)	25
07	Theory Exam-III	10
08	Report-I	Nil
09	Report-II	Nil
10	Report-III	Nil
11	Project-I	30
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

Business Analytics Overview: Analytics overview, Analytics trends: Past, present & future, Towards a predictive enterprise, Analytics: Industry domains, Case studies and solutions, Business Intelligence and Analytics 101, IBM Cognos Analytics for Consumers, Business analysis solutions

IBM Cognos Analytics: Author Reports Fundamentals – Introduction, Create list reports, Focus reports using filters, Create crosstab reports, Present data graphically, Focus reports using prompts, Extend reports using calculations, Use additional report building techniques, Customize reports with conditional formatting, Drill-through definitions, Enhance report layout

IBM Cognos Analytics: Author Reports Advanced – Introduction, Create query models, Create reports based on query relationships, Create advanced dynamic reports, Design effective prompts, Create additional advanced reports, Examine the report specification, Distribute reports through bursting, Enhance user interaction with HTML,

IBM Cognos Analytics: Author Active Reports –Introduction to IBM Cognos Active Reports, Use Active Report connections, Active Report charts, visualizations, and decks

Reference Books:
1. Cindi Howson. *Successful Business Intelligence, Second Edition: Unlock the Value of BI & Big Data*. McGraw-Hill Education, 2013.
2. Dan Volitich, Gerard Ruppert. *IBM Cognos Business Intelligence 10: The Official Guide*. McGraw-Hill Education, 2013.

Activities Related to Skill Development and Employability

Each Student has developed one project

Certificates acquired on IBM Skill Academy.

IBM Skills Academy

This certificate of completion is issued to

Arman Singhal

for successfully completing and passing the final requirements for the

Business Intelligence Analyst 2018 v2

Career Path

10 December 2019

JAGADISHA BHAT
COUNTRY MANAGER – SOFTWARE SERVICES
INDIA

UNIQUE ID:
5820-1575-9665-9987

The course and course requirements are set out at **www.ibm.biz/apskillsacademy**

Course Title and Code:	Big Data Analyst: CS1307
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem VII (IBM BDA & CC Specialization)

Course Objective- This course prepares students to use the Big Data platform and methodologies in order to collect and analyze large amounts of data from different sources. The students will acquire skills in Big Data architecture, such as Apache Hadoop, Ambari, Spark, Big SQL, HDFS, YARN, MapReduce, ZooKeeper, Knox, Sqoop, and HBase.

Learning Outcomes (Provided by IBM):

After completing this course, the students should be able to understand the following topics:

1. Big Data and Data Analytics
2. Hortonworks Data Platform (HDP)
3. Apache Ambari
4. Hadoop and the Hadoop Distributed File System
5. MapReduce and YARN
6. Apache Spark, Storing and Querying data
7. ZooKeeper, Slider, and Knox
8. Loading data with Sqoop, DataPlane Service
9. Stream Computing
10. Data Science essentials, Drew Conway's Venn Diagram
11. The Scientific Process applied to Data Science
12. The steps in running a Data Science project
13. Languages used for Data Science (Python, R, Scala, Julia, ...)
14. Survey of Data Science Notebooks, and Markdown language with notebooks
15. Resources for Data Science, including GitHub, Jupyter Notebook
16. Essential packages: NumPy, SciPy, Pandas, Scikit-learn, NLTK, BeautifulSoup
17. Data visualizations: matplotlib, PixieDust
18. Using Jupyter "Magic" commands
19. Using Big SQL to access HDFS data, Creating Big SQL schemas and tables, Querying Big SQL tables, and Configuring Big SQL security
20. Data federation with Big SQL
21. IBM Watson Studio
22. Analyzing data with Watson Studio

Prerequisites		Linux, SQL
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	Nil
03	Class Participation	10
04	Quiz	05
05	Theory Exam-I	Nil
06	Theory Exam-II (Certification Exam by IBM)	25

07	Theory Exam-III	10
08	Report-I	Nil
09	Report-II	Nil
10	Report-III	Nil
11	Project-I	30
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

Big Data Overview: Data Overview, Industry Applications, Case Studies, Understanding Big Data

Big Data and Analytics: Hortonworks Data Platform (HDP), Apache Ambari, Hadoop and the Hadoop Distributed File System, MapReduce and YARN, Apache Spark, Storing and Querying data, ZooKeeper, Slider, and Knox. Loading data with Sqoop, DataPlane Service, Stream Computing,

Data Science essentials, Drew Conway's Venn Diagram - and that of others, The Scientific Process applied to Data Science, The steps in running a Data Science project, Languages used for Data Science (Python, R, Scala, Julia, ...), Markdown language with notebooks, Resources for Data Science, including GitHub, Jupyter Notebook, Essential packages: NumPy, SciPy, Pandas, Scikit-learn, NLTK, BeautifulSoup..., Data visualizations: matplotlib, ..., PixieDust, Using Jupyter "Magic" commands,

Using Big SQL to access HDFS data, Creating Big SQL schemas and tables, Querying Big SQL tables, Configuring Big SQL security, Data federation with Big SQL,

IBM Watson Studio, Analyzing data with Watson Studio

Reference Books:

1. Benjamin Bengfort and Jenny Kim. *Data Analytics with Hadoop: An Introduction for Data Scientists*. O'Reilly Media, 2016.
2. Jake VanderPlas. *Python Data Science Handbook: Essential Tools for Working with Data*. O'Reilly Media, 2016.
3. James D. Miller. *Learning IBM Watson Analytics*. Packt Publishing Limited, 2016.

Activities Related to Skill Development and Employability

Each Student has developed one project

Classsification of Judgement based on Judge, Advocate
Classifying GW Events based on Effective Inspiral Spin and Chirp Mass
Classifying GW Events based on Primary Mass and Radiated Energy
Person-Role Recognition
Classify Gravitational Waves Based on Final Mass, Gps time and Luminosity distance
Classsification of Judgement based on Result, State and Rules
Author Determination
Classifying GW Events based on Luminosity Distance and UTC Time
Appelent-respondent argument weight Determination
Classifying GW Events based on secondary mass and Radiated Energy
Classifying GW Luminosity Distance and GPS Time
Classifying GW Events based on Luminosity Distance and Redshift
Classifying GW Events based on Chirp Mass and Radiated Energy
Classifying GW Event based on luminous distance and final spin
classification GW events based on primary mass , secondary mass and final mass
Classifying GW Events based on Primary Mass, Secondary Mass and Chirp Mass
Classifying GW Events based on Luminosity Distance and Radiated Energy
radiation energy and final mass
Meta-data Creation
Keyword Determination
Classifying GW Events based on Primary Mass, Secondary Mass
Classifying GW Events based on Peak Luminosity and Radiated Energy
Classifying GW Events based on Peak Luminosity and source Redshift
Classifying GW Events based on Primary Mass and Gps time
Speech-to-text-speech
Post Morton Visualization
Determination of Rules/Code/Act with Dashboard
Classifying GW Events based on FAR gstLAL and FAR pyCBC
Document Summerization
Speech-to-text-speech
Crime Scene Visualization
primary mass , final mass
Meta Data Creation
Co-referencing
Time-Event Recognition
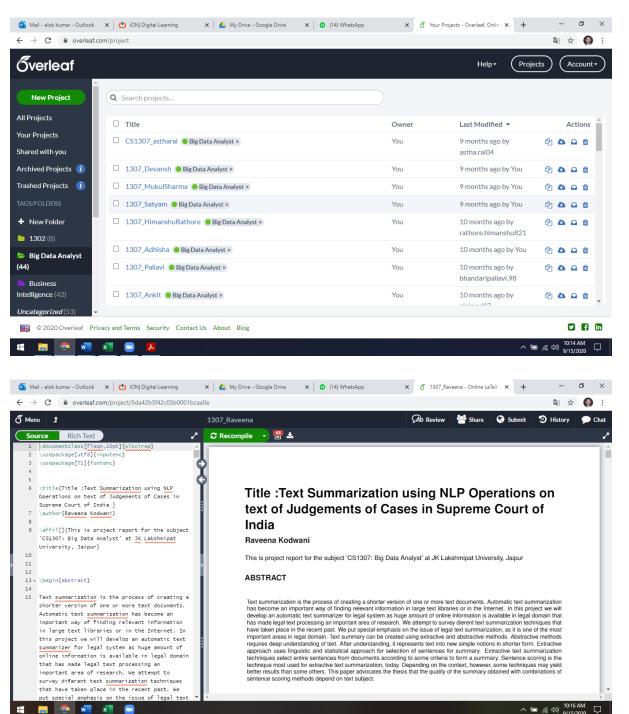
Stemming
clustering based on many feature (bucketing)
What type Question Answering
Citation Graph Generation
Time-Event recognition

Certificates acquired on IBM Skill Academy

Skills Academy ≫✕   **IBM.**

This document certifies that

Asit Sharma

Successfully passed the IBM Academic Certificate exam for

Big Data Engineer v2 Mastery Award for Students (2018)

This achievement also earns you a Mastery Award Badge which you can accept from Acclaim
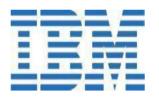
10 December 2019
UNIQUE ID: 8590-1575-9667-8405

Randy Walker
General Manager
IBM Asia Pacific

Norishige Morimoto
Chief Technical Officer
Vice President
IBM Asia Pacific

Proof-of-Concepts for Big Data Technologies:

Proof of Concept or POC on FCI stock position of commodity Wheat

By – Ayush Misra (ayushmisra@jklu.edu.in)

Bachelor of Technology in Computer Science and Engineering,

JK LAKSHMIPAT UNIVERSITY,

Jaipur

POC #: FCI stock position of commodity Wheat Data Analysis

Course Title and Code:	Big Data Analyst: CS2105
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech+M.Tech IX

Course Objective- This course prepares students to use the Big Data platform and methodologies in order to collect and analyze large amounts of data from different sources. The students will acquire skills in Big Data architecture, such as Apache Hadoop, Ambari, Spark, Big SQL, HDFS, YARN, MapReduce, ZooKeeper, Knox, Sqoop, and HBase.

Learning Outcomes (Provided by IBM):

After completing this course, the students should be able to understand the following topics:

1. Big Data and Data Analytics
2. Hortonworks Data Platform (HDP)
3. Apache Ambari
4. Hadoop and the Hadoop Distributed File System
5. MapReduce and YARN
6. Apache Spark, Storing and Querying data
7. ZooKeeper, Slider, and Knox
8. Loading data with Sqoop, DataPlane Service
9. Stream Computing
10. Data Science essentials, Drew Conway's Venn Diagram
11. The Scientific Process applied to Data Science
12. The steps in running a Data Science project
13. Languages used for Data Science (Python, R, Scala, Julia, ...)
14. Survey of Data Science Notebooks, and Markdown language with notebooks
15. Resources for Data Science, including GitHub, Jupyter Notebook
16. Essential packages: NumPy, SciPy, Pandas, Scikit-learn, NLTK, BeautifulSoup
17. Data visualizations: matplotlib, PixieDust
18. Using Jupyter "Magic" commands
19. Using Big SQL to access HDFS data, Creating Big SQL schemas and tables, Querying Big SQL tables, and Configuring Big SQL security
20. Data federation with Big SQL
21. IBM Watson Studio
22. Analyzing data with Watson Studio

Prerequisites		Linux, SQL
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	Nil
03	Class Participation	10
04	Quiz	05
05	Theory Exam-I	Nil
06	Theory Exam-II (Certification Exam by IBM)	25

07	Theory Exam-III	10
08	Report-I	Nil
09	Report-II	Nil
10	Report-III	Nil
11	Project-I	30
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

Big Data Overview: Data Overview, Industry Applications, Case Studies, Understanding Big Data

Big Data and Analytics: Hortonworks Data Platform (HDP), Apache Ambari, Hadoop and the Hadoop Distributed File System, MapReduce and YARN, Apache Spark, Storing and Querying data, ZooKeeper, Slider, and Knox. Loading data with Sqoop, DataPlane Service, Stream Computing,

Data Science essentials, Drew Conway's Venn Diagram - and that of others, The Scientific Process applied to Data Science, The steps in running a Data Science project, Languages used for Data Science (Python, R, Scala, Julia, ...), Markdown language with notebooks, Resources for Data Science, including GitHub, Jupyter Notebook, Essential packages: NumPy, SciPy, Pandas, Scikit-learn, NLTK, BeautifulSoup..., Data visualizations: matplotlib, ..., PixieDust, Using Jupyter "Magic" commands,

Using Big SQL to access HDFS data, Creating Big SQL schemas and tables, Querying Big SQL tables, Configuring Big SQL security, Data federation with Big SQL,

IBM Watson Studio, Analyzing data with Watson Studio

Reference Books:

1. Benjamin Bengfort and Jenny Kim. *Data Analytics with Hadoop: An Introduction for Data Scientists*. O'Reilly Media, 2016.
2. Jake VanderPlas. *Python Data Science Handbook: Essential Tools for Working with Data*. O'Reilly Media, 2016.
3. James D. Miller. *Learning IBM Watson Analytics*. Packt Publishing Limited, 2016.

Activities Related to Skill Development and Employability

Each Student has developed one project. Sample project list

1. Classifying and Predicting GW Events based on Peak Luminosity, Radiated Energy and Chirp Mass
2. Classifying GW events based on Peak Luminosity, Radiated Energy and Primary mass

Course Title and Code:	Business Intelligence & Applications: CS2106
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech+M.Tech IX Sem

Course Objective- This course will prepares students to understand report building techniques using relational data models. They will also learn how to enhance, customize, and manage professional reports and will then further be explained about Active reports content and functionality.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Understand the importance of analytics and how its transforming the world today
2. Understand how analytics provided a solution to industries using real case studies
3. Explain what is analytics, the various types of analytics, and how to apply it
4. Understand how a business analysis software works, and its architecture
5. Describe a reporting application, its interface, and the different report types
6. Create different types of advanced reports
7. Understand Active Reports and how to create them

Prerequisites		-
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	Nil
03	Class Participation	10
04	Quiz	05
05	Theory Exam-I	Nil
06	Theory Exam-II (Certification Exam by IBM)	25
07	Theory Exam-III	10
08	Report-I	Nil
09	Report-II	Nil
10	Report-III	Nil
11	Project-I	30
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

Business Analytics Overview: Analytics overview, Analytics trends: Past, present & future, Towards a predictive enterprise, Analytics: Industry domains, Case studies and solutions, Business Intelligence and Analytics 101, IBM Cognos Analytics for Consumers, Business analysis solutions

IBM Cognos Analytics: Author Reports Fundamentals – Introduction, Create list reports, Focus reports using filters, Create crosstab reports, Present data graphically, Focus reports using prompts, Extend reports using calculations, Use additional report building techniques, Customize reports with conditional formatting, Drill-through definitions, Enhance report layout

IBM Cognos Analytics: Author Reports Advanced – Introduction, Create query models, Create reports based on query relationships, Create advanced dynamic reports, Design effective prompts, Create additional advanced reports, Examine the report specification, Distribute reports through bursting, Enhance user interaction with HTML,

IBM Cognos Analytics: Author Active Reports –Introduction to IBM Cognos Active Reports, Use Active Report connections, Active Report charts, visualizations, and decks

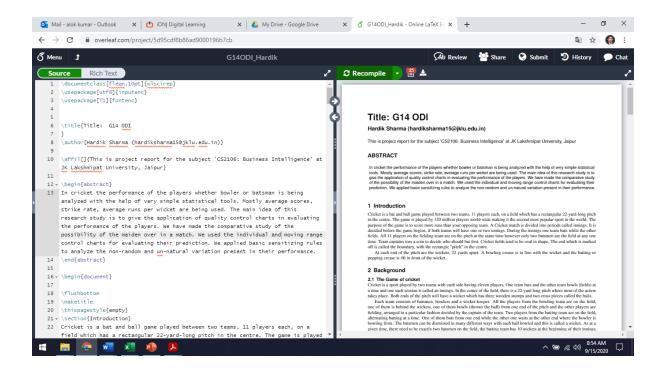**Reference Books:**

1. Cindi Howson. *Successful Business Intelligence, Second Edition: Unlock the Value of BI & Big Data*. McGraw-Hill Education, 2013.
2. Dan Volitich, Gerard Ruppert. *IBM Cognos Business Intelligence 10: The Official Guide*. McGraw-Hill Education, 2013.

Activities Related to Skill Development and Employability

Each Student has developed one project, Report on Overleaf

Mail - alok kumar - Outlook | iON| Digital Learning | My Drive - Google Drive | G14ODI_Hardik - Online LaTeX E

overleaf.com/project/5d95cdf8b86ad9000196b7cb

Menu G14ODI_Hardik Review Share Submit History Chat

Source | Rich Text | Recompile

```
1  \documentclass[fleqn,10pt]{wlscirep}
2  \usepackage[utf8]{inputenc}
3  \usepackage[T1]{fontenc}
4
5
6  \title{Title:  G14 ODI
7  }
8  \author{Hardik Sharma (hardiksharma15@jklu.edu.in)}
9
10 \affil[]{This is project report for the subject 'CS2106: Business Intelligence' at
   JK Lakshmipat University, Jaipur}
11
12 \begin{abstract}
13 In cricket the performance of the players whether bowler or batsman is being
   analyzed with the help of very simple statistical tools. Mostly average scores,
   strike rate, average runs per wicket are being used. The main idea of this
   research study is to give the application of quality control charts in evaluating
   the performance of the players. We have made the comparative study of the
   possibility of the maiden over in a match. We used the individual and moving range
   control charts for evaluating their prediction. We applied basic sensitizing rules
   to analyze the non-random and un-natural variation present in their performance.
14 \end{abstract}
15
16 \begin{document}
17
18 \flushbottom
19 \maketitle
20 \thispagestyle{empty}
21 \section{Introduction}
22 Cricket is a bat and ball game played between two teams, 11 players each, on a
   field which has a rectangular 22-yard-long pitch in the centre. The game is played
```

Title: G14 ODI

Hardik Sharma (hardiksharma15@jklu.edu.in)

This is project report for the subject 'CS2106: Business Intelligence' at JK Lakshmipat University, Jaipur

ABSTRACT

In cricket the performance of the players whether bowler or batsman is being analyzed with the help of very simple statistical tools. Mostly average scores, strike rate, average runs per wicket are being used. The main idea of this research study is to give the application of quality control charts in evaluating the performance of the players. We have made the comparative study of the possibility of the maiden over in a match. We used the individual and moving range control charts for evaluating their prediction. We applied basic sensitizing rules to analyze the non-random and un-natural variation present in their performance.

1 Introduction

Cricket is a bat and ball game played between two teams, 11 players each, on a field which has a rectangular 22-yard-long pitch in the centre. The game is played by 120 million players world-wide making it the second most popular sport in the world. The purpose of the game is to score more runs than your opposing team. A Cricket match is divided into periods called innings. It is decided before the game begins, if both teams will have one or two innings. During the innings one team bats while the other fields. All 11 players on the fielding team are on the pitch at the same time however only two batsmen are the field at any one time. Team captains toss a coin to decide who should bat first. Cricket fields tend to be oval in shape. The end which is marked off is called the boundary, with the rectangle "pitch" in the centre.

At each end of the pitch are the wickets, 22 yards apart. A bowling crease is in line with the wicket and the batting or popping crease is 4ft in front of the wicket.

2 Background

2.1 The Game of cricket

Cricket is a sport played by two teams with each side having eleven players. One team bats and the other team bowls (fields) at a time and one such session is called an innings. In the center of the field, there is a 22-yard long pitch where most of the action takes place. Both ends of the pitch will have a wicket which has three wooden stumps and two cross pieces called the bails.

Each team consists of batsmen, bowlers and a wicket-keeper. All the players from the bowling team are on the field; one of them is behind the wickets, one of them bowls (throws the ball) from one end of the pitch and the other players are fielding, arranged in a particular fashion decided by the captain of the team. Two players from the batting team are on the field, alternating batting at a time. One of them bats from one end while the other one waits at the other end where the bowler is bowling from. The batsmen can be dismissed in many different ways with each ball bowled and this is called a wicket. As at a given time, there need to be exactly two batsmen on the field, the batting team has 10 wickets at the beginning of their innings.

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CS2401 Advanced Statistics

Course Title and Code: Advanced Statistics CS2401	
Hours per Week	Curated MOOC
Credits	4
Students who can take	PhD

Course Objective: This course introduces and explores various statistical modeling techniques, including linear regression, logistic regression, generalized linear models, hierarchical and mixed effects (or multilevel) models, and Bayesian inference techniques. All techniques will be illustrated using a variety of real data sets, and the course will emphasize different modeling approaches for different types of data sets, depending on the study design underlying the data.
Learning Outcome: On successful completion of this course, the students should be able to: 1. Identify the dependent and independent variables in real life problems.   2. Write Python programs for Statistical Inference and Prediction.   3. Apply Linear and Logistic Regression on real data sets   4. Write Python programs using Multilevel and Marginal Models and Dependent Data   5. Apply Bayesian Inference Techniques on real data sets

Prerequisites: Linear Algebra, Basic Statistics

Evaluation Scheme

Sr. No	Specifications	Marks
1	Attendance	Nil
2	Assignment	20
3	Class Participation	Nil
4	Quiz	Nil
5	Theory Exam I	20
6	Theory Exam	Nil
7	Theory Exam (End Term)	40
8	Report-1	Nil
9	Report-2	Nil
10	Report-3	Nil
11	Project -1	20
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation1	Nil
15	Lab Evaluation2	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Evaluation Scheme for Retest

Sr. No	Specifications	Marks
1	Theory Exam (End Term)	40

Course Contents:
Overview & Considerations for Statistical Modeling: Fitting Statistical Models to Data with Python Guidelines, Types of Variables in Statistical Modeling, Different Study Designs Generate Different Types of Data: Implications for Modeling, Objectives of Model Fitting: Inference vs. Prediction, Plotting Predictions and Prediction Uncertainty, Python Statistics Landscape.

Fitting Models to Independent Data: Introduction of Linear Regression, Linear Regression Inference, Interview: Causation vs. Correlation, Introduction of Logistic Regression, Logistic Regression Inference

Fitting Models to Dependent Data: Multilevel Models: Multilevel Linear Regression Models, Multilevel Logistic Regression models, Practice with Multilevel Modeling: The Cal Poly App, Marginal Models: Marginal Linear Regression Models, Marginal Logistic Regression

Bayesian Approaches to Statistics and Modeling: Bayesian in Python, Case Studies on Bayesian Approaches

Case Studies, Assignments & Lab Sessions on real life problems.

Activities Related to Skill Development and Employability

Each Student must complete the assignments and projects, Sample List of assignments and projects:

- Probability of flight Over-booking
- Sales prediction
- House price analysis
- Cricket score analysis
- Forecasting future global fisheries production under climate change
- Model Predictive Control for Urban Road Traffic Networks

CS2402 Data Structure and Algorithms

Course Title and Code: Data Structure and Algorithms (CS2402)	
Hours per Week	Curated MOOC
Credits	**4**
Students who can take	**PhD**

Course Objective: This course introduces advanced algorithms build upon basic ones and use new ideas. It will start with networks flows which are used in more typical applications such as optimal matching's, finding disjoint paths and flight scheduling as well as image segmentation in computer vision. It will then proceed to linear programming with applications in optimizing budget allocation, portfolio optimization, finding the cheapest diet satisfying all requirements and many others. This course will study the classical NP-complete problems and the reductions between them.

Learning Outcome:
On successful completion of this course, the students should be able to:
1.   Write programs to solve the real-life problems using various Network flow algorithms.
2.   Write programs using various LP algorithms on real life problems.
3.   Analyze the Complexity of various Network flows and LP algorithms.
4.   Identify and Analyze the NP-complete problems
5.   Cope with NP-completeness

Prerequisites: Linear Algebra, Basic Statistics

Evaluation Scheme

Sr. No	Specifications	Marks
1	Attendance	Nil
2	Assignment	20
3	Class Participation	Nil
4	Quiz	Nil
5	Theory Exam I	20
6	Theory Exam	Nil
7	Theory Exam (End Term)	40
8	Report-1	Nil
9	Report-2	Nil
10	Report-3	Nil
11	Project -1	20
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation1	Nil
15	Lab Evaluation2	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Evaluation Scheme for Retest

Sr. No	Specifications	Marks
1	Theory Exam (End Term)	40

Course Contents:
Advanced Algorithms and Complexity: Introduction to Network Flows, Residual Networks, Maxflow - Mincut, Ford–Fulkerson Algorithm, Edmonds–Karp Algorithm, Bipartite Matching, Image Segmentation

Linear Programming: Linear Algebra: Method of Substitution, Linear Algebra: Gaussian Elimination, Convexity, Duality, Duality Proofs, Linear Programming Formulations, Simplex Algorithm, Ellipsoid Algorithm.

NP-complete Problems: Brute Force Search, Search Problems: Traveling Salesman Problem, Hamiltonian Cycle Problem, Longest Path Problem, Integer Linear Programming Problem, Independent Set Problem, P and NP, Reductions, Showing NP-completeness, Independent Set to Vertex Cover, 3-SAT to Independent Set, SAT to 3-SAT, Circuit SAT to SAT, All of NP to Circuit SAT, Using SAT-solvers.

Coping with NP-completeness: 2-SAT, 2-SAT: Algorithm, Independent Sets in Trees, 3-SAT: Backtracking, 3-SAT: Local Search, TSP: Dynamic Programming, TSP: Branch and Bound, Vertex Cover, Metric TSP, TSP: Local Search.

Case Studies, Assignments & Lab Sessions on real life problems.

Activities Related to Skill Development and Employability

Each Student must complete the assignments and projects, Sample List of assignments and projects:

- Assigning Airline Crews to Flights (maximum bipartite matching)
- Evacuating People (Edmonds–Karp algorithm for computing maximum flow)
- Stock Charts (maximum flow and path cover)
- Infer Energy Values of Ingredients
- Optimal Diet Problem
- Advertisement Budget Allocation
- Assign Frequencies to the Cells of a GSM Network
- Plan a Fun Party (find maximum independent set in tree using dynamic programming)
- Integrated Circuit Design (solve 2-SAT problem)
- Cleaning the Apartment (reduce Hamiltonian path to SAT)
- Reschedule the Exams

Entrepreneurial Mindset and Problem Identification

Course Code: ED2104
Credit: 2
Trimester: 2

Course Description:
This course intends to familiarize students with concepts pertaining to The Golden Circle, Entrepreneurial Leadership, Design Innovation and Idea Generation. The aim is to give students a deep understanding of these concepts around leadership and entrepreneurship, while also explaining the relevance that each of them holds in the students' current context. With this course, they will be better equipped at understanding their own selves as potential leaders, strengthening their ideological capabilities and identifying shortcomings and potential downfalls in an organisational setting by being able to creatively ideate and innovate solutions on problem statements and situations. With the help of real-life examples, visual aids and various experiential activities - the students are expected to understand the concepts in depth and be able to apply them in their actual entrepreneurial settings. The assignments included will be with the intention of getting them to apply their knowledge to test theoretically, as well as with practical usage.

Course Learning Outcomes:
1. To improve upon the students' existing strengths as learners and potential corporate/entrepreneurial leaders and address their weaknesses.
2. To build the 21st century skill set of "Forever Learning" and collaborate with their peers in an inclusive atmosphere towards entrepreneurial success.
3. To hone their creative ideation and problem solving skills by giving them conceptual knowledge supplemented with activities and assignments to work on the same.
4. To build a skill of identifying problems as opportunities and undertaking field specific research activities towards building a valuable product/service.

Activities Related to Skill Development and Employability

Field Project Briefs
Students will undertake a field project on Design Innovation and Idea Generation to complete the course requirements. This will be a group project allocated and group is expected to complete the same as per guidelines.

Course Code: ED2105
Credits: 3
Trimester: 3

Course Description:

In this course, students will also undergo the early stage entrepreneurial journey, following the process of idea generation, design thinking, market research, product development, business model, business pitch and entrepreneurial finance. The aim is to give students a deep understanding of these concepts around product validation and marketing, while also explaining the relevance that each of them holds in the students' current ventures. With this course, they will be better equipped at understanding their ideal customers, strengthening their value proposition and identifying shortcomings and potential problem areas in their startup plans and how they can rectify them.

With the help of real-life examples, visual aids, mentor connect session and various experiential market activities - the students are expected to understand the concepts in depth and be able to apply them in their actual entrepreneurial settings. The assignments included will be with the intention of getting them to apply their knowledge to test theoretically, as well as with practical usage in their respective startups.While many students can think of business ideas, they need to assess if they feel passionate about the idea and understand how to take action on it. The course will cover fundamentals, real practice and necessary tools around entrepreneurship through academic sessions, mentor workshops, in-class activities, industry visits, on-ground research and out-of- classroom activities.

Course Learning Outcomes:

- Develop the ability to understand and analyse the various aspects of entrepreneurship.
- Learn to ideate, design, market and pitch products or services to the right audience.
- Apply concepts such as design thinking, value proposition and business model in replication of the entrepreneurial process.
- Learn to define and communicate a business concept and fine tune their presentation skills.
- Learn how to identify new opportunities as well as understand myriad marketing and venture development strategies and Go-To-Market strategies

Course Content/Topics to be covered:

- Problem Generation
- Problem Identification
- Problem Framing
- Identifying industries for problem solving
- Idea Generation
- Idea Assessment
- Idea versus Opportunity
- Team Formation
- Empathy Mapping
- Market Research
- Customer Survey
- Elevator Pitch

Activities Related to Skill Development and Employability

Assignment 1: on The Lean Startup
Assignment 2: on Blue Ocean Strategy
Assignment 3: on Pitch Deck
Assignment 4: on Go-To-Market strategies

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
Product Launch

Course Code: ED2111
Credit: 2
Trimester : 1

Course Objective
The students will be will identify a viable product/service, develop it as a concept, prototype to the extent possible and launch on a designated day in the semester. The launch should aim to optimize the adoption/sales of the product or service and investment in the launch.

Course Conduct
Interdisciplinary group work is a cornerstone of the Pinnacle MBA programme. Students will form teams of three or four students from the course. Although the team will work on a single launch, the work and contribution from each member needs to be clearly defined. The students can form their own teams or will be assigned teams by the faculty.

As a final submission, students will submit separate project reports (which could have some shared text with other team members) but will emphasise the work of their respective parts.

The team can launch any product or service which meets the following conditions:
- It should solve a real problem
- It should be both commercially viable, socially acceptable and ethical
- It should be innovative: either entirely new to the world, or a significant improvement on something that exists, or something that is translated from one domain to another in a new way
- The target user for the product/service should be the students of the University.
- The product/service should be developed and prototyped to the fullest extent possible in the time frame of a term. It is not necessary to have a working prototype.

The students will plan their own approach, work schedule, scope of concept/prototype development, research and launch strategy.

On 8-9 October the team will have the opportunity to present its product/service in a 'press conference which will be attended by their chosen invitees.

During the semester, the team will have a weekly check-in with faculty to present their progress, seek feedback and obtain guidance. Attendance will be marked in these sessions.

Activities Related to Skill Development and Employability

Field Project Briefs
Students will undertake a field project on a real problem:
- It should be both commercially viable, socially acceptable and ethical
- It should be innovative: either entirely new to the world, or a significant improvement on something that exists, or something that is translated from one domain to another in a new way
- The target user for the product/service should be the students of the University.
- The product/service should be developed and prototyped to the fullest extent possible in the time frame of a term. It is not necessary to have a working prototype.

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
Prototype & Pilot

Course Code: ED2201
Credits: 3
Trimester: IV

Course Description:
This course intends to familiarize students with concepts pertaining to Lean Market Validation, Value Proposition Canvas, Business Model Canvas, Blue Ocean and Red Ocean Strategy, Beach Head Strategy, Customer Persona, Founder's Agreement, and Pitch Decks. The aim is to give students a deep understanding of these concepts around product validation and marketing, while also explaining the relevance that each of them holds in the students' current ventures. With this course, they will be better equipped at understanding their ideal customers, strengthening their value proposition and identifying shortcomings and potential problem areas in their startup plans and how they can rectify them. With the help of real-life examples, visual aids, mentor connect session and various experiential market activities - the students are expected to understand the concepts in depth and be able to apply them in their actual entrepreneurial settings. The assignments included will be with the intention of getting them to apply their knowledge to test theoretically, as well as with practical usage in their respective startups.

Course Learning Outcomes:
- To improve upon the students' existing strengths as learners and potential corporate/entrepreneurial leaders and address their weaknesses
- Empower students and help them learn how to present their ventures and ideas effectively
- Enable students to learn how to identify new opportunities as well as understand myriad marketing and venture development strategies and Go-To-Market strategies
- Equip students with technical knowledge around building Founder's Agreements and Pitch Decks

Course Content/Topics to be covered:
- Startup Idea Validation
- Lean Market Validation
- Value Proposition Model
- Business Model Canvas
- Blue and Red Ocean Strategy
- Customer Persona
- Beach Head Strategy
- Founder's Agreement
- Market Research for Startups
- Building your Pitch Deck

Activities Related to Skill Development and Employability

Assignment 1: on The Lean Startup
Assignment 2: on Blue Ocean Strategy
Assignment 3: on Pitch Deck
Assignment 4: on Go-To-Market strategies

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
Business Plan & Pitch

Course Code: ED2202
Credits: 3
Trimester: V

Course Description:

This course intends to familiarize students with concepts pertaining to Lean Market Validation, Value Proposition Canvas, Business Model Canvas, Blue Ocean and Red Ocean Strategy, Beach Head Strategy, Customer Persona, Founder's Agreement, and Pitch Decks. The aim is to give students a deep understanding of these concepts around product validation and marketing, while also explaining the relevance that each of them holds in the students' current ventures. With this course, they will be better equipped at understanding their ideal customers, strengthening their value proposition and identifying shortcomings and potential problem areas in their startup plans and how they can rectify them. With the help of real-life examples, visual aids, mentor connect session and various experiential market activities - the students are expected to understand the concepts in depth and be able to apply them in their actual entrepreneurial settings. The assignments included will be with the intention of getting them to apply their knowledge to test theoretically, as well as with practical usage in their respective startups.

Course Learning Outcomes:

- To improve upon the students' existing strengths as learners and potential corporate/entrepreneurial leaders and address their weaknesses
- Empower students and help them learn how to present their ventures and ideas effectively
- Enable students to learn how to identify new opportunities as well as understand myriad marketing and venture development strategies and Go-To-Market strategies
- Equip students with technical knowledge around building Founder's Agreements and Pitch Decks

Course Content/Topics to be covered:

- Startup Idea Validation
- Lean Market Validation
- Value Proposition Model
- Business Model Canvas
- Blue and Red Ocean Strategy
- Customer Persona
- Beach Head Strategy
- Founder's Agreement
- Market Research for Startups
- Building your Pitch Deck

Activities Related to Skill Development and Employability

Field Project Briefs
Students will undertake a field project on identifying new opportunities as well as understanding myriad marketing and venture development strategies to complete the course requirements. This will be a group project allocated and group is expected to complete the same as per guidelines.

Course Code: ED2203
Credits: 2
Trimester: VI

Course Description:
In this course, students will also undergo the early stage entrepreneurial journey, following the process of idea generation, design thinking, market research, product development, business model, business pitch and entrepreneurial finance. The aim is to give students a deep understanding of these concepts around product validation and marketing, while also explaining the relevance that each of them holds in the students' current ventures. With this course, they will be better equipped at understanding their ideal customers, strengthening their value proposition and identifying shortcomings and potential problem areas in their startup plans and how they can rectify them.

With the help of real-life examples, visual aids, mentor connect session and various experiential market activities - the students are expected to understand the concepts in depth and be able to apply them in their actual entrepreneurial settings. The assignments included will be with the intention of getting them to apply their knowledge to test theoretically, as well as with practical usage in their respective startups. While many students can think of business ideas, they need to assess if they feel passionate about the idea and understand how to take action on it. The course will cover fundamentals, real practice and necessary tools around entrepreneurship through academic sessions, mentor workshops, in-class activities, industry visits, on-ground research and out-of- classroom activities.

Course Learning Outcomes:
- Develop the ability to understand and analyse the various aspects of entrepreneurship.
- Learn to ideate, design, market and pitch products or services to the right audience.
- Apply concepts such as design thinking, value proposition and business model in replication of the entrepreneurial process.
- Learn to define and communicate a business concept and fine tune their presentation skills.
- Learn how to identify new opportunities as well as understand myriad marketing and venture development strategies and Go-To-Market strategies

Course Content/Topics to be covered:
- Basics of Fundraising
- Types of Funding
- Sources of Funding
- Crowdfunding
- Running a crowdfunding campaign
- Launch Essentials
- Acquiring early customers
- Marketing Strategies
- Entrepreneurial Journey
- Reflection on process of entrepreneurship

Activities Related to Skill Development and Employability

Field Project Briefs
Students will undertake a field project on understanding their ideal customers, strengthening their value proposition and identifying shortcomings and potential problem areas in their startup plans and how they can rectify them.

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
Special Topics in Economics & Public Policy

Course Code: EP2281
Credit: 1
Term: 3

Overview:

Format	Session
Lecture & Open Discussion	Theme: Diagnostics of Unemployment; Job Creation
Reading	A chapter from his upcoming book with NITI Aayog *Planning in the 20th Century and Beyond.* This will focus on 8 suggestions for the manufacturing strategy for India
Group Discussions	The students will be divided into groups of 10 to discuss 2-3 strategies each from the reading which will be facilitated by him.
Presentations & Conclusion	Each group gives a 15-20 minute presentation based on their readings and discussion which will be graded for the whole group.

Activities Related to Skill Development and Employability

Discussion and Presentation on Diagnostics of Unemployment and Job Creation on the reading material from *'Planning in the 20th Century and Beyond'*.

Course Description: This course introduces computational analysis of data based on Linear Algebra Principles and Statistics. The computational analysis will include learning and utilizing Python as a programming language. This course will lead to a technical project that will be based on learnings from the course duration.

Learning Outcomes

After course completion, the student will be able to
1. Write Simple Python programs using Various Datatypes, Control Structures, Decision Statements, Libraries, Functions (M1)
2. Develop Python programs using Classes and Objects, File Handling, Exception Handling, etc. (M2)
3. Develop Programs for Analyzing and interpreting Complex situations in various domains including sustainable development by combining various Linear Algebra, Statistics and Other Problem Solving Techniques (M3)
4. Model Complex systems as Linear simultaneous equations and analyze the same using Matrix methods (M1)
5. Model Data as matrices and Find Eigen Values and Eigen Vectors and Apply the same for problem solving, e.g., ranking and performance analysis (M1)
6. Perform Support Vector Decomposition on Matrices (M1)
7. Summarize and Visualize different datasets (M2)
8. Analyze and interpret different datasets using Discrete and Continuous Probability Distributions and Apply the same for problem solving, e.g., Goodness of Fit (M2)
9. Formulate and validate parametric hypothesis with reference to different datasets (M2)
10. Apply correlation, regression, least square method and time series analysis for modeling, analysis, interpretation and forecasting (M2)

Domain Specific Knowledge
Python Programming Language, Linear Algebra, Statistical Techniques

Professional Skills
- Collaboration, Leadership, Team-work, Social Responsibility
- Idea Generation, Professional Ethics, Time Management
- Presentation Skills, Report Generation, Desire to Learn
- Interpersonal Skills, Critical Thinking

Teaching Scheme and Credits

Hrs. per Week		Credits	Duration in Weeks
In Class	Out Class	10	12
10 (L) + 2 (T)	20 - 25		

Expectations from the Students

- To adhere to the course guidelines/course code throughout its duration
- To work in team with a significant and well-defined contribution from each individual
- To work beyond class duration in the team on projects
- Self-learning on the topics relevant to the course sessions is required pre and post sessions.

Expectations from the Faculty Members

- To support in the situation where students are feeling stuck in the project
- To provide supporting notes and reading material at various stages, as per requirement
- To announce the assessment score at every evaluation stage so that each student is aware about his/her progress at each stage

Course Feedback: Online Every Fortnight

Evaluation Scheme

Sr. No	Specifications	Weightage (in percentage)
01	Attendance	Nil
02	Assignment	10
03	Class Participation	10
04	Quiz	10
05	Theory Exam	10
06	Theory Exam	10
07	Theory Exam	Nil
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	10
12	Project -2	10
13	Project -3	30
14	Lab Evaluation	Nil
15	Lab Evaluation	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Project Evaluation Components – 50 Marks (50%)

Attendance Marks (% Weightage)	Documentation	Time Mgmt.	Amount of Work Done	Presentation	
				Presentation Skills	Q & A
10 (20%) Marks = 10 * (% Attendance)	10 (20%)	05(10%)	10 (20%)	10 (20%)	05(10%)

Class participation will include learning outcomes in writing, random questions from individuals in the class and surprise quizzes.

Assignment Evaluation Rubrics*: Timely Submission, Presentation of Solution Project Presentation Rubrics: Attendance, Documentation, Time Management, Amount of Work Done, Presentation*

Syllabus
Introduction to Algorithms, Hardware Overview, Python as a Tool, Installing Python and Writing a Program, Programming Standards, Programming Language Standards, Data Types, Data type Standards, Variables & Expressions, Decision Statements, How to Debug?, Control Structures: Loops & Iterations, Linear Data Structure: String, List, Tuple, Data Dictionary and Set, Python Library (Pandas, Numpy, PyPlot), Functions, Classes & Objects, Exception Handling, Working with Files

Matrix Operations, Eliminations, Matrix Inversion, Transformation, Solution of Linear , Simultaneous Equation, Eigen Values & Eigen Vectors , Linear Transformation, Linear Combination, Vector Spaces and Subspaces, Singular Vector Decomposition(SVD)

Probability, Baye's Rule, Sampling, Data Processing and Pre-processing, Random Variable, Discrete & Continuous Distribution, Hypothesis Formulation, Statistical Standards, Test of Parametric Hypothesis, ANOVA, Correlation, Curve Fitting, Regression, Time Series Analysis, Forecasting

Projects
Module 1 (Computational Linear Algebra)
Project: Team Ranking based on performance in SDG tournament

Description: This SDG tournament will be based on a quiz completion based on Sustainability Development Goals for developing countries as defined by UNO. Within each Group Tournament would be played among all pairs of teams and winnings of teams will be recorded. After recording winning/loosing of teams in groups, each team will be required to find ranking of teams using Matrix method within their group.

Group/Team	G1	G2	G3	G4
	T1	T1	T1	T1
	T2	T2	T2	T2
	T3	T3	T3	T3
	T4	T4	T4	T4
	T5	T5	T5	T5
	T6	T6	T6	T6
	T7	T7	T7	T7

Learning outcomes
Able to do:
1. Use matrix operations in real world problem solving.
2. Use python to solve bigger matrix operations

Domain Knowledge:
1. Matrix operations
2. Eigen values and Eigen vectors
3. Python libraries
4. Data interpretation
5. Sustainability Development Goals

Professional Skills:
1. Team work
2. Problem formulation

Module 2 (Computational Statistics)
Project: Environment as SDG

Description: Each group would be allocated one of the following broad areas. Each Group would be required to decide one project under the category. Students would be expected to apply suitable statistical techniques for execution of project.

1. Quantitative Analysis of Pollution in Urban Areas
2. Analysis of Waste Management for Sustainability
3. Modelling and Analysis of Water Quality Parameters

The project titles based on above broad areas may look like
Quantitative Analysis of Pollution in Urban Areas
    a) Comparative analysis of Air Pollution in major cities in Rajasthan
    b) A study on major contributing vehicles for noise pollution in urban areas
    c) A study in the factors for Industry pollution

Analysis of Waste Management for Sustainability
  a) Quantitative analysis of e-waste generation in urban areas
  b) An analysis for municipal solid waste generation in Jaipur
  c) Modelling and Analysis of Industrial waste water

Modelling and Analysis of Water Quality Parameters
  a) Modeling and analysis of relationship between water quality parameters
  b) Modeling and analysis for rain water forecasting
  c) Water quality analysis of river water based on Monsoon seasons

Learning outcomes
Able to do:
1. Formulating relationship between independent variable
2. Building hypothesis
3. Data collection and interpretation

Domain Knowledge:
1. Correlation
2. Regression
3. Sampling

Professional Skills:
1. Team work
2. Desire to learn
3. Critical thinking
4. Professional ethics
5. Societal Thinking

Module 3 (Computational Problem Solving)
Final Project: SDG based project to be decided by students

Description: Each Group of 2 students would be given an opportunity to select a topic based on assigned SDG. Student would prepare a detailed proposal and post approval would start working on data to achieve the mentioned Goals in Proposal.

Learning Outcomes
Able to do:
1. Data Collection
2. Data Preprocessing
3. Data Analysis
4. Data Visualization
5. Data Interpretation

Domain Knowledge:
1. Data Preprocessing Techniques
2. Test of hypothesis
3. Statistical Analysis
4. Eigen values and Eigen vectors
5. Basic matrix operations
6. Python libraries

Professional Skills:
1. Team work
2. Social Responsibility
3. Communication Skills
    a. Technical Writing
    b. Presentation Skills
    c. Interpersonal Communication
4. Critical thinking

Reference Books
1. Allen B. Downey. Think Python. Green Tea Press, Massachusetts, USA.
2. Kenneth Hoffman and Ray Kunze. Linear Algebra. PHI Learning Private Limited, 2nd Edition, 2012.
3. Gilbert Strang. Introduction to Linear Algebra. Wellesley-Cambridge Press, 4th edition, 2009.
4. Allen B. Downey. Think Stats. Green Tea Press, Massachusetts, USA.
5. Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, John Wiley & Sons, Inc., 3rd Edition (2004).
6. Rishard A. Johnson, Miller and Freund's probability and Statistics for Engineers, PHI

IT Resources
1. Anaconda Platform (includes Server, Jupyter Notebook)
2. Spyder (IDE to write Python Programs)
3. Cloud Computation Cycles as per need for some projects

BACHLOR OF BUSINESS ADMINISTRATION

FA1101
ACCOUNTING FOR BUSINESS
COURSE OUTLINE
SEMESTER I

INSTRUCTOR DETAILS
NAME: DR..LOKANATH MISHRA
EMAIL: lokanathmishra@jklu.edu.in
OFFICE: ROOM NO. 206 (IM BLOCK, 2nd FLOOR)
OFFICE TEL: 0141- 7107535

L-T-P: 3-0-0
COURSE CREDITS: 4
SESSION DURATION: 60 MINUTES

COURSE DESCRIPTION:

Students of business expected to have knowledge in the subjects like accounting, because business is built on a foundation of numbers - Revenues, cost ratios, valuations, performance measures etc. These numbers are the science behind the art of making crucial business decisions that would determine the current and future health of a company. Accounting relates to each functional activity due to its measurability in numbers and primacy of profit in a business organization. The financial health of an organization is determined by its Profit & Loss Account and the Balance Sheet. Although these statements are well defined and fact based, their analysis yields crucial information and knowledge for management decision making. Similarly cost accounting aimed to equip students on various aspects of cost ascertainment and cost control techniques Moreover, at the operational level, every employee in the organization comes across financial terms and figures in his/her day to day working. Therefore, it is imperative for every individual to understand the basic financial statements and concepts to perform well in their personal as well as professional life.

COURSE OBJECTIVES:

This Course would help student to

1. Understand the mechanism for recording, classifying and summarizing business transactions.

2. Understand the use & Preparation of Balance Sheet & Income Statement and how amounts that appears in these statements are changed to reflect events that affect an organization's resources.
3. Develop competency in using various tools & techniques for financial statement analysis and its useful interpretation.

LEARNING OUTCOMES:

Upon completion of the course, students are expected to be able to:

1. To appreciate the information needs of different categories of users of company financial reports.
2. To understand the significance of accounting principles.
3. To understand the system and process involved in preparing and presenting financial reports.
4. Prepare various financial statements such as Balance sheet, Income Statement and Cash Flow Statement etc.
5. Analyze and interpret the accounting facts and figures for various business decisions making.
6. Identify, recognize the importance of various costs for business decision and able to Prepare a statement of cost

COURSE OUTLINE

Financial Accounting Framework: Basic Assumptions, GAAP, Concepts and conventions; Accounting process, Rules of debit and credit, recording, classifying and summarizing business transactions. Preparation of Income statement and Balance sheet for sole proprietorship and company form of organization.

Costing for Business Decision: Introduction to Cost Centre, cost unit, Cost element, types and classification, method of costing and various techniques of costing for managerial decision making. Preparation of statement of cost.

Financial Statement Analysis: Comparative statement, Common size statement, trend analysis and Ratio Analysis

Analyzing Financial Statements of Banks: Understanding Banks, Bank Regulation, Bank financial statements, The Drivers of a Bank's Performance,

EVALUATION MATRIX

Component	Weightage
End Term	40%
Continuous Evaluation: Quiz, Practical Assignments, Group Assignment, Case Study, Project Work	60%

SESSION PLAN:

Session	Topics to be Covered
1	Introduction to Accounting, Objective, necessity, accounting terminology
2-3	Basic Assumptions, GAAP, Concepts and conventions
4	Accounting process, Rules of debit and credit
5-9	Recording, Classifying and Summarizing business transactions.
10-13	Preparation of Income statement and Balance sheet for sole proprietorship and company form of organization.
14-15	Review & Recap through case lets, class discussion and presentations.
16-17	Introduction to Cost Centre, cost unit, Cost element, types and classification
18-20	Method of costing and various techniques of costing for managerial decision making.
21-22	Preparation of Statement of Cost
23	Review & Recap through case lets, class discussion and presentations.
24-26	Financial analysis through comparative, common size and trend analysis
27-29	Ratio Analysis
30-31	Review & Recap through case lets, class discussion and presentations.
32-33	Understanding Banks, Bank Regulations,
34-38	Bank Financial Statements, The drivers of banks performance
39	Review & Recap through case lets, class discussion and presentations.
40	Revise and Review of the subject with learning outcomes.

Text Book

Financial Accounting – A managerial perspective (6th edition) by R.Narayanaswamy(2014)PHI Learning Private Limited

Activities Related to Skill Development and Employability

Case 1: Money Care Company

Case 2: The Satyam Accounting Scandal

Case 3: Kapoor Sotfware Ltd

Case 4: Chandra Rubber Company

Case 5: Gradual Bank and First Bank

Assignment 1: on Accounting GAAP & IFRS

Assignment 2: on Processing of Business Transactions

Assignment 3: on Preparation of Financial Statement of Sole Trading and Company.

Assignment 4: on Recognition of Revenue Income and Expenditure

Assignment 5: On Analysis of Financial Statements through Common Size, Comparative and trend

Assignment 6: on Ratio Analysis

Assignment 7: on Classification and controlling of costs

Assignment 8: on Preparation of Cost sheets.

JK Lakshmipat University, Jaipur
Institute of Management
Master of Business Administration
Academic Year- 2019-20
Finance for Decision Making-II

Course Code: FA2201
Credit: 3
Trimester: IV

Course Description:
The financial decisions by corporation are based on meeting short-term needs and also in support of the corporate overarching strategy. Thus, firms evaluate current project or investment by taking into account the internal strategy, the industry in which they operate, market conditions and investor demand. Financial decisions link the operations of the firm (short-term) with the long-term goals of a corporation. Decisions regarding investments, capital structure, and dividend policy are undertaken with the goal of value creation, reduction of risk, and sustainability while achieving the goals of the firms. This course deals with techniques that firms employ in evaluating projects and issues that may arise while making decisions.

Course Objectives:
To enable students to understand the importance of financial decisions that a firm undertakes and the impact both in the short - and long-term

Course Learning Outcomes:
On completion of the course students should be able to:
1. Evaluate the appropriate investment strategy, and corporate structure strategy to achieve the larger corporate goal
2. Appreciate the relationship between risk and return
3. Understand the impact of financial decisions on the long-term sustainability, risk, and profitability of the firm

Course Content:
1. Overview of financial markets and instruments
2. Commonly used capital budgeting techniques
3. Cash flows to consider in evaluating a project
4. Time value of money including bond and stock valuation
5. Risk Return tradeoff
6. Discussion on capital structure and financing decisions

Activities Related to Skill Development and Employability
Case study on hedging Dilemma in Volatile Markets
Case study on Lupin Stock: Risk & Return
Case study on Commercial Paper Market in India
Case study on Certificates of Deposits
Case study on UBS and the Subprime Mortgage Crises

Case study on A note on investment in Bonds: Calculation of YTM
Case study on A comparison of Risk & Return between BSE Sensex and Bank Fixed Deposits.
Case study on Dividend Policy at HPCL

Assignments On:
Risk & Return trade off
Bond Valuation
Capital Budgeting
Capital Structure

Course: Financial Market and Services

Term: V   **Credit:** 3   **Sessions**: 30   **Academic Year:** 2019-2020

Course Instructors: Lokanath Mishra

Email: lokanathmishra@jklu.edu.in

Course Description

The Course aims at providing the students, basic knowledge about the Finance concepts, markets and various services provided in those markets. You will see the difference between primary and secondary markets and learn about markets for different products. You will also look at various economic Indicators and their influence on the markets. The syllabus is structured in a way which provides adequate information about the roles of intermediaries and its regulating bodies. The subject will introduce the students to modern, twenty first century financial system having features such as derivative market; bourses such as NSE, MCX –SX; foreign exchange market and financial services such as mutual funds, credit rating, factoring, merchant banking etc. besides giving an overview of the International finance field. After completing this course, you will have a much stronger background of operation of financial markets and services.

Course Objectives
To enable students to understand the working of financial markets and dealing with its products and services.

Course Learning Outcomes
On completion of the course students should be able to:
- Appreciate the role of financial markets and dealing with its products.
- Acquainting with working of stock exchanges and settlement process
- Apprehend Financial service sector contribution and role in a well efficient financial system

Course Content
1. Money Market and Capital Market
2. Derivative Markets
3. Foreign Exchange market
4. Mutual funds
5. Leasing, Housing Finance, Credit Rating and factoring.

Pedagogy:
Lectures, discussions, videos, and problem solving
Students are expected to have completed the assigned readings before class.
Active pertinent class participation is encouraged to make the discussions interesting.

Academic integrity

Students are required to abide by the standards of academic integrity at JKLU. Students are not allowed to collaborate during exams, and they must not submit someone's work as their own. All members of a group must participate in all aspects of the assignment submission.

Reference books:

Financial Institution and Markets by Meir Kohn 2nd Edition, Oxford University Press, New Delhi.

Indian Financial System by Bharati V. Pathak, 4th Edition, Pearson Education , New Delhi.

Additional readings, cases, and numerical problems will be provided as part of the course

Tentative Evaluation

Quiz 1	10%
Quiz 2	10%
Assignment 1	20%
Assignment 2	20%
Class participation	10%
(incl. assignment, numerical)	
Final	30%

Session Plan

Topic	No. of Sessions	Details
Introduction	2	components of Financial System and their Interrelationship
Money Market	3	Chapter from Book
Capital Market: Primary Market	3	Chapter from Book
Secondary Market	3	Chapter from Book
Derivative Market	6	Concepts and Numerical from Book
Foreign Exchange Market	6	Concepts and Numerical from Book
Mutual Funds	4	Concepts and Numerical from Book
Leasing, Housing Finance,	2	General Idea and case lets
Credit Rating, Factoring	1	General Idea

ACTIVITIES RELATED TO EMPLOYABILITY ENHANCEMENT SKILLS

Assignment on:

1. **Review of Indian Banking Industry**
2. **Economic policies of RBI**
3. **Book Building process- Issue of IPO**
4. **Histrory and operation of stock exchanges in India**
5. **Evaluation of mutual fund sector performance in India**
6. **Credit Rating Agencies In India**
7. **Housing finance**
8. **Leasing**

CASE STUDIES ON:

1. **Derivatives Trading in India: A case Study**
2. **Financial Derivatives: The Currency and Rates**
3. **Risk Management in Commodity Derivatives Trading**

JK Lakshmipat University, Jaipur
Institute of Management
Master of Business Administration
Academic Year- 2019-20
Retail Banking & Operation

Course Code: FA2203
Credit: 2
Trimester: V

Course Description:
Course Description:
The course covers
   a) Evolution of retail banking in India
   b) Constituents of retail banking
   c) High level overview of retail banking operations
   d) The future ahead

Course Learning Outcomes:
   a) Retail banking…
         a. Key tenets and guiding principles
         b. Key operating efficiency and profitability levers
   b) Careers in retail banking

Course Content/Topics to be covered:
   a) History of banking and evolution of retail banking
   b) Retail liability products
   c) Retail liability operations
   d) Retail asset products
   e) Retail asset operations
   f) Retail risk management
   g) Microfinance and financial inclusion
   h) Technology… changing the way retail banking works

Activities Related to Skill Development and Employability

Project Presentation on Card Networks
Project Presentation on The new cashless economy- Unified payment interface & digital payments.
Project Presentation on Indian Retail credit sector Vis 2008-09 GFC
Project Presentation on Small Finance Banks- Are they living up to the financial inclusion dream of RBI
Project Presentation on Loss leader product… Consumer durable finance and profitability through cross sell of pre approval personal loan product
Project Presentation on opportunities in the MSME sector financing.
Case Study on 5 C analysis of Uplift Solution Inc.
Assignment on credit creation capacity of SCBs.

BACHELOR OF COMMERCE (HONOURS)
FN29
FINANCIAL DERIVATIVES
COURSE OUTLINE
SEMESTER VI

INSTRUCTOR DETAILS

NAME: DR. LOKANATH MISHRA

EMAIL: Lokanathmishra@jklu.edu.in

OFFICE: ROOM NO. 206 (IM BLOCK, 2nd FLOOR)

OFFICE TEL: 0141- 7107535

MOB: 9999558286

L-T-P: 4-0-0

COURSE CREDITS: 4

SESSION DURATION: 60 MINUTES

COURSE DESCRIPTION:

The phenomenal growth in the global markets for exchange-traded Options and Futures contracts on financial assets (foreign exchange, fixed income and equity securities, and stock indices) and on commodities has been accompanied by the growth in Over-the-Counter markets for swaps, related options, and other structured products. The exchange-traded products are traded by individuals and institutional investors, but the structured products are tailored to institutions. These derivative securities are used to meet a variety of objectives. The course defines the main kind of derivatives, shows how they are used to achieve various hedging and speculating objectives, introduces a framework for pricing derivatives, and studies several applications of derivative-pricing techniques outside derivative markets.

COURSE OBJECTIVES:
- To Understand the students about the concept of Derivatives and its types
- To acquaint the knowledge of Options and Futures and
- To know about Hedging and the development position of Derivatives in India.

LEARNING OUTCOMES:

- Acquaint with the various types of financial derivatives like forward, futures, options, Swaps, convertible, warrants, etc.
- Know about the mechanism of devising a hedging strategy, which includes (a) deciding on the futures contract, (b) which futures contract and (C) which contract month.
- Demonstrate critical thinking, analytical and problem solving skills in the context of derivatives pricing and hedging practice.
- Demonstrate an understanding of pricing forwards, futures and options contracts

COURSE CONTENTS:

Unit – I Derivatives – Features of a Financial Derivative – Types of Financial Derivatives – Basic Financial derivatives – History of Derivatives Markets – Uses of Derivatives – Critiques of Derivatives – Forward Market: Pricing and Trading Mechanism – Forward Contract concept – Features of Forward Contract – Classification of Forward Contracts – Forward Trading Mechanism – Forward Prices Vs Future Prices.

Unit – II Options and Swaps – Concept of Options – Types of options – Option Valuation – Option Positions Naked and Covered Option – Underlying Assets in Exchange-traded Options – Determinants of Option Prices – Binomial Option Pricing Model – Black-Scholes Option Pricing – Basic Principles of Option Trading – SWAP: Concept, Evaluation and Features of Swap – Types of Financial Swaps – Interest Rate Swaps – Currency Swap – Debt-Equity Swap.

 Unit – III Futures – Financial Futures Contracts – Types of Financial Futures Contract – Evolution of Futures Market in India – Traders in Futures Market in India – Functions and Growth of Futures Markets – Futures Market Trading Mechanism - Specification of 2 the Future Contract – Clearing House – Operation of Margins – Settlement – Theories of Future prices – Future prices and Risk Aversion – Forward Contract Vs. Futures Contracts.

Unit – IV Hedging and Stock Index Futures – Concepts – Perfect Hedging Model – Basic Long and Short Hedges – Cross Hedging – Basis Risk and Hedging – Basis Risk Vs Price Risk – Hedging Effectiveness – Devising a Hedging Strategy – Hedging Objectives – Management of Hedge – Concept of Stock Index – Stock Index Futures – Stock Index Futures as a Portfolio Management Tool – Speculation and Stock Index Futures – Stock Index Futures Trading in Indian Stock Market.

REFERENCES:
- Gupta S.L., FINANCIAL DERIVATIVES THEORY, CONCEPTS AND PROBLEMS PHI, Delhi, Kumar S.S.S. FINANCIAL DERIVATIVES, PHI, New Delhi, 2007
- Chance, Don M: DERIVATIVES AND RISK MANAGEMENT BASICS, Cengage Learning, Delhi.
- Stulz M. Rene, RISK MANAGEMENT & DERIVATIVES, Cengage Learning, New Delhi

Session No	Topic/Activity
1	Introduction to Derivatives,
2-4	Types of Financial Derivatives – Basic Financial derivatives – History of Derivatives Markets – Uses of Derivatives – Critiques of Derivatives – Forward Market
5-6	Forward Market: Pricing and Trading Mechanism
7-14	Options and Swaps
15	Class test/MCQ/ Case lets
16-23	Futures
24-30	Hedging of risk through derivative products

30-38	Concept of Stock Index – Stock Index Futures – Stock Index Futures as a Portfolio Management Tool – Speculation and Stock Index Futures – Stock Index Futures Trading in Indian Stock Market.
39-40	Revision Class

EVALUATION MATRIX:

Component	Weightage
Mid Term I	20%
Mid Term II	20%
End Term	40%
Continuous Evaluation (Internal Marks) Assignment, Case Study, Project Work	20%

JK Lakshmipat University, Jaipur
Institute of Management
BBA
Academic Year- 2019-20
Capstone-II

Course Code: GN42
Credits: 2
Semester: IV

Overview

Capstones are multifaceted and comprehensive assignments intended to serve as capping academic and intellectual experience for students. These are academically and intellectually challenging assignments filled with demanding but stimulating learning experiences. Generally conducted at the end of the term/programme, these are based on the learnings integrated during the preceding term/s. A capstone project may take a wide variety of form, such as a thesis, long-term investigative project, comprehensive case study that culminates into a final product, presentation, or performance. For instance, students may be asked to select a topic, or may be given a complex-problem/Case study to conduct research on the area, maintain a portfolio of findings, create a final product demonstrating their learning, and give an oral presentation on the project to a panel of experts who then collectively evaluate its quality.

The design of capstone projects is such that it encourages students to think critically, solve challenging problems, and develop skills such as oral communication, research, media literacy, teamwork, planning etc. In other words, it will help prepare them for higher studies, careers and life-long learning. In majority of cases, these capstone projects are also multidisciplinary in the sense that they require students to apply skills or research issues across many different domains of knowledge.

The educational goals of capstone projects are as under:
- Increasing student's motivation and engagement through increased academic rigor.
- Enhancing a student's educational and career aspirations.
- Boosting student's confidence, self-perception and self-esteem.
- Providing a platform for demonstrating learning and proficiency.

Activities Related to Skill Development and Employability

Multidisciplinary Case: Duster- New Hope for Indian Consumers (includes problem –solving orientation for concepts related with Marketing, Finance, HR and Operations)
Start-up Analysis: Students will analyse a Start-up and critical study the Business Model of the same. This is a group assessment and students are expected to complete the same as per guidelines.

JK Lakshmipat University, Jaipur
Institute of Management
BBA
Academic Year- 2019-20
Spreadsheet Essentials

Course Code: ID1101
Credits: 4
Semester: I

Course Description:
Business organizations are increasingly using spreadsheets for organizing and maintaining their day-to-day data. Consequently, achieving proficiency in using spreadsheet software has become an utmost necessity for business students. The present course introduces students with fundamental concepts of organizing, processing and presenting data. It also develops their skills in performing data management functions using Excel. Students will be able to learn about some of the most powerful features of Excel and generate useful reports using them. After successfully completing the course, they will be able to create professional-looking worksheets using MS-Excel software and at the same be ready to undertake advanced courses in the data analysis domain.

Course Learning Outcomes:
Upon successful completion, the student should be able to:
- Create, format and link worksheets using MS-Excel.
- Use formulas and functions to perform computations on data.
- Create data visualizations using different types of charts.
- Apply Conditional formatting, Perform Goal Seek Analysis, Use lookup functions.
- Create and update Pivot Tables and Pivot Charts.

Course Syllabi:
- Excel Environment, Ribbon Layout, Entering, Editing and Managing Data, Worksheet Formatting and Printing
- Mathematical computation using Formulas, Copying and Pasting Formulas, Absolute and Relative Referencing, Formula Auditing, Statistical Functions (SUM, COUNT, AVERAGE, MAX, MIN), Sorting and Filtering
- Creating and Formatting Charts (Line, Column, Stacked Column, Pie, Histogram, Pareto), Scatter Plot, Chart sheets, Using Charts in MS-Word/MS-PowerPoint
- Logical and Lookup Functions, Pivot Tables, Pivot Charts
- Working with Text, Dates and Times
- Financial Arithmetic using Spreadsheets
- Introduction to Advanced Excel Features

Activities Related to Skill Development and Employability

- Creating Excel workbooks to store, analyze and report business data.
- Visualize data using various charting features available in Excel
- Prepare worksheets to perform financial arithmetic for mortgage & loan scenarios, interest calculations, amortization etc.

JK Lakshmipat University, Jaipur
Institute of Management
MBA (2019-21 Batch)
Academic Year- 2019-20
Business Modeling using Excel

Course Code: ID2113
Credits: 3
Term: III

Course Description:
The present course will equip you with practical skills required in designing and structuring decision-making models, such as financial models, decision-making models, costing models or operations models. The techniques covered will focus on Microsoft Excel and benefit anyone who wishes to better understand, build, analyze or maintain Excel-based models. The course will build upon your Excel skills and advance them to the next level. You will be able to design professional looking worksheets applying best-practice model design methodologies to business problems.

Course Learning Outcomes:
- Understand and appreciate the role of data analytics in creating value for business.
- Model structured decision-making situations in various functional domains.
- Perform sophisticated data analysis using Microsoft Excel.

Course Syllabi:
- Modeling Fundamentals
- Best-Practice Principles of Modeling
- Useful Excel Tools and Techniques for Modeling
- NPV Analysis for Investment Evaluation
- Make or Buy Decisions
- Optimal Product Mix Decisions
- Travelling Salesman Problem
- Linear and Exponential Growth Modeling
- Determining Customer Value

Activities Related to Skill Development and Employability

- Prepare worksheets to perform financial arithmetic for mortgage & loan scenarios, interest calculations, amortization etc.
- Prepare data models using Excel Add-ins for solving managerial problems.

Course Code: ID2170
Credits: 2
Semester: I

Course Description:
Spreadsheet software (e.g., MS-Excel) offer tremendous functionality and plenty of in-built features that are essential for any data analysis job. Developing proficiency in the use of spreadsheet software can offer an advantage position to those who have to analyze, summarize and report data on a regular basis. The present course introduces participants with fundamental concepts of organizing, processing and presenting data. It also develops their skills in performing data management functions using Excel. Students will be able to learn about some of the most powerful features of Excel and generate useful reports using them. After successfully completing the course, they will be able to create professional-looking worksheets using MS-Excel software and at the same be ready to undertake advanced courses in the data analytics domain.

Course Learning Outcomes:
Upon successful completion, the student should be able to –
- Create, format and link worksheets using MS-Excel.
- Use formulas and functions to perform computations on data.
- Create data visualizations using different types of charts.
- Apply Conditional formatting, Perform Goal Seek Analysis, Use lookup functions.
- Create and update Pivot Tables and Pivot Charts.
- Summarize data using Histograms and Descriptive Statistics
- Run Descriptive Analytics (Using Data Analysis Toolpak)
- Perform basic Financial Arithmetic
- Determine Optimal Product Mix (Using Excel Solver)

Course Syllabi:
- Excel Environment, Ribbon Layout, Entering and Editing Data, Worksheet Formatting and Printing
- Performing Data Computations, Creating Expressions, Use of basic Excel Functions, Formula Copying, Relative and Absolute Referencing
- Formula Auditing, Range Names, Sorting & Filtering, Custom Sort, Subtotal Function
- Data Visualization, Charting in Excel
- Financial Arithmetic Using Excel-I (Simple & Compound Interest Calculation, Computing Loan Instalments, Amortization Chart)
- Financial Arithmetic Using Excel-II (Time Value of Money Concepts, Present Value, Future Value, Annuity, NPV Analysis, Goal Seek Analysis)
- Financial Arithmetic Using Excel-II (Time Value of Money Concepts, Present Value, Future Value, Annuity, NPV Analysis, Goal Seek Analysis)
- Logical and Lookup Functions
- Logical and Lookup Functions
- Pivot Tables and Charts, Data Analysis ToolPak, Solver

Activities Related to Skill Development and Employability

- Creating Excel workbooks to store, analyze and report business data.
- Visualize data using various charting features available in Excel
- Prepare worksheets to perform financial arithmetic for mortgage & loan scenarios, interest calculations, amortization etc.
- Prepare decision models for various managerial problems using Excel Add-ins.

JK Lakshmipat University, Jaipur
Institute of Management
MBA (2018-20 Batch)
Academic Year- 2019-20
Spreadsheet Applications in Management

Course Code: ID2201
Credits: 1
Term: IV

Course Description:
Managers in present times, irrespective of the functional area, need to collect, store and analyze volumes of business data for decision-making. Developing proficiency in use of spreadsheet software (like MS-Excel) thus becomes an imperative for them. Mastering spreadsheet skills will certainly help future managers in using business data to their advantage. The present course builds on the basic spreadsheet skills developed during earlier terms and puts them to use in a business setting. The course will run in a workshop mode where participants will be exposed to a business problem and they will solve it using spreadsheet software.

Course Learning Outcomes:
Upon successful completion, the student should be able to use spreadsheet software to -
- Summarize data using Histograms and Descriptive Statistics
- Describe data using Pivot Tables and Pivot Charts
- Perform basic financial arithmetic
- Calculate periodic payments for mortgage and lease repayments
- Compute future value of an annuity
- Evaluate Investments using NPV criteria
- Determine Optimal Product Mix

Topics to be covered:
- Excel Environment
- Pivot Table and Pivot Charts
- Financial Functions in Excel
- Excel Add-Ins

Activities Related to Skill Development and Employability

- Creating Excel workbooks to store, analyze and report business data.
- Visualize data using various charting features available in Excel
- Prepare worksheets to perform financial arithmetic for mortgage & loan scenarios, interest calculations, amortization etc.
- Prepare decision models for solving managerial problems using Excel Add-ins.

Course Code: LS2104
Credit: 1
Semester: 2

Overview:
You are a citizen. Which means you don't just possesses legal rights and responsibilities in relation to a particular government, but rather you are a member of one or more communities that you want to improve. Your communities may range from a block of houses or a single institution to the entire planet. The seminar on Law and Citizenship will equip you to fulfil this role of a public-spirited citizen. We will study issues that directly affect the lives of millions of citizens in context of accompanying legal frameworks. All these lectures are different but they all take the perspective of the citizen, draw on and enrich practical experience, and aim for a combination of facts, values and strategies that work in India.

The seminar focuses on the following three themes:
  I.   Why You Matter: Rights and Duties of Citizens
  II.   How to Matter: Advocacy on Boring and Unpopular Issues
  III. What Matters Now: Revisiting Citizenship in 21st century

Why You Matter: Rights and Duties of Citizens (4 hours)
1. A Lawyer, a Judge and a Politician Walk Into a Bar: Rights & Duties of Citizens
    1. Elections and a new definition of patriotism
    2. How the Emergency transformed the relationship between citizen and state
    3. Public Interest Litigations and RTI
How to Matter: Advocacy on Boring and Unpopular Issues (3 hours)
2. Rat Tails in Hanoi: How to Transform Good Ideas into Good Legislation
    1. How can citizens influence government policy
    2. Executive, Legislative and Constitutional interventions
    3. Acts vs. Rules

What Matters Now: Revisiting Citizenship in 21st century (3 hours)
3.   The Curious Case of Yuvraj Singh and Sahaja Chowdary: Private Agreements, Public Consequences
            1. Contracts and trust in society
            2. Incorporation: the most powerful idea of the last millennium
            3. Contract negotiations: why 49 is better than 51
4.   What do Naruto and Sophia Deserve: Re-examining Ideas of Citizenship, Liability and Property
            1. Digital Sovereignty and Citizenship in the age of Big Tech
            2. Aadhar case study
  That Spiderman Quote: Don't Be an Irresponsible Citizen

Activities Related to Skill Development and Employability
RTI Assignment

Academic Year- 2019-20
Filmmaking- Using Creativity to Drive Action

Course Code: LS2105
Credit: 1
Trimester: 3

Objective: To establish what is effective storytelling and how to do it.

Day 1| Duration 2.5 Hours
MODULE 1: Watching Films and what to see
Duration : 60 Minutes
1. Showing sequence of the film Whiplash: reference to explain 'What is a character in a story'; how to identify a character in a story; 'how to select a character based on the theme of the story?'
2. These lead to a discussion on the difference of 'fictional story' and 'non-fictional story', where 2 sets of trailers are screened: 'Whiplash and Shaadi Sex aur Parivaar' to establish the difference between non-fictional and fictional work.
3. Invited participants to share examples of nonfiction and fictional work they have seen. How do they identify the difference? (Interactive session)
Deliverables for the module: Interactive Q&A to identify the difference between fictional and non-fictional story frames and to identify the elements that differentiate fictional and nonfictional work.

MODULE 2 : What is an arch?
Duration: 90minutes
1. This module begins with the 'Spine Rule'. Here, the participants are explained how to build a story around a social issue by establishing a character, context, problem statement, intervention, and impact. This is followed by showing a social impact story of 'Ayush', a school going kid who followed the said rule. This is followed by a role-play exercise, where all the participants are divided into 4 groups, where they develop a story on 4 social issues and enact it, following the 'Spine Rule'.
2. This is followed by explaining the elements of how to capture a good frame. For this, we make the participants use their mobile phones to take pictures of other participants by applying the rules of capturing a good frame.
3. Next, we explain to the participants the concept of lighting to capture a good frame, followed by 'how to capture sound effectively'.
Outcome of the module: By the end of the module the participants will understand the difference between fictional and non-fictional narrative; technicalities of shoot (frame, light and sound); how to build a narrative using 'The Story Spine' tool.
Course work after day 1- Write a one page story

DAY 2 | Duration 5.5 hours
MODULE 4: 'Read your story?'
Duration: 60 minutes

Objective: To invite participants' to read and analyse their story based on the parameters of effective storytelling shared in the previous 2 modules, what is interesting and relatable?

Outcome of the module: By the end of the module the participants will be able to apply the previously explained parameters to their favourite stories to understand how effective storytelling tools work to move people.

MODULE 5: What is Consent and Ethics when capturing a story? Duration: 40 minutes

Objective: To invite participants' to understand the protocols to be followed when capturing a story.

Outcome of the module: By the end of the module the participants will understand: what is consent; how to take consent; rule of thumb for shoots.

MODULE 6: How to shoot your story

Duration: 40 minutes

Step 1. 'How to Shoot on Phone: the technicalities of a shoot'. Here we will describe the three components to be kept in mind while shooting on phone: Light, Sound, and Framing.

We will explain 'What is a frame?', followed by 'what does framing mean when shooting?'. What are the components that make a frame? How to select a suitable frame? Second, we will explain 'What does light mean when shooting?' (*Show a good frame and a bad frame: tell the difference)* Third, we will explain the 'role of light' in fictional narrative and non-fictional/documentary narrative.

MODULE 6: Shoot your story Duration: 60 minutes

Participants will be asked to create a short sequence on their phones with the discussed motion and framing techniques of 1 minute

Screening of the film - 60 minutes

Activities Related to Skill Development and Employability

1. Discussion on the difference of 'fictional story' and 'non-fictional story', where 2 sets of trailers are screened: 'Whiplash and Shaadi Sex aur Parivaar' to establish the difference between non-fictional and fictional work.
2. Role-play on 4 social issues and enact it, following the 'Spine Rule'
3. Assignment on effective storytelling tools
4. Discussion on protocols to be followed when capturing a story.
5. Assignment on creating a short sequence on their phones with the discussed motion and framing techniques of 1 minute

Course Title: Introduction to Production & Operation Management
Course Code: OP2102
Credits: 3
Course Instructors: Mr. Rajneesh Phatak, Dr. Sameer Mittal

Course Objective

Introduce concepts and techniques related to the design, planning, control, and improvement of both manufacturing and service operations.

1. Demonstrate an understanding of production as a process of converting or transforming resources into products;
2. Demonstrate an understanding of productivity measures, quality and costs both, direct and indirect; Understand how to measure process efficiency and effectiveness.
3. Understand the link between process characteristics and other strategic choices.
4. Apply tools and techniques for analysis of Production Scenarios.
5. Understand basics of tools and techniques presented by Operations research

Course Content

- ❖ INTRODUCTION TO PRODUCTION AND OPERATION MANAGEMENT (4)
  - Operations Management: Historical Context
  - Why Ops Management
  - Basics of Ops Management: Product, Process, Capacity, Inventory, Supply chain, Quality
- ❖ INTRODUCTION TO OPERATIONS RESEARCH (2)
  - History of Operations Research
  - Stages of Development of Operations   Research
  - OR in production management
- ❖ LINEAR PROGRAMMING (4)
  - Linear Programming Problem Formulation
  - Graphical Linear Programming Solution
  - Linear Programming using Solver
- ❖ FORECASTING (2)
  - Strategic Role of Forecasting in P&OM
  - Components of Forecasting Demand
  - Time Series Methods
  - Forecast Accuracy
  - Time Series Forecasting Using Excel
- ❖ CAPACITY (3)
  - Process Flow
  - Demand and capacity analysis
  - Congestion analysis
    - o Buildup diagrams
    - o Queuing Theory
    - o Little's law
  - Financial decision analysis
- ❖ TRANSPORTATION   & ASSIGNEMET (3)
  - Solution of a Transportation Problem

- Maximization in a Transportation Problem
- Assignment Problem Structure and Solution
- Maximization in an Assignment Problem

❖ Scheduling (2)
- Fundamentals of scheduling : Scheduling models, hard & Soft ceilings, sequencing, Expediting, Input-Output control, workforce scheduling
- Loading : Shop loading & Index method
- Job shop scheduling

❖ INVENTORY (4)
- Why Inventory costs money
- Optimal Order Quantity
- EOQ
- News Vendor Model
- Economic batch quantity
- ABC & VED Analysis

❖ PRODUCTION CONTROL (3)
- Production control methods
  - MRP
  - Kanban & CONWIP
  - MTO/ MTS
❖ BOOK REVIEW & Presentation by Groups: THE GOAL (3)

Reading Materials
- *Operations Management by William J. Stevenson*
- *Operations Management for Competitive Advantage - by Richard Chase*
- *The Goal - by Eliyahu M. Goldratt*

Assessment Scheme

Component	Weightage (100)
Class presentation of book review 1. Prepare a written analysis of one case; 2. Prepare a 3-page review of the book *The Goal* by Eliyahu Goldratt; and 3. Prepare a written report on one of the topics provided in the class	50%
Class Assignment & Quiz	50%

Activities Related to Skill Development and Employability

Case #	Activity
1.	The students prepared a written analysis of a case corresponding to the one of units studied in the course

Activities Related to Skill Development and Employability

Book Review #	Book
1.	The students prepared a 3-page review of the book *The Goal* by Eliyahu Goldratt

Course Title: Production Management & Operation Research
Course Code: OP2111
Credits: 3
Trimester: V
Course Instructors: Dr. Lokesh Vijayvargy

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Course Description:
In today's competitive world, excellence in operational practices is a key for success for any business. The purpose of this course is to educate students on various PMOR functions in any business organization. These concepts not only will create an awareness about this functional area but will also impart skills in students for optimization of various processes and in developing competitive business practices. This course will also develop skills in students with entrepreneurial orientation. The learnings of this course will help students in making strategic decisions in long run in their careers.

Course Learning Outcomes:
At the end of the course, the students should be able to:
 • Apply operations optimization concepts to take strategic decisions like Product, Process, Location, and Layout.
 • Apply operations management tools and techniques to take operational decisions regarding Quality Management, Inventory Management and cost minimization.

Tentative Session Plan

Session	Topic / Sub Topic
1	Introduction (Course overview, Need of the course, Expectations, Evaluation),
2	Transformation Process, Productivity Measurement
3	**Operation Research Tools**: Linear Programming -Introduction and Formulation
4	Linear Programming : Formulations
5	Linear Programming: Solution Methods & Interpretation
6	Linear Programming: Solution Methods & Interpretation using Excel
7	Sensitivity Analysis
8-9	Assignment Problem: Min Cost Problems
10	Transportation Problems
11	Demand Forecasting: Introduction, Reason for forecasting
12-13	Demand Forecasting: Type of Methods
14	Capacity Planning

15	Simulation: Introduction, Random Number Generation
16	Simulation by Excel
17-18	Introduction of Project Management (PERT & CPM)
19	Waiting Line Model: Introduction
20	Waiting Line Models; Service Industry
21-23	Inventory Models: Q and P Models, Economic Order Quantity model with safety stock calculations. Inventory Management Techniques, Selective Inventory Control: ABC, VED, FSN Analysis.
24-25	Facility Location Planning and Selection: Multi Criteria Problems (AHP and Factor Rating Method)
26-27	Product Layout – Production Line Balancing.
28	Service Layout: Process Layouts
29-30	Students Project Presentation

Text Book:
- Operations & Supply Management, Chase R., Shankar R. and Jacobs F., TMH, New Delhi, 12th edition.

  Reading Materials:
- Operations Management by Norman Gaither and Greg Frazier, CENGAGE Learning, Edition 9.
- Operations Management along the supply chain by Russell and Taylor, Wiley India Edition, 2012.
- Service Operations Management-Improving Service Delivery: Robert Johnston and Graham Clark, Pearson 2e.
- Service Operations Management: James Fitzsimmons & Mona Fitzsimmons, TMH

Assessment Scheme:

Assessment Component	Description	Weight (%)
Quizzes	There will be Two Quizzes.	20
Case Assignment	Students in Groups will be required to make presentation on analysis of cases/case-lets.	10
Project Presentation Class Participation	It will be on group basis (group of 4 to 6 students)	20 + 10 = 30
End Term Examination	It will be based on the total course. This will consist of case study, application-based situation questions along with conceptual review.	40

Case #	Case Title
1	Case Study- Petro Refinery: Product Mix Optimization

Course Title: Advance Topics in Operations Management

Course Code: OP2212

Credits: 2

Trimester: V

Course Instructors: Mr. Ramgopal Prajapat

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Course Objective:

Introduce concepts and techniques related to the Operations Strategy, control, and improvement of both manufacturing and service operations.

1. Demonstrate an Operations strategy and how it fits into overall strategy of the firm
2. Demonstrate an understanding of Quality , JIT & lean production systems
3. Understand the link between process characteristics and other strategic choices.
4. Apply tools and techniques for analysis of Production Scenarios.

Course Contents:

- ➢ Key concepts of Operations Management:
    - ▪ Basics of Ops Management: Product, Process, Capacity, Inventory, Supply chain, Quality, JIT, MRP
- ➢ Operations Strategy:
    - ▪ Components of Ops strategy
    - ▪ Market requirements' Vs. 'Operations resource' view of operations strategy
    - ▪ Operations Manager: Key Decisions
    - ▪ Trade Offs & Ops strategy
- ➢ Managing Quality:
    - ▪ Quality & Its dimensions
    - ▪ Evolution of Quality Management
    - ▪ TQM & tools of TQM
- ➢ JIT and Lean production systems :
    - ▪ Introduction to JIT & Lean systems
    - ▪ Waste & Variability
    - ▪ JIT partnerships
    - ▪ JIT Layouts
    - ▪ JIT & Inventory
    - ▪ JIT Scheduling, Kanban
    - ▪ Lean Systems
- ➢ Quantitative methods for Operations Management -
    - ▪ LPP, Transportation, Assignment, Forecasting, Analytical Queuing Models
- ➢ MRP & ERP : 3
    - ▪ Introduction to MRP & ERP
    - ▪ MPS, BOM, Inventory Records
    - ▪ MRP Structure & Management

- ERP , Advantages & Disadvantages
  - Book review & Presentation on : The Goal

Evaluation Scheme:

Component	Weightage (100)
Book Review 1. Prepare a written analysis of one case; 2. Prepare a 3-page review of the book *The Goal* by Eliyahu Goldratt; and 3. Prepare a written report on one of the topics provided in the class	70%
Quiz	30%

Activities Related to Skill Development and Employability

Case #	Case Title
1	Era of Quality at the Akshay Patra Foundation

Market Research

Course Code: QT11

Credit: 3

L-T-P: 3-0-0

Course Instructor: Dr. Sameer Mittal

Course Description:

Market research (MR) is an organized way of collecting information regarding the target market or customers. The MR provides inputs for new product development and improving the existing product. This course introduces students to the steps while conducting market research.

Course Objectives:

The course has following objectives:

- To facilitate students in understanding the fundamental concepts of MR.
- To make students aware regarding how organizations have successfully employed the MR tools.
- To make students aware regarding how market research is conducted.

Course Learning Outcomes:
On successful completion of this course, the students should be able to:

- Identify and use various marketing research tools.
- Understand various stages of marketing research process.
- Design a survey questionnaire for marketing research.
- Analyze and report the results of market research.

Tentative Session Plan:

Session No.	Topics to be covered
1-4	Introduction- Definition, applied & basic marketing research, scientific method, orientation, managerial value, need of marketing research, marketing research in 21st century, valuable information, types of marketing research, stages in research process, deceptions in research designs, rights and obligations of researcher/client.

5-12	Designing-
	Qualitative and quantitative research, exploratory research, secondary data research, sales forecasting, nature of surveys, errors in survey research, reducing survey errors, increasing survey response rates, selecting the appropriate survey research design, observations in marketing research, errors in marketing research, issues of experimental design, issues of experimental validity.
13-20	Measurement-
	What to measure, levels of scale measurement, criteria for good measurement, attitudes in marketing research, techniques for measuring attitudes, questionnaire quality and design, what should be asked, how should questions be phrased, the art of asking questions, best question sequence, internet questionnaire, pretesting and revising questionnaires.
21-22	Sampling and Statistical theory-
	Sampling terminology, why sample, practical sampling concepts, sampling frame, sampling units, random sampling, probability and nonprobability sampling, appropriate sampling design, internet sampling, statistical theory, random error & sample size.
23-30	Analysis and Reporting-
	Tabulation, cross-tabulation, data transformation, charts and graphs, hypothesis testing, choosing appropriate techniques, difference between groups and relationships among variables.

Reading Materials :

- Babin, B. J., & Zikmund, W. G. (2015). *Essentials of marketing research*. Nelson Education.
- Field, A. P., Miles, J., & Field, Z. (2012). Discovering statistics using R/Andy Field, Jeremy Miles, Zoë Field.
- Malhotra, N., Hall, J., Shaw, M., & Oppenheim, P. (2006). *Marketing research: An applied orientation*. Pearson Education Australia.
- Bradley, N. (2007). *Marketing research: tools & techniques*. Oxford University Press, USA.

Note: Latest edition of the readings will be used.

Assessment Matrix:

Assessment Criteria	Percentage
Mid-term exam	20%

End-term exam	30%
Minor Project	15%
Major Project	25%
Class participation	10%
Total	100%

Note:

- Class notes will be provided in the form of slides and pdf.
- Extra reading material will be shared and will be included in the quiz/exams.
- Exams will have subjective and objective questions and may involve cases as well.
- Exams will be open book and open notes and objective in nature.
- Students are expected to bring their calculators in the class.
- The students can meet instructor via appointment by email.
- Both minor and major project will be done individually. Students will be asked to present/prepare a report for both the projects.
- During some lecture one (or more) individual or group will be asked to present a case in the class.
- Emails should be sent to the instructor in the format SemNo. _Surname_Name_Reason. For example: - SemIV_Mittal_Sameer_Appointment.

Activities Related to Skill Development and Employability

Case #	Case
1	The students were required to present an existing case, where marketing research skills were deployed to launch a new product/ service or to improve an existing product or service.

Project #	Project
1	The students assumed that they were in the marketing team of organizations and were required to deploy the tools studied during marketing research to launch a new product/ service or to improve an existing product or service.

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JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2019-20
Strategic Business Management

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Course Code: ST2201
Credit: 3
Trimester: V

Course Description:
Strategic Business Management is a course intended to provide an orientation to and offer a basic framework of crafting and implanting a long-term business strategy of a firm. The course is offered with the intention of meeting a three-fold purpose: The first, to offer few basic skill-sets necessary to frame the business purpose, objectives and vision/mission of a firm and to develop a strategy to operate in a sustainable way; the second, to give a toolkit to students to address the challenges of implementing strategy in diverse environments and competitive scenarios; and thirdly to offer a critical review of various theoretical and conceptual frameworks available in strategy area to build and lead organizations in the present increasingly globalised economy of the country, in a successful way.

The course, expects that the students to have had an exposure to all functional areas of management and that they would be able to apply the knowledge and skills of these functional streams while pursuing this course on Strategy.

Course Learning Outcomes:
The broad learning outcomes of this course for the students would be:
- Diagnose how firms recognize a sense of purpose: which is expressed in the form of a vision/mission and how purpose in turn drives the formation of objectives and goals.
- Appraise the relationship between firm purpose and strategy.
- Perform various analyses - including macro and micro environments and competitor analysis for strategy formulation.
- Identify the various types of strategic decisions firms make to create, enhance and sustain competitive advantage.
- Craft competitive business strategy for a given firm to achieve its purpose and goals by integrating the functional strategies with resources and competitive pressures
- Appraise different dimensions of strategy implementation and its relationship with leadership of the firm and link the issues of strategic leadership to the pursuit of strategic goals; and
- Develop feedback and learning systems for strategic control of a firm and its sustainability

Tentative Session Plan:

Sl. no	Session topic
1	Introduction to the course; case study pedagogy; What is Strategy
2	The managerial process of crafting and executing strategy
3 & 4	Analyzing a company's external environment
5& 6	Analyzing industry environment
7& 8	Analyzing a company's resources, Capabilities & Competitiveness
9	Competitive mapping of a company's position; value chain analysis

10	The five generic strategies
11	Strategic choices and comparative assessment
12	Identification of appropriate strategy and value chain restructuring
13	Establishing competitive position by core competencies
14 & 15	Developing a strategic fit between industry and company
16	Strategies for multiple businesses - diversification strategies
17	Vertical Integration
18	Executing a strategy and ensuring success; resource strength creation; value drivers and operations
19	Strategic Control Systems and tools-BSC
20 & 21	Emerging concepts and their relevance
22	Sustainability
23	Driving competitiveness through technological prowess
24	Strategic role of different functions in organization
25	Project Presentations
26	Project Presentations

Activities Related to Skill Development and Employability

Case Study: Robinhood
Case Study: Why did Thomas Cook Shut down?
Case Study: Will Spotify's entry to India harm Indian music streaming industry?
Case Study: How will Fintech evolve in India?
Case Study: Which generic strategy does the Indian ecommerce players adopt?
Case Study: What should Nokia do to compete in today's mobile market?
Case Study: Amazon in India
Case Study: How can companies use AI as a competitive advantage?

JK Lakshmipat University, Jaipur
Institute of Management
BBA

2019-20
Entrepreneur and Entrepreneurship

Course Code: ED1101

Course Credits: 4

Semester: II

Course Description:

Entrepreneurship plays a vital role in industrial development. It is relatively new subject and one of the fastest growing subjects in colleges and universities across the world. It has been identified as one of the major trends shaping business, economy and even society. It has now emerged as profession. That like other profession, it can be developed and fostered through specific educational and training programme is well evidenced by behavioural studies and experiments conducted across the regions. This course is about creating, managing and leading an entrepreneurial organisation. It would enable students to start dreaming big, visualizing and working towards the realization of their dreams. This course will introduce and develop an awareness of the state of entrepreneurship across the globe and develop entrepreneurial skills among the students.

Topics to be Covered:

- Introduction and Relevance of Entrepreneurship
- Introducing Entrepreneur
- Entrepreneurial Competencies
- Entrepreneur and Manager
- Entrepreneurship, Process, Eco System, Factors
- Entrepreneurship and Economic Development
- Women Entrepreneurship
- Social Entrepreneurship
- Family Business
- MSME and Startups
- Forms of Business Ownership
- Climate Change and Entrepreneurship

Activities Related to Skill Development and Employability

Case 1 : Luck and Persistence

Case 2:How I make my first million

Case 3: Shahnaz Hussain: A World Famous Entrepreneur

Project on Social Entrepreneurship Idea

Out-class exercises 1: Meet Entrepreneurs and Identify their characteristics and competencies

Out-class exercises 2: One dollar activity

In-class exercises 3: Story Telling

Assignment: Find out Entrepreneurship role in Economic Development with facts

Assignment: Find out the emerging opportunities in India

Assignment: Discuss latest Women Entrepreneurship Survey

JK Lakshmipat University, Jaipur
Institute of Management
BBA

2019-20
Basic Course in Entrepreneurship

Course Code: IM311

Course Credits: 3

Semester: III

Course Description:

This is a compulsory course for all the II Year management students and open course for III Year Engineering Students. It is one of the fastest growing subjects in colleges and universities across the world. It has been identified as one of the major trends shaping business, economy and even society. This course is about creating, managing and leading an entrepreneurial organisation. It would enable students to start dreaming big, visualizing and working towards the realization of their dreams. The programme imparts essential knowledge of how to start one's own business venture and the various facets that influence successful set up and operations. The teaching/ learning of entrepreneurship require greater focus on experiential learning. Engagements such as interactive sessions, cases, games, exercise, role plays, films, projects, assignments, simulation and group activities play a vital role in teaching this course. This course is supported by Wadhwani Foundation and facilitated through Learnwise.

Topics to be Covered:

- Overview of Entrepreneur and Entrepreneurship
- Get Started (Discover Yourself)
- Identification of Idea/ Problem
- Identify Customer and Craft Value Preposition
- Business Model
- Validation
- Money (Revenue, Costs, Pricing and Financing)
- Team Building
- Support (Business Regulation)

Project

Activities Related to Skill Development and Employability

Project : Work on an idea (Campus Company or Start up) and prepare solution Demo or MVP

Case 1: Luck and Persistence

Case 2: Chula

Out-class exercises 1: Meet Entrepreneurs and Identify their characteristics and competencies

In-class Activity 2: Identify your style

In-class exercises 3: Design Thinking Activity

Out-class exercises 4: Problem Solving Activity

Out-class exercises 5: Back up envelope Exercise

Out-class exercises 6: Design Business model on your start up

In-class Activity 7: Pitch your deck

Out –class activity 8: Break even analysis of any small startup

JK Lakshmipat University, Jaipur
Institute of Management
MBA

2019-20

Economics For Business

Course Code: EP2102

Course Credits: 3

Trimester: IV

Course Description:

Economics for Business provides a solid foundation for economic analysis and thinking. Concepts and models of the course apply to Finance, Marketing, Operations, Strategy, Human Resource Management, Politics, Public Policy, History, and many other fields, and form the basis for managerial decision making.

Tentative Session Plan:

Session	Description	Book: Principles of Economics, 6th Ed, by N. Gregory Mankiw	Video
1	Intro + Videos + Slope	Chs 1 & 2, Appendix to Ch 2: Figs A3, A4, A5	Video 1 (V1)
2-3	International Trade	Ch 3 Trade	V41-44 (30 mins) - International Trade
4-5	Demand, Supply and Equilibrium	Ch 4 D&S	V2-V11 (75 mins) - Demand & Supply
6-7	Elastiity & its Applications	Ch 5 Elasticity	V12-V17 (45 mins) - Elasticity
8	Demand Forecasting		
	Assignment 1		
9	Welfare	Ch 7	
10	Supply, Demand and Government Policies: Price & wage controls	Ch 6 Price controls	V30-V40 Price Ceiling & Price Floor

11	Supply, Demand and Government Policies: Taxes	Ch 6, Ch 8	V18-V22 (50 mins) Taxes and Subsidies
	QUIZ 1		
12	Government Policies		
13	Externalities	Ch 10	V47-V52
14	Externalities + Public Goods	Ch 11	V75-V78
15	Public Goods	Ch 11	
	Assignment 2		
16	Market for inputs	Ch 18	Ch 18: 375-378; V69
17-19	The Costs of Production	Ch 13; Parkin Ch 11	V 29
20	Firms in Competitive Markets	Ch 14	V26-27 (economic problem, Information & Incentive), V53-V59
21-23	Firms in Competitive Markets	Ch 14	V53-59, V61
	MIDTERM		
24	Monopoly	Ch 15	V61-68
25	Monopoly: Market Segmentation and Price discrimination	Ch 15	V61-68
26	Natural Monopoly	Ch 15	
27	Monopolistic Comp	Ch 16	
	Assignment 3		

28-29	Oligopoly and Game Theory	Ch 17	
30	Game Theory		
31-34	Adverse Selection, Signaling, Moral Hazard, and modern technology	Ch 22	V71-72, V79-V83
35-36	Income Inequality and Poverty	Ch 20	
37-38	Review		
	End Term Exam		

Activities Related to Skill Development and Employability

Class Activities: Numerical and case lets (Applied Problems)

Class Activity: Demand Forecasting through regression analysis

Assignments: case lets (Applied Problems)

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Semester - 1

Course Title: Animation (Elective – 2)

Course Code: AN1109

Credits: 2.0

Course Description & Content

The Animation elective offers an introduction to the basic animation techniques. Amongst the various techniques available, Stop-Motion is the choice of medium. Stop Motion is a software free technique wherein one can manipulate objects and capture images to create an illusion of motion. After initial trials the students will animate simple self-made stories.

Learning Outcomes

The students will be able to:

1. Learn how the illusion of animation works
2. Work with timeline and understand frames per second
3. Communicate ideas through animation films
4. Deconstruct animation techniques
5. Gain skills to build sets and aid to assist in animation shots

Activities with direct bearing to Employability, Skill development

1. Animation is a discipline which is very well established as an industry. This elective gives the students technical skills like stop motion, creating characters, background, principles of animation to create stories using animation as skill.
2. It allows students to undertake animation or motion media projects from the industry after acquiring right skills.

Methodology

- Lectures
- Assignments
- Analysis

Evaluation Criteria

- Skills.

- Levels of improvement.

- Overall output.

- Clarity of concepts.

- Innovation.

S.No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	10%
3	Process and management	Nil
4	Application of concepts	Nil
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	10%
8	Levels of thinking & Reflection	Nil
9	Overall output	10%
10	Innovation & creativity	20%
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%

	Total	100%

Suggested Readings

1. Animator's Survival Kit by Richard Williams
2. The Illusion of Life / Frank Thomas and Ollie Johnston
3. https://www.renderforest.com/blog/35-motion-graphics-animation-blogs

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Course Title: Digital Drawing

Course Code: DD1102

Credits: 2.0

Course Description & Content

This course fosters understanding of using computers and relevant software to do drawing and sketching as a tool for ideation and presentation. The contents of the course include overview of drawing software for ideation, rendering and presentation, introduction to drawing objects, human forms and spaces on screens, basic hand and body movements in drawing, using devices of different types, digital plotting and layout, drawing of basic solids (cubes/cones/spheres). Drawing a variety of solid forms derived from basic solids, getting comfortable with various software elements and tools, capturing the overall form through finer details of depth, light and shade, simple perspectives of spaces.

Learning Outcomes

- Students get to observe and represent images, ideas and concepts.
- Students can improve coordination of hands and eyes.
- Students will explore inputting devices like trackpads, mouse and digital pencils as media.
- Students understand drawing and sketching as technique for ideation, rendering and presentation.

Activities with direct bearing to Employability, and Skill development

1. Learning Autodesk Sketchbook app which allows the students to produce paid concepts sketches and illustrations for clients

2. <mark>Learning skills related to colour, object representation and rendering which is essential to create professional high-quality concept artwork and illustrations. Students can now undertake paid projects based on this skill.</mark>

Methodology

- Lectures, demonstrations, and presentations.
- Lab working.
- Assignments.
- Discussions and feedback.

Evaluation Criteria

- Skills.
- Levels of improvement.
- Overall output.
- Clarity of concepts.

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	20%
3	Process and management	Nil
4	Application of concepts	Nil
5	Understanding & clarity of concepts	20%
6	Attitude towards learning	Nil
7	Levels of improvement	10%
8	Levels of thinking & Reflection	Nil
9	Overall output	10%
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil

13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

Daniel Simons Books.

Product Sketching and Rendering by Koos Eisen.

Websites

 http://www.simkom.com/sketchsite/ . Skeren Youtube, Car Design News,

https://vimeo.com/idsketching

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Visual Documentation

Course Code: VD1117

Credits: 4.0

Course Description & Content

This course introduces students to the fundamentals of typography in design and its application in effective product interface/communication, basics of photography and videography, ways of documenting design work and photo imaging/manipulation and illustration manipulation techniques in succession. The course looks at elements of visual documentation in parts as well as in succession and brings them together for a holistic understanding of visual culture and approaches in design.

Learning Outcomes

- Students will understand the fundamentals of typography in communication.
- Students will understand the concept of graphic layouts, type hierarchy, white space.
- Students get to understand typography as an element of graphic design.
- Students will learn basics of photography and cutting-edge digital techniques.
- Students will learn the methodologies of documenting design works.
- Students will learn photo manipulation with regards to illustration and digital image processing.

Activities with a direct bearing to Employability, Skill development

1. Learning Adobe InDesign to design Layouts and documents. It can lead to employment in Publishing houses as graphic and print designers.
2. Learning the finer details about visual hierarchy, prioritization of the content and how to use the images and texts in cohesive manner.
3. Learning the basics of Photography using professional DSLR cameras. This can open opportunities in media companies for street, fashion and studio photography assignments.

Methodology:

- Lectures, demonstrations and presentations.
- Experimentation with traditional and modern methods.
- Group discussions and feedback.

Evaluation Criteria:

- Understanding and clarity of concepts.
- Levels of thinking and reflection.
- Communication and presentation.
- Observation and perception.
- Process and management.

S. No	Components	Weightage
1	Communication/Presentation	20%
2	Skills	Nil
3	Process and management	10%
4	Application of concepts	Nil
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	10%
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	10%
15	Jury	40%
	Total	100%

Suggested Readings

1. The Elements of Typographic Styles by Robert Bringhurst.

2. TYPOGRPHIE - A manual of Design, by Emil Ruder.

3. Cultural Connectives by Rana Abou Rjeily.

4. Thinking with TYPE by Ellen Lupton, Just My Type by Simon Garfield.

5. Ways of Seeing by John Berger.

6. Understanding Exposure by Bryan Peterson.

7. The Decisive Moment by Henri Cartier Bresson.

8. Dreams of India by Raghu Rai.

9. Photoshop: Photo Manipulation Techniques to Improve Your Pictures to World Class Quality by John Slavio.

JKLU

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Coding 101 / HTML CSS

Course Code: CD1111

Credits: 2.0

Course Description & Content

The course looks at coding in context of digital design and introduces coding languages, backend coding principles and interrelation between the digital design workflows and coding methods for the same with regards to interaction design.

Learning Outcomes

- This course introduces students to fundamental principles of coding and its correlation with interaction design.
- It helps to develop a holistic knowledge of digital design processes, from workflow to coding and finally to being launched on the web platform.
- This course aims at developing systems thinking at the basic level through study of interconnections between larger systems in web design processes.

Activities with direct bearing to Employability, Skill development

1. Coding allows students to understand how to communicate to a computing machine. This is done by learning a computer language. Our students developed skills in HTML/CSS to realize their ideas and communicate it through a website.

2. This skill helps students to further undertake website design projects which has a good demand in the industry.

Methodology:

- Study of coding languages, application, and systems.
- Practicing variations and language-based probabilities and tracing their connection with design workflows.
- Study of the various developer platforms and DIY methods of digital design launching and publication.

Evaluation Criteria

- Understanding & clarity of concepts
- Levels of thinking & reflection.
- Process & Management.
- Application of concepts.
- Observation and perception.

S.No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	Nil
3	Process and management	10%
4	Application of concepts	10%
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	20%
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	10%
15	Jury	40%
	Total	100%

Suggested Readings
1. Code Complete by Steve McConnell.
2. Clean Code by Robert Cecil Martin.
3. Don't Make Me Think by Steve Krug.
4. Designing Mobile Interfaces: Patterns For Interaction Design by Eric Berkman and Steven Hoober.

Course Title and Code: Design of RCC and Steel Structures CE1107	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B.Tech Semester-V (Batch: 2017-2021)/ Core**

Course Objective:
This course aims to develop understanding about design of RCC and steel structure components for structural design.

On successful completion of this course, students will be able to:

1. Analyse behaviour and engineering properties of concrete and reinforcing bar.
2. Apply various design philosophies for design of structures.
3. Analyse and design reinforced concrete rectangular beams and slabs by Limit State Design Method.
4. Design bolted and welded connections for steel structures.
5. Design the axially loaded tension members and compression members of steel sections.

Prerequisites		Structural Analysis
Sr. No.	**Evaluation Component**	**Marks**
1	Attendance	NIL
2	Assignment	20
3	Class Participation	10
4	Quiz	NIL
5	Theory Exam-I	10
6	Theory Exam-II	NIL
7	Theory Exam-III	30
8	Report-I (Mix Design of Concrete)	10
9	Report-II	NIL
10	Report-III	NIL
11	Project-I (Planning & Design of Building)	20
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I	NIL
15	Lab Evaluation-II	NIL
16	Course Portfolio	NIL
	Total (100)	100

Course Syllabi (Theory):

Reinforced Concrete Materials: Concrete- Grade of concrete, Characteristic strength, Compressive strength, Flexural tensile strength, modulus of elasticity and Poisson's Ratio, creep & shrinkage, Stress-strain behavior, Design stress-strain curve of concrete, Nominal mix and design mix of concrete. **Reinforcing steel**-Types, sizes and grades, Stress-strain behavior, Design stress-strain curve. Sustainable concrete by using Recycled Concrete Aggregates (RCA) & other waste materials.

Basic concepts of Reinforced Concrete Design: Working Stress Method (WSM), Ultimate Load Method (ULM) and Limit State Method (LSM), Characteristic strength of materials, Characteristic loads, Partial safety factors for materials and loads.

Reinforced Concrete Beams: Design of singly & doubly reinforced rectangular sections in flexure, Design for shear, Design for bond and anchorage of reinforcement.

Slabs: Analysis and design of one way and two way slabs by LSM.

Introduction and Design Philosophies: Types of Structural Steel, structural steel sections, Working Stress Method (WSM) and Limit State Method (LSM).

Introduction to Connections: Types of Bolts, Bolted and Welded Connections under axial loadings.

Tension Members: Design of axially loaded tension members.

Compression Members: Design of axially loaded compression members, Design of Built-up Columns.

Syllabus (Practical)

Design problems based on theory syllabus

Activity: Field visit: Construction of Aasara Residential Apartment, Mahindra SEZ Road,

Jaipur (Date of Visit: 25.09.2019)

JK Lakshmipat University, Institute of Engineering & Technology, Jaipur

Department of Civil Engineering

No: JKLU/IET/CE/2019-20/31   Date: 05-10-2019

Industrial Visit Report

Name of Project/Industry: Construction of Aasara Residential Apartment

Address of Project/Industry: Mahindra SEZ Road, Jaipur

Date of Visit: 25.09.2019

Semester and Branch: V & VII Semester, B. Tech. (Civil Engineering)

Number of Students: 13

Name of Faculty/ LT: Dr. D. K. Sharma

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Brief about Visit:

Samanvay Buidhome, Jaipur is constructing a residential apartment named "AASARA" on Mahindra SEZ road, Jaipur. It is a multi-story (G + 8) residential apartment in which four towers

Objective: To determine 7 days and 28 days compressive strength of M25 grade of concrete designed as nominal mix concrete
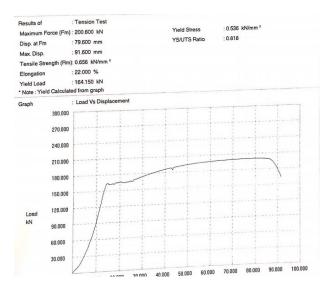
Theory: Concrete is very strong in compression and for structural design purpose, one has to know the compressive strength by testing hardened concrete specimen. In India, cube specimen 150 mm size is taken as standard. Concrete strength increases with age. After 28 days, the increase in strength in normal concrete is negligible. The characteristic strength of concrete is determined after 28 days of curing.

Concrete Mix Design – concrete mix design is permitted for M25 or higher grade of concrete. It is given as IS: 10262 - 2009.

Quality Calculation:

1. Required strength:

   $f'_{ck} = f_{ck} + 1.65 (s)$

   From table 1 IS: 10262, s= 4

   $f'_{ck} = 25 + 1.65(4) = 31.6 \text{ N/mm}^2$

2. Water cement ratio
   According to table 5 of IS: 456, maximum water cement ratio = 0.5
3. Maximum water content per cubic metre of concrete
   According to table 2 of IS: 10262, Maximum water content for nominal maximum

Tensile strength test on Rebar by UTM

Results of : Tension Test

Maximum Force (Fm) : 200.600 kN   Yield Stress : 0.536 kN/mm²

Disp. at Fm : 79.600 mm   YS/UTS Ratio : 0.818

Max. Disp. : 91.600 mm

Tensile Strength (Rm): 0.656 kN/mm²

Elongation : 22.000 %

Yield Load : 164.150 kN

* Note : Yield Calculated from graph

Graph : Load Vs Displacement

Activiyy: Home assignments

Assignment No-1 (Course: CE1107)

B. Tech. (Civil Engg.), V Semester (Batch:2017-21)

(Analysis & Design of Singly & Doubly Reinforced Beams)

Name of Faculty: Dr. D.K.Sharma

Date of Assignment: 09.08.2019   Date of Submission: 26.08.2019

Note: Use IS:456-2000 for design.

1. Compare Working stress method (WSM) and Limit State Method (LSM). Discuss advantages and disadvantages.
2. Describe about under reinforced, over reinforced and balanced sections?
3. Describe brittle and ductile failure of R. C. Beams?
4. What do you understand by a singly reinforced beam and doubly reinforced beam? State the condition when a doubly reinforced beam is required to design?
5. A singly reinforced rectangular beam having width 250 mm and effective depth 500 mm. It is reinforced with 4 bars of 16 mm diameter at an effective cover of 50mm. Assume grade of concrete M-25 and HYSD bars of grade Fe-500. Determine the moment of resistance by Limit State Method.
6. Design a singly reinforced rectangular beam for flexure to carry a super imposed live load of 15 kN/m and having effective span of 5 m. Assume grade of concrete M-25 and HYSD bars of grade Fe-500.

Assignment No-2 (Course: CE1107)

B. Tech. (Civil Engg.), V Semester (Batch:2017-21)

(Topic: Shear and Bond)

Name of Faculty: Dr. D. K. Sharma

Date of Assignment: 23.09.2019   **Date of Submission: 02.10.2019**

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Note: Use IS:456-2000 for design.

1. A simply supported beam of effective span 5 m carries live load of 40 kN/m. The section of the beam is 250 mm wide and 500 mm deep up to the center of reinforcement with effective cover of 50 mm. Design the shear reinforcement by using 8 mm diameter two legged vertical stirrups at supports and mid span. Assume grade of concrete M-20 and HYSD bars of grade Fe-415. Assume % of tensile reinforcement at support = 0.75%. Also find the length of zone where minimum shear r/f is to be provided.
2. A simply supported beam 300 mm x 600 mm (effective depth) is reinforced with 5 bars of 25 mm diameter. It carries uniformly distributed load of 80 kN/m including self weight over effective span of 5.6 m. Assume grade of concrete M-20 and HYSD bars of grade Fe-415. Design shear r/f by using 8 mm diameter 2-legged vertical stirrups
   Also find the length of zone where minimum shear r/f is to be provided.
3. A simply supported RC beam of 250 mm wide and 500 mm deep with effective cover 35 mm is reinforced with 8 Nos.-20 mm diameter bars at support. It has 135 KN factored shear force at the center of support. Assume grade of concrete M-20 and

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Assignment No-3 (Course: CE1107)

B. Tech. (Civil Engg.), V Semester (Batch:2017-21)

(Topic: One way & Two way slab)

Name of Faculty: Dr. D. K. Sharma

Date of Assignment: 14.10.2019   **Date of Submission: 21.10.2019**

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Note: Use IS:456-2000 for design.

....

1. A slab is simply supported over a clear opening in plan 4.5 m x 10.0 m and width of supports is 300 mm. The Live load plus super imposed dead load (SIDL) on the slab is 12 kN/m^2. A floor finish with plain cement concrete of thickness 75 mm is provided over the roof. Design the slab by using M-25 & Fe-415.

2. A slab is simply supported over a clear opening in plan 6 m x 4.0 m. The corners of the slab are free to lift up. The Live load plus super imposed dead load (SIDL) on the slab is 14 kN/m^2 and a floor finish load of 2 KN/m^2 is also acting on the slab. Design the slab by using M-20 & Fe-500. Assume width of supports as 300 mm.

Assignment No-4(Course: CE1107)

B. Tech. (Civil Engg.), V Semester (Batch:2017-21)

(Topic: Bolted connections, CM & TM)

Name of Faculty: Dr. D. K. Sharma

Date of Assignment: 04.11.2019   **Last Date of Submission: 25.11.2019**

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Note: Use IS:800-2007 and steel table for design.
....

1. Design a lap joint between two plates of thickness 10 mm and 12 mm to transmit a factored load of 110 kN by using M 18 bolts of grade 4.6. The grade of plates is Fe 410. Also draw plan of connection and provide bolts in single row.

2. Design a but joint with single cover plate between two plates of thickness 14 mm to transmit a factored load of 120 kN by using M 20 bolts of grade 4.6. The thickness of cover plate may be taken as 10 mm. The grade of plates is Fe410.

3. Design a but joint with double cover plate between two plates of thickness 14 mm to transmit a factored load of 120 kN by using M 20 bolts of grade 4.6. The thickness of cover plates may be taken as 8 mm. The grade of plates is Fe410.

4. Design an Beam (I) section for a column 3.5 m long with both ends hinged. It has to carry a factored load of 650 kN.

5. Design a single angle strut of a roof truss for a factored compressive load of 120 kN. The c/c distance between connection is 1.75 m. Assume one end is fixed and other is hinged.

Course Title and Code: Public Health EngineeringCE1201	
Hours per week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B.Tech Semester-V (Batch: 2017-2021)/DE**

Course Objective:

This course aims to develop critical thinking and engineering problem solving skills by exploring and proposing sustainable solutions for current water and waste water problems.

On successful completion of this course students will be able to:

1. Identify current public health problems within a broader framework of sustainable development.
2. Use research tools and analytical methods to critically monitor and assess the water and wastewater management problems.
3. Develop treatment plant layout and analyse main physical, chemical and biological processes for water and wastewater treatment.
4. Design water treatment and wastewater treatment units to meet the drinking water and discharge/reuse standards.

Prerequisites		Basic science and mathematical Skills
Sr. No.	**Evaluation Component**	**Marks**
1.	Attendance	NIL
2.	Assignment	10
3.	Class Participation	10
4.	Quiz	10
5.	Theory Exam-I	NIL
6.	Theory Exam-II	10
7.	Theory Exam-III	20
8.	Report-I	NIL
9.	Report-II	NIL
10.	Report-III	NIL
11.	Project-I	20
12.	Project-II	NIL
13.	Project-III	NIL
14.	Lab Evaluation-I (Continuous Evaluation)	10
15.	Lab Evaluation-II (Lab Examination)	10
16.	Course Portfolio	NIL
	Total	100

Course Syllabi (Theory):

UNIT-1: General requirement for sustainable water supply, Quality and quantity of water, Domestic water quality standards; Water analysis (CPCB, ISO, WHO standards).

UNIT-2: Physical, chemical and biological characteristics of water and their significance, water quality criteria, Process of treatment: mixing, aeration, sedimentation, coagulation, disinfection, softening.

UNIT-3: Distribution systems pump, pumping systems, distribution systems- analysis and distribution of network, layout of distribution system, methods of water supply, distribution reservoir, and capacity of reservoirs.

UNIT-4: Waste water treatment: sewage and effluent, sources of wastewater, classification of wastewater, characteristics and testing of sewage, composition, sampling, physical and chemical analysis. Waste water discharge standards.

UNIT-5: Waste treatment process: objectives, significance of treatment, and classification of treatment processes, Activated sludge process, wastewater treatment operations, screenings, skimming, sedimentation, biological treatment, aerobic and anaerobic treatment, Design of STP

Syllabus (Practical):

1. Determination of P_H of given in water /waste water sample

2. Determination of Alkalinity in water sample

3. To determine the Total Dissolved Solids of the given water/sewage sample

4. Determination of Hardness in water sample

5. Determination of CO_2 in water sample

6. Determination of turbidity of water supply system

7. Determination of chlorine demand and chloride residuals in water supply system

8. To determine Total Suspended Solids (TSS) of the given sewage sample.

9. To find out the Quantity of Dissolved Oxygen present in the given waste water /water sample

10. Determination of Biochemical Oxygen Demand exerted by given wastewater sample
11. To find out Chemical Oxygen Demand of the waste water

References:

Textbooks

1. Environmental engineering, HS Paevy, DR Rowe, G Tchobanoglous, McGraw Hill
2. Environmental engineering: Wastewater engineering, SK Garg, Khanna Publishers
3. Water supply and sanitation engineering, GS Birdie, JS Birdie, Galgotia Publishing Ltd.
4. Water Supply Engineering, Dr. B.C. PunmiaLaxmi Publications Pvt. Ltd.
5. Water and wastewater engineering, Metcalf and Eddy, McGraw Hill
6. Standard Handbook of Environmental Engineering, by Robert A. Corbitt, McGraw-Hill Professional publication.
7. Industrial waste treatment by Nelson Leonard Nemarow

E-books

1) Textbook Of Environmental Engineering by by P. VenugopalaRao
2) Environmental Engineering by D. Srinivasan.

Video Lectures
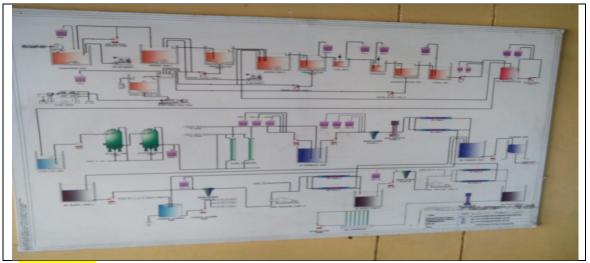
1) NPTEL >> Civil Engineering >> Water and Waste Water Engineering (Video) >>
2) https://www.youtube.com

Websites (related to the course)

1) http://www.cpcb.nic.in/
2) http://www.rpcb.rajasthan.gov.in
3) http://www.bis.org.in/
4) http://www.who.int/en/
5) 3. http://www.moef.gov.in/
6) http://www.greentribunal.gov.in/

ETP Layout
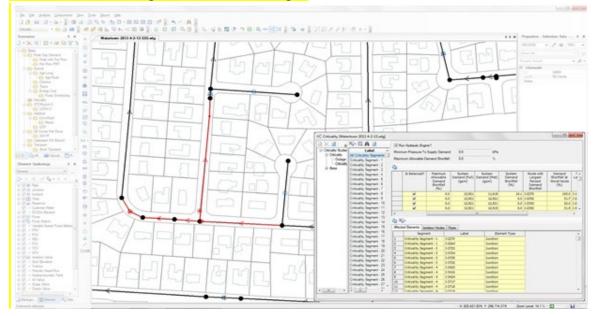
Ultra-filtration Unit

Visit to ETP Plant Bagru Industrial area Jaipur

A 131 Activated Sludge Parameters

Basis of Calculation
- (●) A 131
- ( ) Sludge Stabilization

Outflow Requirements
- [ ] Denitrificatio

Organic Load

Max. MLSS of the Activated Sludge	3,78	kg/m3
MLSS (Aeration Tank) (< 5 kg/m³)	3,78	kg/m3

Acid Capacity in the Inflow	8,00	mmol/l
NTK in the Inflow	52,80	mg/l
Ammonia-N in the Outflow	4,00	mg/l
Nitrate-N in the Outflow	6,00	mg/l

[Calculate]   [Interim Result]

Result

Required Volume VBBmin	6.685,04	m3
Sludge Age, total	15,00	d
Denitrification Ratio	0,513	
Spec. Surplus Sludge Production	0,510	kg/kg

Phosphate Elimination
- [✓] chemical   [✓] biological
- Factor XP,BM   0,005

Basic Data
- Discharge Limit   2,0 mg/l
- ß-Value   1,5

Biological P-Elimination
- Part of the Biological Fixed Phosphorus   0,006 kgP/kgCSB
- Operation   65 %
- Anaerobic Contact Time   0,0 h

Precipitant
- (●) Iron Salt FeCl3   ( ) Aluminium Salt AlCl3
- ( ) Iron Salt FeSO4

External Carbon Dosage
- [ ] External Carbon Dosage
- Primärschlamm

Density	1200	kg/m³
COD-Concentration	96,000	kg/m³
Denitrification Capacity	0,15	kgN/kgCSB
Denitrification Rate	3,0	g/(kg*h)
Additional ES-Production	0,50	kg/kgCSB
Max. Denitrification Relation	0,60	

Phosphate Elimination

XP,BM	1,76	mg/l
Biological removed	2,11	mg/l
Chemical Removed	6,64	mg/l
P-total in the Outflow	2,00	mg/l
Anaerobic Volume	0,00	m3

Denitrification process
- [ ] Cascade
- ( ) Separate Stage   ( ) Simultaneous
- ( ) intermittend   (●) combined
- Separate   0,15

Parameter

Inert part of particulate COD	fA	0,25
Proportion of inorganic matter of filterable	fB	0,25
Part of easily degradable COD	fCOD	0,25
Yield coefficient	Y	0,67
Decomposition Coefficient	b	0,17

Process factor PF

fN	1,4	1,6	1,8	2,0	2,2	2,4
SNH4,Control						
5 mg/l	[ ] 1,50	[✓] 1,60	[ ] 1,90	[ ] 2,20	[ ] 2,50	[ ] 2,80
10 mg/l	[ ] 1,50	[ ] 1,50	[ ] 1,50	[ ] 1,60	[ ] 1,90	[ ] 2,10

Process factor	PF	1,60
Process factor chosen	PF	1,60

Fractions COD

Particulate COD	XCOD,ZB	224,00 mg/l
Dissolved COD	SCOD,ZB	128,00 mg/l
Dissolved inert COD	SCOD,inert,ZB	17,60 mg/l
Particulate inert COD	XCOD,inert,ZB	56,00 mg/l

==Students working on different water distribution and STP designing software==

Course Title and Code:	Municipal and Urban Engineering CE1202

Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B. Tech all branches (Open Elective)**

Course Objective:
To develop understanding about the engineering related urban planning and management especially focussing on transportation, water and waste management.

On successful completion of this course students will be able to:

1) Apply various and standards for urban traffic planning.
2) Manage the working of various transport systems in different scenarios.
3) Design traffic control system for highway safety.
4) Plan a solid waste management system for a given urban area.
5) Select appropriate SWM options in a specific local context.
6) Characterize water and wastewater effluents.
7) Make a plan to process water, wastewater treatment and sludge handling.

	Prerequisites	Basic science
Sr. No	**Specifications**	**Marks**
1	Attendance	NIL
2	Assignment	10
3	Class Participation	10
4	Quiz	10
5	Theory Exam-I	NIL
6	Theory Exam-II	NIL
7	Theory Exam-III	20
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	15
12	Project-II	15
13	Project-III	NIL
14	Lab Evaluation-I(Continuous Evaluation)	10
15	Lab Evaluation-II(Lab Examination)	10
16	Course Portfolio	NIL
	Total	**100**

Course Syllabi (Theory):

Urban Traffic Planning & Management: Modes of transportation, Characteristics of various modes, Socioeconomic effect of transportation, objectives of transport planning, urban traffic & transport problems, steps in urban transport planning process, traffic system management measures, pedestrian & cyclist management measures, Intelligent Transportation System (ITS) and its advantages, Use of ITS in India, alternative urban transportation systems such as BRT, Metro & mono rail.

Traffic Control & highway safety: Traffic control devices, traffic signs and their classification, pavement markings, traffic island and their classifications, types and advantages of signals, coordinated signals, Miscellaneous traffic control aids-delineators, hazard markers, object markers, speed breakers, guard rails and barrier rails, road safety audits.

Water and Waste Water Treatment: Quantity Estimation, Water Sources, Water Supply/Distribution System, IS standards and tests for drinking water, treatment of Surface water, Waste water collection system, domestic waste water treatment, Introduction to microbiology, Biological unit processes, CNG production at Sewage treatment Plants, Sludge treatment, Use of manure for sustainable agriculture.

Solid Waste Management: Generation and characterization of solid waste, challenges in waste collection, methods of solid waste disposal, energy recovery from solid wastes, 3 R (reduce, reuse, recycle) principal for sustainable development

Syllabus (Practical)

1) Determination of P$_H$ of given in water /waste water sample
2) Determination of Alkalinity in water sample.
3) To determine the Total Dissolved Solids of the given water/sewage sample
4) Determination of Hardness in water sample
5) Determination of turbidity of water supply system
6) Determination of chlorine demand and chloride residuals in water supply system
7) To determine Total Suspended Solids (TSS) of the given sewage sample.
8) To find out the Quantity of Dissolved Oxygen present in the given waste water /water sample
9) Determination of Biochemical Oxygen Demand exerted by given wastewater sample.
10) To determine the elongation and flakiness index,Impact value, for an aggregate sample.
11) To determine the Crushing value and Abrasion value for an aggregate sample.
12) To determine the Softening point for a bitumen sample
13) To determine the Penetration value for a bitumen sample
14) To determine the Ductility for a bitumen sample

Reference:

Books

1) Kadiyali L. R. Traffic Engineering and Transport Planning, Khanna Publishers, New Delhi, India, 1997.
2) Khanna, S. K. and C.E.G. Justo Highway Engineering Nem Chand and Bros, Roorkee, India, 2001.
3) Ministry of Road Transport and Highways. Specifications for Road and Bridge Works,
4) Papacostas C. S. and P D Prevedouros Transportation Engineering and Planning, Third Edition. Prentice Hall of India Pvt. Ltd, New Delhi, India, 2002.
5) Environmental engineering: Wastewater engineering, SK Garg, Khanna Publishers
6) Water supply and sanitation engineering, GS Birdie, JS Birdie, Galgotia Publishing Ltd.
7) Water Supply Engineering by Dr. B.C. Punmia, Laxmi Publications Pvt. Ltd
8) Environmental engineering, HS Paevy, DR Rowe, G Tchobanoglous, McGraw Hill

Video Lectures

1)   NPTEL >> Civil Engineering >> Water and Waste Water Engineering (Video) >>
2)   https://nptel.ac.in/courses/120108005/
3)   https://www.youtube.com

Websites (related to the course)

1)   http://www.cpcb.nic.in/
2)   http://www.rpcb.rajasthan.gov.in
3)   http://www.bis.org.in/
4)   http://www.who.int/en/
5)   http://www.moef.gov.in/
6)   https://nhai.gov.in/
7)   http://mohua.gov.in/
8)   http://smartcities.gov.in/content/

SOLID WASTE MANAGEMENT OF JK LAKSHMIPAT UNIVERSITY JAIPUR

Submitted By-

Rashi Arora (2017Btechcse007)

Divya Bhatia (2016Btechche001)

Pranjal Tripathi (2016Btechcse117)

Kunal Kumawat (2016Btechcse113)

Anurag Soni (2016Btechcse104)

Kapil Jain (2016Btechcse304)
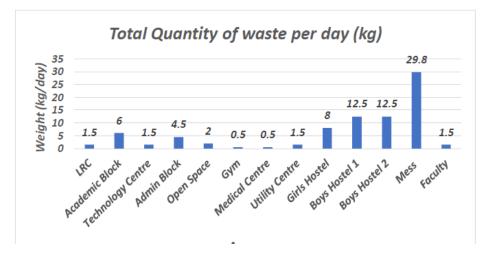
Submitted To-

Mr. Vinod Kumar Vishwakarma

4.1.1 Total amount of waste generated by different area per day.

Amount and percentage of waste generated by different building like LRC, academic block, admin block, technology centre, mess, hostels etc in a day.

Total Quantity of waste per day (kg)

Project Report on 'Solid Waste Management of JK Lakshmipat University Campus'

PREPARED BY

Isha Narolia (2016BTECHEE002)

Arpit Sharma (2016BTECHME005)

Devkaran Singh (2016BTECHME008)

Devvrat Singh Chauhan (2016BTECHME009)

Ekhlak Ahmad (2016BTECHME010)

Ritwik Raman (2016BTECHME021)

FACULTY GUIDE

Prof. Vinod Kumar Vishwakarma

Asst. Professor, Dept. of Civil Engineering

Institute of Engineering and Technology,

JK Lakshmipat University
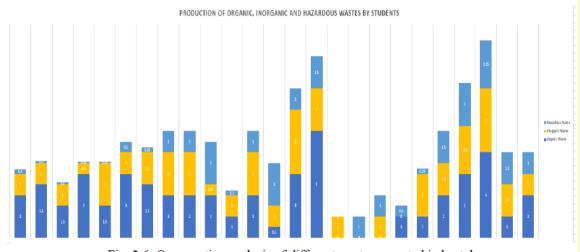
Fig. 2.6: Comparative analysis of different waste generated in hostels

The above data shows organic wastes produced in Indigo, Inorganic wastes in yellow and hazardous wastes in blue colors. Most of the students produce organic wastes like vegetable and fruit peels etc. in majority on a weekly basis. With majority engineering students residing in the hostel the amount of hazardous waste, which majorly includes e-waste is also present in the graph. But, the amount of inorganic waste like medicine residues, plastics etc. are also present in majority.

Presentation on Solid Waste Management of JKLU Campus

PREPARED BY

Isha Narolia(2016BTECHEE002)

Arpit Sharma(2016BTECHME005)

Devkaran Singh (2016BTECHME008)

Devvrat Singh Chauhan (2016BTECHME009)

Ekhlak Ahmad (2016BTECHME010)

Ritwik Raman(2016BTECHME021)

SUBMITTED TO

Prof. Vinod Kumar Vishwakarma

Asst. Professor, Dept. of Civil Engineering
Institute of Engineering and Technology
JK Lakshmipat University

Institute of Engineering and Technology (IET)

JK Lakshmipat University, Jaipur

October 2019

Municipal and Urban Engineering CE1202: QUIZ 01

1. As per IS : 1172-1963, water required per head per day for average domestic purposes, is

A. 50 litres

B. 65 litres

C. 85 litres

D. 105 litres

E. 135 litres.

2. Distribution mains of any water supply, is normally designed for its average daily requirement

A. 100%

B. 150%

C. 200%

D. 225%.

3. In distribution pipes, drain valves are provided at

A. lower point

B. higher point

C. junction points

D. anywhere.

4. The population growth curve is

A. S-shaped curve

B. parabolic curve

C. circular curve

A. durability

B. strength

C. easy connection

D. low maintenance cost

E. all the above.

8. The factor to be considered for the source of city water supply, is

A. quantity and quality of the available water

B. elevation of the source of water

C. general terrain intervening the area

D. all the above.

9. Non-pathogenic bacterias cause the following water borne disease,

A. cholera

B. typhoid

C. infections hepatitis

D. None of these.

10. Alkalinity in water may be caused due to

A. calcium and magnesium bicarbonates

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

EndTerm ExaminationDecember,2019

B. Tech (All branches except CE), Semester VII & Semester V, (OE)

Roll No……………………………..

CE1202: Municipal Urban Engineering   Time: 3:00 hours   Max. Marks: 40
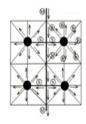
Instructions to students:
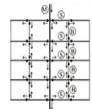
1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. **Question Paper consists of TWO parts (Part-A, Part-B)**
5. **Answer any four questions from Part-A and any two from Part-B**

PART-A (05 Mark each)

Q.1[LO 6] How will you differentiate Disinfection from Sterilization by explaining in detail the process of Disinfection along with factors affecting the process and also explain why Cl_2 gas preferred for disinfection purpose?

Q.2 [LO7] Identify the water distribution system given below. List out the major advantages and disadvantages of each system:

Q.4[LO1& 2] Draw the any three traffic signs under each category those required for below mention purpose:
     i. Require the driver to obey the signs for the safety of other road users.
     ii. signs are for the safety of oneself who is driving and advice the drivers to obey these signs

Q.5 [LO7] Draw the process flow sheet of conventional domestic sewage treatment plant (STP). Discuss in brief about the primary and secondary treatment of waste water.

PART-B (10 Mark each)

Q.6 [LO3] Urban transportation planning is the process that leads to decisions on transportationpolicies and programs. So if you are a transport planner of a city than design a model of transportation planning process for a city showing major activities involved.

Q.7[LO4&5] Estimate the moisture content of a solid waste sample with the following composition:

S.N.	Component	% by mass	Moisture content %
1	Food waste	15	70
2	Paper	45	6
3	Cardboard	10	5
4	Plastics	10	2
5	Garden Trimmings	10	60
6	Wood	5	20
7	Tin cans	5	3

*Based on 100 Kg sample of waste

Q.6 [LO4&5] Estimate the as discarded densityof a solid waste sample with the following composition:

S.N.	Component	% by mass	Typical density (Kg/m³)
1	Food waste	15	290
2	Paper	45	85
3	Cardboard	10	50
4	Plastics	10	65

Course Title and Code: Building Planning and design CE1205	
Hours per week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B.Tech Semester-VI (Batch: 2017 civil Engg)**

Course Objective: The objective of the Building Planning and design enabling the principals of planning for drafting the content into graphical form and thereafter its execution. Civil engineer has to convert design parameters and process details into actual practice. The principal of planning for buildings includes the entire facilities to be provided as individual's requirements, economical status and suitable to the users.

On successful completion of this course students will be able to:
1. Interpret conventional sign, symbols and working drawings of various civil engineering structures.
2. Understand basic principles of building design and planning.
3. Explore building drawing as a way of discovering and developing ideas for designing residential, commercial and public buildings.
4. Apply Building Bye laws for residential and public building, fundamental of perspective drawing and town planning.
5. Develops basic drawing skills; create multilayer architectural and working drawings.
6. Use software (AutoCAD) to prepare detailed drawing of residential and public buildings.

Syllabus (Theory)

Unit 1: Introduction to buildings, Type of buildings, Principles of building planning, Principles of architecture composition building by–laws as per National Building Code, Standards for residential buildings, Building by–laws of local authority, standards for industrial, public, commercial and institutional buildings.

Unit 2: Planning of earthquake resistant building considering symmetry, simplicity, continuity, consideration of locating staircase and overhead water tank, most sensitive to earthquake.

Unit 3: Introduction of Building Services like water supply, sewerage and drainage systems, sanitary fittings and fixtures, plumbing systems, principles of internal & external drainage systems, principles of electrification of buildings, intelligent buildings, elevators & escalators their standards and uses ,air-conditioning systems, firefighting systems, building safety and security systems, ventilation and lightening and staircases, fire safety, thermal insulation

Unit 4: Perspective Drawing and Town Planning-Elements of perspective drawing involving simple problems, one point and two point perspectives, energy efficient buildings. Concepts of

master plan, structure plan, detailed town planning scheme and action plan, estimating future needs planning standards for different land use, allocation for commerce, industries, public amenities, open areas etc., planning standards for density distributions, density zones, planning standards for traffic network, standard of roads and paths, provision for urban growth, growth models, plan implementation, town planning legislation and municipal acts, panning of control development schemes.

LIST OF EXPERIMENTS

Drafting of following Using Auto CAD software

1. Symbols used in Civil Engineering drawing, Masonry Bonds.
2. Doors, Windows and staircases.
3. Plumbing & Electrical fitting drawing.
4. Comprehensive Drawing of Residential building (Layout, plan, elevation & sectional elevation).
5. Prepare civil engineering drawings effectively and efficiently using 2D & 3D projection CAD software.
6. Preparation of Layout planning of different civil engineering Projects.
7. Preparation of layout plan/Maps and building drawing using computer

Activities Related to Skill Development and Employability

Assignment -I

1) Explain in detail the factors to be considered for selection of a site for a residential building.

2) What are the types of staircase? draw each

3) Write down the building bye laws & which document required to completion of building according to national building code of India.

4) A house of plinth area about 35 Sqm is to be located in a plot of 10 m x 12 m. The shorter side is parallel to road running in East-West direction, with plot on Southern side of the road. The following rooms are required: One bedroom, Drawing room, Kitchen, Bath and WC. Draw line plane and plan of building

5) How the planning of a public building does differ from planning of a residential building? Explain the key factors to be considered in the design of an educational institution.\

6) By assuming suitable data and the standard norms list out the requirement and draw the line plan of primary school building for total 450 no. of students as a total strength for a budding township.

7) What are the requirements to be considered in planning of Industrial building?

8) Classify the buildings based on occupancy and type of construction.

9) What do you mean by grouping? Explain its significance in the planning of residential buildings along with neat sketches.

Assignment -II

1) Enlist units of primary Health Center and write minimum dimension of each unit.

2) Draw a neat sketch showing RCC components of lintel with 1 : 20 scale.

3) Explain important rules and byelaws of sanctioning authorities for construction in rural area.

4) Give the necessity of perspective drawing.

5) Explain any four important Principals of planning.

PROJECT-1

CE1205- BUILDING PLANNING AND & DESIGN

PREPARED BY
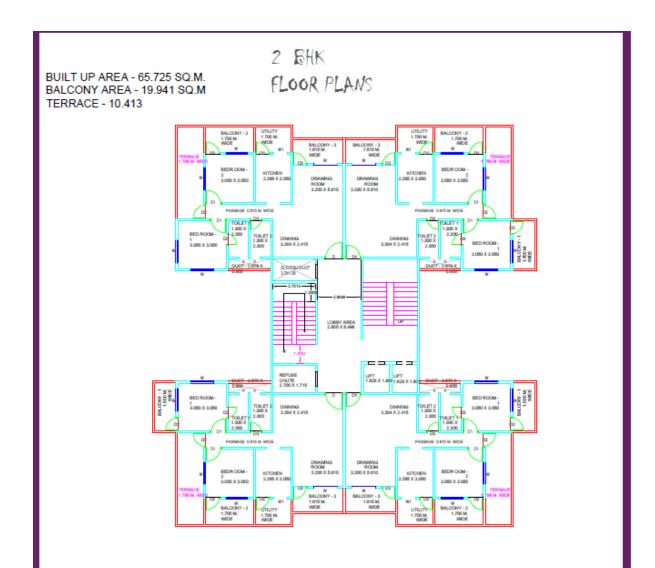
Location of Vrundavan Apartments on the Map
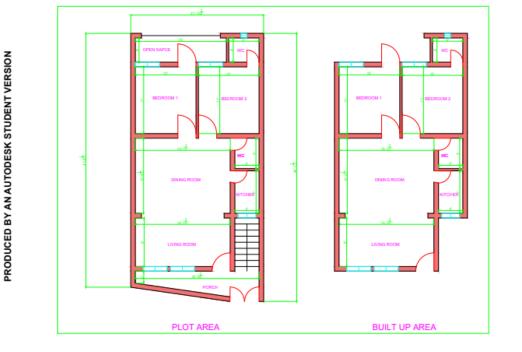
✦ **Images of Vrundavan Apartments:**
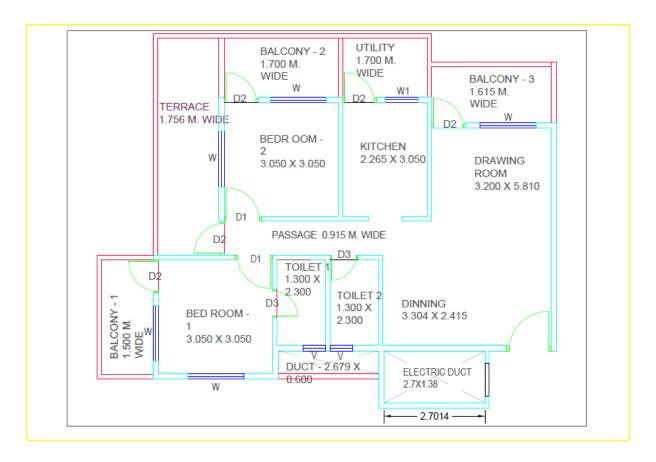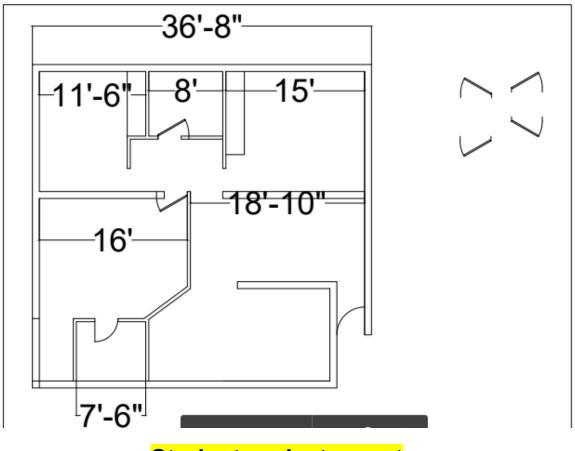
2 BHK
FLOOR PLANS

BUILT UP AREA - 65.725 SQ.M.
BALCONY AREA - 19.941 SQ.M
TERRACE - 10.413

Floor plan upper diagram labels:

BALCONY - 2
1.700 M. WIDE

UTILITY
1.700 M. WIDE

BALCONY - 3
1.615 M. WIDE

TERRACE
1.756 M. WIDE

D2   W   D2   W1

BEDR OOM - 2
3.050 X 3.050

KITCHEN
2.265 X 3.050

D2   W

DRAWING ROOM
3.200 X 5.810

W

D1

D2

PASSAGE 0.915 M. WIDE

D1   D3

TOILET 1
1.300 X 2.300

BALCONY - 1
1.500 M. WIDE

D2

BED ROOM - 1
3.050 X 3.050

D3

TOILET 2
1.300 X 2.300

DINNING
3.304 X 2.415

W   W

W

V   V

DUCT - 2.679 X 0.600

ELECTRIC DUCT
2.7X1.38

2.7014

Lower diagram labels:

OPEN SAPCE   WC

BEDROOM 1   BEDROOM 2   BEDROOM 1   BEDROOM 2

WC

WC   WC

DINING ROOM   DINING ROOM

KITCHEN   KITCHEN

LIVING ROOM   LIVING-ROOM

PORCH

PLOT AREA   BUILT UP AREA

Student project report

S No	Participant Name	Course Name	Activity Type	Activity Name	Attempt Number	Start Date – Time	End Date – Time	KeKe	Question Key Value 3	Question
	GOURAV DADHICH	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:08 PM	23 Jul 2020 03:24 PM	NA NA	NA	NA
	Amit Soni	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:19 PM	23 Jul 2020 03:26 PM	NA NA	NA	NA
	Ashish Kumar Sharma	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:23 PM	23 Jul 2020 03:37 PM	NA NA	NA	NA
	RANJEETA BOSE	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:13 PM	23 Jul 2020 03:29 PM	NA NA	NA	NA
	Neha Sain	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:02 PM	23 Jul 2020 03:17 PM	NA NA	NA	NA
	Rohitash Kumar Yadav	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:24 PM	23 Jul 2020 03:34 PM	NA NA	NA	NA
	Ajay Choudhary	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:24 PM	23 Jul 2020 03:39 PM	NA NA	NA	NA
	Vinayak Pathak	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:02 PM	23 Jul 2020 03:18 PM	NA NA	NA	NA
	Mohit Sharma	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:03 PM	23 Jul 2020 03:16 PM	NA NA	NA	NA
0	RANVEER SINGH SHEKH	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:04 PM	23 Jul 2020 03:15 PM	NA NA	NA	NA
1	PRIYANSHU TATIWAL	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:05 PM	23 Jul 2020 03:21 PM	NA NA	NA	NA
2	SURESH KUMAR PUROH	Building Planning & Desig	Assessment	QUIZII _BPD_1205	1	23 Jul 2020 03:06 PM	23 Jul 2020 03:22 PM	NA NA	NA	NA
3	Amit Soni	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:00 PM	23 Jun 2020 01:19 PM	NA NA	NA	NA
4	Neha Sain	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:02 PM	23 Jun 2020 01:23 PM	NA NA	NA	NA
5	PRIYANSHU TATIWAL	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:41 PM	23 Jun 2020 01:52 PM	NA NA	NA	NA
6	Vinayak Pathak	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:31 PM	23 Jun 2020 01:35 PM	NA NA	NA	NA
7	RANJEETA BOSE	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:03 PM	23 Jun 2020 01:27 PM	NA NA	NA	NA
8	Ashish Kumar Sharma	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:18 PM	23 Jun 2020 01:28 PM	NA NA	NA	NA
9	Ajay Choudhary	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:19 PM	23 Jun 2020 01:22 PM	NA NA	NA	NA
0	GOURAV DADHICH	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:07 PM	23 Jun 2020 01:24 PM	NA NA	NA	NA
1	Mohit Sharma	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:08 PM	23 Jun 2020 01:19 PM	NA NA	NA	NA
2	RANVEER SINGH SHEKH	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:09 PM	23 Jun 2020 01:25 PM	NA NA	NA	NA
3	Vikas Yadav	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:36 PM	23 Jun 2020 01:43 PM	NA NA	NA	NA
4	Rohitash Kumar Yadav	Building Planning & Desig	Assessment	QUIZ _BPD 1205	1	23 Jun 2020 01:36 PM	23 Jun 2020 01:45 PM	NA NA	NA	NA

Datasheet | Attributes | Datasheet Coursewise | Grades Glossary | Attendance | Instructions

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Colour

Course Code: CL1115

Credits: 3.0

Course Description & Content

This course helps in the perception of colour and the interaction of colour and form. This course content includes, the theory of colour, interaction of colours, the relationship of colour and form, perception of light and colours, pigments, chromatic and achromatic colours.

Learning Outcomes

- Helps students to understand the science of colour as an element of design, and its application.
- Students get to understand colour perception and its relationship with form.
- Students can develop visual sensitivity through application of colour.

Activities with direct bearing to Skill development

1. Developing skills to perceive how colours interact with other colours, elements, and space.

2. Observe, articulate, and document how brands and movies use colours for impactful storytelling.

3. Deconstruct master paintings to understand the usage of colours in different art movements.

4. Understanding the basics of colours – Standards and terminologies.

Methodology:

- Lectures, demonstrations and presentations.
- Experimentation with pigments.

- Discussions and feedback.

Evaluation Criteria

- Observation and Perception.
- Understanding and clarity of concepts.
- Levels of improvement.
- Skills.

Evaluation Criteria:

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	10%
3	Process and management	Nil
4	Application of concepts	Nil
5	Understanding & clarity of concepts	20%
6	Attitude towards learning	Nil
7	Levels of improvement	10%
8	Levels of thinking & Reflection	Nil
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	20%
15	Jury	40%
	Total	100%

Suggested Readings

L. Hotzschue; Understanding Colour, VNR, 1995.

Itten, Johannes; The Art of Colour: The Subjective Experience and Objective Rationale of Color, Wiley Publications, 1997.

Course Title and Course Code	Computer Aided Modeling and Simulation (ME1206)
Hours per Week	L T P: 1 0 2
Credits	2
Students who can take	B. Tech Semester-IV & VI ME

Course Objective:

To develop competencies in CAD modeling and simulation for effective concurrent engineering.

Learning Outcomes:

On successful completion of this course, the students will be able to:
1. design mechanical parts using CAD software.
2. assess the use of tool to create, constrain, and edit sketched features.
3. assess the use of modeling & assembly tools to create and constrain components.
4. generate simulation results for any machine part and assembly.

Prerequisites		Basics of Physics		
Sr. No	Specifications	Marks	S#1	S#2
1	Attendance	5	5	5
2	Assignment	25	25	25
3	Class Participation	NIL	NIL	NIL
4	Quiz	NIL	NIL	NIL
5	Theory Exam-I	NIL	NIL	NIL
6	Theory Exam-II	NIL	NIL	NIL
7	Theory Exam-III	NIL	NIL	NIL
8	Report-I	NIL	NIL	NIL
9	Report-II	NIL	NIL	NIL
10	Report-III	NIL	NIL	NIL
11	Project-I	40	40	40
12	Project-II	NIL	NIL	NIL
13	Project-III	NIL	NIL	NIL
14	Lab Evaluation-I	15	15	15
15	Lab Evaluation-II	15	15	15
16	Course Portfolio	NIL	NIL	NIL
	Total (100)	**100**	**100**	**100**
Evaluation Scheme for Retest		**Marks**		
1	Lab Evaluation-Retest	30	30	30
	Total (30)	**30**	**30**	**30**

COURSE SYLLABUS:

UNIT – I
Introduction to 2-D & 3-D Modeling:
Creating a New Part File, Sketched Base Features, Primitive Base Features, Sketch Geometry, Advanced Editing Tools, Rectangle & Circular Sketch Patterns, Over-Dimensioned Sketches, Sketch Preferences, Extruded Secondary Features, Revolved Secondary Features, Using Existing Geometry, Editing Sketched Secondary Features, Edge Chamfer, Constant Fillets, Variable Fillets, Face Fillets, Full Round Fillets, Straight Holes, Threads, Creation Sequence, Section Views.

UNIT - II
Advance 3-D modeling and Assembly:
Creating a New Part, Rail Lofts, Center Line Lofts, Advanced Loft Options, Rectangular Feature Patterns, Circular Feature Patterns, Mirror Parts or Features, Manipulate Patterns and Mirror Features, Assembling Components using Constraints, Content Center, Assembly Browser, Assembling Components using Joints, Moving and Rotating Assembly Components, Selection Options in Assemblies, Measurement Tools, Model Properties, Assembly Parts, Assembly Features.

UNIT - III
Surfacing, and Drafting:
New Drawing Views, Manipulating Views, Dimensions, Drawing Sheets, Parts List, Balloons, Styles and Standards, Hatching, Text, Symbols, Hole and Thread Notes, Chamfer Notes, Center Marks and Center Lines, Hole Tables, Revision Tables and Tags.

UNIT - IV
Static & Dynamic Simulation
General Working of FEA, Nodes, Elements, General Procedure of Conducting Finite Element Analysis through inventor, Structural Analysis, Material Properties, Mesh Generation, Mesh Density, Defining the New Analysis Type, Restarting the Analysis, Setting Analysis Options, Solving the Analysis Problem, Dynamic Analysis.

Text Books:
1. Tickoo, Sham. Autodesk Inventor 11 For Engineers & Designers (With Cd). Dreamtech Press, 2006.
2. Shih, Randy. Parametric Modeling with Autodesk Inventor 2014. SDC Publications, 2013.
3. Bethune, James D. Engineering Design Graphics with Autodesk Inventor 2020. Macromedia Press, 2019.
4. Zeid, Ibrahim. CAD/CAM theory and practice. McGraw-Hill Higher Education, 1991.

S. No	Roll No	Name	Project
1	2018BTechME001	Abhimanyu Shankar	Two-wheeler frame
2	2018BTechME004	Ronak Singh	Suspension system of a Motorcycle
3	2018BTechME005	Anirudh Pareek	Two-wheeler clutch assembly
4	2018BTechME006	Prashant Chaudhary	Fork of motorcycle
5	2018BTechME007	Piyush Singh Panwar	Power transmission and wheels of motorcycle
6	2018BTechME008	Mayank Soni	Cad model of the engine of the bike

7	2017BTechME003	Ajay Kumar Choudhary	Cad modelling of automobile suspension system
8	2017BTechME005	Arun Kumar Jangir	Automobile engine block
9	2017BTechME007	Gautam Anand	Cad modelling of a bicycle
10	2017BTechME008	Hitesh Chugh	Cad modelling of chess board
11	2017BTechME009	Lakshay Soni	Automobile engine block
12	2017BTechME010	Pranjal Wadhwa	Motor blower assembly
13	2017BTechME011	Ravinder Singh Khangarot	Cad modelling of a bicycle
14	2017BTechME012	Praful Maheshwari	NACA-23112 airfoil study
15	2017BTechME014	Aditya Gupta	Cad modelling of chess board
16	2017BTechME018	Neelesh Kesarwani	NACA 23112 airfoil study
17	2017BTechME019	Ashish Dugar	Cad modelling of automobile suspension system
18	2016BTechME016	Naveen Bhardwaj	____Not submitted____

Session 2019-20

Department of Mechanical Engineering

Course : Computer Aided Product Design
Code: ME1112

Course Title and Course Code	**Computer Aided Product Design (ME1112)**
Hours per Week	**L T P: 2 0 4**
Credits	**4**
Students who can take	**B. Tech Semester-IV (Batch: 2016-2020)** **B. Tech Semester-III (Batch: 2017-2021)**

Course Objective:

This course aims to expose the students to the various aspects of Industrial Design so as to design new products considering aesthetics, cost, environment and other human factors.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1. Read, understand and analyze drawing sheet of parts and assemblies as per standards.
2. Develop 3D model of the parts as per the dimensional values.
3. Assemble number of 3D model of parts together to check for its dimensional suitability and compatibility for an assembly.
4. Generate the drafting sheet of assembled product with Bill of materials.

Prerequisites		Basics of Physics
Sr. No	**Specifications**	**Marks**
1	Attendance	NIL
2	Assignment	10
3	Class Participation	5
4	Quiz	5
5	Theory Exam-I	NIL
6	Theory Exam-II	NIL
7	Theory Exam-III	20
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	NIL
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I	20
15	Lab Evaluation-II	20
16	Course Portfolio	20
Total (100)		**100**

Syllabus:

Concept of product design, Limits and fits, Geometric dimensioning and tolerance (GD&T).

Introduction to CAD software, Sketch Module, drawing commands in 2D Sketch.

3D Modelling tools with example like Extrude, Revolve, Sweep, Blend.

Editing commands like fillet, chamfer, holes, drafts, pattern.

Advance 3D modelling tool Relation, Family table, UDF.

Top down and bottom up assembly approach, mechanism in assembly

Drafting, bill of materials, sheet metal.

CNC programming.

Expt. No.	Name of the Experiment	Area of Application
1.	Portfolio of the complete course	• *Used in placement interviews.*
2.	Design the fixture assembly using CREO software	• *It is used in design Industries* • *It is also very useful in cad-cam industries*
3.	Design the cylinder piston assembly using CREO software	• *It is used in design Industries* • *It is also very useful in cad-cam industries*
4.	Design the butterfly valve assembly using CREO software	• *It is used in design Industries* • *It is also very useful in cad-cam industries.*
5.	To prepare the drafting sheet of each assembly	• *It is used in design Industries* • *It is also very useful in cad-cam industries*
6.	To generate the codes for simple turning on CNC machine	• *It is used in manufacturing Industries* • *It is also very useful in cad-cam industries*
7.	To generate the codes for thread cutting on CNC machine	• *It is used in manufacturing Industries* • *It is also very useful in cad-cam industries*
8	To prepare codes for CNC Milling machines for simple facing.	• *It is used in manufacturing Industries* • *It is also very useful in cad-cam industries*
9	To prepare codes for CNC Milling machines for profile cutting.	• *It is used in manufacturing Industries* • *It is also very useful in cad-cam industries*
10	Prepare a GD & T for the assembled drawings.	• *Used in placement interviews.* • *Used in design and manufacturing industries*

List of students   session 2016-2020

Sr. No	Roll No	Name
1	2016BTechME001	Abhishek Phogat
2	2016BTechME002	Abhishek Sharma
3	2016BTechME003	Akshay Taparia
4	2016BTechME005	Arpit Sharma
5	2016BTechME006	Ashish Kumar Sisodiya
6	2016BTechME007	Deepansh Dikshit
7	2016BTechME008	Devkaran Singh
8	2016BTechME009	Devvrat Singh Chauhan
9	2016BTechME010	Ekhlak Ahmad
10	2016BTechME011	Jai Singh Rathore
11	2016BTechME012	Jaswant Singh Deora
12	2016BTechME013	Kaushlendra Kumar Pandey
13	2016BTechME015	Manvendra Singh
14	2016BTechME017	Param Gupta
15	2016BTechME018	Raj Agrawal
16	2016BTechME019	Rajat Nebhnani
17	2016BTechME020	Ram Upadhyay
18	2016BTechME021	Ritwik Raman
19	2016BTechME022	Rohit Dhanraj
20	2016BTechME023	Rudra Kumar Suthar
21	2016BTechME024	Sajal Jain
22	2016BTechME025	Shantanu Sharma
23	2016BTechME026	Snehashish Banerjee
24	2016BTechME028	Yash Mathur
25	2016BTechME030	Arjun Gupta
26	2016BTechME031	Deeksha Parwani
27	2015BTechME023	T. Kishor

List of students session 2017-21		
Sr. No	Roll No	Name
1	2017BTechME003	Ajay Kumar Choudhary
2	2017BTechME005	Arun Kumar Jangir
3	2017BTechME007	Gautam Anand
4	2017BTechME008	Hitesh Chugh
5	2017BTechME009	Lakshay Soni
6	2017BTechME010	Pranjal Wadhwa
7	2017BTechME011	Ravinder Singh Khangarot
8	2017BTechME012	Praful Maheshwari
9	2017BTechME014	Aditya Gupta
10	2017BTechME017	Akash Kumar Singh
11	2017BTechME018	Neelesh Kesarwani
12	2017BTechME019	Ashish Dugar
13	2016BTechME014	Naveen Bharatdwaj

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Craft Study

Course Code: CR1113

Credits: 2.0

Course Description & Content

The course looks at the craft history and hands on study of diverse craft techniques from India and further looks into application of the same in design. The course contents are introduction to craft history, craft and society, craft and its cultural relevance, study of traditional materials associated with craft and allied craft techniques and its application through design thinking.

Learning Outcomes

- This course broadens students' perception about Indian handicrafts, design culture with regards to geographical diversity and the roots of craft imagination.
- It helps to develop the ability to understand cultures and approach processes and techniques associated with them.
- This course aims at developing holistic understanding of craft techniques with regards to the cultural, sociological, and geographical aspects of the same.

Activities with direct bearing to Employability, Skill development

1. Research skills garnered in the course are essential to the learners' performance in the tasks of documentation, analysis, segregation and data management at any design consultancy/firm/corporation, etc.
2. empathy skills developed in the learners help them in building meaningful

3.

Methodology:

- Lectures, field study and group discussions.
- Interviews and interactions with craft engineers and craft-based designers.
- Study of techniques and processes and documentation.

Evaluation Criteria

- Observation and perception.
- Understanding and clarity of concepts.
- Research and analysis.
- Communication/presentation.
- Levels of thinking and reflection.

S. No	Components	Weightage
1	Communication/Presentation	10%
2	Skills	Nil
3	Process and management	Nil
4	Application of concepts	Nil
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	10%
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	10%
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	20%
15	Jury	40%
	Total	100%

Suggested Readings

1. Handmade in India: Crafts of India by Aditi Ranjan, M P Ranjan.

2. Craft Atlas of India by Jaya Jaitley.

3. Handmade in India: A Geographical Encyclopedia of India Handicrafts by Aditi Ranjan, M P Ranjan.

4. Tribes of India – The Struggle for Survival by Christoph Van Furer, Haimendorf.

5. The Beautiful Tree – A Personal Journey into How the World's poorest people are educating themselves.

Course Title and Code	
Mobile Application Development : CS1205	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem VI

Course Objectives: This Course is designed to offer learners an introduction to Android platform and related applications in the business world. Learners would be introduced to different cross platforms like IONIC, REACT NATIVE, and TABRIS.JS. The Course will cover ethical contents and security related issues in app deployment at Google Play Store. All techniques will be illustrated using different app design with real-time and static databases.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. develop high-level plans for script solutions for mobile and evaluate the post-production outcome;

2. design scripts to meet given interface and media control requirements;

3. use variables, properties and other code elements appropriately to implement the code design;

4. devise, carry out and evaluate functional test strategies of mobile design;

5. implement and evaluate techniques for the installation of mobile applications and delivery via various channels;

6. explain the principles of technologies which support media production and delivery on a variety of platforms;

7. create event listeners and responding to events;

8. give permissions and Android manifests;

9. tying Android XML resources to Java code;

10. create a Google Play Store account and preparing apps for the Play Store.

Syllabus (Theory)

Module I – Mobile Application Overview
Introduction to Mobile Computing, Introduction to Android Development Environment, Mobile Software Engineering, Design of application (view level).

Module II – Framework and User Interface Development
Frameworks and Tools, Generic UI Development, Android User (privileges), VUIs and Mobile Apps Text-to-Speech Techniques, Designing the Right UI, Multichannel and Multimodial UIs, Android Intents and Services, Characteristics of Mobile Applications
Successful Mobile Development.

Module III – Storing Retrieving Data with Real-time Database
Synchronization and Replication of Mobile Data, Getting the Model Right, Android Storing and Retrieving Data, Working with a Content Provider, Communications Via Network and the Web, State Machine, Correct Communications Model, Android Networking and Web.

Module IV – Notifications, Alarming and Location
Performance and Memory Management, Android Notifications and Alarms, Graphics, Performance and Multithreading, Graphics and UI Performance, Android Graphics and Multimedia, Mobile Agents and Peer-to-Peer Architecture, Android Multimedia, Mobility and Location Based Services.

Syllabus (Practical)
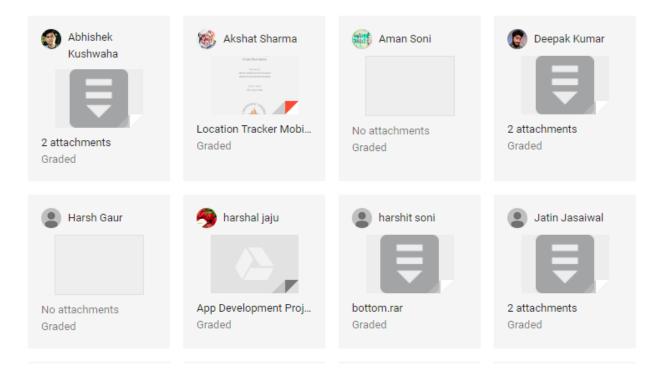
Layout design: Linear (Horizontal, Vertical), Relative and Constraint. Navigation Drawer App, embedding videos with media control, Media Player and handling Audio, Android SeekBar, ListViews and Array adapters, Countdown timer and handler, Background task performance, Google API (google map, location), Text-to-Speech and Speech-to-Text conversion, saving data to android devices using Shared Preferences, RecyclerView, Static Database SQLite and its operations, Real-time database Firebase, Manifest file and Gradle dependencies.

JKLU University Activity App
JKLU Faculty and Students Interaction App
MediHelp App
RunTime Location Tracking App
InstaOwn Chatting and sharing App
Shopping Center App
Text-to-Speech and Speech-to-Text App: For blind people
Music Player App
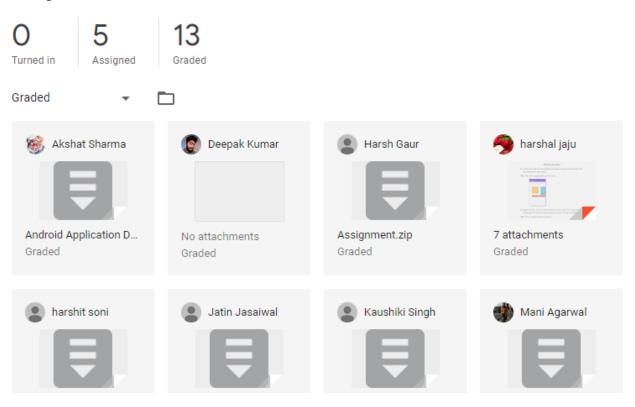
Students regular assessment are done using google classroom, where they shared the link of progressing work

Abhishek Kushwaha — 2 attachments — Graded

Akshat Sharma — Location Tracker Mobi... — Graded

Aman Soni — No attachments — Graded

Deepak Kumar — 2 attachments — Graded

Harsh Gaur — No attachments — Graded

harshal jaju — App Development Proj... — Graded

harshit soni — bottom.rar — Graded

Jatin Jasaiwal — 2 attachments — Graded

Kaushiki Singh

2 attachments
Graded

Mani Agarwal

TOBO.rar
Graded

Muskaan Jain

Mobile_App Project.zip
Graded

pranjal bhada

No attachments
Graded

Rashi Arora

Rashi_and_Harshal_A...
Graded

Sid Jain

GitHub - jainsiddharth...
Graded

SYED AQSA AHMED

Flowchart.docx
Graded

umesh kumar

MediHelp_Umesh_Ku...
Graded

Students have implemented different API's as part of different assignment given to them:
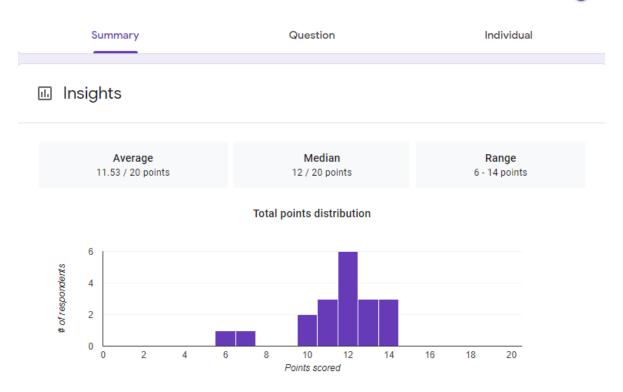
Assignment
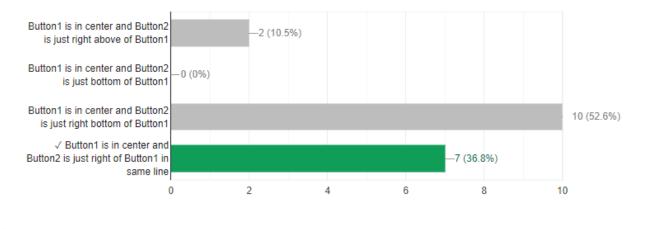
0	5	13
Turned in	Assigned	Graded

Graded 🗀

Akshat Sharma

Android Application D...
Graded

Deepak Kumar

No attachments
Graded

Harsh Gaur

Assignment.zip
Graded

harshal jaju

7 attachments
Graded

harshit soni

Jatin Jasaiwal

Kaushiki Singh

Mani Agarwal

End-Term
Google Forms

Graded

Akshat Sharma	Aman Soni	Deepak Kumar	Harsh Gaur
Graded	Graded	Graded	Graded
harshal jaju	harshit soni	Jatin Jasaiwal	Kaushiki Singh
Graded	Graded	Graded	Graded
Mani Agarwal	Muskaan Jain	Pranav Jain	pranjal bhada
Graded	Graded	Graded	Graded
Rashi Arora	Sid Jain	SYED AQSA AHMED	umesh kumar

📊 Insights

Average	Median	Range
11.53 / 20 points	12 / 20 points	6 - 14 points

Total points distribution

7 / 19 correct responses

Button1 is in center and Button2 is just right above of Button1 — 2 (10.5%)

Button1 is in center and Button2 is just bottom of Button1 — 0 (0%)

Button1 is in center and Button2 is just right bottom of Button1 — 10 (52.6%)

✓ Button1 is in center and Button2 is just right of Button1 in same line — 7 (36.8%)

Course Title and Code: Machine Learning and Data Mining: CS2102	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	Pre PhD (2019-2021)

Course Objective: This course introduces the fundamental concepts of machine learning and data mining techniques. The course will cover the state-of-the art data mining techniques along with its usage with machine learning algorithms on real-world data (or big data). This course helps the students to pursue project related ML and data mining
with real-world research problems.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Utilize advanced knowledge of data mining, data warehousing and KDD concepts and techniques.
2. Organize and Prepare the data needed for data mining using pre-preprocessing techniques.
3. Generate and apply different mining techniques such as rule generation, association mining, Bayesian techniques and Frequent Itemset generation.
4. Apply the techniques of clustering, classification, association finding, feature selection and visualization on real world data.
5. Demonstrate knowledge in scalability and management of large dataset.
6. Identify machine learning techniques suitable for a given problem.
7. Interpret fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
8. Use the standards and energy efficient ML algorithms.
9. Apply dimensionality reduction techniques.
10. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
11. Utilize state-of-the art algorithms of Machine Learning for building applications related to SDG.

Prerequisites		Linear Algebra, Basic Statistics
Sr. No	**Specifications**	**Marks**
1	Attendance	Nil
2	Assignment	10
3	Class Participation	Nil
4	Quiz	Nil

5	Theory Exam	10
6	Theory Exam	Nil
7	Theory Exam	30

8	Report-1	10
9	Report-2	Nil
10	Report-3	Nil
11	Project -1	20
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation1	Nil
15	Lab Evaluation2	20
16	Course portfolio	Nil
	Total (100)	100

Syllabus (Theory)

UNIT – I: Introduction: Data warehouse – Difference between Operational DBs and Data warehouses – Multidimensional Data Model, The process of knowledge discovery in databases, predictive and descriptive data mining techniques, supervised and unsupervised learning techniques.

UNIT – II: Techniques of Data Mining: Link analysis, predictive modeling, database segmentation, score functions for data mining algorithms, Bayesian techniques in data mining, Association Analysis: Problem Definition; Frequent Itemset generation; Rule Generation; Compact representation of frequent itemsets; Alternative methods for generating frequent item- sets

UNIT – III: Issues in Data Mining: Scalability and data management issues in data mining algorithms, parallel and distributed data mining, privacy, social, ethical issues in Knowledge Discovery in Databases (KDD) and data mining, pitfalls of KDD and data mining.

UNIT – IV: Introduction to Machine Learning, Supervised Learning: Classification: Preliminaries; General approach to solving a classification problem; Decision tree induction; Rule-based classifier; Simple and Multiple Linear Regression ; Nearest-neighbor classifier, SVM, Unsupervised Learning: Clustering; K-Means, Hierarchical Clustering

UNIT – V: Model Evaluation Measures: Cross-Validation Technique, Confusion matrix for evaluation, Class probabilities and class predictions, ROC Curve, Model evaluation metrics, Fitting dataset and evaluating their performance set, Evaluation of selected features, Model evaluation metrics, making predictions on new data; Usage of AI and ML Techniques for achieving sustainable practices, NIST and IEEE standards for AI and ML libraries, tools and techniques

Reference Books:

1. Mitchell, Tom. Machine Learning, McGraw Hill 1997.

2. Murphy, Kevin P. Machine learning: a probabilistic perspective. MIT press, 2012. (Electronic copy available through the Bodleian library.)

3. Bishop, Christopher M. Pattern recognition and machine learning. Springer, 2006.

4. Han, Jiawei, Jian Pei, and Micheline Kamber. Data mining: concepts and techniques. Elsevier, 2011.

5. Tan, Pang-Ning, Michael Steinbach, Vipin Kumar, and Anuj Karpatne. Introduction to Data Mining, Global Edition. Pearson Education Limited, 2019.

6. Witten, Ian H., Eibe Frank, Mark A. Hall, and Christopher J. Pal. Data Mining: Practical machine learning tools and techniques. Morgan Kaufmann, 2016.

Course Name: Data Science using R programming.

Course Code: CSEM

Course Offered to: Student of (B. Tech + M. Tech) 9th Sem as a curated MOOC

Credits: 3

Course Description:

The scientific discipline of Data Science using R Programming focuses on developing algorithms to find patterns or make predictions from empirical data. R is a programming language and environment commonly used in statistical computing, data analytics and scientific research. It is one of the most popular languages used by statisticians, data analysts, researchers and marketers to retrieve, clean, analyze, visualize and present data.

PREREQUISITES: Relevant applied math and statistics, core computer science.

INDUSTRY SUPPORT: Data science is big deal across so many industries, like. insurance, internet, healthcare, telecom, travel and transportation.

COURSE LAYOUT:

Course Name	Hours Dedicated	Level
R Programming	10	Intermediate Level
Getting and Cleaning data	8	Intermediate Level
Exploratory Data Analysis	8	Intermediate Level
Reproducible Research	6	Intermediate Level
Statistical Inference	10	Intermediate Level
Regression Models	10	Intermediate Level

SUGGESTED READING MATERIALS:

Own course notes, copy of ppts. Data Science using R programming textbooks:

Roger D. Peng: R Programming for Data Science, 2016.

Instructor:

Jeff Leek, PhD Associate Professor, Biostatistics, Bloomberg School of Public Health.

Roger D. Peng, PhD Associate Professor, Biostatistics, Bloomberg School of Public Health.

Brian Caffo, PhD Professor, Biostatistics, Bloomberg School of Public Health.

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Semester - 1

Course Title: Culture Studies

Course Code: CU1107

Credits: 2.0

Course Description & Content

This course introduces the students to the visual culture of India, the deep-rooted Indian traditions, values, and cultural practices. This course contents are cultural traditions of India, design as a reflection of culture, globalization, and its effects on cultural traditions.

Activities with direct bearing to Employability, Skill development

1. Develops skills of Empathy, self-esteem, cooperation.
2. Self-confidence and Team playing increases employability.
3. Hands on class assignments encourage independent thinking and creativity hence entrepreneurship.

Methodology

- Lectures.
- Reading Assignments.
- Field Visits to craft clusters and museums.
- Group discussions and feedback.

Evaluation Criteria:

- Presentation.

- Understanding.

- Clarity of concepts.

S. No	Components	Weightage
1	Communication/Presentation	20%
2	Skills	Nil
3	Process and management	Nil
4	Application of concepts	20%
5	Understanding & clarity of concepts	20%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	Nil
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

1. Village India by Stephen P. Huyler.

2. Daughters of India by Stephen Huyler.

3. Introducing Anthropology by (writer) Merryl Wyn Davies . Piero (Illustrator).

4. Mankind Behaving Human needs & Material Culture by James K. Feible.

5. Tribes of India The Struggle for Survival by Christopher Van Furer – Haimendorf).

6. Handmade in India A Geographic Encyclopedia of Indian hand crafts by Sir M.P Ranjan and Aditi Ranjan.

Session 2019-20

Department of Mechanical Engineering

Course : Design of Machine Elements
Code: ME1110

Course Title and Code	
Design of machine elements- ME1110	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B. Tech Semester-VI (Batch: 2017-2021)/ Core**

Course Objective: This course aims to equip students with the concepts, procedure, and standards for designing and evaluating shafts, bearings, springs, and gears for different applications.

After course completion, the student will be able to:

1. Design and evaluate shafts to work under different service loading conditions as per ASTM/BIS standards.
2. Design bearings for various applications as per ASTM/BIS standards.
3. Design, evaluate gears for various applications as per ASTM/BIS standards.
4. Design springs for various systems as per ASTM/BIS standards.

Prerequisites : Strength of Materials and Engineering Mechanics.

Sr. No	Specifications	Marks
1	Attendance	NIL
2	Assignment	10
3	Class Participation	NIL
4	Quiz	10
5	Theory Exam I	10
6	Theory Exam II	10
7	Theory Exam-III	30
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	10
12	Project-II	Nil
13	Project-III	Nil

14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

UNIT-I

Design for Fluctuating Loads- Theory of failures, cyclic stress, fatigue and endurance limit, stress concentration factor, notch sensitivity, design for finite and infinite Life, Soderberg, Goodman & Gerber criteria.

Shafts- Material for shaft, stresses in shaft, design of shaft subjected to twisting moment, bending moment and combing twisting and bending moments, shaft subjected to fatigue load.

UNIT-II

Bearing- Classification of bearing, hydrodynamic lubrication, sliding contact bearing, design of journal bearing, thrust bearing-pivot and collar bearing, hydrodynamic thrust bearing.

Rolling contact bearing, types of rolling contact bearing, Bearing life, Selection of ball and roller bearings with ABMA Standards.

UNIT-III

Spur Gears- classification of gear, tooth forms, system of gear teeth, design consideration, Beam strength of gear tooth, dynamic tooth load, wear strength of gear tooth, failure of gear tooth, design of spur gears, AGMA standards.

Helical Gears: Terminology, forces components on a tooth of helical gear, virtual number of teeth, beam strength & wear strength of helical gears, dynamic load on helical gears.

UNIT-IV

Springs- Types of springs, design for helical springs against tension, compression and fluctuating loads, Design of leaf springs, Surging phenomenon in springs.

List of Experiments:

Expt. No.	Name of the Experiment	Area of Application
1.	Design an Oldham coupling and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*
2.	Design a roller bearing and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*
3.	Design a sliding contact bearing and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*
4.	Design a spur gear and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*
5.	Design a helical gear and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*
6.	Design of spring under given condition and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*
7.	Design an Oldham coupling and develop a 3D model.	• *It is used in manufacturing Industries* • *It is used in CAD Industries*

Project:
(a) **Engine Assembly**
(b) **Hydraulic Bridge**
(c) **Mini Conveyor using Gineva Mechanism**

List of students session 2017-21		
Sr. No	**Roll No**	**Name**
1	2017BTechME003	Ajay Kumar Choudhary
2	2017BTechME005	Arun Kumar Jangir
3	2017BTechME007	Gautam Anand
4	2017BTechME008	Hitesh Chugh
5	2017BTechME009	Lakshay Soni
6	2017BTechME010	Pranjal Wadhwa

7	2017BTechME011	Ravinder Singh Khangarot
8	2017BTechME012	Praful Maheshwari
9	2017BTechME014	Aditya Gupta
10	2017BTechME017	Akash Kumar Singh
11	2017BTechME018	Neelesh Kesarwani
12	2017BTechME019	Ashish Dugar
13	2016BTechME014	Naveen Bharatdwaj

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Design Process / Problem Solving

Course Code: DP1116

Credits: 4.0

Course Description

This course gives students an overview of the process of design. This overview is essential for them to appreciate the learning through various courses. The course content includes analysis and mapping of the design process, the morphology of the problem solving process, role of creativity in design, methodologies and strategies related to the different stages of the design problem and case studies.

Learning Outcomes

- Students will understand and demonstrate the different stages in the design process – from perception of a problem to generating a solution to the problem through investigation, analysis, and synthesis
- Students will understand the methodology of the problem-solving process.

Activities with direct bearing to Entrepreneurship, Skill development

1. Design process is an integral component to any design practice, so this course has a direct effect on the abilities of the learners to perform at such practices.
2. The skills of ideation, problem framing, prototyping, etc. are essential in a lot of domains like design/architecture. UX consultancies, social design firms, Industrial design studios, etc.

Methodology:

- Lectures
- Assignments.
- Individual Design Projects
- Discussions and feedback.

Evaluation Criteria

- Understanding and clarity of concepts.
- Application of concepts.
- Attitude towards learning.
- Research and analysis.
- Innovation and creativity.

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	Nil
3	Process and management	Nil
4	Application of concepts	10%
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	10%
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	Nil
9	Overall output	Nil
10	Innovation & creativity	10%
11	Research & analysis	20%
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

1. D. Norman; The Design of Everyday things, London, The MIT Press, 1998.
2. A Forty; Objects of Desire, Thems & Hudson, 1993.
3. Julier, G.; 20th Century Design, Thames &Hudson, 1993.
4. Potter, Norman; What is a Designer: Things, Places, Messages, Princeton Architectural Press 2002.
5. Victor Papanek, Design For The RealWorld.
6. Indian Design Edge – Strategic insights for success in the creative economy by Darlie Koshy.
7. Design the International Movement by H Kumar Vyas.

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Course Title: Elements of Composition

Course Code: EC1105

Credits: 3.0

Course Description & Content

This course is essential for students to understand the basic elements and principles of visual composition this course contents are Basic elements of composition, manipulation of elements in two dimensions to induce specific effects, concepts of harmony, rhythm, balance, contrast and movement, Gestalt theory. The course also takes into consideration new developments in social media content compositional strategies and looks into that as a specialized segment.

Learning Outcomes

- Students develop visual perception ability among students.
- Students can understand the visual dynamics that exists between elements.
- Students will create compositions using basic elements of point, line, plane, volume, etc. and use the same to communicate ideas.

Activities with direct bearing to Skill development:

1. Assignment on element manipulation: Case studies of visual elements in play in nature and assignments based on skill development with regards to basic elements present in nature. A large part of modern graphic design is also based on these fundamentals and the assignments help students to learn about this relationship and explore the same.
2. Assignment on space and elemental form study with respect to organic forms: The assignment explored the organic plant forms in terms of negative and positive spaces and explored the possibilities of composition with them.

3. Case Study 1: Case Studies of utilization of compositional principals in the field of photography, architecture, art and engineering.
4. Case Study 2: Case studies along with exercises to develop visualization skills in a grid-based layout, to help creating a pattern or form with controlled repetition.

Methodology

- Lectures, demonstrations, and presentations.
- Assignments.
- Analysis and feedback.

Evaluation Criteria

- Skills.
- Process and management.
- Understanding.
- Levels of improvement.
- Overall output.

S.No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	20%
3	Process and management	10%
4	Application of concepts	Nil
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	10%
8	Levels of thinking & Reflection	Nil
9	Overall output	10%
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil

13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

1. Gail Greet Hannah, Elements of Design, Princeton Architectural Press, 2002.

2. Lauer, David; Design Basics, Wadsworth Publishing, 1999.

3. W. Wong; Principals of Two-Dimensional Design, John Wiley and Sons, 1972.

4. J. Bowers; Introduction Design: Understanding of form and function, John Wiley & Sons 1999.

5. L. Hotzschue; Understanding Colour, VNR, 1995.

6. Itten, Johannes; The Art of Color: The Subjective Experience and Objective Rationale of Color, Wiley Publications, 1997.

7. Proctor, R.M.; The Principles of Pattern, Dover Publications, 1990.

Course code	Course Title	Teaching Scheme				
		L	**T**	**P**	**S**	**Credits**
EE-1202	**Electrical System Design**	**3**	**0**	**2**	**0**	**4**

Course Description

This course aims to develop understanding about how to apply basic electrical concepts such as power factor, kVA, kW, and inductive loads, and how to design of low voltage electrical distribution systems and equipment selection according to the requirements of the National Electrical Code®. Students will do the analysis of needs and objectives, then proceed to the exploration of alternative concepts and the selection of equipments that best meets goals including performance, timeliness, and affordability.

Learning Outcomes:

On successful completion of this course, the students should be able to:

1. Apply the acts in accordance with the risk and safety issues, legal obligations codes of safety practice.
2. Design the low voltage and medium voltage electrical installations and also prepare their estimates.
3. Select the equipment for their installations.
4. Design internal electrification and air-conditioning system for domestic, commercial and industry consumers
5. Design earthing systems in different installations.
6. Review the design of existing electrical systems as per the standard electrical safety codes.
7. Integrate the sensors for the monitoring and automation of electrical systems.
8. Course Evaluation for Electrical System Design

Prerequisites		Basics of Electrical Engineering,
Teaching Scheme (Hours per Week)		L T P (3 0 2)
Credits		04 Credits
Sr. No.	**Evaluation Component**	**Marks**
1	Attendance	-
2	Assignment	10
3	Class Participation	05
4	Quiz	10
5	Theory Exam-I	-
6	Theory Exam-II	10
7	Theory Exam-III	30
8	Report-I (case study)	10
9	Report-II	-
10	Report-III	-
11	Project-I	-
12	Project-II	-
13	Project-III	-
14	Lab Evaluation-I	10
15	Lab Evaluation-II	15
16	Course Portfolio	-
	Total (100)	100

Syllabus

Unit-I: System Planning

Basic design considerations, voltage selection, costs. General aspects of the design of electrical installations for domestic, commercial and industrial consumers, calculation of voltage drops. Preparing the cost estimate: classes of estimates, equipment and material, installation. Pre-commissioning tests of domestic installations. National Lighting Code (NIC), IS codes for lighting and interior illumination.

Unit-II: Lighting Design

Light sources, laws of illumination, interior lighting, exterior lighting, utility services, different types of loads and their individual protections, selection of cable/wire sizes, Design of illumination systems: Yard lighting, street lighting and flood lighting, design and layout of installation for recreational or assembly buildings, cinema theatre and high rise building. Design of Electrical system related to firefighting, lifts and escalators.

Unit-III: Internal Electrification Design

Electrical layout in residential building using Auto CAD, Selection of house wiring, sizing of conduit, switch/socket, Calculation of load on circuit, Design of sub circuit (Lighting/Power circuit), Calculation of fan, design of Earthing, Selection of low voltage switchgears, design and layout of installation for recreational or assembly buildings, cinema theatre and high rise building.

Unit-IV: Equipment Selection

Selection and installation of transformers, Installation of induction motors, Design of automatic power factor correction (APFC) Panel, Design of indoor and outdoor 11 kV substation upto 630 kVA.

Air-conditioning systems, Size and load calculation, design of air-conditioning system for domestic/theatres, Energy conservation techniques. Pre-commissioning tests of cables, transformers and generators, Selection of UPS and Generators.

Design of Sensor Network, Substation Automation system design, Selection of PLC, Communication protocol, Substation Automation with ICE 61850 Standard, Power line carrier Equipment (PLCC).

Unit-V: Design and Engineering of Switchyard

Selection of project, Classification, Electrical clearance of substation, Insulation coordination calculation of Equipment, Outdoor substation Layout, bus-bar schemes, Sizing of Transformers, Reactive Compensation Equipment, Selection of Current/Voltage Transformers for switchyards, HT/LT Circuit Breaker, Control and Relay Panels, Protection Schemes for Substation, Lightning Protection, Selection of Insulators, Earthing of Switchyard, Cabling of Switchyard, Fire protection Facilities in Substation, DC supply/ Battery bank Sizing.

List of Experiments:

1. Survey of rural electrification and draw Single Line Diagram.
   - Visit to a village.
   - Supply is taken from pole mounted transformer and distributed in various part of village.
   - Load calculation, loading capacity of different equipments.

- Verification of 3-phase balanced loading.
- Finding transformer rating based on loading.
- Making drawing sheet representing Single line diagram of three phase distribution.

2. Survey of industrial distribution system and draw Single Line Diagram.

3. Study pipe earthing and plate earthing.

4. Study of Indian standards related to design problems. (Suggestive list of Indian standards)
   I. IS 282-1982 for Hard-drawn copper conductors for overhead power transmission (second revision)
   II. IS 398(Part 1):1996 for Aluminium conductors for overhead transmission purposes: Part 1
   Aluminium stranded conductors (third revision)
   III. IS 398(Part 2):1996 for Aluminium conductors for overhead transmission purposes: Part 2
   Aluminium conductors, galvanized steel reinforced (third revision)
   IV. IS 60071(Part 1):2006 for Insulation Coordination - Part 1 Definitions, principles and rules.
   V. IS 3043:1987 for code of practice for earthing
   VI. IS 12360:1988 for Voltage Bands for Electrical Installations Including Preferred Voltages And
   Frequency
   VII. IS 15086(Part 5):2001 for Surge arresters: Part 5 Selection and application recommendations.
   VIII. IS 3716:1978 for Application guide for insulation coordination (first revision).
   IX. IS 60071(Part 1):2004 for Insulation coordination – Part 4: Computational guide to insulation co- ordination and modelling of electrical networks.

5. Survey of Cables/Conductors used in transmission and distribution system.

6. To design a proper Illumination scheme for a given working place.

7. Study of light sources: Incandescent lamps, sodium & mercury vapour lamps and Fluorescent Tube Light.

9. To study the different types of power cables and methods of laying underground cables and Localization of an earth fault by "Murray Loop Test".

References:
1. National Electric Code, Bureau of Indian Standards publications.
2. Albert Thumann, P.E., C.E.M. and Harry Franz, P.E., "Efficient Electrical Systems Design Handbook" by The Fairmont Press, Inc.
3. Xavier Roboam, "Integrated Design by Optimization of Electrical Energy Systems" published by ISTE Ltd and John Wiley & Sons, Inc.
4. Neil Sclater, John E. Traister, "Handbook of Electrical Design Details" published by TMH.
5. David J. Marne, "National Electrical Safety Code Handbook" published by McGRAW-HILL.

Activities Related to Skill Development and Employability

Workshop

Workshop on Electrical CAD was conducted for VII Sem. Electrical Engineering students on September 19, 2019. The workshop was conducted by Trainer Mr. Rajender Manglaw from Prime Vision Automation Solutions, Jaipur.

Industrial Visit

33/0.4 kV Substation in JKLU Campus visit for observing the installation of various components.

Projects

1. Design of Automatic power factor correction panel.
2. Estimation and costing of electric wiring of Library of JKLU.
3. Design the earth leakage protection scheme for a residential load circuit.

Course Title and Code: Analog Circuits EE 1102	
Hours per Week	L-T-P: 6 0 0
Credits	4
Students who can take	B. Tech Sem VI (2018-2022) EEE
Course Objective: The course aims to develop understanding about working of analog circuits and learn to develop their applications. The course is planned as Project Based Learning course.	

Learning Outcomes:

On successful completion of this course, the students should be able to:

1. Explain electrical characteristics of op-amps and their open loop configurations.

2. Design inverting, noninverting, and differential amplifiers.

3. Find out frequency response, stability, transient response, bandwidth, maximum output voltage, and other important parameters of an op-amp with and without feedback.

4. Analyze and design summing and differential amplifiers, voltage to current converters, low voltage dc voltmeters, low voltage ac voltmeters, zener diode testers, light-emitting diode testers, and integrator and differentiator circuits.

5. Design and analyze filters and oscillators viz., low-pass filters, high-pass filters, bandpass filters, band-reject filters, Phase shift oscillators, Wien bridge oscillators, quadrature oscillators, square wave generators, triangular wave generators, and sawtooth wave generators.

6. Fabricate and design some op-amp based devices such as power supplies, audio function generators, LED temperature indicators, dc motor speed controllers, appliance timers, sirens/alarms etc.

7. Test the performance of different circuits as per IEEE, IEC, ISO and other standards.

8. Refine the design of devices with a sensitivity to sustainability

Syllabus:

Unit I: Feedback topologies Voltage series, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability, gain margin and phase margin.

Unit II: Oscillators Review of the basic concept, Barkhausen criterion, RC oscillators (phase shift, Wien bridge etc.), LC oscillators (Hartley, Colpitt, Clapp etc.), non-sinusoidal oscillators UNIT

Unit III: Differential amplifier Basic structure and principle of operation, calculation of differential gain, common mode gain, CMRR and ICMR. OP-AMP design: design of differential amplifier for a given specification, design of gain stages and output stages, compensation. OP-AMP applications: review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, precision rectifier, Schmitt trigger and its applications.

UNIT IV: Active filters Low pass, high pass, band pass and band stop, design guidelines; Digital-to-analog converters (DAC): Weighted resistor, R-2R ladder; Analog to-digital converters (ADC): Single slope, dual slope, successive approximation, flash etc.

UNIT V: Design and Standards Projects using Linear Integrated circuits for minimum power consumption as well as low cost. Familiarize with 1801-2013 - IEEE Standard for Design and Verification of Low-Power Integrated Circuits.

Projects:

Project 1:   Instrumentation amplifier design to interface pH sensor, thermistor, flexible tactile sensor for use in IoT projects.

Project 2: Function generator (sine, triangular, square wave form of various frequencies using oscillators and filters

Activities Related to Skill Development and Employability

Two projects were made by each student -first one on hardware implementation Low power Texas Instruments- Analog Circuits Operational amplifiers have been used in design of first project. Multisim software was introduced for simulation of the projects. 40% marks of total were used for evaluation of projects and laboratory skills.

Course code	Course Title	Teaching Scheme				
		L	**T**	**P**	**S**	**Credits**
EE1103	**Advanced Electrical Machines**	**3**	**0**	**2**	**0**	**4**

Course Objectives:
1. Equip students with comprehensive knowledge of induction motor, wind mill generator, synchronous machines, and special machine.
2. Provide the essential numerical background for analyse performance of induction motor, wind mill generator, synchronous machines, and special machine.
3. Equip students with basic experimental and modeling skills for handling problems associated with electrical machine

Learning Outcomes:
On successful completion of this course, the students should be able to:
1. Use mathematical models to analyze basic operation of Induction motor, Wind mill generator and Synchronous machines through theoretical and practical investigations
2. Tackle problems of performance analysis and explain the shape of characteristics of actual machines
3. Detailed analysis of EEMUA132 standards (Ploy phase induction machine), IEC 61400 I standards(Wind Mill Generator), and IEEE 81 standards(Single phase Induction Motors)
4. Troubleshoot the operation of electrical machines and evaluate suitable measures for associated problems.
5. Identify the machine parameters and validate same through experiment.
6. Analyse the stability of Synchronous machines.
7. Design hardware project using low voltage induction motor and special machine.

Assessment Scheme:

Prerequisites	DC Machine and Transformers
Teaching Scheme (Hours per Week)	L T P 3 0 2
Credits	4

Sr. No.	Evaluation Component	Marks
1	Attendance	Nil
2	Assignment	5
3	Class Participation	5
4	Quiz	Nil
5	Theory Exam-1	10
6	Theory Exam-2	10
7	Theory Exam-3	30
8	Report-1	Nil
9	Report-2	Nil
10	Report-3	Nil
11	Case Study–1/ Project-1/Research Paper-1	25
12	Case Study–2/ Project-2/Research Paper-2	Nil

13	Case Study–3/ Project-3/Research Paper-3	Nil
14	Lab Evaluation-1	05
15	Lab Evaluation-2	10
16	Course portfolio	Nil
	Total (100)	**100**

Course Syllabi (Theory):

Unit – I: Polyphase AC Machines

Construction and performance of double cage and deep bar three-phase induction motors; e.m.f. injection in rotor circuit of slip ring induction motor, starting and speed control method, EEMUA132 standards

Unit – II: Wind Mill Generator

Characteristics of wind power. Wind power parameters, Classification of windmill generators, Configuration of variable slip wind turbine generator and Doubly Fed Induction Generator, IEC 61400 I standards

Unit – III: Single phase Induction Motors

Construction, starting characteristics and applications of split phase, capacitor start, capacitor run, capacitor start capacitor run and shaded pole motors, IEEE 81 standards

Unit – IV: Synchronous machines

Construction, Operating characteristics of synchronous machines, V-curves, salient pole machine–two reaction theory, analysis of phasor diagram, power angle characteristics. Parallel operation of alternators, swing equation of a single machine connected to the infinite bus and its stability considerations.

Unit – V: Special purpose machine

Two-phase ac servomotors, Stepper Motors, Switched Reluctance Motors and repulsion motors.

Course Syllabi (Practical):

1. To perform OC & SC test on a three phase transformer & find its efficiency and parameters for its equivalent circuit.
2. To perform sumpner's back-to-back test on 3 phase transformers, find its efficiency & Parameters for its equivalent circuits.
3. Separation of iron losses of Single- phase transformer.
4. To perform no load and blocked rotor test on a 3 phase induction motor and to determine the parameters of its equivalent circuits. Draw the circle diagram and compute the following (a) Max. Torque (b) Current (c) slip (d) p.f. (f) Efficiency.
5. To perform the load test on a 3-phase induction motor and determine its performance characteristics (a) Speed vs load curve (b) p.f. vs load curve (c) Efficiency vs load curve (d) Speed vs torque curve.
6. To plot OCC & SCC of an Alternator and to determine its regulation by synchronous impedance method.
7. To find Xd and Xq of a salient pole synchronous machine by slip test.
8. To plot the V-curve for a synchronous motor at 100 % Load , 75 % Load, 5o % Load and at No-Load.

References:

1. Fitzgerald, A.E., Kingsley, C. Jr., and Umans, Stephen, Electric Machinery, McGraw-Hill (2002)
2. Electric machinery and transformers / Bhag S Guru and Huseyin R Hiziroglu, Guru, Bhag S, Hiziroglu, Huseyin R., Oxford University Press, 2012

3. Nagrath, I.J. and Kothari, D.P., Electric Machines, Tata McGraw Hill (2004)
4. Generalized theory of electrical machines ,P S Bimbhra, <u>Khanna Publishers,</u> 2015
5. B. L. Theraja, "A Text Book on Electrical Technology" S.Chand, VolumeII. 2012.
6. Electric Machinery and Transformers-Bhag S. Guru,Huseyin R. Hiziroglu-Oxford   Publication

Activities Related to Skill Development and Employability
Projects:
1. Smart Cleaning system for solar panels.
2. Dc motor speed & direction of rotation control using Arduino.
3. Design of wind turbine.

Course code	Course Title	Teaching Scheme				
		L	**T**	**P**	**S**	**Credits**
EE1104	ELECTROMAGNETICS AND MICROWAVES	3	0	2	0	4

Course Objectives: This course aims to provide fundamental concepts of electrostatics & magnetostatics. Focus is given to field effects in transmission of EM waves & its propagation in guided medium. The course further introduces the concept of microwave network theory, passive devices & microwave generators. There is emphasis on important microwave properties and applications of the various devices & networks like klystrons, magnetrons, couplers, circulators, isolators, etc.

Learning Outcomes:

On successful completion of this course, the students will be able to

1. Analyze static electromagnetic field in cables, coils, etc., used in electric power transmission circuits.

2. Analyze fluctuating electromagnetic fields in different medium, e.g., linear and isotropic medium using Maxwell's equations.

3. Analyze characteristics of EM waves under time varying potentials and polarization of EM waves due to different mode of transmission.

4. Analyze time average power carried by the EM waves in the medium.

5. Analyze wave propagation through different transmission lines and plane electromagnetic waves in homogeneous media.

6. Analyze the amount of electromagnetic noise generated by a device and test Electromagnetic compatibility (EMC) and electromagnetic interference (EMI).

7. Analyze SWR, cutoff frequency, guide wavelength, etc and Characterize microwave junctions like tees

8. Characterize microwave corners, bends & twists and directional couplers, isolators, circulators and attenuators

9. Analyze the applications of the above mentioned networks & devices

10. Analyze the applications of microwave generators like klystrons & magnetrons

Assessment Scheme:

Sr. No.	Evaluation Component	Marks
1	Attendance	Nil
2	Assignment	25
3	Class Participation	5
4	Quiz	10
5	Theory Exam-I	10
6	Theory Exam-II	0
7	Theory Exam-III	20
8	Report I	5
9	Report II	Nil
10	Report III	Nil
11	Project I	5
121	Project II	Nil
13	Project III	Nil
14	Lab Evaluation I	10
15	Lab Evaluation II	10
16	Course Portfolio	Nil
	Total (100)	100
Evaluation Scheme for Re-Test:		
1	Theory Exam - III	20
2	Lab Evaluation - II	20
	Total (40)	40

Syllabus(Theory):

UNIT I: Introduction
Revision of vector calculus– Scalars and Vectors – Different co-ordinate systems-vector calculus –- Divergence theorem – Stoke's theorem.

UNIT II: Time Varying Fields and Maxwell's Equations
Faraday's laws, induced emf – Transformer and motional EMF–Forces and Energy in quasi-stationary Electromagnetic Fields - Maxwell's equations (differential and integral forms) – Displacement current – Relation between field theory and circuit theory.

UNIT III: Electromagnetic Waves
Generation – Electro Magnetic Wave equations – Wave parameters; Waves in free space, lossy and lossless dielectrics, conductors-skin depth, Poynting vector – Plane wave reflection and refraction.

UNIT IV: Transmission Structures and Resonators
Transmission Line equation, Characteristic impedance, losses in transmission line, reflection coefficient, standing wave ratio, Smith Chart, Impedance matching, Rectangular Waveguides – TE/TM mode analysis, Characteristic Equation and Cut-off Frequencies, Circular Waveguides- Nature of Fields, Characteristic Equation, Dominant and Degenerate Modes.

UNIT V: Microwave Network Theory and Passive Devices

Scattering matrix - Microwave junctions -Tee junctions -Magic Tee - Rat race - Corners - bends and twists - Directional couplers -two hole directional couplers- Ferrites - important microwave properties and applications– Termination - Gyrator- Isolator-Circulator – Attenuator

UNIT VI: Microwave Generators

Transit-time effect, Limitations of conventional tubes, Two-cavity and multi-cavity Klystrons, Reflex Klystron, TWT, Magnetrons.

Syllabus (LABORATORY):

1. Set up Microwave components and instruments
2. Characterize Reflex Klystron
3. Measurement of guide wavelength, cutoff frequency, SWR (X band) using microwave test bench
4. Measurement of an unknown Load Impedance
5. Characterize Gunn diode oscillator
6. Characterize and Analyse Magic Tee junction
7. Characterize and Analyse Isolators, Circulators and Couplers
8. Characterization and measurement using the Horn Antenna

Text books:

1. Principles of Electromagnetics, N. O. Sadiku ; Oxford Univ. Press, 6/e, 2016.
2. Microwave Engineering by David M. Pozar, WILEY India, 4/e, 2012.

Reference Books:

1. Introduction to Electrodynamics: David J Griffiths, Pearson Education, 2015.

2. Microwave Devices and Circuits by S.Y. Liao, Pearson, 2008.

Web Resources:

1. https://nptel.ac.in/courses/115/101/115101005/
2. https://nptel.ac.in/courses/108/103/108103141/

Activities Related to Skill Development and Employability

1. Characterization of microwave devices and components were analyzed using microwave test bench.
2. Design simulations were performed on CST Microwave Studio.
3. Assignments were given on topics such as couplers, tees, etc.
4. Industry Case Study was done on identifying few RF and Microwave product categories and understanding their applications.
5. Students implemented projects using Arduino. Table below shows samples.

Table: Samples of Projects done by Students

Sl. No.	Students	Project	Tool Used
1	Naman Sharma and Nikhil Agarwal	Radio controller using Arduino nano and NRF24 module	Arduino
2	Anmol Shekhawat and Khushi Bhatt	Smart Home using WiFi 802.11 connectivity	Arduino
3	Shashwat Mishra	Quadcopter design	Arduino

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
EE 1107	Power System-I	3	0	2	4

Course Description

This course is designed to give students the ability to install, maintain and troubleshoot various types of electric power generation, transmission and distribution systems. The students will learn how generators operate and how power is transmitted via transmission / distribution lines. The course will also focus on the environmental impacts from power generations and will look at alternative and sustainable generation systems.

Learning Outcomes

On successful completion of this course, the students should be able to:
1. Evaluate the options of energy generation through conventional and renewable energy sources.
2. Analyse general layout, major equipments and auxiliaries in various types of power stations
3. Apply power system concepts required to design engineering systems.
4. Design power system components for a specified system and application
5. Formulate A.C and D.C supply systems for transmission and distribution of electrical power
6. Analyse the performance of transmission lines
7. Analyse the environmental impact of electrical energy generation from coal based thermal power plants.

Syllabus (Theory):

Unit-I: Generation of Electrical Power

Hydro-electric, Thermal steam power plants, Nuclear power plants – selection of site, elements of power plant, working and classification, Renewable power plants – Solar power generation – Photo-voltaic and solar thermal generation – solar concentrators, Wind power generation – types of wind mills, wind generators, tidal, biomass, geothermal and magneto-hydro dynamic power generation, micro-hydro power plants, fuel cells and diesel and gas power plants.

Unit –II: Tariff and Economic aspects in power Generation

Terms commonly used in system operation, various factors affecting cost of generation: Load curves, load duration curves, Connected load, maximum load, Peak load, base load and peak load power plants, load factor, Plant capacity factor, Plant use factor, Demand factor, diversity factor, Cost of power plant, Tariffs.

Unit-III: Supply System

Structure of electric power system, Types of AC and DC distributors, distributed and concentrated loads, Distribution systems, feeder and distributor, radial, loop & grid system, primary feeder conductor size, Kelvin's law. Computation of voltage drop, Transmission & distribution losses.

Unit-IV: Overhead Transmission Line
Types of conductors, Conductor materials, Line supports, Insulators, String efficiency, Sag, Calculation of line parameters – Inductance and Capacitance of single phase, three phase, symmetrical and unsymmetrical configurations, Concepts of GMD and GMR, Transposition, Bundle conductors, Double or parallel circuit, Effect of earth on capacitance calculation, Interference with communication circuit, Concept of Corona discharge.

Unit-V: (a) Performance of Lines
Short, medium and long lines - Representation, A, B, C, D constants, Voltage regulation and Transmission efficiency, Ferranti effect, Effect of active and reactive power flow on bus voltage magnitude and phase angle.

(b) Underground Cables
Types of cables, cable components, capacitance of single core and 3-core cables, dielectric stress, optimum cable thickness, grading, dielectric loss and loss angle.

Syllabus (Practical)
1. Measurement of solar irradiance Intensity and Study of solar energy trainer and solar panel.
2. Calculation of power and load for solar photo-voltaic system.
3. Study of solar battery charger with MPPT technique.
4. Modeling and simulation of solar PV module.
5. Study of wind training system.
6. Study of bio-energy training system.
7. Study of fuel cell trainer.
8. Modeling and simulation of hybrid energy system (to be performed in Lab and MATLAB/ HOMER environment).
9. Modeling and simulation grid connected hybrid energy system (to be performed in Lab and MATLAB/ HOMER environment).
10. To Design the distribution network and measurement of voltage and current in distributors.
11. To Study of different types of a power cable and measurement of insulation resistance.
12. To observe and compensate Ferranti effect in a Long Transmission Line

Text Book(s)
1. Generation of Electrical Energy by B.R. Gupta, S. Chand Publications.
2. Non-Conventional Energy Sources by G.D. Rai, Khanna Publishers.
3. Power System Analysis & Design by B R Gupta, S Chand Publications.
4. Power System Engineering by I. J. Nagrath & D.P.Kothari, TMH publication
5. Electrical Power Transmission and Distribution by Sivanagaraju and Satyanarayana, Pearson Education.

Reference Book(s)

1. B. H. Khan, "Non-conventional Energy Resources" TMH.
2. Soni, Gupta, Bhatnagar "Electrical Power System."Dhanpat Rai & Sons.
3. Electrical Power System by C.L.Wadhwa, New Age International publisher.

Course Evaluation for Power Systems-I:

Prerequisites	Basics of Electrical Engineering,
Teaching Scheme (Hours per Week)	L T P (3 0 2)
Credits	04 Credits
Sr. No.	**Evaluation Component**	**Marks**

Sr. No.	Evaluation Component	Marks
1	Attendance	-
2	Assignment	10
3	Class Participation	05
4	Quiz	10
5	Theory Exam-I	10
6	Theory Exam-II	-
7	Theory Exam-III	30
8	Report-I (case study)	10
9	Report-II	-
10	Report-III	-
11	Project-I	-
12	Project-II	-
13	Project-III	-
14	Lab Evaluation-I	10
15	Lab Evaluation-II	15
16	Course Portfolio	-
	Total (100)	100

Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development

- **Content with direct bearing on Employability/ Entrepreneurship/ Skill development:** It will equip students with understanding of different segments of the electrical power system, and have comprehensive knowledge about common components like insulator, conductor, power cables and transformers etc. There are a variety of employment opportunities in the power and utilities industry.

Course Name: Measurement and Control Systems (EE1108)	
Hours per Week	L-T-P: 3-0-2
Credits	4
Students who can take	

Course Objective: This course aims to provide a thorough grounding in the theoretical concepts, technologies and standards related to measurement and control systems, with an emphasis on the analysis of deterministic Linear Time Invariant (LTI) models.

Learning Outcomes:

On successful completion of this course, the students should be able to:

1. Select, specify, simulate and design basic measurement and control systems, emphasizing human safety, financial profitability and environmental integrity
2. Assess, troubleshoot, improve and document basic measurement and control systems
3. Recognize the importance of applying relevant engineering standards to meet technical, safety, regulatory, societal and market needs

Syllabus

1. Introduction to measurement and control systems. Definition of the elements in a control loop. Open and closed loop systems. Linear time invariant systems: Transfer function, state variable representation. Block diagram reduction techniques, signal flow graphs. Mason theorem.

2. Instrumentation. Characteristics of instruments: accuracy, precision, sensitivity, etc. Units and standards. Electrical measurements. Measurement of temperature, position, speed, force, pressure, light, level, humidity and other variables. Signal conditioning and transmission. Indicators, recorders. Actuators. Valves and motors. Instrumentation symbols. Functional identification.

3. Time response analysis. Standard test signals, transient and steady state response, specifications, steady state error. Basic control actions. BIBO-stability, Routh-Hurwitz criterion. Basic properties of root locus.

4. Frequency response analysis. Introduction to frequency response and specifications. Stability analysis using Bode and Nyquist plots.

5. Introduction to controller design. PID actions, Lead-Lag compensators

Activities Related to Skill Development and Employability

Students work in practical applications like:

1) Sensor specification, calibration and test
2) Control loop design and maintenance
3) Motion control and robotics

Certificates

Preparation for ISA Certified Automation Professional® (CAP®) Certification Program

ISA CAP certification provides a non-biased, third-party, objective assessment and confirmation of an automation professional's skills – specifically, the CAP exam is focused on direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting. The CAP certification exam reflects the documented knowledge, skills, and abilities needed for competent job performance.

Course Title and Course Code	Power System-II (EE 1114)
Hours per Week	L T P: 3 0 2
Credits	4
Students who can take	B. Tech Semester-VI EEE

Course Objective: The course focuses on representation of power system using per unit system and study fault analysis, formation impedance and admittance matrices for power system network, finding different electrical parameters for various buses in power system, assessment of steady state and transient stability of power system.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1. Develop the computational models for Power system analysis including per unit system and stability.
2. Analyze the performance of power system under symmetrical and unsymmetrical fault conditions.
3. Evaluate the model of power system components during normal and fault conditions.
4. Evaluate the power system dynamics and its stability during normal and abnormal conditions according to IEEE standards.
5. Assess the different methods of control and compensation to choose the best option so that social and environmental problems are minimized and recognize the need to continuously follow the advancements in technology and incorporate them in the present system to improve efficiency and increase the flexibility and quality of operation.

Sr. No	Specifications	Marks (Existing)
1	Attendance	NIL
2	Assignment	10
3	Class Participation	05
4	Quiz	05
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	20
8	Report-I (case study)	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	10
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I (Continuous)	10
15	Lab Evaluation-II (Exam)	10
16	Course Portfolio	10
Total (100)		**100**

Evaluation Scheme for Retest:

S. No.	Specifications	Marks
1	Theory Exam-III (End Term)	30
2	Lab Evaluation-II (Exam)	10
3	**Total**	**40**

Syllabus (Theory)

UNIT-I: Per Unit System: Per unit quantities, Impedance/Reactance diagram of a balanced for a balanced 3-phase system, per unit impedance of 3-phase transformer, **Admittance Model**: Equivalent admittance network and calculation of Y bus, Modification of an existing Y bus.

UNIT-II: Symmetrical Fault Analysis: Transient analysis of a transmission line, Short circuit analysis of a synchronous machine, Equivalent circuits of synchronous machine under sub transient, transient and steady state conditions, Fault analysis of an unloaded and loaded synchronous generator, balanced three phase fault analysis, Selection of circuit breaker.

UNIT-III: Sequence Components: Fortesque theorem, symmetrical components, Sequence networks of transmission lines, Synchronous machine and Transformers, sequence networks of power system, Phase shift in star-delta transformers. **Unsymmetrical Fault Analysis:** Classification of unsymmetrical faults, analysis of Unsymmetrical faults i.e. L-G, L-L, L-L-G faults, connection of sequence networks under the fault conditions, IEC 60909, ANSI/IEEE Short Circuit Studies standards.

UNIT-IV: Power System Stability: Steady state stability, transient stability, Power angle curve, equal area criterion, swing equation, Methods of improving stability, High speed fault clearing, regulated shunt compensation, dynamic braking, and Independent pole operation of circuit breaker, automatic voltage regulator.

UNIT-V: Load Flow Study: Load flow problem, development of load flow equations, bus classification. Gauss Seidel, Newton-Raphson, decoupled and fast decoupled methods for load flow analysis. Comparison of load flow methods, IEEE 30022018-1721251 load flow standard.

Syllabus (Practical)

1. Introduction to Matlab and its commands.
2. Matlab program to solve swing equation using point by point method.
3. Matlab program to find optimum loading of generators neglecting transmission loses.
4. Matlab program to simulate Ferranti effect.
5. Matlab program for formulation of admittance matrix.
6. Matlab program to solve load flow equations by Gauss Seidel method.
7. Matlab program to solve load flow equation by Newton Raphson method.
8. Matlab program for formulation of impedance matrix.
9. Modelling of DC Machines.
10. Modelling of Synchronous Machine.
11. Modelling of Induction Machine.

Textbooks
1. Kothari. D. P., Nagrath. I. J., "Power System Engineering", TMH New Delhi, 2019.
2. Gupta, B.R., "Power System Analysis and Design", S. Chand & Company Ltd. New Delhi, 2015.
3. Hadi Saadat, "Power System Analysis", TMH New Delhi, 2011.

Reference books
1. Weedy B.M., Cory B.J., Jenkins N., Ekanayake J.B., Strbac G., "Electric Power Systems", John Wiley & Sons Limited, 2012.
2. Wadhwa C. L., "Electrical Power Systems", New Age International Private Limited, New Delhi, 2017.
3. Glover J.D., Sarma M., Overbye T. J., Power System Analysis & Design, Cengage Learning India Private Limited, 2012.
4. Grainger John, William Stevenson Jr., Power System Analysis, Hill Education, 2017.

Activities Related to Skill Development and Employability

Industrial Visit

33/0.4 kV Substation visit in JKLU Campus

Projects

1. Improve transient stability of power grid using STATCOM

2. Distributed load flow analysis for power grid

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
EE1201	**Microprocessor and Computer Architecture**	3	0	2	0	4

Course Objectives: The course introduces the architectures of computers and builds the programming concepts for microprocessors. The course emphasizes on concepts on interfacing between microprocessor and peripherals, exception: handling, pipelining, memory technology and hierarchy and I/O systems.

Learning Outcomes:

On successful completion of this course, the students will be able to

1. Write programs for microprocessors 8085 and 8086 using assembly language and to interface peripherals with minimum resources.

2. Determine which hardware blocks and control lines are used for specific instructions.

3. Demonstrate how to add and multiply integers and floating-point numbers using two's complement and IEEE floating point representation.

4. Implement an ALU core and analyze its timing constraints and power consumption

5. Implement memory block and memory controller. Study the timing diagram for read and write cycles for this implementation using simulator.

6. Use interrupts for special tasks on microprocessors and develop interrupt handler programs.

7. Use AXI standard for interfacing between IP core and few switches and LEDS.

8. Map a virtual address into a physical address for memory blocks.

Assessment Scheme:

Sr. No.	Evaluation Component	Marks
1	Attendance	Nil
2	Assignment	10
3	Class Participation	Nil
4	Quiz	10
5	Theory Exam-I	20
6	Theory Exam-II	Nil
7	Theory Exam-III	20
8	Report I (Term paper)	10

Activities Related to Skill Development and Employability:

Students participated in open day exhibition at JKLU. Team at Sr. No 5 participated in Rajasthan State Incubation Cell Hackathon at Manipal University

S.No.	Name of student	Project done
1	Vipul Parihar	Solar tracker motor interface with 8051
2	Akshat Mishra Mohit Singh	Aesthetic ambience lighting using PWM for PGB LED
3	Samarth Shrivastava Aman Gupta	Birthday Candle using Arduino microcontroller
4	Himanshu Baghel Kundan Singh Rathore Manthan Singh	Interfacing motors for quadcopter using Arduino microcontroller
5	Abhishek Goyal Sheetal Sharma	Interfacing RF trans receiver for robo for receiving accelerometer data (shortlisted at Hackathon, please see email appended below).

Get Outlook for Android

From: E-Cell Manipal University Jaipur <ecellmuj@gmail.com>
Sent: Monday, December 2, 2019, 9:31 PM
Cc: ankit.mundra@jaipur.manipal.edu; hackathon@ecellmuj.in
Subject: Notification for your Idea "National Hackathon"

Dear Innovator,

Welcome

Congratulations!!

Your idea for Hackathon has passed initial round of scrutiny. You are required to fill the final registration form https://forms.gle/PNE3ZA51p6ibjmRG8 on or before 5th December so that we can confirm your participation and arrangements.

Please note few important points:

1. There will free accommodation (twin sharing) separate for girls and boys in respective hostels of Manipal University Jaipur (the luxurious accommodation) but only confirmed after getting your travel tickets in the above link.

2. Bring your own laptop to work, we shall provide the internet connection.

3. Kindly bring the required hardware/software or any other components related to your idea/project prototype.

4. Required to design the idea/prototype in 24 hrs during the Hackathon only.

5. It is advisable to wear warm clothes, as there will be cold weather in Jaipur.

6. Kindly bring the electricity extension board if required.

7. Free food arrangements will be taken care by Manipal University Jaipur.

8. If any faculty mentor is coming along with you, (s)he would need to pay for their accommodation in guest house, please provide the information separately.

9. For those who will be availing accommodation in University, can check-in on 16th December morning (from 6:00 AM onwards) and need to checkout on 17th December (by 07:00 PM).

10. The shortlisting has been now finalized and you are invited to Manipal University Japur for the National Hackathon.

Looking forward to meet you at Manipal University Jaipur.

Kindly feel free to contact below mentioned details (for any further assistance)

Shakun Shan
shakunshan@ecellmuj.in
+91 970 921 8558

Ankit Mundra
ankit.mundra@jaipur.manipal.edu

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
EE1204	Antenna Design	3	0	2	0	4

Course Objectives: This Course aims to develop knowledge about concepts, design & fabrication of a variety of antennas.

Learning Outcomes:

On successful completion of this course, the students should be able to:

1. Identify the constraints for antenna designing.
2. Design antenna specifications for varied applications as per IEEE standards.
3. Design monopole and dipole antenna and analyze the output characteristics i.e. return loss, gain and radiation pattern.
4. Design loop antenna and analyze the output characteristics i.e. return loss, gain and radiation pattern.
5. Design microstrip antenna and analyze the output characteristics i.e. return loss, gain and radiation pattern.
6. Use preventive mechanism to avoid/minimize health hazards caused by antenna radiation.

Assessment Scheme:

Prerequisites	Microwave Engineering
Teaching Scheme (Hours per Week)	L T P 3 0 2
Credits	4

Sr. No.	Evaluation Component	Marks
1	Attendance	5
2	Assignment	10
3	Class Participation	5
4	Quiz	10
5	Theory Exam-I	15
6	Theory Exam-II	NA
7	Theory Exam-III	25

8	Report-I	NA
9	Report-II	NA
10	Report-III	NA
11	Project-I	NA
12	Project-II	NA
13	Project-III	NA
14	Lab Evaluation-I	15
15	Lab Evaluation-II	15
16	Course Portfolio	NA
	Total (100)	100

Course Syllabi (Theory):

Unit 1:

Understanding the basics of Antenna Design parameters, standards and IEEE 149-1977 test procedure, Antenna Introduction, Antenna Fundamentals, Antenna Radiation Hazards, Dipole Antennas, Introduction to AISG (The Antenna Interface Standards Group).

Unit 2 :

Monopole Antennas, Loop Antennas, Slot Antennas, Linear Arrays, Planar Arrays

Unit 3:

Microstrip Antennas (MSA), Rectangular MSA, MSA Parametric Analysis-I, Circular MSA

Unit 4:

Broadband MSA, Compact MSA, Tunable MSA, Circularly Polarized MSA, MSA Arrays,

Unit 5 :

Helical Antennas, Horn Antennas and Yagi-Uda Antenna

Design the basic antennas and analyze their output for sustainable development of Human and society.

Course Syllabi (Practical):

1. Design and Analyze the output characteristics (i.e. return loss, Gain and Radiation Pattern) of following antennas on CST MICROWAVE STUDIO/HFSS/MATLAB software.
   a. Monopole Antenna.
   b. Dipole Antenna

    c. Loop Antenna
    d. Antenna Array
    e. Microstrip Antenna.

2. Measurement of antenna characteristics: Radiation Pattern on polar plots, Beam width and Gain of main lobe for the following types of antennas.
    a. Half wave and quarter wave dipole
    b. Folded dipole
    c. Yagi Uda
    d. Hertz Antenna
    e. End fire array and broad side array
    f. Paraboloid reflector antenna
    g. Loop antenna
    h. Ground plane antenna

References:
1. Constantine.A.Balanis "Antenna Theory Analysis and Design", Wiley Student Edition, 2006.
2. Edward C.Jordan and Keith G.Balmain" Electromagnetic Waves and Radiating Systems" Prentice Hall of India, 2006
3. R.E.Collin,"Antennas and Radiowave Propagation", Mc Graw Hill 1985
4. S. Drabowitch, "Modern Antennas" Second Edition, Springer Publications, 2007.
5. Robert S.Elliott "Antenna Theory and Design" Wiley Student Edition, 2006.
6. H.Sizun "Radio Wave Propagation for Telecommunication Applications", First Indian Reprint, Springer Publications, 2007.

Activities Related to Skill Development and Employability

1. Characterization of dipole and horn antennas were analyzed using microwave test bench.
2. Design simulations were performed on CST Microwave Studio.
3. Assignments were given on topics such as Slot Antennas, Linear Arrays, Planar Arrays etc.
4. Students implemented projects on MSA using CST Microwave Studio

Table: Samples of Projects done by Students

Sl. No.	Student Name	Project Name	Tool Used

1	Kanwar Deep Singh Gahlot	Patch antenna design for 2.4 Ghz	CST Microwave Studio
2	Anudit Bhatt	Dipole Antenna design for 2.4 GHz	CST Microwave Studio
3	Shreyash Purwar	Half wave dipole antenna design	CST Microwave Studio
4	Chandresh Sharma	Yagi Uda Antenna Design	CST Microwave Studio

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
EE1207	Circuit Analysis and Design	3	0	2	0	4

Course Objectives: This course is aimed at developing the required understanding to design, analyse and verify low-power, energy-aware electric circuit. It includes circuit analysis techniques such as nodal analysis, mesh analysis, theorems, source transformation and several methods to simplifying networks. It develops clear understanding for transient response, time domain and frequency domain behaviour of higher order electrical systems.

Learning Outcomes:
On successful completion of this course, the students should be able to:

1. Analyse DC and AC circuits using network theorems, concept of linearity and superposition.
2. Develop mathematical model of electrical circuit to analyse their transient response and also time and frequency domain behaviours.
3. Solve different types of two-port network using network parameters, with different types of connections.
4. Design and analyse various types of filters and attenuators to minimize power losses and improve signal quality.
5. Design and verify low-power, energy-aware electric circuit as per 1801-2015 - IEEE Standard
6. Utilize simulation tools (such as Tina pro, Matlab) to accurately analyse electrical circuits.

Assessment Scheme:	
Prerequisites	**Operations Research**
Teaching Scheme (Hours per Week)	L T P 3 0 2
Credits	4

Sr. No.	Evaluation Component	Marks
1	Attendance	Nil
2	Assignment	10
3	Class Participation	-
4	Quiz	10
5	Theory Exam-1	10
6	Theory Exam-2	Nil
7	Theory Exam-3	30
8	Report-1	Nil
9	Report-2	Nil
10	Report-3	Nil
11	Project-1	10
12	Case Study – 2/ Project-2/Research Paper-2	Nil
13	Case Study – 3/ Project-3/Research Paper-3	Nil
14	Regular lab Assesment	10
15	Lab Evaluation-2	20

16	Course portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

Network Concepts: RLC parameter, Independent and dependent sources, Voltage/current relationship for individual element, source transformation techniques, KCL, KVL for network having both Independent and dependent sources star-delta transformation, IEC 60050 standards.

Network Analysis Techniques and theorems: Superposition, Thevenin and Norton Theorem, Maximum power transfer, Reciprocity theorem, Series and parallel resonant circuits, Mutual inductance, Dot Convention, magnetically couples circuit analysis.

AC AND DC Transients Analysis: Laplace transform fundamentals, properties and theorems, unit step function, other unit function, the impulse, ramp and doublet, Laplace transform for shift and singular, functions, initial and final value theorems, Formulation and solution of network equilibrium equations on loop and node basis, Introduction to Laplace Transform, Laplace transform of some basic functions, Laplace transform of periodic functions, Inverse Laplace transform, Time Constant, Complete response of RL, RC, and RLC circuits to step, sinusoidal, exponential, ramp, impulses and the combinations of excitations.

Two Port Network: Voltage & current ratio of two port network, Admittance, impedance, hybrid and transmission parameter of two port networks, Conversion of one parameter to another parameter, Series, parallel and cascade connection of two port networks, Condition of reciprocity & symmetry, Iterative and Image Impedance.

Filter Circuits Design: Constant k type low pass, high pass, band pass and band elimination passive filters, 1801-2015 - IEEE Standard

Network Functions: Concepts of Complex Frequency, Transform Impedance, Network functions of one and two port network, concepts of poles and zeros, properties of driving point and transfer functions, time response stability from pole zero plot, Hurwitz Polynomials.

Course Syllabi (Practical):

1. Study and verification of Thevenin's Theorem.

2. Study and verification of Norton Theorem.

3.   Study and verification of Superposition theorem.

4. Study and verification of Maximum power transfer Theorem.

5. Transient analysis of RL/RC circuits.

6. Transient analysis of series RLC circuits.

7. Transient analysis of parallel series RLC circuits.

8. Design Low pass filter.

9. Design high pass filter.

10. Design band pass filter.

References:
1. Van Valkenburg M.E., "Network Analysis", Prentice Hall, India, 3rd Edition, 2002.

2. A. Chakarbrati, "Circuit Theory", Dhanapat Rai and Co.

3. T.K.Nagsarkar,M.S. Sukhija,"Basic Electrical Engineering", Oxford University press, 2nd edition, 2011.

4. Roy Choudhary, "Network Theory", TMH, 3rd Edition, 2004

5. Edminister Joseph A., "Electrical Circuits, Schaum's Outline Series", Tata McGraw Hill, 2nd edition, 1983.

6. Hayt W.H., Kemmerly J. E., Durbin S. M., "Engineering Circuit Analysis", Tata McGraw Hill, 6th edition, 2006.

Activities Related to Skill Development and Employability

Student has developed projects, related to circuit design and analysis of electrical circuits. Students has participated in Mock interview and power point presentation.

1. **Sample List of Projects.**

S.N.	Title of Projects
1	**Design band pass and band elimination filters**
2	**Design of an intelligent and efficient light control system**
3	**Self-powered Fast Battery-Tester**

2. **Mock Interview and Presentation by department faculty.**

Course code	Course Title	Teaching Scheme				
		L	**T**	**P**	**S**	**Credits**
EE1208	Digital Communication Networks	3	0	2	0	4

Course Objectives: The course introduces the evolution of various digital communication networks. The course emphasizes on the architecture & protocols describing the wireless LANs, mobile cellular networks & optical networks. Components, applications, research issues & network management functions are discussed.

Learning Outcomes:

On successful completion of this course, the students will be able to

1. Analyze the OSI model of networks.

2. Analyze the various architectures employed in digital communication networks.

3. Analyze the different protocols used in the digital networks.

4. Design issues & protocols of wireless LANs. Emphasis on IEEE 802.11 standards. WiMax mobility support & broadband applications.

5. Formulate, solve & understand research issues in wireless networks

6. Design ad-hoc networks, sensor networks & mesh networks

7. Analyze satellite, optical and mobile cellular network architectures & protocols and their applications

8. Implement quality of service & network management functions

Assessment Scheme:

Sr. No.	Evaluation Component	Marks
1	Attendance	Nil
2	Assignment	25
3	Class Participation	5
4	Quiz	10
5	Theory Exam-I	10
6	Theory Exam-II	Nil
7	Theory Exam-III	20
8	Report I	5
9	Report II	Nil
10	Report III	Nil
11	Project I	5
121	Project II	Nil
13	Project III	Nil
14	Lab Evaluation I	10
15	Lab Evaluation II	10
16	Course Portfolio	Nil
	Total (100)	100

	Evaluation Scheme for Re-Test:	
1	**Theory Exam - III**	20
2	**Lab Evaluation - II**	20
	Total (40)	40

Syllabus(Theory):

1. Evolution of Communication Networks, Layered Architecture and OSI Model, Unified View of Protocols and Services

2. Wireless LANs: Network components, design requirements, Architectures, IEEE-802.11x, WLAN protocols, 802.11p and applications. WMANs, IEEE-802.16: Architectures, Components, WiMax mobility support, Protocols, Broadband networks and applications.

3. Cellular networks, Satellite Network, Applications. Wireless ad-hoc networks: Mobile ad-hoc networks, Sensor network, Mesh networks, VANETs, Research issues in Wireless networks.

4. Optical networks Client layers of the optical layer, SONET/SDH, Multiplexing, layers, Frame Structure, ATM functions, Adaptation layers, Quality of service and flow, ESCON, HIPPI, Network management functions.

Syllabus (LABORATORY):

1. NS2 Implementation of congestion control protocol (TCP over IP) after creating a duplex link using nodes in a network
2. Analyse performance of IEEE 802.4 token bus LAN protocol in MAC layer
3. Analyse performance of IEEE 802.5 token ring LAN protocol in MAC layer
4. Implement ARQ stop and wait protocol/sliding window protocol in Data Link layer of OSI model by creating a NS2 network scenario
5. Implement the different frames of HDLC protocol by creating a NS2 network scenario
6. Execute the Distance Vector Routing and Link State Algorithms
7. Analyse the performance of IEEE 802.3 CSMA/CD LAN protocol operating at MAC layer
8. Execute the go back N protocol/ selective repeat transmission flow control protocol
9. Design and Analyze a wireless sensor network architecture (also with TCP) using NS2
10. Design and Analyze a mobile ad-hoc network architecture using NS2

Text books:

1. "Optical Network Design and Planning", Simmons, Jane M, Springer, 2/e, 2014
2. "Computer Networks", Andrew S. Tanenbaum, David J. Wetherall, Pearson, 2013
3. Tse, David, and Pramod Viswanath. Fundamentals of wireless communication. Cambridge university press, 2005

Reference Books:

1. Data and Computer Communications, William Stallings, 9/e, 2013
2. Data Communication and Networking, Behrouz Forouzan, 4/e, 2017

Web Resources:

https://nptel.ac.in/courses/117/105/117105076/

Activities Related to Skill Development and Employability

1. Network configuration and Protocols were understood and analyzed through Lab simulations on MATLAB and Cisco Packet Tracer.
2. Lab simulations were conducted on Network Simulator NS2.
3. Assignments were given on topics like IEEE standards, protocols, security, etc.
4. Students implemented projects on network topology, IP address configuration, switched network configuration, Routers, etc., on Cisco Packet Tracer and TCP/IP socket Interface on MATLAB. Table below shows samples.

Table 1: Samples of Projects done by Students

Sl. No.	Students	Project	Tool Used
1	Himanshu Baghel and Samarth Srivastava	Testing Ring Network Topology and configuration	Cisco Packet Tracer
2	Manthan Singh	Configuring and Troubleshooting a Switched Network	Cisco Packet Tracer
3	Rajat Chandra and Gaurang Shukla	Network Topology utilizing DHCP, HTTPS, DNS Protocols in single network	Cisco Packet Tracer
4	Aman Gupta	Implementation of Border Gateway Protocol	Cisco Packet Tracer
5	Abhishek Goyal	Core Router Network	Cisco Packet Tracer
6	Kundan Rathore	TCP/IP socket Interface	MATLAB

5. Industry Case Study was conducted specifically on products related to Cisco and IBM, design issues, compatibility, specifications, etc. Table below shows case study samples.

Table 2: Samples of Case Studies done by Students

Sl. No.	Students	Case Study
1	Himanshu Baghel	BEXCO, adopted WiFi-6 to produce a high-speed mobile network
2	Manthan Singh	Cisco Catalyst 2960 Research issues, Design issues concerning the circuits/protocols/product standards
3	Rajat Chandra	Wireless Controller manufactured by Cisco, model 9800 L controller working advantages, research aspects and design issues and service aspects
4	Aman Gupta	Compatibility issues between Cisco and IBM products in view of technologies
5	Abhishek Goyal	Cisco products - switches, hubs, gateways - Research and Design issues
6	Kundan Rathore	Downer Group Secures Smart Cities with Cisco Firepower Next Generation Firewalls
7	Samarth Srivastava	Issues faced by Cisco catalyst 9300 and Encryption issues

Course Name: Advanced Control Systems (EE1209)	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	

Course Objective: This course aims to create the required skills to implement and maintain advanced control systems.

Learning Outcomes:
On successful completion of this course, the students should be able to:

1. Select, specify, simulate and design basic measurement and control systems, emphasizing human safety, financial profitability and environmental integrity

2. Assess, troubleshoot, improve and document advanced measurement and control systems

3. Apply relevant engineering standards to meet technical, safety, regulatory, societal and market needs

Syllabus

UNIT1: CLASSICAL CONTROL THEORY AND PRACTICE. LIMITATIONS

Control problem formulation. Discrete time control systems. Introduction to system identification. PID and compensators design. Performance assessment. Limits of performance. Technical issues. Standards: IEC 61131 – Industrial controllers. ISA 88 – Batch Control Systems. ISA 106 – Procedural Automation.

UNIT2: STATE SPACE ANALYSIS

Basic concepts. Linear algebra. State vector, state model, state model of linear systems, state model for Single-Input/Single-Output linear systems and linearization of the state equation. Canonical representations, transfer function for state model. Properties of the state transition matrix. Computation of state transition matrix. Controllability and observability.

UNIT3: STATE FEEDBACK AND OBSERVERS

Full-state feedback control design. Observer design. Integrated full-state feedback and observer. Reference Inputs. Introduction to optimal control problems.

UNIT4: CASE STUDIES

Application of advanced control systems theory to sustainability problems: health, energy, water, smart cities, etc.

Activities Related to Skill Development and Employability

Students work in practical applications like:

1) Automation project management
2) Sensor specification, calibration and test
3) Control loop design and maintenance
4) Motion control and robotics

Certificates

Preparation for ISA Certified Automation Professional® (CAP®) Certification Program

ISA CAP certification provides a non-biased, third-party, objective assessment and confirmation of an automation professional's skills – specifically, the CAP exam is focused on direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting. The CAP certification exam reflects the documented knowledge, skills, and abilities needed for competent job performance.

Course and Code: Elements of Stress Analysis (ME1202)

Academic year: 2016-20

Course Title and Course Code	**Element of Stress Analysis (ME1202)**
Hours per Week	**L T P: 3 0 2**
Credits	**4**
Students who can take	**B. Tech Semester-VII ME**

Course Objective:

The key objective of this course is to acquaint the students with fundamentals of stress and strain for 1-D, 2-D, and 3-D systems, factors cause failure and theories to avoid failure, transducers to measure the strain and introduction to fracture mechanics.

Learning Outcomes:

On successful completion of this course, the students will be able to:
1. Formulate the stress and strain present in any mechanical system.
2. Conduct the test to evaluate the behavior of stress and strain
3. Conduct experiment to determine 1-D, 2-D, and 3-D stress tensor in a specimen.
4. Determine stress and strain using analytical and graphical methods.
5. Identify use of transducers for the measurements of strain.
6. Analyze the crack propagation and fracture mechanics

Sr. No	Specifications	Marks
1	Attendance	5
2	Assignment	10
3	Class Participation	NIL
4	Quiz	5
5	Theory Exam-I	10
6	Theory Exam-II	NIL
7	Theory Exam-III	30
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	NIL
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I (Continuous)	25

15	Lab Evaluation-II (Exam)	15
16	Course Portfolio	NIL
	Total (100)	**100**

COURSE SYLLABUS (Theory):

Unit I Simple Stresses, Strains & Compound Stresses
Definition/derivation of normal stress, shear stress, and normal strain and shear strain –Stress-strain diagram-Elastic constants –Poisson's ratio –relationship between elastic constants and Poisson's ratio –Hook's law –Strain energy. Introduction to compound stresses, state of stress at a point, General two-dimensional stress system, Principal stresses, and principal planes. Mohr's circle of stresses and Theories of Failure.

Unit II Three-Dimensional Stress and Strain Fields
Introduction to cartesian tensors, Strains: concept of strain, derivation of small strain tensor and compatibility, stress: derivation of Cauchy relations and equilibrium and symmetry equations, airy stress function, plane stress and plane strain problems, introduction to governing equations in cylindrical and spherical coordinates, axisymmetric problems.

Unit III Introduction to Material Modelling
Constitutive equations: generalized Hooke's law, linear elasticity, material symmetry; boundary value problems: concepts of uniqueness and superposition, introduction to plasticity, elastic constitutive models and plastic models, finite element implementation of these models, thermo-elasticity, 2-d contact problems, computational implementation of theories of failure.

Unit IV Stresses and Strain Measurements
Introduction to strain measurement and related instrumentation strain gage-based transducers, Electric Resistance strain gauges, Calibration of strain gauges, Measuring circuits, arrangements of strain gauge elements (rosettes), Practical set-up for measurement of strains, introduction to optical methods in strain measurements, digital image correlation in dynamic/impact conditions.

Unit V Generalized Problems
Thick cylinder under uniform internal and / or external pressure, rotating disks of uniform thickness, solid disks, circular disk with a hole, stress concentration, introductory fracture mechanics, analysis of cracked bodies, numerical implementation of fracture mechanics.

COURSE SYLLABUS (Practical):

1. To evaluate stress strain curve for tension test on a standard Mild Steel specimen
2. To evaluate stress strain curve for compression test on a standard Mild Steel specimen and compare the result with the tension test.
3. To write a MATLAB program to generate LAME'S ellipsoid
4. To write a MATLAB program to generate principle stress, shear stress of a given element and plot the same.
5. To write a MATLAB program to generate Mohr's Circle of a given element and plot the same.
6. To write a MATLAB program to generate Mohr's Circle of a given element and plot the same.
7. To develop a CAD model in-order to conduct ANSYS analysis on a given specimen.
8. To study the behavior of stress and strain of a given specimen in ANSYS environment.
9. To study the behavior of deformation of a given specimen in ANSYS environment.
10. To perform Fatigue Test on a given specimen in ANSYS environment.

TextBooks:
1. Timoshenko, S and Goodier, J. N., "Theory of Elasticity", Tata McGraw Hill, New Delhi,3rd edition, 1970
2. Srinath, L. S., "Advanced Mechanics of Solids", Tata McGraw Hill, New Delhi, 3rd edition, 2010
3. Thomas M. G., Ronald E. S., George. E. M, "Continuum Mechanics for Engineers", 3rdEdition, CRC Press, Boca Raton, 2009

References:
1. Batra, R. C., "Elements of Continuum Mechanics", Reston, 2006.
2. George E. M, Schaum's "Outline of Continuum Mechanics", McGraw-Hill, 1970
3. Dill, Ellis Harold, "Continuum Mechanics: Elasticity, Plasticity, Viscoelasticity", CRC Press, 2006.
4. Sadhu Singh," Theory of Elasticity" Khanna publisher, 4th edition, 2013
5. Timoshenko, Stephen P., and James M. G., "Theory of elastic stability", Courier Corporation, 2nd edition, 2009.

List of students:

Sl. No.	Roll No.	Name
1	2016BTechME001	Abhishek Phogat
2	2016BTechME002	Abhishek Sharma
3	2016BTechME003	Akshay Taparia
4	2016BTechME005	Arpit Sharma
5	2016BTechME006	Ashish Kumar Sisodiya

6	2016BTechME008	Devkaran Singh
7	2016BTechME009	Devvrat Singh Chauhan
8	2016BTechME010	Ekhlak Ahmad
9	2016BTechME011	Jai Singh Rathore
10	2016BTechME012	Jaswant Singh Deora
11	2016BTechME013	Kaushlendra Kumar Pandey
12	2016BTechME015	Manvendra Singh
13	2016BTechME017	Param Gupta
14	2016BTechME018	Raj Agrawal
15	2016BTechME019	Rajat Nebhnani
16	2016BTechME020	Ram Upadhyay
17	2016BTechME021	Ritwik Raman
18	2016BTechME022	Rohit Dhanraj
19	2016BTechME023	Rudra Kumar Suthar
20	2016BTechME024	Sajal Jain
21	2016BTechME025	Shantanu Sharma
22	2016BTechME026	Snehashish Banerjee
23	2016BTechME028	Yash Mathur
24	2016BTechME030	Arjun Gupta
25	2016BTechME031	Deeksha Parwani

Course Title and Code: Energy and Environment Studies ES1105	

Hours per Week :	L-T-P: 1-0-0
Credits	02
Students who can take	B. Tech all branches (First Year)

Course Objective: To enhance the understanding of conventional and non-conventional energy sources and its relationship with the ecology and environment.

On successful completion of this course students should be able to:
1) Relate renewable energy with ecology & environment
2) Explain the climate change and threat to biodiversity
3) Describe the various pollution sources and their impacts on Environment

	Prerequisites	Basic science
Sr. No	**Specifications**	**Marks**
1	Attendance	Nil
2	Assignment	20
3	Class Participation	10
4	Quiz	Nil
5	Theory Exam-I	Nil
6	Theory Exam-II	Nil
7	Theory Exam-III	30
8	Report-I	20
9	Report-II	20
10	Report-III	Nil
11	Project-I	Nil
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I(Continuous Evaluation)	Nil
15	Lab Evaluation-II(Lab Examination)	Nil
16	Course Portfolio	Nil
	Total	**100**

Evaluation Scheme for Retest		
Sr. No	**Specifications**	**Marks**
1	Theory Exam-III	30

Course Syllabi (Theory):

Unit-1: Present Energy resources in India and its sustainability, Energy Demand Scenario in India- Advantage and Disadvantage of conventional Power Plants – Conventional vs Non-conventional power generation.

Unit-2: Basics of Solar Energy, Wind energy- Environmental benefits and impacts, Biomass resources- Bioenergy, Geothermal Energy.

Unit-3: Understanding environment, global crisis, Basic Concepts Forest and Grassland ecosystems, Desert Ecosystems, Aquatic Ecosystems Introduction to Biodiversity, Biodiversity Conservation.

Unit-4: Air pollution- Sources, effects, control, air quality standards, air pollution act, air pollution measurement.Greenhouse gases – effect, Global Warming, Acid Rain, and Ozone Depletion, Water pollution-Sources and impacts, Noise pollution, Soil pollution, Pollution aspects of various power plants.

Reference:
1) Rajagopalan, R., "Environmental Studies: From Crisis to Cure", Oxford **University Press, New Delhi, 2e, 2011**
2) Ranjit Daniels & J. Krishnaswamy "Environmental Studies", Wiley India
3) Davis & Cornwell "Environmental Engineering", McGraw Hill
4) Gilbert M. Masters and Wendell P. ELA – Introduction to Environmental Engineering And Science
5) W. Cunningham – Principles of Environmental Science, TMH
6) P. Venugoplan Rao – Principles of Environmental Science and Engineering, PHI.
7) Meenakshi – Environmental Science and Engineering, Prentice Hall India.
8) Martin – Ethics in Engineering, TMH
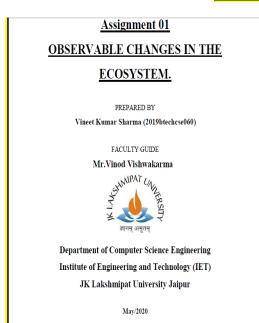
Video Lectures:
1) http://www.nptelvideos.in/2012/12/fundamentals-of-environmental-pollution.html
2) http://www.nptelvideos.in/2012/11/energy-resources-and-technology.html
3) https://nptel.ac.in/courses/122/102/122102006/
4) https://nptel.ac.in/courses/127106004/
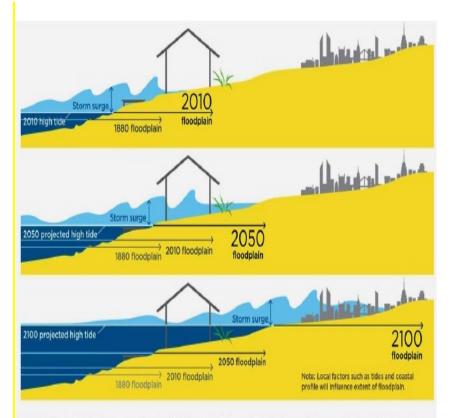
Websites (related to the course)
1)   http://www.cpcb.nic.in/
2)   http://www.rpcb.rajasthan.gov.in
3)   http://www.bis.org.in/
4)   http://www.who.int/en/
5)   http://www.moef.gov.in/

Employability skill activities

Assignment 01

OBSERVABLE CHANGES IN THE ECOSYSTEM.

PREPARED BY

Vineet Kumar Sharma (2019btechcse060)

FACULTY GUIDE

Mr.Vinod Vishwakarma

Department of Computer Science Engineering

Institute of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

May/2020
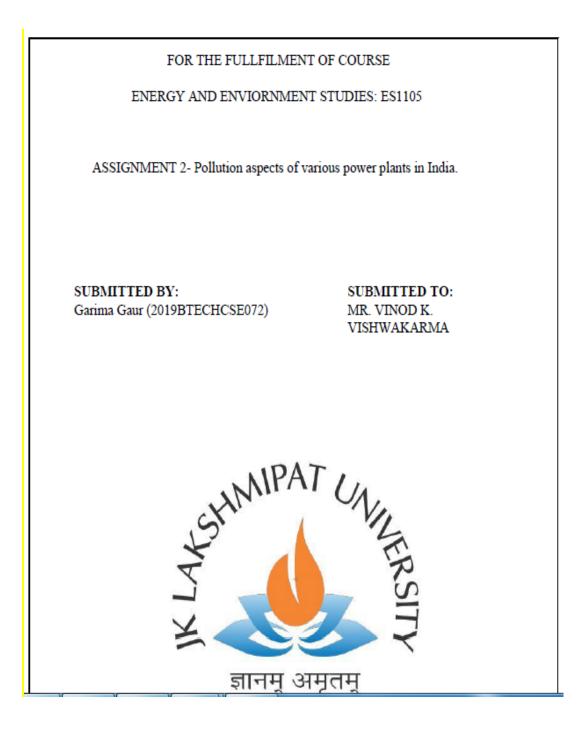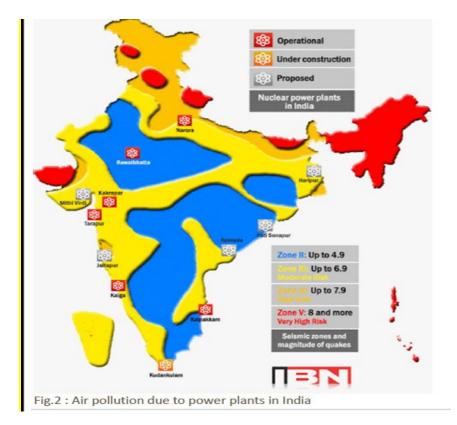
Assignment 01: List out any 05 Observable Changes that you have noticed in the Ecosystem of your Area and also comment a possible scientific explanation based on your thinking.
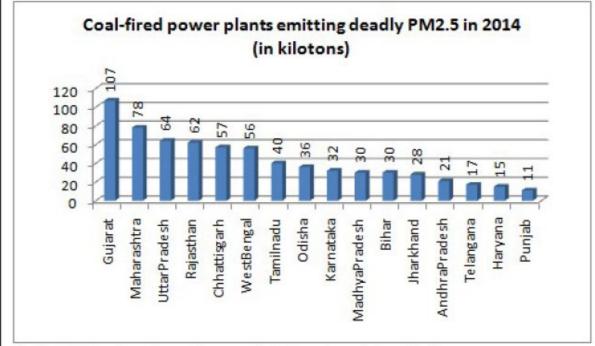
Sea level sets a baseline for storm surge—the potentially destructive rise in sea height that occurs during a coastal storm. As local sea level rises, so does that baseline, allowing coastal storm surges to penetrate farther inland. With higher global sea levels in 2050 and 2100, areas much farther inland would be at risk of being flooded. The extent of local flooding also depends on factors like tides, natural and artificial
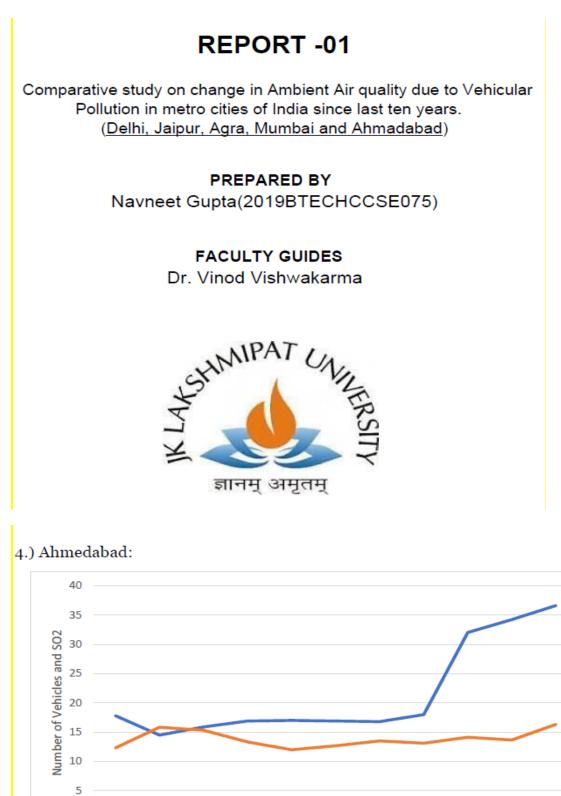
Figure 2: Prediction of Flood Plain in Year 2100[2]

FOR THE FULLFILMENT OF COURSE

ENERGY AND ENVIORNMENT STUDIES: ES1105

ASSIGNMENT 2- Pollution aspects of various power plants in India.

SUBMITTED BY:
Garima Gaur (2019BTECHCSE072)

SUBMITTED TO:
MR. VINOD K.
VISHWAKARMA

JK LAKSHMIPAT UNIVERSITY

ज्ञानम् अमृतम्

Fig.2 : Air pollution due to power plants in India

Fig,1 : Pollution from thermal power plants in various states of India

REPORT -01

Comparative study on change in Ambient Air quality due to Vehicular Pollution in metro cities of India since last ten years.
(Delhi, Jaipur, Agra, Mumbai and Ahmadabad)

PREPARED BY
Navneet Gupta(2019BTECHCCSE075)

FACULTY GUIDES
Dr. Vinod Vishwakarma

4.) Ahmedabad:

Fig 5.10 Graph of Number of Vehicles and Amount of SO2

IMPACT OF CLIMATE CHANGE ON LOSS OF BIODIVERSITY IN INDIA SINCE LAST 50 YEARS WITH SPECIAL REFERENCE TO THE WESTERN GHATS

Energy and Environment Course

SAUMYA PATEL

2019BtechCSE049

Section : B1

Date of Submission : 22.05.2020
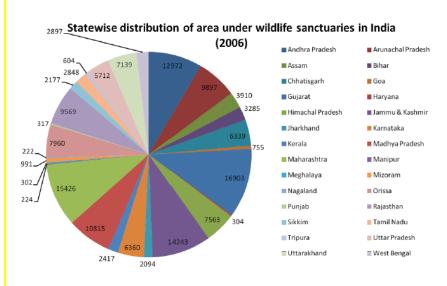
Fig.2 : Area under wildlife sanctuaries

The Western Ghats: A hotspot of Biodiversity in India

Question No	Question Text	Error Rectification	Hint	Option Count	Correct Option	Option 1	Option 2	Option 3	Option 4
	ES1105 QUIZ								
1	Non-Criteria Pollutants are :			4	2	those that violate the National Ambient Air Quality Standards	all pollutants not included in the NAAQS and HAP lists	Both	None
2	VULNERABLE Species are those species :			4	3	Species which have small populations in the world and are confined to limited areas or are thinly distributed over a more wide area	Species which are under the threat of extinction and whose survival is unlikely if the causal factors like habitation loss continue operating	Species whose population has still not reduced but face the threat of extinction as the causal factors like reduction in habitat can be easily observed	A particular species is considered extinct when its last surviving member dies
3	Examples of "RARE" Species:			4	4	Black Buck, Spotted deer, Golden langur, Asiatic wild ass	dodo, passenger pigeon	vultures	Asiatic Pheasants, Satyr Tragopan, Temminick Tragopan
4	Example of EX-SITU CONSERVATION of Wild life:			4	3	National Parks	Wildlife Sanctuaries	Animal Seed Bank	Biosphere Reserves
5	The term hotspot was first introduced by			4	1	Norman Myers	Sir Arthur G. Tansley	Chales Darwin	Ernst Haeckel
6	To qualify as a biodiversity hotspot, a region must meet strict criteria			4	2	It must have ≤10% of its original natural vegetation left	It must have at least 1,500 vascular plants as endemics (i.e. 0.5% of the	Both of above	None

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Course Title: Freehand Drawing

Course Code: FD1101

Credits: 4.0

Course Description & Content

This course fosters understanding of drawing and sketching as a tool for ideation and presentation. The contents of this course includes, overview of drawing systems for ideation, rendering and presentation, Introduction to basic elements of visual design – line, texture, colour, size, proportion, etc., introduction to drawing objects, human forms and spaces, basic hand and body movements in drawing, using pencils of different grades, freehand plotting and layout, perspective study and drawing of basic solids (cubes/cones/spheres), sketching of natural and human figures, capturing the overall form through finer details of depth, light and shade and simple perspectives of spaces.

Learning Outcomes

- Students can observe and represent images, ideas and concepts.
- Students get to improve coordination of hands and eyes.
- Students get to explore pencil as a media.
- Students can understand drawing and sketching as technique for ideation, rendering and presentation.

Activities with direct bearing to Skill development

1. Gain observation and skills to draw humans, plants, objects, environments in perspective and analytically representing 3d solids and objects.
2. Freehand drawing skills without use of measurement tools for quick ideation and representation

Methodology

- Lectures, Demonstrations and Presentations.
- Assignments.
- Analysis and feedback.

Evaluation Criteria

- Skills.
- Understanding.
- Levels of improvement.
- Overall output.

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	20%
3	Process and management	Nil
4	Application of concepts	Nil
5	Understanding & clarity of concepts	20%
6	Attitude towards learning	Nil
7	Levels of improvement	10%
8	Levels of thinking & Reflection	Nil
9	Overall output	10%
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

Perspective, A new system for Designers, by Jay Doblin.

Websites

Sketch A Day.com, hedesignsketchbook.com , sketchaway.wordpress.com

http://www.simkom.com/sketchsite/ . Skeren Youtube

https://vimeo.com/idsketching

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Semester - 1

Course Title: Film Appreciation (Elective – 1)

Course Code: FL1110

Credits: 2.0

Course Description & Content

The first elective of Foundation semester, Film Appreciation course would deal with the history, theory, and practice with respect to design. The elective course would look into film language, techniques and history from the perspective of design and introduce students to the fundamental concepts of application of design thinking in films.

Learning Outcomes

The students will be able to:

- Trace the trajectory of moving images and how it affected societies globally.
- Study regarding the various methodologies of filmmaking approaches.
- Distinguish between facts, assumptions and opinions.
- Have a holistic understanding of visual culture and the trajectory from still to moving images.

Activities with direct bearing to Employability, Entrepreneurship, Skill development

1. Introduction to design thinking and films: Presentations and discussions with regards to history of cinema, growth and use of the medium in popular culture, in promotion of ideas, products and services in its different forms.
2. Assignment on Film Making: The assignment on re-enacting a particular sequence from the film with a smartphone concentrated on narrative, visual and technological skill development. With limited resources, no prior training in filmmaking and very limited resource, the assignment concentrated on studying

Methodology

- Lectures
- Assignments
- Analysis
- Discussions

Evaluation Criteria

- Presentation.
- Understanding.
- Levels of thinking.
- Clarity of concepts.
- Teamwork.

S.No	Components	Weightage
1	Communication/Presentation	10%
2	Skills	Nil
3	Process and management	Nil
4	Application of concepts	10%
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	10%
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	20%
14	Observation and perception	Nil

15	Jury	40%
	Total	100%

Suggested Readings

1. Introducing Critical Theory by Stuart Sim.
2. Starting Point: 1979-1996 by Hayao Miyazaki.
3. Film Theory: An Introduction Through the Senses by Malte Hagener and Thomas Elsaesser.
4. How to Read a Film by James Monaco.

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Course Title: Geometry & Construction 2D

Course Code: GC1104

Credits: 3.0

Course Description

This Course helps the student to appreciate geometrical patterns in natural forms and understand geometrical relations. The contents of this course includes geometry and its relevance to design, drawing instruments and their usage, methodology of geometric construction: perpendiculars, divisions, parallels, etc., straight and curved lines, squares and grids, construction of regular polygons and ellipse, study of properties of geometric forms in nature through visual analysis, introduction to golden proportion, tessellations .

Learning Outcomes

- Students get to inculcate skills and precision in drawing with instruments.
- Students get to understand the basic geometrical patterns on two-dimensional surfaces.
- Students understand to stimulate imagination based on the fundamentals of geometric logic.

Activities with direct bearing to Skill development

1. Exploration-based understanding of two-dimensional geometry enables the learner to work at a variety of design setups like architecture practices, industrial design studios, graphic design consultancies etc.

2. Research-based understanding of traditional ways of geometric constructions help the learner draw insights that will be useful in his/her tentative design careers.

Methodology

- Lectures, Demonstrations and Presentations.
- Assignments.
- Analysis and feedback.

Evaluation Criteria

- Skills.
- Presentation.
- Understanding.
- Attitude towards learning.
- Levels of thinking.
- Clarity of concepts.

S. No	Components	Weightage
1	Communication/Presentation	10%
2	Skills	10%
3	Process and management	Nil
4	Application of concepts	10%
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	10%
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	10%
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil

13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Reading

1. Gail Greet Hannah, Elements of Design, Princeton Architectural Press 2002.

2. Lauer, David; Design Basics, Wadsworth Publishing, 1999.

3. W.Wong; Principles of Two Dimensional Design, John Wiley and Sons, 1972.

4. J.Bowers; Introduction to Two.

5. Dimensional Design: Understanding Form and Function, John Wiley & Sons 1999.

6. Proctor, R.M.; The Principles of pattern, Dover Publications, 1990.

7. Elam, Kimberly; Geometry of Design: Studies in Proportion and Composition, Princeton Architectural Press, 2001.

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Geometry & Construction 3D

Course Code: GC1114

Credits: 2.0

Course Description & Content

This course helps the student to understand the geometry of solids and its application in form generation. This course includes enhanced geometric construction: derivation of regular and semi-regular tessellations, geometry of solids, construction of regular polygons and ellipse, derivation of Archimedean solids, subdivision of regular polyhedron into symmetric components.

Learning Outcomes

- Students would have a good understanding of geometrical patterns in three-dimensional forms.
- Students would appreciate and articulate the language of form, pattern, and structure.
- Students will be stimulated by the fundamentals of geometric logic.

Activities with direct bearing to Employability, Skill development

1. Knowledge and exploration-based understandings of geometric structures and elements like planes. edges make the learner capable of working with architecture practices, product design consultancies, etc.
2. Understandings from the course can we effectively applied in the fabrication and manufacturing corporations and setups in terms of mold development, weight distributions, center of mass, etc.
3. Softer skills like precision, control over media and material exploration skills help the learner become able to perform in any creative practice/company.

Methodology:

- Lectures, Demonstrations and Presentations.
- Assignments.
- Analysis and feedback.

Evaluation Criteria

- Understanding and clarity of concepts.
- Skills.
- Overall output.
- Process and management.

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	20%
3	Process and management	10%
4	Application of concepts	Nil
5	Understanding & clarity of concepts	20%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	Nil
9	Overall output	10%
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

1. Sacred Geometry by Stephen Skinner.

2. Islamic Ornamental Design by Humbert Claude.

Course Title and Course Code	**Green Energy (ES1209)**
Hours per Week	**L T P: 3 0 2**
Credits	**4**
Students who can take	**B. Tech (Semester-VI)**

Course Objective:
The main objective of the course is to provide good exposure to the students to different energy sources, solar energy, solar photovoltaic, biomass, wind, small hydro and other renewable energy resources. To develop understanding of conversion technologies, processes, systems and devices and equip the student to take up projects in those areas.

Learning Outcomes:
On successful completion of this course, the students should be able to:
1. Identify suitable renewable source and technology for a given requirement
2. Use interdisciplinary approach for designing solar energy systems, predicting performance with different systems
3. Design solar energy systems for making the process economical, environmentally safe and sustainable.
4. Identify the major sources of biomass energy and apply the various technologies to generate biomass energy.

Assessing the hydro power potential of a basin and design the various types of turbines to generate hydro power.

UNIT-I   Energy Sources and Sustainability   (10 Hours)

Energy chain and common forms of usable energy - Present energy scenario - World energy status - Energy scenario in India - Introduction to renewable energy resources – Sustainability, Triple bottom line, sustainable smart city.

UNIT-II Biomass Energy   (10 Hours)

Biomass as energy resources; Bio energy potential and challenges-Classification and estimation of biomass; Source and characteristics of biofuels: Biodiesel, Bioethanol, Bio petrol, Biogas; Types of biomass energy conversion technologies; waste to energy conversions; Biomass resource development in India; Future of Biomass energy in India & Global Scene; Environmental benefits.

UNIT-III Solar Energy

Solar Energy, Solar cell, I-V characteristic, cell efficiency, Current status and Future potential of P.V. cells, Solar Thermal systems, Application of solar energy, Design and installation of solar panels for residential and industrial applications, solar power generation systems (a) off-grid systems (b) grid connected systems (c) power control and management systems, Energy Storage devices, Environmental impact, economics of solar energy systems.

UNIT-IV Hydro Power Energy   (10 Hours)

Hydro power energy, types of hydropower plants and schemes, runoff studies, assessment of hydropower potential of a basin, storage and pondage, load studies, elements of hydropower plants, types of power houses, low head turbines

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Mid Term Examination, February, 2020
Green Energy
B. Tech. all Branches, Semester VI

Roll No………………………………..

Course Code : ES 1109   Time: 1.5 hours   Max. Marks: 20

Instructions to students:

Do not write anything other than your roll number on question paper.
Assume suitable data wherever required and mention it clearly.
Writing appropriate units, nomenclature, and drawing neat sketches/schematics/
flow chart wherever, required are an integral part of the answer.

1. John works as an investment banker, his office is at a distance of 20 miles from his home. If the average mileage of his car is 22 MPG (Miles per gallon). Calculate monthly and annual CO_2 emissions by his car to drive daily from his home to office and back to home. Take average vehicle CO_2 emissions about (404 grams) per mile. **(L02)**   **(5 M)**

2. Critic on modern Indian and World energy need scenarios of today with some tables and graphs? **(L01)**   **(3 M)**

3. Mention the significance of Renewable and Non-renewable energy in terms of sustainability? Explain them briefly.**(L02)**   **(2M)**

4. As an environmental specialist explain what are greenhouse gases (GHG)? With an infrared spectrum diagram explain which GHG is responsible for global warming **(L01) (3 M)**

5. An industry has identified the location 'X' suitable to install a nuclear power plant, As an expert explain how to generate electricity from Nuclear power and its merits and de-merits to the industry? **(L02)**   **(2 M)**

6. The dam is 357 feet high, the head (distance the water falls) is 235 feet. The typical flow rate is 2200 cfs. Let's say the turbine and generator are 80% efficient. Calculate the power generated by the power plant. **(L02)   (2 M)**

7. Will the biomass energy be alternative energy source for the near future of renewable energies? What potential challenge resides with biomass energy''. Comment. **(L04)**   **(5 M)**

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination, July, 2020
Green Energy
B. Tech. in Mechanical Engineering

Roll No……………………………..

Course Code : ES1109   Time: 1.5 Hours   Max. Marks: 30

Instructions for Students

1. Open Book Exam/Open Source/Takeaway exam

2. Assume suitable data wherever required and mention it clearly.

3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever required is an integral part of the answer.

4. Zoom meeting will start **sharp at 9:30** for end term exam and each student have to report at schedule time. If reporting is **late by 15 min** he will not be considered for exam.

5. All students **must keep the** required stationary ready with them.

6. A4 sheet will be consider for answering question paper having **all four side border of 15 mm**. all answer should be within the border.

7. On top of each sheet must have N**ame, Roll number, Date of exam, Course Name and Course Code** (as per format attached/shared).

8. **Exam will start at 9:45** to …… (duration of exam as per the hours mention in the question paper).

9. After completing the exam, students will be **provided 15 minutes to submit** /upload e-copy of answer sheet in pdf /images/word format in a single file.

10. Each page should have a **page number** format page of page (1 of 5)

11. The file name should be **"student name "_"roll number "_"course code"**

12. **No break** (for water or washroom) will be provided.

13. Internet disconnected for more than **30 seconds** by any means (natural or by any flaws), the exam will be considered null and void.

Answer all the questions, each question carries different marks

Q-1: A remote house has the load listed in table-1:

Table-1:

Appliance Type	Description	Power type	Period of operation
Lights	4, 20 W each daily	DC	Nighttime 6 h each
Light	18 W daily	AC	Nighttime 4 h
Water pump	200 W (6 amp start current) daily	DC	Daytime 2 h
Oven	600 W, 4 times a week	AC	Daytime 1 h
Iron	450 W, once a week	AC	Daytime 1.5 h

Estimate the average load, peak power and expected daily energy requirement to be satisfied by a 24 V PV system with an inverter. The efficiencies of the various components of the system are: Inverter – 90 %, Battery – 75 %, Distribution circuit – 95 %.   [05 Marks]

Q-2: Design and cost analysis of a 2-kW low temperature solar power plant for water pumping system. Draw the block diagram with all the required components.   [05 Marks]

Q-3: Estimate the environmental impacts of 400 kWp solar PV system installed in JKLU campus. Analyze the power generation in a year, cost of energy and identify the factors which affect the performance of the plant.   [05 Marks]
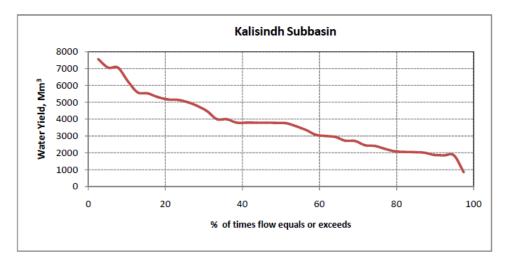
Q-4: A village of population (select a suitable number from 3000 + 100 * α) is located on the banks of a perineal river (river which have water around the year). (Here α is position of your names first alphabet in ABCD. Say for A it is equal to 1, for B = 2 for Z = 26). A check dam of height H (8 m for A to L alphabet and 11 m for M to Z) is planned to fulfil the energy need of the village. The per person per day need is to be calculated as 1Kw/person/day. The distribution of demand is such that 70% power is required during day time (7 AM to 7 PM) and 30% during night time (7PM to 7 AM). Take turbine efficiency as 85% + 0.1 * α and generator efficiency as 80% + 0.2 * α . Due to the fluctuations in demand design two turbines and find the flow rate required for each turbine.   [06 Marks]

Q-5: In the question number 1, the river is not a perineal (water is available only during 3 months of monsoon (July to September). Assume that the head mention in Question 1 is available for next 9 months (October to June). Now it is require to construct a reservoir on this river for power generation. Note that some water is also lost due to evaporation and seepage. The amount of loss is around 15% of total capacity of reservoir. River flow in such a manner that during monsoon sufficient water is available both for power generation and storage. What should be the capacity of reservoir if we want to generate power from this reservoir?   [04 Marks]

Q-6: With the human population expected to increase from 7 to 9 billion in the coming decades, discuss why production and use of biofuels represent more sustainable alternatives. Discuss some of the challenges associated with the production and use of biofuels, and also suggest some solutions overcome them.   [05 Marks]

Assignment 1

The design capacity of the Reservoir depends of the volume of the water available in the River. For design volume we take volume which is available 75% times. Say in this Figure 5000 Mm^3 water is available for 75% times. (Use 25% at X Axis)

Question: Find the design volume of reservoir for following observations.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Volume (MCM)	5000	5430	2000	2500	3500	6000	3333	3670	4100	4200
Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Volume (MCM)	4390	2800	3800	4352	4400	5453	5100	2600	2000	5100
Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Volume (MCM)	3567	3200	3450	2400	3690	3580	4900	5050	5145	3156

Assignment 2

Q1. In the assignment1, the total volume of the reservoir is 4900 MCM

MCM = million cubic meter

4900 MCM = 4900 X 10^6 m^3

This water will be available for 8 months. The available head in the reservoir is
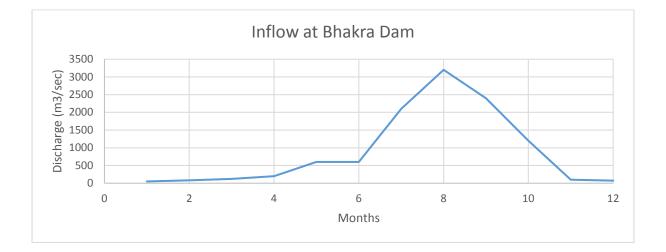
(100 + α m) (Here α is position of your names first alphabet in ABCD. Say for A it is equal to 1, for B = 2 for Z = 26).

Find the energy output from the reservoir during whole operation period.

Assume suitable value of efficiencies.

Q 2. Inflow hydrograph (Time Vs Q) for Sutlej River at Bhakra Dam is given in figure.

Month	Average Discharge for month (m3/sec)	Water Release for Hydro Power Generation (m3/sec)
1	50	400
2	80	400
3	120	350
4	200	450
5	600	450
6	600	450
7	2100	200
8	3200	200
9	2400	650
10	1200	650
11	100	650
12	70	600

Inflow at Bhakra Dam

For a month total inflow or outflow volume is = (average inflow / outflow discharge * 30 *24 * 3600)

30 days of a month

24 hrs in a day

3600 seconds in a hr

The total capacity of Bhakra Dam is 9000 MCM. Assume that on 1 Jan 3000 MCM water is available in reservoir.

Find the volume of water on last date of each month (Take average value of 30 days for each month).

In view of Total capacity of reservoir find that what percentage of water is utilized for power generation.
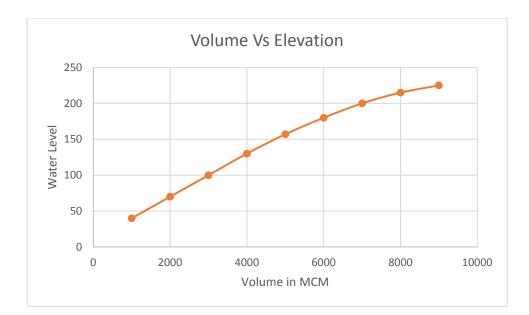
Q 3. For question 2, the volume vs elevation is presented in fig 2.

Find the average energy output from Bhakra dam.

(Take average of water elevation for a month. Say for January take average flow depth on 1 Jan and 30 Jan). (For example on 1 Jan 3000 MCM water in reservoir and on 30 Jan 2000 MCM water is in reservoir. Means take average head as (100+70)/2.

Overall efficiency of Turbine is (1- β/100) (Here β is position of your names first alphabet in ABCD. Say for A it is equal to 1, for B = 2 for Z = 26).

Volume in MCM		Water Level
9000		225
8000		215
7000		200
6000		180
5000		157
4000		130
3000		100
2000		70
1000		40

Volume Vs Elevation

(X-axis) Volume in MCM — (Y-axis) Water Level

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Habitat Studies

Course Code: HS1112

Credits: 2.0

Course Description & Content

This course makes the students sensitive towards the social, cultural and physical environment and understands the relevance of design in that context. The course contents are Introduction to the socio-cultural structure of Indian society, Introduction to field work; preparatory exercises to understand the methodology for studying an environment, field study in a chosen location and communication of its understanding through maps, sketches, illustrations and textual reports, observation and study of detailed aspects of the chosen environment.

Learning Outcomes

- This course broadens students' perception about Indian habitat; appreciate the interrelationships and interdependence of the physical components.
- It helps to develop the ability and desire to establish contact with people, share their experiences and learn from their living.
- This course can develop the ability to collect and analyze information from the grassroots level and present it in the form of a document.

Activities with direct bearing to Skill development

1. Habitat study helps the students to observe, engage and understand rural and indigenous environments to gain insights through strong primary research which includes notes, sketches, environment sketches, interviews. A major learning is living in the environment and then observe it.
2. This is a lifelong skill as it brings in empathy of studying an environment and

Methodology:

- Lectures, field study and group discussions.
- Interviews and interactions with people.
- Sketching and illustrations.

Evaluation Criteria

- Observation and perception.
- Levels of thinking and reflection.
- Understanding and clarity of concepts.
- Research and analysis.
- Communication and presentation.

S. No	Components	Weightage
1	Communication/Presentation	10%
2	Skills	Nil
3	Process and management	Nil
4	Application of concepts	Nil
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	10%
9	Overall output	Nil
10	Innovation & creativity	Nil
11	Research & analysis	20%
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	10%
15	Jury	40%
	Total	100%

Suggested Readings

1. Village India by Stephen. P. Huyler.

2. ManKind Behaving – Human Needs and Material Culture by James K Feible.

3. Daughters of India – Art & Identity by Stephen. P. Huyler.

4. Tribes of India – The Struggle for Survival by Christoph Van Furer, Haimendorf.

5. The Beautiful Tree – A Personal Journey into How the World's poorest people are educating themselves.

Course Title and Course Code	**Internal Combustion Engines (ME1201)**
Hours per Week	**L T P: 3 0 2**
Credits	**4**
Students who can take	**B. Tech Semester-VII**

Course Objective:
The main objective of the course is to give the students an introduction to reciprocating internal combustion engines with emphasis on marine and stationary applications. The focus is on explaining engine performance in terms of power, energy utilization and exhaust emissions, its relation to internal processes like combustion and gas exchange, and varying engine operating conditions.

Learning Outcomes:
On successful completion of this course, the students should be able to:
1. Demonstrate different types of reciprocating internal combustion engines (ICE), their typical design features and performance characteristics.
2. Analyze and compute various efficiencies of power cycle of internal combustion engines using ideal gas cycles, air cycles, and fuel-air cycles.
3. Demonstrate engine heat transfer and its relation to thermal loading of engine components and cooling.
4. Compute rate of heat release based on measured dynamic cylinder pressure.
5. Demonstrate homogeneous combustion in SI-engines and spray combustion in CI-engines. Fuel quality requirements of SI- and CI-engines.
6. Design the components of exhaust emissions and demonstrate the mechanisms of emission formation.
7. Design exhaust system, and their relations to fuel quality and engine performance.
8. Compute the kinematics of the crank mechanism and compute inertia forces and moments in single-

COURSE SYLLABUS (Theory):

UNIT - I
Air standard cycles: Internal and external combustion engines; classification of I.C. Engines, Cycles of operation in four stroke and two stroke I.C. Engines, Assumptions made in air standard cycle; Otto cycle; diesel cycle, dual combustion cycle, comparison of Otto, diesel and dual combustion cycles; sterling and Ericsson cycles; air standard efficiency, specific work output, specific weight; work ratio; mean effective pressure; deviation of actual engine cycle from ideal cycle. Problems. **(8)**

UNIT - II
Carburetion, fuel Injection and Ignition systems: Mixture requirements for various operating conditions in S.I. Engines; elementary carburetor, Requirements of a diesel injection system; types of injection systems; petrol injection, Requirements of ignition system; types of ignition systems, ignition timing; spark plug. **(4)**
Combustion in S. I. Engines: Ignition limits, Stages of combustion in SI engine, effect of engine variables on ignition lag, effect of engine variables on flame propagation, rate of pressure rise, abnormal combustion, detonation or knocking, effects of detonation. **(4)**

Combustion in C. I. Engines: Stages of combustion, air-fuel ratio in CI engines, delay period or ignition lag, variables affecting delay period, diesel knock, and methods of controlling diesel knock. **(2)**

UNIT - III
Lubrication and Cooling Systems: Lubrication principles, hydrodynamic lubrication, Functions of the lubricating system, Properties of the lubricating oil, SAE rating of lubricating oils, Service rating of oils, Types of lubrication systems; mist, wet sump and dry sump lubrication systems; engine performance and lubrication, Necessity of engine cooling; disadvantages of overcooling; cooling systems; air-cooling, water cooling; radiators. **(6)**

UNIT – 1V
Engine Testing and Performance: Performance parameters: BHP, IHP, mechanical efficiency, brake mean effective pressure and indicative mean effective pressure, torque, volumetric efficiency; specific fuel consumption (BSFC, ISFC), thermal efficiency; heat balance; Basic engine measurements; speed, fuel and air consumption, brake power, indicated power and friction power, heat going to cooling water and exhaust gases; performance curves. Problems. **(8)**

Air pollution from I.C. Engine and Its remedies: Pollutants from S.I. and C.I. Engines, Mechanism of formation of pollutants in SI engines, Exhaust emission, emission of unburnt hydrocarbon. Mechanism of formation of pollutants in CI engines. Methods of emission control; alternative fuels for I.C. Engines.   **(8)**

I C Engine Assignment- 1

1. Define heat engine, and explain how IC (Internal combustion) engines are classified? (5M)
2. Why is petrol more volatile than diesel explain it with chemical formulas? (3M)
3. With a neat sketch describe different components of an IC Engines? (5M)
4. What do you mean by Air fuel mixture, explain various mixtures and their ratios? (3M)
5. How do you measure performance of an IC engine explain them individually with equations (10 M)
6. Derive the expression for calculating the efficiency of Otto cycle (4 M)
7. Derive the expression for calculating the efficiency of Diesel cycle (6 M)
8. Derive the expression for calculating the efficiency of Dual cycle (10 M)
9. Write 10 differences between 4-stroke engine and 2-stroke engine (4 M)
10. Write 10 differences between SI engines and CI engines (4 M)
11. Calculate the ideal air standard cycle efficiency based on the Otto cycle for a gas engine with a cylinder bore of 50 mm, a stroke of 75 mm and a clearance volume of 21.3 cm3 (3M)
12. An oil engine takes in air at 1.01 bar, 20^0C and the maximum cycle pressure is 69 bar. The compressor ratio is 18:1. Calculate the air standard thermal efficiency based on the dual-combustion cycle. Assume that the heat added at constant volume is equal to the heat added at constant pressure.(3M)
13. A four-stroke Otto-cycle has a crankshaft speed of 2000 rpm, a compression ratio of 8, and a displacement volume of 1.5 liters. At the start of compression the air is at 293 K, 0.1013 MPa. The peak cycle temperature is equal to the 2000 K source temperature. The compression and expansion processes are each reversible and adiabatic. Assuming constant specific heats, make a complete thermal analysis of the engine. Find the energy transfer per unit mass for each process in the cycle. (3M)
14. At the start of the compression process in a Diesel-cycle engine the air is at 530 R, 14.7 psia. The compression ratio is 16. The peak cycle temperature is equal to the 4000 R source temperature. The adiabatic compression and expansion processes are reversible. Even though high temperatures are involved, assume that specific heats are constants at their

low-temperature values. Find the energy transfer per unit mass for each process in the cycle (3M).

15. A high performance four-stroke SI has a swept volume of 873 cm^2 and a compression ratio of 10:1. The indicated efficiency is 55 percent of the corresponding ideal air standard Otto cycle. At 8000 rpm, the mechanical efficiency is 85 percent, and the volumetric efficiency is 90 percent. The air/fuel efficiency (gravimetric that is by mass) is 13:1 and calorific value of the fuel is 44 MJ/kg. The air is included at 20^0 and 1 bar. Calculate 1) overall efficiency and the sfc 2) the air mass flow rate, power output and Bmep (3M).

16. A 2 litre four-stroke indirect injection diesel engine is designed to run at 4500 rpm with a power output of 45 k W; the volumetric efficiency is found to be 80 percent. The sfc is 0.071 kg/MJ and the fuel has a calorific value of 42 MJ/kg. The ambient conditions for the test were 20°C and I bar. Calculate the bmep, the arbitrary overall efficiency, and the air-fuel ratio (3M).

17. A single cylinder engine operating at 2000 rpm develops a torque of 8 N-m. The indicated power of the engine is 2.0 kW. Find loss due to friction as the percentage of brake power (3M)

18. A diesel engine consumes fuel at the rate of 5.5 gm/sec. and develops a power of 75 kW. If the mechanical efficiency is 85%. Calculate bsfc and isfc. The lower heating value of the fuel is 44 MJ/kg (3M)

19. Find the air-fuel ratio of a 4-stroke, 1 cylinder, and air cooled engine with fuel consumption time for 10 cc as 20.0 sec. and air consumption time for 0.1 m3 as 16.3 sec. The load is 16 kg at speed of 3000 rpm. Also find brake specific fuel consumption in g/kWh and thermal brake efficiency. Assume the density of air as 1.175 kg/m3 and specific gravity of fuel to be 0.7. The lower heating value of fuel is 44 MJ/kg and the dynamometer constant is 5000 (3M)

20. A six-cylinder, gasoline engine operates on the four-stroke cycle. The bore of each cylinder is 80 mm and the stroke is 100 mm. The clearance volume per cylinder is 70 cc. At the speed of 4100 rpm, the fuel consumption is 5.5 gm/sec.[or 19.8 kg/hr.) and the torque developed is 160 Nm. Calculate : (i) Brake power, (ii) The brake mean effective pressure, (iii) Brake thermal efficiency if the calorific value of the fuel is 44000 kJ/kg and (iv) The relative efficiency on a brake power basis assuming the engine works on the constant volume cycle r = 1.4 for air.

I C Engine Assignment- 2

21. What is Ignition lag or delay period in S.I engines explain with a neat sketch. (5M)

22. Explain phenomenon of knocking and brief the reasons why knocking occurs in C.I as well as S.I Engines.(5M)

23. What is flame front? Explain its influence with engine speed, temperature and pressure. (5M)

24. What is ignition quality? Explain it for diesel as well as Gasoline. (5M)

25. With a neat sketch explain different parts of a fuel injector.(5M)

26. With a neat sketch explain different injection systems. (5M)

27. What are different ignition systems available explain them briefly. (3M)

28. With a neat sketch explain Battery ignition system. (5M)

29. Explain few points by comparing battery ignition and Magneto ignition system. (5M)

30. Write some drawbacks of conventional Ignition system. (3M)

31. Write some advantages of Electronic ignition system. (4M)

32. What do you mean by firing order? Explain some advantages of proper firing order (5M)

33. List some probable firing orders of following (10M)

    1. 3- cylinder engine
    2. 4 cylinder engine
    3. 6 cylinder engine
    4. 8 cylinder inline engine
    5. 8 cylinder v type engine

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Quiz-I, August, 2019
Internal Combustion Engines
B. Tech. in Mechanical Engineering, Semester VII

Roll No………………………………..

Course Code : ME1201   Time: 20 Mins   Max. Marks: 20

1. The air standard efficiency of an I.C Engine depends on   [   ]

    A.) Fuel Used   B) Speed of the Engine   C) Compression Ratio D) None of the Above

2. The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called

                                                                              [   ]

    A.) Net Efficiency B) Efficicency ratio C) Relative Efficiency D) Overall Efficiency

3. Compression ratio of I.C. engine is   [   ]

    A.) the ratio of volumes of air in cylinder before compression stroke and after compression stroke

    B.) Volume displaced by piston per stroke and clearance volume in cylinder

    C.) ratio of pressure after compression and before compression.

    D.) swept volume/cylinder volume.

4. Indicated power of a 4-stroke engine is equal to   [   ]

    A.) pLAN   B) 2pLAN   C) pLAN/2   D) 4pLAN

    Where, p = mean effective pressure, L = stroke A = area of piston and N = rpm of engine

5. Diesel cycle is also known as   [   ]

    A.) constant volume cycle   B) constant pressure cycle   c) constant temperature cycle

          D) None of the above

6. A diesel engine has compression ratio from   [   ]

    A.) 6 to 10   B) 10 to 15   C) 16 to 20   D) 25 to 40

7. The combustion in compression ignition engine is   [   ]

    A.) Homogeneous   B) heterogeneous   C) laminar   D) None of the above

8. The fuel in diesel engine is normally injected at pressure of   [   ]

    A.) 5-10 kg/cm^2 B) 20-25 kg/cm^2 C) 60-80 kg/cm^2 D) 90-130 kg/cm^2

9. Ignition quality of petrol is expressed by   [   ]

    A.) octane number   B) calorific value   C) self-ignition temperature   D) Cetane Number

10. Iso-octane   [   ]

A.) has octane number of 0   B) has octane number of 50   C) has octane number of 100 D) None of the above

11. Which of the following is the lightest and most volatile liquid fuel?   [   ]

A.) Diesel   B) Gasoline   C) Kerosene   D) fuel oil

12. Diesel fuel, compared to petrol is   [   ]

A.) less difficult to ignite   B) just about the same difficult to ignite   C) more difficult to ignite   D) None of the above

13. A carburetor is used to supply   [   ]

A.) petrol, air and lubricating oil   B) air and diesel   C) petrol and lubricating oil   D) petrol and air

14. Which of the following does not relate to spark ignition engine?   [   ]

A.) Ignition coil   B) Spark plug   C) Carburetor   D) Fuel injector

15. Which of the following does not relate to compression ignition engine?   [   ]

A.) Fuel pump   B) Fuel injector   C) Governor   D) Carburetor

16. Carburetion is done to   [   ]

A.) feed petrol into cylinder   B) govern the engine   C) break up and mix the petrol with air   D) None of the above

17. In the passenger cars, the following type of carburetor is preferred   [   ]

A.) horizontal type   B) downward draught type   C) upward draught type   D) None of the above

18. In a fuel-injection system, the amount of fuel delivered into the air stream going to the engine is controlled by a pump which forces the fuel under pressure.   [   ]

A.) True   B) False

19. The requirements met by the injection system are: [   ]

A.) Proper atomization of fuel into very fine droplets

B.) Proper spray pattern to ensure rapid mixing of fuel and air

C.) Uniform distribution of fuel droplets throughout the combustion chamber

D.) All of the mentioned

20. Advantage of air injection system is   [   ]

A.) cheaper fuels can be used   B) mep is high   C) fine atomization and distribution of the fuel   D) all of the mentioned

21. In battery ignition system, the energy required for producing spark is obtained from a _____ battery.   [   ]

A.) 6 V to 12 V   B) 12 V to 24 V   C) 24 V to 30 V   D) None of the above

22. The essential components of battery ignition system are   [   ]

A.) ignition coil   B) contact breaker   C) capacitor   D) all of the mentioned

23. The battery is charged by a _____ driven by the engine.   [   ]

A.) Shaft   B) axle   C) dynamo   D) none of the mentioned

24. The alkaline battery is used in _____ duty commercial vehicles.   [   ]

A.) Heavy   B) light   C) large   D) None of the above

25. In _____ combustion, the flame initiated by the spark travels across the combustion chamber in a fairly uniform manner.   [   ]

A.) Abnormal   B) normal   C) knocking   D) None of the above

26. _____ Knock occurs when the delay period is excessively long so that there is a large amount of fuel in the cylinder for the simultaneous explosion phase.   [   ]

A.) Petrol   B) Diesel   C) Kerosene   D) None of the above

27. Types of Multi-Point Fuel Injection system are   [   ]

A.) port injection   B) throttle body injection   C) All the above   D) None of the above

28. The Multi-Point Fuel Injection system can be functionally divided into   [   ]

A.) electronic control system   B) fuel system   C) air induction system D) All the above

29. In MPFI-Electronic Control System, the _____ sensor sends information about the engine speed.   [   ]

A.) Speed   B) ignition   C) air-flow   D) air-mass

30. In magneto ignition system, as the engine speed increases the flow of current   [   ]

A.) Decreases   B) remains constant   C) increases   D) none of the above

31. The primary voltage increases as the engine speed increases due to the limitations in the current switching capability of the breaker system.   [   ]

A.) True   B) False

32. The important requirements of an automobile carburetors are   [   ]

A.) ease of starting the engine, particularly under low ambient conditions

B.) developing sufficient power at high engine speeds

C.) equally good and smooth engine operation at various loads

D.) All the above

33. An ignition process obeys the law of   [   ]

A.) conservation of mass   B) conservation of energy   C) conservation of momentum

D) None of the above

34. The pressure, temperature and density of the mixture between the spark plug electrodes have a considerable influence on the _____ required to produce a spark. [   ]

A.) Voltage   B) Current   C) mass   D) None of the above

35. In a four stroke engine, the working cycle is completed in   [   ]

   A.) one revolution of the crankshaft   B) two revolution of the crankshaft   C)   three
   revolution of the crankshaft   D) four revolution of the crankshaft

36. In a four stroke cycle petrol engine, the charge is ignited at   [   ]

   A.) 30º before top dead center   B) 30º after top dead center   D) 30º before bottom
   dead center   D) 30º after bottom dead center

37. In Otto cycle, with increase in fuel consumption, thermal efficiency is   [   ]

   A.) Increased   B) reduced   C) remains same   D) None of the above

38. Two stroke engines are liable to cause a _____ consumption of lubricating oil.   [   ]

   A.) Lighter   B) heavier   C) unpredictable   D) None of the above

39. At light loads, the running of engine is not very smooth because of the _____ dilution of
   charge.   [   ]

   A.) Decreased B) increased   C) equal   D) None of the above

40. For the same compression ratio, the efficiency of dual combustion cycle is   [   ]

   A.) greater than Otto cycle   B) less than diesel cycle   c) less than Otto cycle and
   greater than diesel cycle   D) greater than both Otto and diesel cycle

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination, December, 2019
Internal Combustion Engines
B. Tech. in Mechanical Engineering, Semester VII

Roll No………………………………..

Course Code : ME1201   Time: 3 hours   Max. Marks: 60

Instructions to students:

Do not write anything other than your roll number on question paper.

Assume suitable data wherever required and mention it clearly.

Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

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1. A six-cylinder, gasoline engine operates on the four-stroke cycle. The bore of each cylinder is 80 mm and the stroke is 100 mm. The clearance volume per cylinder is 70 cc. At the speed of 4100 rpm, the fuel consumption is 5.5 gm/sec.[or 19.8 kg/hr.] and the torque developed is 160 Nm. Calculate : (i) Brake power, (ii) The brake mean effective pressure, (iii) Brake thermal efficiency if the calorific value of the fuel is 44000 kJ/kg and (iv) The relative efficiency on a brake power basis

assuming the engine works on the constant volume cycle r = 1.4 for air.
(L02) 10M

2. A 2-cylinder C.I. engine with a compression ratio 13:1 and cylinder dimensions of 200mm × 250mm works on two stroke cycle and consumes 14kg/h of fuel while running at 300 r.p.m. The relative and mechanical efficiencies of engine are 65% and 76% respectively. The fuel injection is effected upto 5% of stroke. If the calorific value of the fuel used is given as 41800 kJ/kg, calculate the mean effective pressure developed.   **(L02) 10M**

3. As an Automobile specialist in engines suggest how do you measure the performance parameters of SI and CI engines and discuss them briefly with mathematical formulas **(L01) 10 M**

4. An n- cylinder engine is to be designed with a specific firing order take (n = 3, 4, 6 and 8) specify proper correct firing order in order to perform the engine at its maximum efficiency. **(L02) 5 M**

5. Debate between a carburetor and fuel injection system and suggest which one is a good option for better performance of the engine **(L05) 5M**

6. Design a fuel injector system with different components **(L03) 5M**

7. What is the difference between breathing and combustion demonstrate using a chemical reaction **(L04) 5M**

8. Sketch battery ignition system and Magneto ignition system and compare and suggest which one is advantageous over other. **(L06) 10M**

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Mid Term Examination, August, 2019
Internal Combustion Engines
B. Tech. in Mechanical Engineering, Semester VII

Roll No……………………………..

Course Code : ME1201   Time: 1.5 hours   Max. Marks: 30

Instructions to students:

Do not write anything other than your roll number on question paper.

Assume suitable data wherever required and mention it clearly.

Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1	Short answer type questions (Answer any two)	**04**
i.	Design an Internal combustion engine for a Multi Utility vehicle with different components. **(LO1)**	
ii.	A sports car is travelling in different terrains to achieve various speeds on this terrain construct an Air-fuel mixture ratio's according to the speed requirement. **(LO5)**	
iii.	Is gasoline more volatile or Diesel? Explain your thought with chemical formula (**LO2)**.	
Q.2	A six-cylinder engine with a volumetric efficiency of 90% and a thermal efficiency of 38% produces 200 kW of power at 3000 rpm. The cylinder bore and stroke are 100 mm and 200 mm respectively. If the condition of air in the intake manifold is 95 kPa and 300 K, determine (a) the mass flow rate of air in kg/s, (b) the fuel consumption rate in kg/s and (c) the specific fuel consumption in kg/kW.hr. Assume the heating value of the fuel to be 35 MJ/kg of fuel. **(LO2)**.	**08**
Q.3	A four-stroke Otto-cycle has a crankshaft speed of 2000 rpm, a compression ratio of 8, and a displacement volume of 1.5 liters. At the start of compression the air is at 293 K, 0.1013 MPa. The peak cycle temperature is equal to the 2000 K source temperature. The compression and expansion processes are each reversible and adiabatic. Assuming constant specific heats, make a complete thermal analysis of the engine. Find the energy transfer per unit mass for each process in the cycle **(LO4)**.	**05**
Q.4	List out 10 differences between SI engines and CI engines **(LO1)**	**05**
Q. 5	A requirement has arisen in a workshop to purchase 2 engines (one Spark Ignition and one Compression ignition) as an automobile expert what performance parameters you would look into to select appropriate engines **(LO1)**.	**04**
Q.6	A six-cylinder, gasoline engine operates on the four-stroke cycle. The bore of each cylinder is 80 mm and the stroke is 100 mm. The clearance volume per cylinder is 70 cc. At the speed of 4100 rpm, the fuel consumption is 5.5 gm/sec. [or 19.8 kg/hr.) and the torque developed is 160 Nm. Calculate: (i) Brake power, (ii) The brake mean effective pressure, (iii) Brake thermal efficiency if the calorific value of the fuel is 44000 kJ/kg and (iv) The relative efficiency on a brake power basis assuming the engine works on the constant volume cycle r = 1.4 for air **(LO2)**	**04**

Session 2019-20

Department of Mechanical Engineering

Course: Materials Engineering
Code: ME1101

Course Title and Course Code	**MATERIALS ENGINEERING (ME 1101)**
Hours per Week	**L T P: 3 0 2**
Credits	**4**
Students who can take	**B. Tech Semester-III (Batch: 2018-2022)**

Course Objective:

The main objective of the course is to impart knowledge of materials engineering so that students can able to identify crystal structure, crystal defects, select suitable material for application based components, and control their mechanical properties.

Learning Outcomes:

On successful completion of this course, the students will be able to:

1. Identify crystal structure, crystal defects and perform various mechanical tests as per ASTM standards to know properties of materials.
2. Evaluate materials on the basis of their static and dynamic failure criteria as per ASTM standards.
3. Perform various heat treatment processes to hold required mechanical properties in ferrous alloys.
4. Prioritize other ferrous and non-ferrous alloys for various applications.

Prerequisites		**Basics of Physics**
Sr. No	**Specifications**	**Marks**
1	Attendance	5
2	Assignment	10
3	Class Participation	NIL
4	Quiz	5
5	Theory Exam-I	10
6	Theory Exam-II	NIL
7	Theory Exam-III	30
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	20
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	NIL
Total (100)		**100**

COURSE SYLLABUS (Theory):

UNIT - I
Crystal Structure: Unit cells, Metallic crystal structures, Ceramics.
Imperfection in Solids: Point, line, interfacial and volume defects; dislocation strengthening mechanisms and slip systems, critically resolved shear stress.
(6)
Mechanical Property Measurement: Tensile, compression and torsion tests; Young's modulus, relations between true and engineering stress-strain curves, generalized Hooke's law, yielding and yield strength, ductility, resilience, toughness and elastic recovery;
Hardness: Rockwell, Brinell and Vickers and their relation to strength.
(6)

UNIT - II
Static failure theories: Ductile and brittle failure mechanisms, Tresca, Von-mises, Maximum normal stress, Mohr-Coulomb and Modified Mohr-Coulomb;
Fracture mechanics: Introduction to Stress-intensity factor approach and Griffith criterion.
Fatigue failure: High cycle fatigue, Stress-life approach, SN curve, endurance and fatigue limits, effects of mean stress using the Modified Goodman diagram; Fracture with fatigue, Introduction to nondestructive testing (NDT)
(8)

UNIT - III
Phase Diagram: Alloys, substitutional and interstitial solid solutions- Phase diagrams: Interpretation of binary phase diagrams and microstructure development; eutectic, peritectic, peritectoid and monotectic reactions. Iron Iron-carbide phase diagram and microstrctural aspects of ledeburite, austenite, ferrite and cementite, cast iron.
(6)
Heat treatment of Steel: Annealing, tempering, normalising and spheroidising, isothermal transformation diagrams for Fe-C alloys and microstructure development. Continuous cooling curves and interpretation of final microstructures and properties- austempering, martempering, case hardening, carburizing, nitriding, cyaniding, carbo-nitriding, flame and induction hardening, vacuum and plasma hardening. **(6)**

UNIT - IV
Ferrous and Non Ferrous Alloys: Alloying of steel, properties of stainless steel and tool steels, maraging steels- cast irons; grey, white, malleable and spheroidal cast irons- copper and copper alloys; brass, bronze and cupro-nickel; Aluminium and Al-Cu – Mg alloys- Nickel based super-alloys and Titanium alloys
(8)

COURSE SYLLABUS (Practical):

1. To evaluate microstructure of various metallic materials and prepare a comparative report.
2. To perform Tensile Test and know the tensile properties of the metallic materials
3. To perform Impact Test and know about the toughness of the metallic materials
4. To perform Hardness Test and know about the hardness value of the metallic materials
5. To perform Torsion Test on the metallic materials and calculate torsional rigidity of the materials.
6. To perform Fatigue Test on the metallic materials
7. To perform Compression Test on the metallic materials
8. To perform and compare various Heat Treatment (Anealing, Normalizing, Quenching) cycles.

9. To perform Heat Treatment cycle to understand Case Hardening.
10. Study of various ferrous and non-ferrous materials
11. Effect of strain rate on various properties of materials

Text Books:

1. W. D. Callister, 2006, "Materials Science and Engineering-An Introduction", 6th Edition, Wiley India.
2. Kenneth G. Budinski and Michael K. Budinski, "Engineering Materials", Prentice Hall of India Private Limited, 4th Indian Reprint, 2002.
3. V. Raghavan, "Material Science and Engineering', Prentice Hall of India Private Limited, 1999.
4. U. C. Jindal, "Engineering Materials and Metallurgy", Pearson, 2011.

List of experiments:

Expt. No.	Name of the Experiment	Area of Application
1.	To evaluate microstructure of various metallic materials and prepare a comparative report.	• *It is used to know the properties of materials*
2.	To perform Tensile Test and know the tensile properties of the metallic materials	• *It is used to know the tensile strength of the materials.*
3.	To perform Impact Test and know about the toughness of the metallic materials	• *It is used to know the impact strength of the materials.*
4.	To perform Hardness Test and know about the hardness value of the metallic materials	• *It is used in to find the hardness of the materials*
5.	To perform Torsion Test on the metallic materials and calculate torsional rigidity of the materials.	• *It is used in know the torsional strength of the materials*
6.	To perform Fatigue Test on the metallic materials	• *It is used in know the endurance strength of the materials*
7	To perform Compression Test on the metallic materials	• *It is used in know the compressional strength of the materials*
8	To perform and compare various HeaTreatment (Anealing, Normalizing, Quenching) cycles.	• *It is important to know the heat treatment on metals*
9	To perform Heat Treatment cycle to understand Case Hardening.	• *It is important to know the heat treatment on metals*
10	Study of various ferrous and non-ferrous materials	• *Identify the materials uses on the bases of its properties.*

List of students session 2018-2022		
Sr. No	**Roll No**	**Name**
1	2018BTechME001	Abhimanyu Shankar
2	2018BTechME004	Ronak Singh

3	2018BTechME005	Anirudh Pareek
4	2018BTechME006	Prashant Chaudhary
5	2018BTechME007	Piyush Singh Panwar
6	2018BTechME008	Mayank Soni

Formula E Electric Vehicle

PREPARED BY

Pranjal Wadhwa (2017BTECHME010)

Arun Jangir (2017BTECHME005)

FACULTY GUIDE

Mr Mohd Zubair & Mr Yogesh Rohilla

Department of Mechanical engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

November 2019

Formula E Electric Vehicle

Bachelor of Technology in Mechanical Engineering

By:
Pranjal Wadhwa (2017BTECHME010)

Arun Jangir (2017BTECHME005)

Faculty Guide:
Mr Zubair & Mr Yogesh Rohilla

**Department of Mechanical engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur**

November 2019

CERTIFICATE

This is to certify that the project work entitled "**Formul E Electric Vehicle**" submitted by Pranjal Wadhwa (2017BTECHME010) & Arun Jangir (2017BTECHME005) , towards the partial fulfillment of the requirements for the degree of **Bachelor of Technology in Mechanical Engineering** of JK Lakshmipat University Jaipur is the record of work carried out by them under my supervision and guidance. In my opinion, the submitted work has reached a level required for being accepted for Practical examination.

------------------------------   -----------------------------------

Dr. Mohd Zubair   **Dr. Yogesh Rohilla**

Assistant Professor   Associate Professor

Department of Mechanical   Department of Electrical

Institute of Engineering & Technology (IET)   Institute of Engineering & Technology (IET)

JK Lakshmipat University Jaipur   JK Lakshmipat University Jaipur

Date of Submission ————

ACKNOWLEDGEMENTS

We would like to express our special thanks of gratitude to Dr. Zubair sir and Dr. Yogesh sir as well as our university who gave us the golden opportunity to do this wonderful project on the topic **Formula E Electric Vehicle** which also helped us in learning a lot of things and We came to know about so many new things We are really thankful to them. Secondly We would also like to thank Mechanicsl Department of JK Lakshmipat University for providing us with the required equipment's for the completion of this project. We would also like to thank my collegues for helping me directly and indirectly in many ways

Sincerely yours,
Pranjal Wadhwa (2017BTECHME010)
Arun Jangir (2017BTECHME005)

ABSTRACT

This project is all about the design, fabrication and testing of electric vehicle. In this project we are mainly focusing on making things from scrap.
We have divided this project in 2 phases.

1st Phase
In 1st phase we aimed forward for designing the basic structure (with caculations) and making it functional with the help of temprory equipments and 3 phase power supply.

2nd Phase
As we achieve success in 1st phase we will aim forward for budgeting and purchasing of various mechanical and electrical components and assemble the vehicle.

In this project our aim is to learn about the Electric vehicle and its mechanism and how to operate different mechanical machines.

List of Figures

List of Tables (if any)

Contents

CHAPTER 1 : INTRODUCTION

This project is all about the design, fabrication and testing of electric vehicle. In this project we are mainly focusing on making things from scrap.
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2nd Phase
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1.1 Problem Statement

To design and fabricate E-Vehicle with the minimization of cost.

1.2 Training Objectives

OBJECTIVE 1: To learn to operate various Mechanical machines.

OBJECTIVE 2: To learn about the mechanical and electrical design & parts of any electric vehicle.

OBJECTIVE 3: To design and fabricate Formula E Electric vehicle.

1.3 Methodology Adopted

1) Methodology adopted for Objective 1: Took the help of Ramesh Sir & Deepak Sir for learning about the working of machines.

2) Methodology adopted for Objective 2: Took the help of our Faculty Guides and various online platforms for learning.

3) Methodology adopted for Objective 3: Still working on this part.

CHAPTER 2 :   DIMENSIONING & DESIGNING

2.1 Dimensioning

Firstly, we took the A3 image of an electric vehicle and traced that design on butter paper. Then we took the basic dimensions from that drawing and comined them with the dimensions of the idle vehicle of the competition that we are aiming.
Then we applied ratio analysis and took some assumptions and finalized the dimensions.
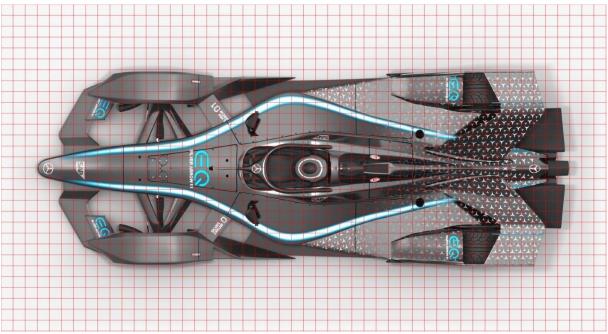
Fig 2.11 Top Grid view of Formula E Electric Vehicle

Fig 2.12 Side Grid view of Formula E Electric Vehicle

2.2 Designing

We designed the vehicle by considering all possible details in designing and modelling software like NX and Solidworks and subjected to analysis using ANSYS, based on analysis result, the model was modified and retested and a final design was fixed. The design process was based on various engineering aspects depending upon
- Idle dimensions of components
- Safety and Ergonomics

As the core design team did all initial calculation based on the data provided by internet about the electric formula one car and till date on the basis of that data and our work we have achieved to reach at this stage where we have the initial frame of the vehicle.
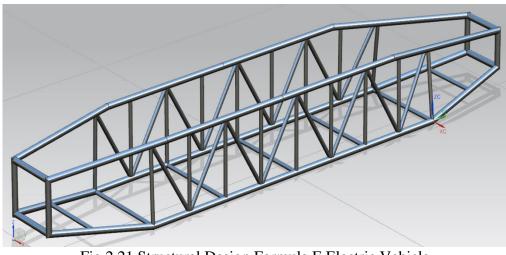
Fig 2.21 Structural Design Formula E Electric Vehicle

CHAPTER 3 :   RESEARCH & TESTING

3.1 Material selection

Formula E Electric vehicle structure is made of carbon fibre honeycomb structures but due to high cost and typical manufacturing process we moved towards the pipe structure of SS304 pipes of different cross-section areas.

We selected pipes stainless steel of grade SS304 for fabricating the chassis because of the following reasons
- Machinability
- Weldability
- Availability

This material was in our budget and was easy to weld than Aluminium as it was hard to weld and MS was heavy in weight so we selectes SS304.

Material Testing

Our welding team made various weldman profiles and welded them usuing various welding techniques and tested them on different machicnes and worked on improving their strength

3.2 Component selection

Firstly we studied about different electric vehicles for the knowledge of various equipments like steering, suspension, motor etc.
Then we arranged a E vehicle for 1 day and brought that vehicle in our lab and did a detailed study about that vehicle.

Fig 3.21 Circuit design of electric vehicle

Component testing

We connected our differential which was brought from scrap and then coupled it with the maximum power motor (Max RPM 1440) available with us and tested it and obtained these results.

Current (in Amp)	Motor RPM	Diffrential RPM
2.8	210	131
2.1	1090	510
1.8	1180	570
1.5	1200	615
1.0	1400	625

Table 3.21 Testing results of differential with motor

CHAPTER 4 : MARKETING RESEARCH &PURCHASE

4.1 Material

We first founded the vendors of SS304 in Jaipur and started the comparison of rates b/w them and finally we negotiated from Rs 260/Kg to 220/Kg and purchased the material.
Various other lab equipments were also purchased like grinder blades, welding rod etc.

4.2 Mechanical Components

- Diffrential – this was purchased from a vendor in Haryana in the price of scrap and we then cleaned and serviced it in our lab and made it working with the help of proper greasing.
- Front Calipers (with disc brake) – they were purchased from Jaipur and we cleaned it and the surface was smoothened with the help of CNC and oiling and greasing was done. The tyre will be mounted in these.
- Tyres – 4 tyres of purchased at a total cost of Rs 2500 with nominal grip.
- Steering System – Rack & pinion arrangement and 2 connecting rods were purchased.

All the above items were purchased from scrap dealer .

Many other equipments like ball bearings and dampers were purchased from market.

4.3 Electrical Components

I, Arun and Abhishek went to Delhi for the market research of various electrical components.

- Motor – we went to different vendors for our required motor and after searching the complete market we came to the conclusion that these types of motors are available either in Pune or Second hand motors which are removed from defence ships but there was no warranty for them.
- Motor Controller – the vendor of Crompton-Greaves told us about a place in Mumbai and told that he can arrange the motor as well as controller but the cost was very high.
- Battery – we met a dealer who has his own manufacturing unit of Li-ion Battery and they provided us with the quotation.

CHAPTER 5 : FABRICATION PROCESS

5.1 Design of welding joints

In this we took the various joints in Solidwork software and opened their cross-section and then pasted then on the pipes for achieving the perfect joints.
Then we removed the marked material with the help of angle grinder and polished them.\

Fig 5.11 Weldman Joints

5.2 Welding and grinding

After making the joints we welded them with the help of two types of welding

- Arc welding - Resistance or "spot" welding, as it is often called, is one of the most economical types of welding. The resistance welding (RW) equipment is incredibly versatile, which means it can be used on both small and large projects.RW uses an electrical current to heat frayed metal edges and seal them together. This type of welding is exceptionally productive on metal with a low melting point because it can be tailored to prevent distortion of the metal.

- Tig Welding or Gas tungsten arc welding - Offering high quality, versatility and longevity, TIG is the most commonly used stainless steel welding process. This welding process creates a low heat input, which makes it perfect for thin material. The argon gas is often mixed with other gases, depending on the needs of the specific project, including helium, hydrogen and nitrogen. To prevent oxidation and increase resistance to corrosion, a single-sided welding process can be used creating inert backing gas protection between the interior and exterior welds.

Then after the welding process our welding team grinded all the welding joints to achieve better finishing and strength.
This operation was done very precisely as 1degree deflection can also result in major fault.

CHAPTER 6 : SUMMARY

REFERENCES

- Wikipedia
- Youtube Videos
- Litreture reviews

Fork

MOTORCYCLE
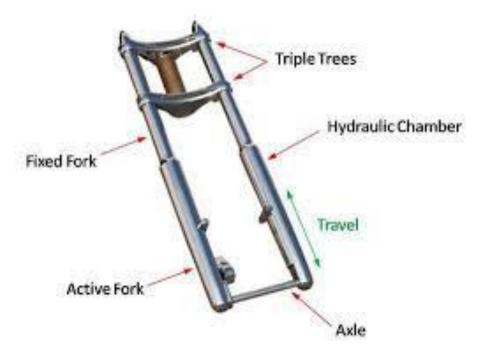
Prashant Choudhary
2018Btechme006
Strength of Materials & Analysis

Design

- To design a fork that was durable and also that the materials were easily accessible, but since we had to use the fork of the bike that was provided to us already, these ideas of designing a sustainable fork was discarded.

- So the final design of the fork as follows:

The design was modified a small as we put a single rod handle to cut out material cost, making the fork lighter and also it helps us to give it a incline to make a comfortable ride for the rider.

MODELING

A basic fork model was easy to build because it was easy to access them from the bikes and online tutorials.

The modeling went through as follows:
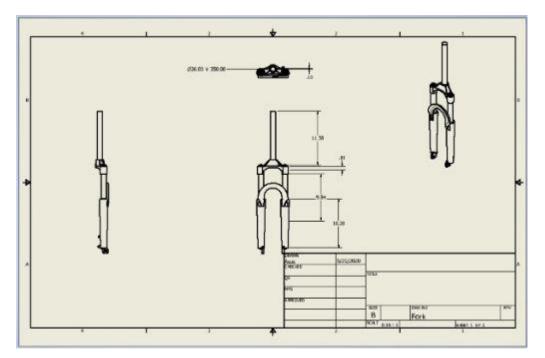
Advantages of fork

- Stability and rigidity
- Reduce friction level
- Reduce sprung weight
- Makes ride more smoth and comfortable
- Provide better handelling by holding front tyre on ground

3D Draft of the Fork

Drafting of the 3D fork design after the modeling is completed:

Simulation

Basic forces were applied on the top and bottom sides of the fork as the bottom holds the tire and the upper part has the weight of the handle.

Now, to test whether the fork could withstand the pressure and the force of the driver as well as of the obstacles shocks on road we ran our simulation.

The benchmark of the simulation was that the fork can go through applied force of 1000N (101.97 Kg).

General objective and settings:

Design Objective	Single Point
Study Type	Static Analysis
Last Modification Date	5/20/2020, 1:01 PM
Detect and Eliminate Rigid Body Modes	No
Separate Stresses Across Contact Surfaces	No
Motion Loads Analysis	No

Mesh settings:

Avg. Element Size (fraction of model diameter)	0.1
Min. Element Size (fraction of avg. size)	0.2
Grading Factor	1.5
Max. Turn Angle	60 deg
Create Curved Mesh Elements	No
Use part based measure for Assembly mesh	Yes

. Material(s)

Name	Steel, Alloy	
General	Mass Density	7.73 g/cm^3
	Yield Strength	250 MPa
	Ultimate Tensile Strength	400 MPa
Stress	Young's Modulus	205 GPa
	Poisson's Ratio	0.3 ul
	Shear Modulus	78.8462 GPa
Part Name(s)	Crown.ipt Adj.ipt Adj.ipt simering.ipt simering.ipt	
Name	Stainless Steel	
General	Mass Density	8 g/cm^3
	Yield Strength	250 MPa
	Ultimate Tensile Strength	540 MPa
Stress	Young's Modulus	193 GPa
	Poisson's Ratio	0.3 ul
	Shear Modulus	74.2308 GPa
Part Name(s)	Tube.ipt	
Name	Steel, Carbon	
General	Mass Density	7.85 g/cm^3
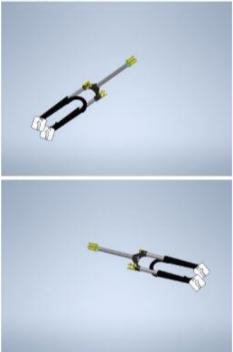
	Yield Strength	350 MPa
	Ultimate Tensile Strength	420 MPa
Stress	Young's Modulus	200 GPa
	Poisson's Ratio	0.29 ul
	Shear Modulus	77.5194 GPa
Part Name(s)	Lower.ipt	
Name	Iron, Cast	
General	Mass Density	7.15 g/cm^3
	Yield Strength	758 MPa
	Ultimate Tensile Strength	884 MPa
Stress	Young's Modulus	120.5 GPa
	Poisson's Ratio	0.3 ul
	Shear Modulus	46.3462 GPa
Part Name(s)	dg.ipt dg.ipt	
Name	Stainless Steel, 440C	
General	Mass Density	7.75 g/cm^3
	Yield Strength	689 MPa
	Ultimate Tensile Strength	861.25 MPa
Stress	Young's Modulus	206.7 GPa
	Poisson's Ratio	0.27 ul
	Shear Modulus	81.378 GPa
Part Name(s)	Damper rod.ipt Damper rod.ipt	
Name	Steel	
General	Mass Density	7.85 g/cm^3
	Yield Strength	207 MPa
	Ultimate Tensile Strength	345 MPa
Stress	Young's Modulus	210 GPa
	Poisson's Ratio	0.3 ul
	Shear Modulus	80.7692 GPa
Part Name(s)	M8 hex.ipt M8 hex.ipt	

Operating conditions

Pressure:1

Load Type	Pressure
Magnitude	1000.000 MPa
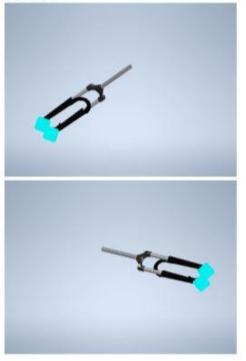
. Selected Face(s)

. Fixed Constraint:1

Constraint Type	Fixed Constraint

. Selected Face(s)

Results

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)
Fixed Constraint:1	40258.1 N	0 N	1388.04 N m	400.324 N m
		40258.1 N		62.596 N m
		0 N		-1327.58 N m

Result Summary

Name	Minimum	Maximum
Volume	659230 mm^3	
Mass	5.14878 kg	
Von Mises Stress	0.0999419 MPa	2733.48 MPa
1st Principal Stress	-582.297 MPa	2715.28 MPa
3rd Principal Stress	-2259.97 MPa	536.992 MPa
Displacement	0 mm	8.39698 mm
Safety Factor	0.115083 ul	15 ul
Stress XX	-1265.45 MPa	1077.17 MPa
Stress XY	-674.405 MPa	1093.78 MPa
Stress XZ	-606.744 MPa	506.856 MPa
Stress YY	-2108.1 MPa	2409.75 MPa
Stress YZ	-726.284 MPa	855.315 MPa
Stress ZZ	-1186.25 MPa	894.471 MPa
X Displacement	-0.97681 mm	0.0944976 mm
Y Displacement	-1.57596 mm	0.0941452 mm
Z Displacement	-8.23965 mm	0.112156 mm
Equivalent Strain	0.000000485855 ul	0.0117893 ul
1st Principal Strain	-0.0000525502 ul	0.0121976 ul
3rd Principal Strain	-0.0115414 ul	0.000109823 ul
Strain XX	-0.00446985 ul	0.00380777 ul
Strain XY	-0.00454263 ul	0.0070549 ul
Strain XZ	-0.0039135 ul	0.00341405 ul
Strain YY	-0.0101345 ul	0.0101396 ul
Strain YZ	-0.0046057 ul	0.00551678 ul
Strain ZZ	-0.00395441 ul	0.00423562 ul
Contact Pressure	0 MPa	3093.3 MPa
Contact Pressure X	-1372.95 MPa	1474.11 MPa
Contact Pressure Y	-3028.47 MPa	2891.86 MPa
Contact Pressure Z	-2122.54 MPa	1957.51 MPa

CONCLUSION & FUTURE SCOPE

The project was a really great idea to work on as it provided us with hands on learning on AUTODESK INVENTOR and also encouraged us to learn about the strength of materials and how they work.

In future we can work with this project further on a hybrid engine, rigid hybrid suspension as well as on the mono-shock suspension.

Course and Code: Mechatronics and Robots (IL1201)

Academic year: 2017-21

Course Title and Course Code	**Mechatronics and Robotics (IL1201)**		
Hours per Week	**L T P: 3 0 2**		
Credits	**4**		
Students who can take	**B. Tech Semester-VI**		

Course Objective:
To provide understanding of robots & manipulators in different fields of application, also to synthesis planar & spatial manipulator and its control strategy.

Learning Outcomes:
On successful completion of this course, the students will be able to:
1. identify the use of robots and its application in industry and everyday life.
2. analyze kinematic parameters for different robots.
3. analyze dynamic parameters for robots and method to improve its performance including energy requirements.
4. develop open and close loop control system for a manipulator.
5. perform trajectory planning for a manipulator.

Prerequisites		Basics of Physics	
Sr. No	**Specifications**	**Marks**	**Marks (Post COVID)**
1	Attendance		
2	Assignment	10	10
3	Class Participation		
4	Quiz		10
5	Theory Exam-I		10
6	Theory Exam-II		
7	Theory Exam-III	30	30
8	Report-I		20
9	Report-II		
10	Report-III		
11	Project-I	40	
12	Project-II		
13	Project-III		
14	Lab Evaluation-I (Continuous)	10	10
15	Lab Evaluation-II (End Term)	10	10
16	Course Portfolio		
Total (100)		**100**	**100**
Evaluation scheme for Retest		**Marks**	
1	Theory Exam-Retest	30	50	50
Total		**30**	**50**	**50**

COURSE SYLLABUS (Theory):

UNIT - I
Introduction:
Robotics trends and the future, robot anatomy – links, joints and joint notation scheme, Degrees of Freedom (DOF), required DOF in a manipulator, arm configuration, wrist configuration; end-effector, human arm characteristics, design & control issues, manipulation & Control, robotics sensors, robot specification, different robot programming platform.

UNIT - II
Robot Motion Analysis:
Introduction to co-ordinate frames mapping, mapping between rotated frames, mapping between translated frames, description of objects in space, transformation of vectors - rotation & translation of vectors, composite transformations, inverting a homogeneous transform, fundamental rotation matrices – principle axes rotation fixed, euler and equivalent angle axis representations.

Kinematics Manipulators:
The kinematic modeling of manipulator, direct kinematics, Denavit – Hartenberg notation, kinematic relationship between links, manipulator transformation matrix, the inverse kinematics manipulator: workspace, solvability of inverse kinematic model, singularities of manipulators.

UNIT – III
Differential Motion, Statics:
Linear and angular velocity of a rigid body, relationship between transformation matrix and angular velocity, mapping velocity vectors, velocity propagation along links. manipulator Jacobian, Jacobian inverse, Jacobian singularities, static analysis. Jacobian in statics.

Dynamics:
Introduction, Lagrangian mechanics, Lagrange – Euler formulation, velocity of a point on the manipulator, the inertia tensor, the kinetic energy, the potential energy. equations of motions, the Lagrangian-Euler (LE) dynamic model algorithm.

UNIT – IV
Robot Control:
Open loop, close loop system, and differential equation, control of movements of mechanical joints, control sequence, n-joints manipulator control system, system performance, control system with damping, control strategy, architecture of control systems.

UNIT – V
Trajectory Planning
Definition and planning tasks, joint space techniques, cartesian space techniques, joint space versus cartesian space tp.

Machine Vision:
Introduction to machine vision, industrial application of vision controlled robotic systems, image processing and analysis, description of other components of vision system.

COURSE SYLLABUS (Practical):
1. To determine the forward kinematic of a 1-DOF robot using RoboAnalyzer
2. To determine the forward kinematic of a 3-DOF robot using RoboAnalyzer
3. To determine the forward kinematic of a 6-DOF robot using RoboAnalyzer
4. To determine the inverse kinematic of a 1-DOF robot using RoboAnalyzer
5. To determine the inverse kinematic of a 3-DOF robot using RoboAnalyzer
6. To determine the forward dynamic of a 3-DOF robot using RoboAnalyzer
7. To determine the inverse dynamics of a 3-DOF robot using RoboAnalyzer
8. To determine the trajectory control of a 3-DOF robot using RoboAnalyzer

9. To determine the trajectory control of a 6-DOF robot using RoboAnalyzer
10. To write a MATLAB program to interface camera for data acquisition.
11. To write a MATLAB program to determine pattern in an image.

Text Books:
1. Saha, Subir Kumar. Introduction to robotics. Tata McGraw-Hill Education, 2014.
2. Mittal, R. K., and I. J. Nagrath. Robotics and control. Tata McGraw-Hill, 2003.
3. Fu, King Sun, Ralph Gonzalez, and CS George Lee. Robotics: Control Sensing. Vis. Tata McGraw-Hill Education, 1987.
4. Waldron, Kenneth J., Gary L. Kinzel, and Sunil K. Agrawal. Kinematics, dynamics, and design of machinery. John Wiley & Sons, 2016.
5. Groover, Mikell P., Mitchell Weiss, and Roger N. Nagel. Industrial robotics: technology, programming and application. McGraw-Hill Higher Education, 1986.
6. Schilling, Robert J. Fundamentals of robotics: analysis and control. Vol. 629. New Jersey: Prentice Hall, 1990.

List of projects:

Sl. No.	Roll No.	Name	Project
1	2017BTechCSE017	Abhishek Kumar	Gesture Controlled Car from Android
2	2017BTechECE002	Manthan Singh	
3	2017BTechCSE021	Aman Ojha	
4	2017BTechCSE203	Anamika Agrawal	Metal Detector Robotic Vehicle
5	2017TechCSE206	Arman Singhal	DTMF Controlled Robot
6	2017BTechECE006	Kundan Singh Rathore	Design and Development of Pipe Climbing Robot
7	2017BTechCSE304	Payal Sharma	Robotic Arm with Wireless Glove Controller
8	2017BTechCSE306	Rohit Kumar Bindal	
9	2017BTechCSE402	Shubham Bhandari	

List of students:

Sl. No.	Roll No.	Name
1	2017BTechCSE017	Abhishek Kumar
2	2017BTechCSE021	Aman Ojha
3	2017BTechCSE203	Anamika Agrawal
4	2017TechCSE206	Arman Singhal
5	2017BTechECE006	Kundan Singh Rathore
6	2017BTechECE002	Manthan Singh
7	2017BTechCSE304	Payal Sharma
8	2017BTechCSE306	Rohit Kumar Bindal
9	2017BTechCSE402	Shubham Bhandari

JK LAKSHMIPAT UNIVERSITY

INSTITUTE OF DESIGN

B-Des Programme

Course Title: Material Explorations

Course Code: MX1103

Credits: 3.0

Course Description & Content

This exploratory course helps students in understanding the properties of different materials that are used in products. It helps student understand the basic nature of tools and material relationship, the contents of the course includes study of wood, metal, plastic and bamboo as basic materials, Exploration of basic forms of materials, exploration of basic processes and form generation, combination of materials.

Learning Outcomes

- Students will understand the different materials and their properties.
- Students get to explore the properties of materials through the use of various hand tools.
- Students get introduced to various hand tools and machinery used in the workshops.

Activities with direct bearing to Skill development

1. Material exploration helps students understand materials like clay, plastic, wood, metal. This is made possible by engaging and manipulating various kind of materials using a wide range of tools.
2. This builds hands on skills by understanding the physical characteristics of the materials, possibility of forms that can be created and tools to be used for the same.

Methodology

- Lectures, demonstrations, and presentations.

- Hands-on experience in workshops and studios.
- Assignments.
- Discussions and feedback.

Evaluation Criteria

- Skills.
- Process and Management.
- Attitude towards learning.
- Overall output.
- Teamwork.

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	20%
3	Process and management	10%
4	Application of concepts	Nil
5	Understanding & clarity of concepts	Nil
6	Attitude towards learning	10%
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	Nil
9	Overall output	10%
10	Innovation & creativity	Nil
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	10%
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Reading

1. A Compendium of Chinese Bamboo.

2. Handmade in India, A Geographical Encyclopedia of Indian hand crafts (Sir MP Ranjan & Aditi Ranjan).

3. Bamboo in Japan, (Nancy Moore Bess with Bibi Wein).

4. Objects & Furniture Design Charles & Ray Eames (Ediciones Poligrafe).

5. Bamboo Craft Design (A.G. Rao & Madhavi Koli).

6. Dutch Design meets Bamboo (Pablo Van der Lugt).

7. Chinese Bamboo (Zhang Qisheng Chang Weishan).

Course Title and Code: Industrial Project-II (PR2107)	
Hours per Week	**L-T-P: 0-0-20**
Credits	**10**

Course Objective:

The purpose of the Industry Project is to give students the opportunity to gain an insight into the operation of their field of study and develop an understanding of their profession in a professional context. By enabling students to observe the day-to-day operations of an organization and to prepare a research project based on these observations, with the guidance of a work place and academic supervisor, students will develop a critical perspective of their profession. Students will attend pre and post placement classes to guide the development of their research project, the sourcing of them host organization and the protocols associated with the placement.

After course completion, the student will be able to:

1. Identify skills and capabilities that intersect effectively with the needs of industry.
2. Apply and practice good communication skills in the workplace setting.
3. Reflect and evaluate on experiences that might lead to future employment.
4. Report research findings in written and verbal forms.
5. Demonstrate and apply research skills to complete a project.

Sr. No	Prerequisites	
	Specifications	**Marks**
1	Attendance	Nil
2	Assignment	Nil
3	Class Participation	Nil
4	Quiz	Nil
5	Theory Exam-I	Nil
6	Theory Exam-II	Nil
7	Theory Exam-III	Nil
8	Report-1 (Synopsis)	10
9	Report-II	Nil
10	Report-III	Nil
11	Project-I (Mid Term Exam)	20
12	Project -2 (Day to Day work) (Demo, Presentation, Viva, Report)	30
13	Project -3 (End Term) (Demo, Presentation, Viva, Report)	40
14	Lab Evaluation-I	Nil
15	Lab Evaluation-II	Nil
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus:

Dissertation-I/ Industrial Project-I/ Entrepreneurial Project-I, Research and development projects based on problems of practical and theoretical interest. Students may choose a project based on any subject of Health, safety and

Environmental Engineering. The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. Evaluation will be based on student seminars, written reports, and evaluation of the developed system and/or theories.

Operation Procedure

- Student has to devote full semester for Dissertation-I/ Industrial Project-I/ Entrepreneurial Project-I.
- Student has to report to the Supervisor regularly.
- Seminars evaluation has to be carried out in the presence of a two-member Committee comprising.
- Experts in the relevant area constituted by the Supervisor.
- Final Dissertation-I/ Industrial Project-I/ Entrepreneurial Project-I Report to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

Reference Books and Tools:

Based on literature survey to be done with peer reviewed journals and magazines and relevant tools required to build the project.

Date: 26-05-2020

To whom so ever it may concern

This is to certify that Hardik Sharma, student of Master of
Technology (Computer Science and Engineering), JK Lakshmipat
University, Jaipur, Rajasthan,

has successfully completed his Industrial Dissertation II, at Analogica
Software Development Private Limited, Bengaluru (Karnataka), from
12/01/2020 to 20/05/2020 for the duration of 4months.

He has completed his project work titled
"Content Creation and Implementation of Machine Learning".
He worked here during the period as Machine Learning Researcher and
Technical Writer Intern.

We found him sincere, hardworking, creative, technically sound and result
oriented. We wish him every success in life.

Vijay Shanthagiri,
CEO, Director

ANALOGICA
Leadership Program for
Emerging Technologies

JK LAKSHMIPAT UNIVERSITY

Institute of Design

B-Des Programme

Course Title: Semiotics (Elective - II)

Course Code: SE1119

Credits: 2.0

Course Description & Content

The third elective of Foundation semester, Semiotics would deal with studying of the basis of meaning making through signs and symbols. Semiotics will introduce the culture of studying visual signs and their historical, psychological, and unconscious connect with the human mind and how that has seen applications in design proper. The elective course would look at study of visual signs, semiotic theory along with fundamentals of visual semiotics in the digital domain.

Learning Outcomes

- Learning fundamentals of semiotic theory and its application in design thinking.
- Understanding of elements of semiotics and visual semiotics.
- Understanding of visual semiotic theory and practice with regards to visual communication and industrial design.

Activities with direct bearing to Entrepreneurship, Skill development:

1. Assignment on word to image: The assignment dealt with creation of images for randomly juxtaposed words. Scrabble was used as a tool for the same. Through this process, complex images that the mind sees while looking at words are given a collectively acceptable form in each context.
2. Assignment on meaning through form: The assignment trained students to explore a particular meaning trail through form exploration (from 2D to 3D and then back to 2D) in order to learn how to project the same onto a product, service, branding element as per requirement. The concept of 'distinguished meaning making' that helps a brand to get recognized was explored through this assignment.

Methodology:

- Study of Saussurian and Piercean theory of semiotics.
- Study of analytical psychology models and their application in design.
- Study of cognition, signification, representation and meaning making through semiotics.

Evaluation Criteria

- Understanding and clarity of concepts.
- Levels of thinking and reflection.
- Application of concepts.
- Innovation and creativity.
- Process and management.

S. No	Components	Weightage
1	Communication/Presentation	Nil
2	Skills	Nil
3	Process and management	10%
4	Application of concepts	10%
5	Understanding & clarity of concepts	10%
6	Attitude towards learning	Nil
7	Levels of improvement	Nil
8	Levels of thinking & Reflection	10%
9	Overall output	Nil
10	Innovation & creativity	20%
11	Research & analysis	Nil
12	Class participation	Nil
13	Teamwork	Nil
14	Observation and perception	Nil
15	Jury	40%
	Total	100%

Suggested Readings

1. Course in General Linguistics by Ferdinand de Saussure.
2. A Theory of Semiotics by Umberto Eco.
3. The Essential Pierce by Nathan Houser and Christian Kloesel.
4. On Norms and ideals by Charles Saunders Pierce
5. Archetypes and the Collective Unconscious by Carl Jung.
6. Logos: The Development of Visual Symbols by Steven Skaggs.
7. Type, Sign, Symbol by Adrian Frutiger.
8. Man and His Symbols – Carl Jung.

Course and Code: Strength of Material & Analysis (ME1105)

Academic year: 2018-22

Course Title and Course Code	Strength of Material & Analysis (ME1105)
Hours per Week	L T P: 3 0 2
Credits	4
Students who can take	B. Tech Semester-IV ME

Course Objective:

The key objective of this course is to acquaint the students with fundamentals of stress and strain for 1-D, and 2-D systems, factors cause failure and theories to avoid failure.

Learning Outcomes:

On successful completion of this course, the students will be able to:
1. identify stress and strain present in a mechanical system.
2. analyze and evaluate 1-D and 2-D stress tensor in a specimen.
3. analyze shear force and bending moment diagrams for a beam under different loading conditions.
4. design shafts against torsion load for different application.
5. design columns against buckling load for various end conditions.

Sr. No	Specifications	Marks	S#1	S#2
1	Attendance	NIL	NIL	NIL
2	Assignment	10	10	10
3	Class Participation	NIL	NIL	NIL
4	Quiz	10	10	10
5	Theory Exam-I	10	10	10
6	Theory Exam-II	NIL	NIL	NIL
7	Theory Exam-III	30	30	30
8	Report-I	NIL	NIL	NIL
9	Report-II	NIL	NIL	NIL
10	Report-III	NIL	NIL	NIL
11	Project-I	20	20	20
12	Project-II	NIL	NIL	NIL
13	Project-III	NIL	NIL	NIL
14	Lab Evaluation-I (Continuous)	10	10	10
15	Lab Evaluation-II (Exam)	10	10	10
16	Course Portfolio	NIL	NIL	NIL

Total (100)	100	100	100
Evaluation scheme for Retest	**Marks**		
1	Theory Exam-Retest	30	30	30
Total (30)	**30**	**30**	**30**

COURSE SYLLABUS (Theory):

UNIT 1 Stresses and Strains
Simple Stresses and Strain: Introduction, Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to self-weight. Saint-Venant's principle, Compound bars, Temperature stresses, Compound section subjected to temperature stresses, state of simple shear, Elastic constants and their relationship.

Unit II Multiaxial Stress-Strain System
Introduction to Biaxial stresses, state of stress at a point, General two-dimensional stress system, Principal stresses and principal planes, Mohr's circle of stresses and Introduction to Theories of Failure.
Thin and Thick Cylinders (*Cartesian Coordinates*): Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution.

UNIT III Theory of Beams
Introduction to types of beams, supports and loadings. Definition of bending moment and shear force, Sign conventions, relationship between load intensity, bending moment and shear force. Shear force and bending moment diagrams for statically determinate beams subjected to points load, uniformly distributed loads, uniformly varying loads, couple and their combinations, Deflection of beams by Double integration method–Macaulay's method–Area moment theorems for computation of slopes and deflections in beams –Conjugate beam method.

UNIT IV Bending and Torsion
Theory of simple bending –bending stress and shear stress in beams, assumptions, bending equation, modulus of rupture, section modulus, flexural rigidity, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections.
Introduction, pure torsion, Assumptions, Torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion.

UNIT V Column and Struts and Introduction to 3-D stresses

Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns. Fundamentals of theory of elasticity.

COURSE SYLLABUS (Practical):

1. To evaluate stress strain curve for tension test on a standard Mild Steel specimen on Universal Testing Machine UTE-20.
2. To evaluate stress strain curve for compression test on a standard Mild Steel specimen on Universal Testing Machine UTE-20.
3. To conduct impact test on a mild steel specimen, IT-30.
4. To conduct torsion test on a mild steel specimen, TTE-10.
5. To conduct Rockwell Hardness Test.
6. To conduct Brinell's Hardness Test.
7. To conduct Vickers Hardness Test, VM-50.
8. To conduct fatigue test on Fatigue Testing machine, FTG 8(D).
9. To conduct bending stress in a beam, STR 5.
10. To write a MATLAB program to generate principle stress, shear stress of a given element and plot the same.
11. To write a MATLAB program to generate 2-D principle stress, shear stress of a given element and plot the same.
12. To write a MATLAB program to generate Mohr's Circle of a given element and plot the same.
13. To develop a CAD Simulation model of Mild steel specimen for conducting simulation.
14. To develop a CAD Simulation model of Aluminum specimen for conducting simulation.

Text Books:

1. S. S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013)
2. Popov, Egor Paul. Engineering mechanics of solids. Prentice Hall, 1990.
3. R. K. Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010.

Reference Books:
1. Timoshenko, S. and Goodier, J. N., "Theory of Elasticity", Tata McGraw Hill, New Delhi, 3rd edition, 1970
2. Srinath, L. S., "Advanced Mechanics of Solids", Tata McGraw Hill, New Delhi, 3rd edition, 2010
3. Ferdinand P. Beer, E. Russell Johnston and Jr. John T. DeWolf "Mechanics of Materials", Tata McGraw-Hill, Third Edition, SI Units.
4. D.H. Young, S.P. Timoshenko "Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition (Reprint 2014)

5. Vazirani, V. N., Ratwani M. M. and S K Duggal "Analysis of Structures Vol. I", 17th Edition, Khanna Publishers, New Delhi.

List of projects:

S. No	Roll No	Name	Project Name
1	2018BTechME001	Abimanyu Shankar	Analysis of 2-Wheeler Frame
2	2018BTechME004	Ronak Singh	Analysis of Suspension Motorcycle
3	2018BTechME005	Anirudh Pareek	Analysis of Clutch Assembly
4	2018BTechME006	Prashant Chaudhary	Analysis of Fork of a motorcycle
5	2018BTechME007	Piyush Singh Panwar	Analysis of Power Transmission and Wheels
6	2018BTechME008	Mayank Soni	Analysis of Engine Block of a Motorcycle using Autodesk Inventor

List of students:

S. No	Roll No	Name
1	2018BTechME001	Abimanyu Shankar
2	2018BTechME004	Ronak Singh
3	2018BTechME005	Anirudh Pareek
4	2018BTechME006	Prashant Chaudhary
5	2018BTechME007	Piyush Singh Panwar
6	2018BTechME008	Mayank Soni

Pinnacle MBA (Academic year 19-20)
Course Title: Special Topics in Management
Course Code: ST2202
Credits: 2
Trimester: VI
Course Instructors: Dr. Lokanath Mishra, Dr. Sheetal Mundra, Dr. Richa Mishra,
Dr. Upasana Singh, Dr. Sameer Mittal

_____

Course Objective:
The primary objective of this course to provide an integrated view of the core/fundamental concepts across various domains and at the same time provide necessary inputs to the graduating students that directly help them in enhancing their job-performance once they are absorbed in the job market. The course is largely discussion-oriented and will heavily rely on the use of case method as the pedagogy. Spread over five modules, the broad topics to be covered in various modules are as under:

Module 1: Cases/Problems in Finance & Accounts (Dr. Loakanth Mishra)
- Refresher Module on basic taxonomy of Finance and Accounts (include review of key terminology)
- Financial Arithmetic
- Analyzing Financial Statements (Ratios, Leverages)
- Security Valuation Discounted Cash Flow valuation

<mark>Case Studies in valuation (perhaps one on Calculating RoI, one on valuation of a startup, one on valuation of company or business for acquisition)</mark>

Session Plan:

Session No	Topics Coverage	Remarks
1-3	Basic Taxonomy of Finance and Accounts	Students will be evaluated with their basic knowledge and acquaintance with the key terms in the area of accounts and finance. 50 key terms will be discussed. (2 Hours) Reading the Financial statements of a company and understanding the figures and relations and interpretations (**JK Tyre Ltd** financial statement 2018-2019)
4-5	Financial Arithmetic	Simple interest, Compound interest(ASQMDH), Annuity, Loan amortization schedule, NPV, IRR,PI
6-7	Analyzing financial Statements	Earning Quality Analysis, Balance sheet Analysis, Cash flow Analysis, through Ratios, Vertical and Horizontal Analysis)
7-8	Analyzing Financial Statement	Financial Statement Analysis **Case Study- Shree Cement Ltd.**
9-11	Company Valuation	Case study- Valuation of **Ashok Leyland/ or Hero Motor Corporation Limited.**

12-14	Evaluation- Group of 4 Students will make Presentation	Each Group will be make presentation on Selected Company Given to them on Financial Statement Analysis through Ratio/ Common Size Statement or company valuation.

Key Terms:

Income Statement, Balance Sheet, Current Asset, Current Liability, Non-current Assets, Non-current Liability, Net Worth, Profit/Earning- Gross profit/Operating Profit/ Net profit/PBT/PAT/EBITDA /EBIT, ROI, Operating Expenses, Non-Operating Expenses, EPS, DPS, Market Value and Book Value of Share, Capitalization, Capital Structure, Financial Structure, Wealth Maximization, Liquidity Decision, Dividend Decision, Financing Decision, Investment Decision, Bond, Debenture, Financial System, Money Market, Capital Market, Primary Market, Secondary Market, FII/DII, SENSEX, ADR/GDR/IDR, Depository, Credit Rating, Leasing/Hire Purchase, Factoring, Derivative, Mutual Fund, Foreign Exchange- Direct Quote/Indirect Quote, Hedging, Call option, Put option and Forward.

Module 2: Economics and Business Environment Issues (Dr. Sheetal Mundra)
- Review of key Terminology (50 terms to know well)
- Key Indicators of Macroeconomics
- Indian Economy at a Glance – will be good to make students understand trends – how has GDP, GNP, National Income, Average income, Distribution of income and GDP grown since independence, what major events led to this; concept of purchasing power parity and its implications (relevant example for them may be how placement salaries for overseas jobs actually are similar to placement salaries in India in PPP terms)
- Case Studies on (if you mean the lehmann and subprime crisis, that is fine – and what it meant for companies and people in India: should we do case study on demonetization in India,
- Basic Firm economics – Demand-supply-price relationships

Module 3: OB & HRM at Work (Dr. Richa Mishra/Dr. Upasana Singh)
- Review of key Terminology (50 terms to know well)
- Do a case study on building an organization for a young organisation in India which scaled from a startup of 2-4 founders to thousands of people
- A case study on transformation of an old low performing company to a high performing one using many of the HR levers below.
- TA

Module 4: Operations in Action (Dr. Sameer Mittal)
- 8 hours Review of key Terminology (50 terms to know well)
- Play the Beer game (or equivalent) and bring out how Operations, sales and production need to be integrated
- Case study in Capacity Planning Case Study in Inventory Management (EOQ)
- Case study in logistics Case study in Statistical Quality Control

Case Study 1: Great Place to Work: INTUITE India

Case Study 2: How Netflix reinvented HR

Course Title and Code: Safety in ConstructionCE.2202	
Hours per Week :	**L-T-P: 3-0-0**
Credits	**03**
Students who can take	**M.Tech (HSE) II Semester**

Course Objective: The objective of this course is to provide practical guidance ontechnical, managerial and legal framework for safety and health in the construction sector.

On successful completion of this course students will be able to:
1) Define the key safety requirements in construction Industries
2) Identify the hazards and risks involved in construction industries
3) Implement the Effective Safety Management System
4) Reduce of workplace injuries through incident prevention methods
5) Improve safety culture within the organization
6) Apply Indian Standards for safety in Construction site

	Prerequisites	Basics of Civil Engineering	
Sr. No	**Specifications**	**Marks** **(Pre COVID 19)**	**Marks** **(Post COVID 19 situation)**
1	Attendance	NIL	NIL
2	Assignment	10	10
3	Class Participation	5	10
4	Quiz	10	10
5	Theory Exam-I	NIL	NIL
6	Theory Exam-II	15	NIL
7	Theory Exam-III	30	30
8	Report-I	NIL	20
9	Report-II	NIL	20
10	Report-III	NIL	NIL
11	Project-I	15	NIL
12	Project-II	15	NIL
13	Project-III	NIL	NIL
14	Lab Evaluation-I(Continuous Evaluation)	NIL	NIL
15	Lab Evaluation-II(Lab Examination)	NIL	NIL
16	Course Portfolio	NIL	NIL
	Total	**100**	**100**

Evaluation Scheme for Retest		
Sr. No	**Specifications**	**Marks**
1	Theory Exam-III	30

Course Syllabi (Theory):

Unit:1 Management of Safety in Construction: Importance and current situation on safety in construction, safety actions & planning, Construction Project: General features, key tasks, safety planning, personal safety equipment, worker participation, hazard identification and assessment, hazard prevention and control, education and training, program evaluation and improvement, communication and coordination for employers on multiemployer worksites.
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Unit:2 Safety in Road Construction Zones: Introduction, Components of construction zone, Traffic Control devices, Traffic management practices, Planning and implementation of safety measures during construction/maintenance of roads as per guidelines of IRC: SP:55. Safety from transport and earth moving equipment, Road safety audit during construction as per IRC: SP 88, safety audit on live project of road.

Unit 3:Safety PracticesDuring Construction Work: Frequency of accidents and safety hazards causes of structural failure, design error, construction error, and material deficiencies. Excavation, concreting, Fabrication and erection of structural steel works, Masonry work.

Unit 4: Post Construction Safety &Safety During Emergency: Overloading, safety hazard due to aggressive environment, damage due to external forces, instability of foundation, Safety during Earthquake, Safety during Building demolition and dismantling.

Unit 5: Legal Issues in Quality and Safety: Regulatory framework: The building and other construction workers, (Regulation of employment and conditions of service) acts, 1996, The building and other construction workers, (Regulation of employment and conditions of service) central rules, 1998, labor laws, compensation,

References:
1. Tang, S.L., Ahmed, S.M., Aoieong, Raymond T. and Poon, S.W. (2005), Construction quality management, Hong Kong University Press, Hong Kong.*
2. Poon, S.W., Tang, S.L. and Wong, Francis K.W. (2008), Management and economics of construction safety in Hong Kong, Hong Kong University Press.*
3. International Journal of Quality and Reliability Management. (Emerald's journal)
4. The TQM Journal (Emerald's journal)
5. Safety Science (Elsevier's journal)
6. IRC:SP:55-2001 "Guidelines on safety in road construction zones, The Indian Road Congress, New-Delhi.
7. Building & other construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 (BOCWA)
8. Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998 (BOCWR)
9. OSHA Field Safety and Health Manual
10. Hudson, R., Construction hazard and Safety Handbook, Butterworth's Publication, 1985.
11. JnatheaD.Sime, Safety in the Build Environment, London, 1988.
12. V.J.Davies and K.Thomasin, Construction Safety Hand Book, Thomas Telford Ltd., London, 1990.
13. Handbook of OSHA Construction safety and health, Charles D. Reese and James V. Edison
14. Accident Prevention Manual for Industrial Operations, NSC, Chicago, 1982
15. Fulman, J.B., Construction Safety, Security, and Loss Prevention, John Wiley and Sons, 1979.

Employability skill activities

Project 01 by Students on PM10 assessment in JKLU Campus:

JK LAKSHMIPAT UNIVERSITY PM$_{10}$ AQI STUDY
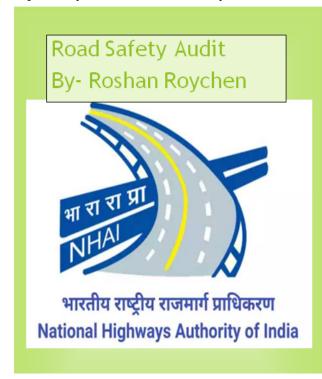
Prepared By

Aman Rathore	(2019MTHSE001)
Bogella.Ravikanth	(2019MTHSE002)
Roshan Roychen	(2019MTHSE003)
Pankaj Keshre	(2019MTHSE004)
Tejaswee Singh Rathore	(2019MTHSE005)
Yash Kale	(2019MTHSE006)

Submitted To

Mr.Vinod K. Vishwakarma

Assistant Professor,Dept.of Civil Engineering

Institute of Engineering & Technology

JK Lakshmipat University, Jaipur

Project 02 by Students on Road Safety Audit

Road Safety Audit
By- Roshan Roychen

भा रा रा प्रा
NHAI

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India

In today's world road and transport has become an integral part of every human being. Everybody is a road user in one shape or the other. The present transport system has minimized the distances, but it has on the other hand increased the life risk. Every year road crashes result in loss of lakhs of lives and serious injuries to crores of people.

In India itself about eighty thousand people are killed in road crashes every year which is thirteen percent of the total fatality all over the world. Man behind the wheel plays an important role in most of the crashes. In most of the cases crashes occurs either due to carelessness or due to lack of road safety awareness of the road user. Hence, road safety education is as essential as any other basic skills of survival.

Our aim is to provide road safety information for road users to encourage safer road user behaviour among current and prospective road users and reduce the number of people killed and injured on our roads every year.

Observation & Recommendations

- Improper barricading using of only sacks filled with mud instead of using safety cones with safety labels or barricades.
- Absence of flagman at the site for guiding the vehicles to proper direction and alerting them of diversion if necessary or of work in progress.
- Regardless of what your job duties entail in the work zone, you should always be mindful of what's going on around you.
- Avoid walking behind any vehicles that may be backing up or into the swing radius of heavy equipment.
- Whenever possible, face traffic while inside the work zone or have a spotter available when your back is turned.
- Spotters should also be used to monitor the movement of vehicles and heavy equipment inside the work zone in addition to monitoring traffic to alert workers to any potential dangers.

Right Hand Curve	Left Hand Curve	Right Hair Pin bend	Left Hand Pin Bend	Right Reverse Bend	Left Reverse Bend
Steep Ascent	Steep Descent	Narrow Road Ahead	Road Widens Ahead	Narrow Bridge	Slippery Road
Lose Gravel	Cycle Crossing	Pedestrian Crossing	School Ahead	Men At Work	Cattle
		Falling Rocks	Ferry		

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Appendix 2

Photographs of safety lapses

Heavy Machinery under construction without proper construction

Highway construction workers touching electrical equipment without proper gloves

Observation & Recommendations

Assignments by Students:

Construction Safety
Assignment-2

Roshan Roychen   5/14/20   HSE

Roshan Roychen
2019MTHSE003

Construction Quiz -1

Q Can a Construction worker remove a section of scaffold if it in the way of job?

→ He has to find a alternate way to carry out the job or else he can use another method to carry out job.

Q What is the maximum depth of a trench that may be dug in loose ground or sand during Timbering / Shuttering

→ Safe depth (1.5m) should be considered while digging the trench in loose ground or sand during timbering?

Name: Aman Rathore   Date: 17/07/2020
Roll Number: 2019MTHSE001
Course Name: Safety in Construction   Course Code: CE 2202

Part-A

Q.1
Ans. Four areas into which accident costs may be classified are:-
→ Supplies
→ Labour
→ Overhead
→ External Services

Q.2
Ans. Hazard:- A Hazard is any source of potential damage, harm or adverse health effects on something or someone.
Risk:- Risk is the chance or probability that a person will be harmed or experience an adverse health effect if exposed to a hazard.

Q.3
Ans. Retrofitting:- Modifying existing equipment or structures with additional or new components or members is called retrofitting.

Q.4
Ans. Admixture:- An admixture is a substance which can be added to concrete to achieve or modify its properties. Admixtures are added to the concrete, in addition to cement, water and aggregate, typically

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination, July,2020
M.Tech HSE Semester II

Roll No.......................................

Safety in Construction CE2202   Time: 1.5 hours   Max. Marks: 30

Instructions to students:
1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.
4. Question Paper consists of three parts (**Part-A, Part-B and Part-C**)
5. Answer ALL the questions

PART-A (01 Mark each)

Q1. Name four areas into which accident costs may be classified?

Q2. What is (a) A hazard and
             (b) A risk?

Q3 Define Retrofitting.

Q4.What are the Admixtures in concrete.

Q5. Explain the term Safe Work Method Statement (SWMS).

PART-B (2.5 Mark each)

Q.6 Explain the role and composition of Central Advisory Committee in Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.

Q.7 Write any five steps that you should take at site prior any demolition work of any concrete/steel structure.

Q.8 Identify and explain briefly about the factors those who are contributing in to the failure of foundation of any concrete structure.

Q.9 Write short note on Hydro-demolition technique.

CS2107 Computer-Aided Risk Analysis

Course Title and Code: Computer-Aided Risk Analysis (CS2107)	
Hours per Week	L-T-P: 3-0-4
Credits	5
Students who can take	M.Tech. Semester-II (Batch: 2019-2021)
Course Objective: This course introduces the fundamental concepts of risk analysis techniques and their applications in the industry. The course will cover Monte Carlo simulation, Probability distributions, Correlation modeling, model design and validation techniques using risk analysis software and MS Excel.	

Course Syllabi (Theory):

- **Risk Analysis, Risk Assessment, Risk Management, Risk Evaluation:** Introduction to Risk Analysis, Planning a Risk Analysis, Evaluating Risk Management Options, Quality of a Risk Analysis.
- **Qualitative Risk Analysis And Quantitative Risk Analysis**
  Qualitative Risk Assessment Tools: Failure Modes And Effects Analysis (FMEA), Red, Amber, Green (RAG) and Risk Urgency Assessment**,** Categorization etc.
  Quantitative Risk Assessment Tools: Event Trees, Sensitivity Analysis, Project Simulations etc.
- **Risk Analysis Modeling Techniques :** Monte Carlo Simulation, Probability Distributions (Univariate Continuous Distributions, Univariate Discrete Distributions, Multivariate Distributions)
  Correlation Modeling In Risk Analysis: Optimization Of Stochastic Models, Summing Random Variables, Testing And Modeling Causal Relationships, Stochastic Time Series, Simulation For Six Sigma, Modeling Expert Opinion, Probability Theory And Statistics
- **Fitting Probability Models To Data:** Fitting Time Series Models To Data, Fitting Correlation Structures To Data, Fitting Probability Distributions To Data, Comparison Of Classical And Bayesian Methods, Classical Statistics, Bayesian, Bootstrap, Bayesian Model Averaging
- **Model Design and Validation Techniques** Using Excel, Overview of Various Risk Analysis Softwares, Predictive Analytics for Risk Management and Case Studies.
  Lab Assignments:
- Identify the Piping & Instrument Diagrams(P&IDs) or Process Flow Diagrams (PFDs) of relevant industry and perform the following analysis using appropriate software tools:
- Hazard and Operability Studies (HAZOP)
- Process Hazard Analysis (PHA)
- Failure Modes and Effect Analysis (FMEA)
- Reliability Block Diagram (RBD)
- Fault Tree Analysis (FTA)
- Event Tree Analysis (ETA)
- Perform the following features of Excel on various Health, Safety and Environment data like AQI, WQI, F&EI, Road Accidents Data etc.
- Sort
- Filter
- Conditional Formatting
- Charts
- Pivot Tables
- Tables
- What-If Analysis
- Solver
- Analysis Tool-Pak
- Perform the Monte Carlo Simulation on various Health, Safety and Environment data like AQI, WQI, F&EI, Road Accidents Data etc.
- Demonstrations of available Risk Analysis Softwares using by various industries.

- <mark>Case Studies of previous Hazard events and analysis it on selected tool.</mark>

Activities Related to Skill Development and Employability

Each Student has done two Case Studies and one EHS Software Study.

Sample List of EHS Software Study:
- Gensuit EHS Software
- ASK EHS Software
- EHSInsight EHS Software
- Momentum QMS Software

Sample List of Case Studies:
- Case study on Natural Disasters in India.
- Occupational Health Case Study
- Case study on India population and Sex Ratio
- Case Study of accidental deaths in India
- Case study on Road Safety
- Case study on suicide rate in India

Course Title and Code: Industrial Waste Management	CE2201	
Hours per Week	**L-T-P: 3-0-0**	
Credits	**3**	
Students who can take	M.Tech Semester-I (Batch: 2019-2021) **Core**	

Course Objective: This course provides an in-depth understanding of solid and hazardous waste characteristics and management. This course also covers the principles of integrated solid waste management and provides an overview of industrial waste and hazardous waste management.

After course completion, the student will be able to:

1. Analyze key sources, typical quantities generated, composition, and properties of solid and hazardous wastes.
2. Compare effective methods of solid & hazardous wastes handling and segregation of wastes at source.
3. Test the most common techniques for preventing, minimizing, recycling, disposing and treatment of waste and their application on-site remediation.
4. Recognize the relevant regulations that apply for facilities used for disposal, and destruction of waste.
5. Identify, formulate, and solve engineering problems, and an understanding of professional and ethical responsibility.

Sr. No	Specifications	Marks
1	Attendance	05
2	Assignment	10
3	Class Participation	05
4	Quiz	-
5	Theory Exam-I	15
6	Theory Exam-II	15
7	Theory Exam-III	30
8	Report-I	-
9	Report-II	-
10	Report-III	-
11	Project-I	20
12	Project-II	-
13	Project-III	-
14	Lab Evaluation-I	-
15	Lab Evaluation-II	-
16	Course Portfolio	-
	Total (100)	**100**

Evaluation Scheme for Retest			
1	Theory Exam-III	30	
	Total (30)	**30**	

Syllabus:

SOLID AND HAZARDOUS WASTE: Types and Sources of solid and hazardous wastes - Need for solid and hazardous waste management - Legislations on management and handling of municipal solid wastes, hazardous wastes, and biomedical wastes.

WASTE GENERATION: Waste generation rates – Composition - Hazardous Characteristics – TCLP tests – waste sampling- Source reduction of wastes – Recycling and reuse. Handling and segregation of wastes at source – storage and collection of municipal solid wastes – Analysis of Collection systems - Need for transfer and transport – Transfer stations - labelling and handling of hazardous wastes.

WASTE PROCESSING: Processing technologies – biological and chemical conversion technologies – Composting - thermal conversion technologies - energy recovery – incineration – solidification and stabilization of hazardous wastes - treatment of biomedical wastes.

DISPOSAL: Disposal in landfills - site selection - design and operation of sanitary landfills- secure landfills and landfill bioreactors – leachate and landfill gas management – landfill closure and environmental monitoring – landfill remediation

INTEGRATED WASTE MANAGEMENT: Elements of integrated waste management

REFERENCE BOOKS:

Refer all courses related books, other than text books here.

R1: George Tchobanoglous, Hilary Theisen and Samuel A, Vigil, Integrated Solid Waste Management, McGraw- Hill, New York, 1993

R2: CPHEEO, Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.

R3: George Tchobanoglous; Frank Kreith Handbook of Solid Waste Management, Second Edition ISBN: 9780071356237 Publication Date & Copyright: 2002 .The McGraw-Hill Companies, Inc

R4: Thomas H. Christensen; Solid Waste Technology & Management, 1 & 2; First published:23 November 2010 Print ISBN:9781405175173 |Online

Activity for Skills and employability

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
Mid Term Examination-II, OCT, 2019

M. Tech. in ……HSE……. Engineering, Semester …I…….

Roll No… … … … … … … … … … … … ..

Course Code & Name : CE2201 & Industrial Waste Management

Time: 1.5 hours   Max. Marks: 15

Instructions to students:
1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1	In Delhi city residential area 1000 houses have an average of four residents per house, the following observation was made at the disposal site for a period of one week. Estimate the energy content. [**Calculate for 100kg of samples]	05 [LO-2]

Component	% by mass	Energy content (Kj/KG)	Total energy
Food waste	14	4650	65100
Paper	40	16750	670000
Wood	5	18600	78000
Tin cans	6	700	4200
Plastics	9	32600	200000

Q.2 (a)	A residential area of OMAX society with 500 houses and an average of two residents per house. For estimating the quantity of solid waste generated, the following observation obtained at the disposal site for one week. Calculate the wastes generation rate for society.	04 [LO-1 & 2]

Types of vehicle	Number of trips	Volume (m3)	Weight (kg/m3)
1	11	15	250
2	10	3	100
3	25	1	150

(b)	Write short note on chemical processing for the transformation of organic solid waste	01[LO-3]

Course Title and Code Advanced Transport Phenomena CH1101	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B. Tech Semester-VII (Core)**

Course Objective:
The course aims to provide an in depth knowledge of heat, mass and momentum transport that is necessary in assessing, analyzing and developing typical chemical engineering and environmental technologies. The course focuses on modelling momentum, heat & mass transfer processes using analytical and numerical solutions of the partial differential equations of transport phenomena.

On successful completion of the this course, the student should be able to:
1. assess the similarities between the transport processes and the effect of properties of the media on the overall process.
2. apply the techniques for non-dimensionalized problems and construct the parameters that govern the evolution of transport phenomena.
3. develop the model of transport phenomena and obtain analytical or computational solutions of the appropriate partial differential equations resulted in profiles of velocity, temperature, and concentration.
4. develop and simulate model to analyse the combined effect of heat, mass and momentum transport in a typical chemical engineering equipment (heat exchanger, catalyst bed, chemical reactor, etc.)

Sr. No	Specifications	Marks
1	Attendance	
2	Assignment	10
3	Class Participation	10
4	Quiz	10
5	Theory Exam-I	15
6	Theory Exam-II	
7	Theory Exam-III	25
8	Report-I	
9	Report-II	
10	Report-III	
11	Project-I	20
12	Project-II	
13	Project-III	
14	Lab Evaluation-I (continuous)	10
15	Lab Evaluation-II	
16	Course Portfolio	
	Total (100)	**100**

Syllabus:
Unit 1: Scope and objectives of course, methodology, Newton's law of viscosity, molecular theories of viscosity, Convective momentum transport, Shell momentum balances, boundary conditions, Examples, Equations of continuity, motion, and mechanical energy, Examples
Unit 2: Dimensional analysis, Time-dependent flow of Newtonian fluids, Solving flow problems using stream functions and velocity potential, Boundary layer theory, Fourier's law of heat conduction, molecular theories of thermal conductivity, Convective transport of energy, work

associated with molecular motions, Shell energy balances, examples, Forced and free convection, Various forms of energy equations, Examples

Unit 3: Unsteady state heat conduction in solids and in laminar flow, Boundary layer theory for non-isothermal flow, Fick's law of binary diffusion, molecular theories of diffusion, Mass and molar transport by convection, summary of mass and molar fluxes, Shell mass balance, boundary conditions, Examples, Equations of continuity, summary of multicomponent equations of change, Examples

Unit 4: Time-dependent diffusion, Steady state transport in binary boundary layers, Time-smoothed equations of change and velocity profiles, Empirical expressions for turbulent momentum flux; turbulent flow in ducts etc., Time-smoothed equations of change and temperature profiles for turbulent flow in tubes, Time-smoothed concentrations and equation of continuity and applications

<u>**Text Book**</u>:
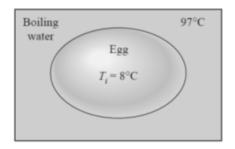
1. Bird, Stewart and Lightfoot, "Transport Phenomena'", John Wiley & Sons, 2nd ed., 2002.

<u>**Reference Books**</u>:
1. Fox and McDonald, "Introduction to fluid dynamics", John Wiley & Sons, 5th ed., 2000.
2. Incropera F P "Principles of Heat and Mass Transfer", Wiley.

Activity for Skill Development and Employability

ASSIGNMENTS

1. Consider a steady laminar flow between two infinite plates. The plates are horizontal and the top plate moves at a uniform velocity of U_0 while the bottom plate is stationary. The pressure gradient in the flow direction id dp/dx, and the flow field may be assumed to be completely developed. Find the velocity profile and the shear force exerted by the fluid on top and bottom walls.
2. Two infinite parallel plates are placed on a slope which makes an angle θ with horizontal. The gap between two plates is 2H. A steady incompressible flow fills the entire gap between the plates. The pressure at inlet and exit section of the flow is equal to atmospheric value. Assuming fully developed flow, determine the velocity field between the plates and shear stress value at top and bottom walls.
3. An ordinary egg can be approximated as a 5.5-cmdiameter sphere whose properties are roughly k =0.6 W/m·°C and α= 0.14×10^{-6} m^2/s. The egg is initially at a uniform temperature of 8°C and is dropped into boiling water at 97°C. Convection heat transfer coefficient to be h = 1400 W/m^2·°C. Formulate the physical domain and mention the governing equation and boundary conditions.

Submitted To

Dr. Raj Lakshmi Nayak

Advanced Transport Phenomenon

B.Tech Chemical Engineering

JKLU, Jaipur.

End Term I Examination, December, 2019
Advanced Transport Phenomena
B. Tech. in Chemical Engineering, Semester VII

Roll No………………………………..

Course Code : CH1101   Time: 3 hours   Max. Marks: 60
Instructions to students:

Do not write anything other than your roll number on question paper.

Assume suitable data wherever required and mention it clearly.

Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1   Two infinite parallel plates are placed on a slope which makes an angle θ **10(LO1,3)**
with horizontal. The gap between two plates is 2H. A steady incompressible
flow fills the entire gap between the plates. The pressure at inlet and exit
section of the flow is equal to atmospheric value. Assuming fully developed
flow, determine the velocity field between the plates and shear stress value
at top and bottom walls.

Q.2 For a simple Couette flow problem with upper plate at T1 and lower plate at **10(LO2,3)**
To (To<T1), obtain the temperature distribution in the fluid. Obtain the
expression for maximum temperature in the fluid and its location. Obtain
heat transfer at both the plates.

Q.3 The procedure for determining the thermal conductivity of solid material **10(LO3)**
involves embedding the thermocouple in a thick slab of solid and measuring
the response to a prescribed change in temperature at one surface. Consider
an arrangement for which thermocouple embedded is 10mm from a surface
i.e. suddenly brought to a temperature of 100 ℃ by exposing to boiling
water. If the initial temperature of slab was 30 ℃ and thermocouple measure
65 ℃, 2 min after the surface brought to 100 ℃. What is the thermal
conductivity of material. ρ=2200 kg/m^3 , C_p=700 J/kg K.

Q.4 Consider a 0.8-m-high and 1.5-m-wide double-pane window consisting of **10(LO3)**
two 4-mm-thick layers of glass (k = 0.78 W/m · ℃) separated by a 10-mm-
wide stagnant air space (k=0.026 W/m · ℃). Determine the steady rate of
heat transfer through this double-pane window and the temperature of its
inner surface for a day during which the room is maintained at 20℃ while
the temperature of the outdoors is -10℃. Take the convection heat transfer
coefficients on the inner and outer surfaces of the window to be h_1= 10
W/m2 · ℃ and h_2 =40 W/m2 · ℃, which includes the effects of radiation.

Q.5 Estimate D_{AB} for a mixture of 80 mol percent methane and 20 mole percent **10(LO4)**
ethane at 136 atm and 313 K. The experimental value of PD_{AB} at 293 K is
0.163 atm cm^2/sec.
Data: Methane: Tc=190.7K, Pc = 45.8 atm, $PD_{AB}/(PD_{AB})^o$ = 0.73
        Ethane: Tc=305.4 K, Pc = 48.2 atm

Q.6 Consider the flow of Engine oil at 20℃ in a 30-cm-diameter pipeline at an **10(LO4)**
average velocity of 2 m/s. A 200-m-long section of the pipeline passes
through icy waters of a lake at 0℃. Measurements indicate that the surface
temperature of the pipe is very nearly 0 ℃. Disregarding the thermal
resistance of the pipe material, determine (a) the temperature of the oil when
the pipe leaves the lake, (b) the rate of heat transfer from the oil, and (c) the
pumping power required to overcome the pressure losses and to maintain the
flow of the oil in the pipe.

TABLE 4–3

The complementary error function

ξ	erfc (ξ)	ξ	erfc (ξ)	ξ	erfc (ξ)	ξ	erfc (ξ)	ξ	erfc (ξ)	ξ	erfc (ξ)
0.00	1.00000	0.38	0.5910	0.76	0.2825	1.14	0.1069	1.52	0.03159	1.90	0.00721
0.02	0.9774	0.40	0.5716	0.78	0.2700	1.16	0.10090	1.54	0.02941	1.92	0.00662
0.04	0.9549	0.42	0.5525	0.80	0.2579	1.18	0.09516	1.56	0.02737	1.94	0.00608
0.06	0.9324	0.44	0.5338	0.82	0.2462	1.20	0.08969	1.58	0.02545	1.96	0.00557
0.08	0.9099	0.46	0.5153	0.84	0.2349	1.22	0.08447	1.60	0.02365	1.98	0.00511
0.10	0.8875	0.48	0.4973	0.86	0.2239	1.24	0.07950	1.62	0.02196	2.00	0.00468
0.12	0.8652	0.50	0.4795	0.88	0.2133	1.26	0.07476	1.64	0.02038	2.10	0.00298
0.14	0.8431	0.52	0.4621	0.90	0.2031	1.28	0.07027	1.66	0.01890	2.20	0.00186
0.16	0.8210	0.54	0.4451	0.92	0.1932	1.30	0.06599	1.68	0.01751	2.30	0.00114
0.18	0.7991	0.56	0.4284	0.94	0.1837	1.32	0.06194	1.70	0.01612	2.40	0.00069
0.20	0.7773	0.58	0.4121	0.96	0.1746	1.34	0.05809	1.72	0.01500	2.50	0.00041
0.22	0.7557	0.60	0.3961	0.98	0.1658	1.36	0.05444	1.74	0.01387	2.60	0.00024
0.24	0.7343	0.62	0.3806	1.00	0.1573	1.38	0.05098	1.76	0.01281	2.70	0.00013
0.26	0.7131	0.64	0.3654	1.02	0.1492	1.40	0.04772	1.78	0.01183	2.80	0.00008
0.28	0.6921	0.66	0.3506	1.04	0.1413	1.42	0.04462	1.80	0.01091	2.90	0.00004
0.30	0.6714	0.68	0.3362	1.06	0.1339	1.44	0.04170	1.82	0.01006	3.00	0.00002
0.32	0.6509	0.70	0.3222	1.08	0.1267	1.46	0.03895	1.84	0.00926	3.20	0.00001
0.34	0.6306	0.72	0.3086	1.10	0.1198	1.48	0.03635	1.86	0.00853	3.40	0.00000
0.36	0.6107	0.74	0.2953	1.12	0.1132	1.50	0.03390	1.88	0.00784	3.60	0.00000

TABLE A.5 Thermophysical Properties of Saturated Fluids[a]

Saturated Liquids

T (K)	ρ (kg/m³)	c_p (kJ/kg · K)	$\mu \cdot 10^2$ (N · s/m²)	$\nu \cdot 10^6$ (m²/s)	$k \cdot 10^3$ (W/m · K)	$\alpha \cdot 10^7$ (m²/s)	Pr	$\beta \cdot 10^3$ (K⁻¹)
Engine Oil (Unused)								
273	899.1	1.796	385	4280	147	0.910	47,000	0.70
280	895.3	1.827	217	2430	144	0.880	27,500	0.70
290	890.0	1.868	99.9	1120	145	0.872	12,900	0.70
300	884.1	1.909	48.6	550	145	0.859	6400	0.70
310	877.9	1.951	25.3	288	145	0.847	3400	0.70
320	871.8	1.993	14.1	161	143	0.823	1965	0.70
330	865.8	2.035	8.36	96.6	141	0.800	1205	0.70
340	859.9	2.076	5.31	61.7	139	0.779	793	0.70
350	853.9	2.118	3.56	41.7	138	0.763	546	0.70
360	847.8	2.161	2.52	29.7	138	0.753	395	0.70
370	841.8	2.206	1.86	22.0	137	0.738	300	0.70
380	836.0	2.250	1.41	16.9	136	0.723	233	0.70
390	830.6	2.294	1.10	13.3	135	0.709	187	0.70
400	825.1	2.337	0.874	10.6	134	0.695	152	0.70
410	818.9	2.381	0.698	8.52	133	0.682	125	0.70
420	812.1	2.427	0.564	6.94	133	0.675	103	0.70
430	806.5	2.471	0.470	5.83	132	0.662	88	0.70

Course Title and Code: Process Engineering and Plant Design (CH1201)	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	**B.Tech Semester-VI (Batch: 2016-2020)/ Elective**

Course Objective:

The aim of this course is to focus on engineering and economic aspects involved in the development or modification of commercial process plants.

On successful completion of this course students will be able to:

1) Apply various algorithms to synthesize a process flow sheet.
2) Calculate different costs involved in a process plant.
3) Design chemical process plant flow diagrams in view of economic & sustainability.
4) Calculate interest and time value of investments for process plants in view of economic, construction, safety, operability, and other design constraints
5) Evaluate the profitability of process industry projects using measures such as Return on Investment (ROI), Net Present Value (NPV) and Discounted Cash Flow Return (DCFR)
6) Perform breakeven analysis and optimum design of a process.

Prerequisites	mass and energy balances, heat and mass transfer, fluid mechanics, and reaction engineering

Sr. No.	Evaluation Component	Marks
1	Attendance	05
2	Assignment	05
3	Class Participation	05
4	Quiz	05
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	30
8	Report-I	05
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	05
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	NIL
	Total (100)	100

Course Syllabi (Theory):

Introduction: Basic concepts: General design considerations, Process design development, Layout of plant items, Flow sheets and PI diagrams, Economic aspects and Optimum design, Practical considerations in design and engineering ethics, Degrees of freedom analysis in interconnected systems, Network analysis, PERT/CPM, Direct and Indirect costs, Optimum scheduling and crashing of activities.

Flow-sheeting: Synthesis of flow sheet: Propositional logic and semantic equations, Deduction theorem, Algorithmic flow sheet generation using P-graph theory, Sequencing of operating units, Feasibility and optimization of flow sheet using various algorithms viz, Solution Structure Generation (SSG), Maximal Structure Generation (MSG), Simplex, Branch-and-bound etc.

Analysis of Cost estimation: Factors affecting Investment and production costs, Estimation of capital investment and total product costs, Interest, Time value of money, Taxes and Fixed charges,

Salvage value, Methods of calculating depreciation, Profitability, Alternative investments and replacements.

Optimum Design and Design Strategy: Break-even analysis, Optimum production rates in plant operation, Optimum batch cycle time applied to evaporator and filter press, Economic pipe diameter, Optimum insulation thickness, Optimum cooling water flow rate and optimum distillation reflux ratio.

Syllabus (Practical)
1. Design & drawing of the urea manufacturing plant.
2. Design & drawing of the cement manufacturing plant
3. Design & drawing of the ammonia production plant
4. Design & drawing of the petroleum refinery
5. Design & drawing of the soap and detergent manufacturing plant
6. Design & drawing of the edible oil production plant
7. Design & drawing of the alcohol manufacturing plant
8. Design & drawing of the coal gas manufacturing plant

Main References
Text Books:
1. Peters, M.A. and Timmerhaus, K.D., Plant Design and Economics for Chemical Engineers, McGraw Hill (2003).
2. Anil Kumar, Chemical Process Synthesis and Engineering Design, Tata McGraw Hill (1982).

Reference Books:
1. James M. Douglas, "Conceptual Design of Chemical Processes", McGraw Hill, New York, International Edition, 1988.
2. Warren D. Seider, J. D. Seader, and Daniel R. Lewin, "Product & Process Design Principles: Synthesis, Analysis, and Evaluation", John Wiley & Sons, New York, 2nd Edition, 2004.
3. Robin Smith, "Chemical Process Design", International Editions, McGraw Hill, Singapore, 2000.
4. Richard Turton, Richard C. Bailie, Wallace B. Whiting, Joseph A. Shaeiwitz, "Analysis, Synthesis, and Design of Chemical Processes", International Edition, Prentice Hall, New Jersey, 1998.
5. Dale F. Rudd, and Charles C. Watson, "Strategy of Process Engineering", John Wiley & Sons, New York, 1968.
6. Ulrich, G.D., A Guide to Chemical Engineering Process Design and Economics, John Wiley & Sons (1984).
7. Perry, R.H. and Green, D., Chemical Engineer's Handbook, McGraw-Hill (1997).
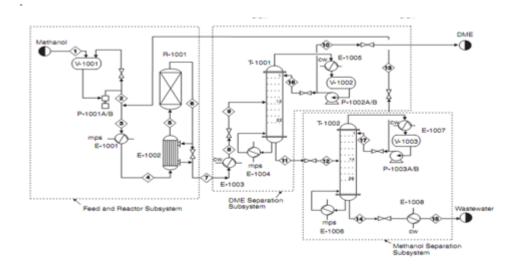
Activity for Skill Development and Employability

Quizzes

1. Toluene and hydrogen are converted in to reactor to produce benzene and methane. The reaction does not go to completion, and excess toluene is required. The non-condensable gases are separated and discharged. The benzene product and the unreacted toluene are then separated by distillation. The toluene is the recycled back to the reactor and benzene removed in the product stream. Design a diagram for giving a clear overview of the production of benzene.

Design a diagram where the data are represented in a sequential manner with symbolic representation of equipments.

2. Identified utilities streams and recycle streams in the below process flow diagram and also design a diagram for the purpose of initial estimation of cost details.

ASSIGNMENT-1

Q.1. Process plant having purchased-equipment cost is Rs.7,258,485/- was erected in the Dallas (Southwest area) for a fixed-capital investment of 31,646,985/- in 1987, determine what the estimated fixed-capital investment would have been in 2002 for a similar process plant located near Los Angeles (Pacific Coast Area) with twice the process capacity but with an equal number of process units? Use the power-factor method to evaluate the new fixed-capital investment.

Q.2.The purchased-equipment cost for a plant that produces pentaerythritol (solid-fluid processing plant) is Rs.21, 775, 448/-. The plant is to be an addition to an existing formaldehyde plant. The major part of the building cost will be for indoor construction. The contactor's fee will be 7 percent of the direct plant cost. All other cost is close to the average values found for typical plants. On the basis of the information, estimate the total direct plant cost, the fixed-capital investment, and the total capital investment.

ASSIGNMENTS-2.

Q.1. Consider a highly automated processing plant having a capacity of 100 tons/day of product and requiring principal processing steps of heat transfer, reaction, and distillation. What are the average operating labor requirements for an annual operation of 360 days?

Q.2. The annual direct production costs for a plant operating at 80 percent capacity are R.20,323,752/- while the sum of the annual fixed charges, overhead costs, and general expenses is Rs.14,516,965/-. What is the break-even point in units of production per year if total annual sales are Rs.40, 647,504/- and the product sells at Rs.2903/- per unit? What were the annual gross earnings and net profit for this plant at 100 percent capacity in 1988 when corporate income taxes required a 15 percent tax on the first Rs.3629241/- of annual gross earnings, 25 percent on annual gross earnings of Rs.36, 292,414/- to Rs. 5, 44862/-, 34 percent on annual gross earnings above Rs.75, 000, and 5 percent on gross earnings from Rs.7, 258,482/- to Rs.24, 315,917/-?

ASSIGNMNET-3

A carbon steel heat exchanger that costs Rs.10, 500,000/- is expected to have a service life of 5 year before it require replacement. If type 304 stainless steel is used, then the service life will be increased to 10 years. Which exchanger is the most economical if the cost of capital is 12%?
Methyl ethyl ketone (MEK) is manufactured by the dehydrogenation of the 2-butanol. A simplified description of the process listing the various units used is as follows:
Q.1. A reactor in which the butanol is dehydrated to produce MEK and hydrogen, according to the reaction, $CH_3CH_2CH_3CHOH \rightarrow CH_3CH_2CH_3CO + H_2$ the conversion of alcohol is 88%, and the selectivity to MEK can be taken as 100%.
Q.2. A cooler-condenser in which the reactor off gases are cooled and most of the MEK and unreacted alcohol are condensed. Two exchanger are used, but they can be molded as on unit. Of the MEK entering the unit, 84% is condensed, together with 92% of the alcohol. The hydrogen is non-condensable. The condensate is fed forward to the final purification column.
Q.3. An absorption column in which the uncondensed MEK and Alcohol are absorbed in water. Around 98% of the MEK and alcohol can be considered to be absorbed in this unit, giving a 10 wt% solution of MEK. The water feed to the absorber is recycled from the nest unit, the extractor. The vent stream from the absorber, containing mainly hydrogen, is sent to a flare stack.
Q.4. An extraction column in which the MEK and Alcohol in the solution from the absorber are extracted into trichloroethylene (TCE). The raffinate, water containing around 0.5% MEK, is recycled to the absorption column. The extract, which contains around 20 wt% MEK and a small amount of butanol and water, is fed to a distillation column.
Q.5. A distillation column, which separates the MEK and alcohol from the solvent TCE. The recovery of the MEK is 99.99%. The solvent containing a trace of MEk and water is recycled to the extraction column.
Q.6. A second distillation column, which produces a 99.9% pure MEK product from the crude product from the first column. The residue from this column, which contains the bulk of the unreacted 2-butanol, is recycled to the reactor. For a production rate of 1250 kg/h MEK: Draw a flow sheet for the process and also estimate the stream flow rates and compositions.

ASSIGNMENT-4

Q.1. Estimate the annual cost of providing refrigeration to a condenser with duty 1.2 MW operating at -5C. The refrigeration cycle rejects heat to cooling water that is available at 40C and has an efficiency of 80% of the Carnot cycle efficiency. The plant operates for 8000 hours per year and electricity costs Rs, 4.5/kWh.

Q.2. The process for making cyclohexane by saturation of benzene consists of a feed-effluent heat exchanger, a saturation reactor and a product stabilizer column. Estimate the cost of a plant that produces 200000 metric tons per year (200 kMTA) of cyclohexane using the correlation in table and Bridgewater's method.

Case Study: Waste paper De-inking

Historically, paper has been produced in the United States primarily from virgin wood pulp. However, since the last half of the 20th century there has been an ever-increasing shift to produce paper from recycled fibers. A common process used in the production of recycled pulp (and subsequently paper) is de-inking.

De-inking wastes are regulated under 40 CRR. Part 430, Subpart, pertaining to the De-inking Division of the Secondary Fibers subcategory of the Pulp, Paper, and Paper board point source category. The Secondary Fibers subcategory includes all recycled paper. The De-inking division includes those secondary fiber processes where ink is removed prior to production of white (recycled) paper. The objective of the de-inking process is to remove ink in order to brighten the pulp and to remove other non-cellulosic substances such as pigments, fillers, and coatings. Therefore, wastes from de-inking processes will contain all of these substances plus a portion of additional substances added in the de-inking process.

For purposes of federal regulation, the de-inking division is divided into three subdivisions that correspond to differences in final product production requirements, as well as differences in wastewater characteristics. Those de-inking facilities that produce pulp for tissue paper generally have the highest pollutant load, in terms of daily flow, BOD_5, and TSS. Those that produce pulp for newsprint generally have the lowest pollutant loads, and those that produce fine papers such as office stationery, copier paper, and computer printout paper have pollution loads that are less than those of the tissue paper mills and more than those of the newsprint mills.

The De-inking Process

Waste-papers to be reused as secondary fiber products must first be sorted and classified as to suitability for final product. Newer secondary fiber processing facilities are capable of handling a much wider range of recycled paper types, and are equipped to separate out wire, bottles, and a wide variety of unwanted foreign objects. Older mills are not as well equipped. Once the "used" paper has been sorted, the following processes convert it to a pulp product that is ready for the paper mill. In some cases, the recycled pulp is mixed with virgin pulp. In many cases, it proceeds directly to the paper-making process by itself.

There are ten basic steps in the de-inking process, and they are as follows:

1. Pulping, 2. Prewashing, heat and chemical loop, 3. Screening (coarse and fine), 4. Through-flow cleaning (or reverse cleaning), 5. Forward cleaning, 6. Washing, 7. Flotation, 8. Dispersion, 9. Bleaching, 10. Water recirculation and makeup

Different de-inking facilities employ different numbers and different sequences of these ten steps depending on the requirements of the final product and the characteristics of the wastepaper. A brief description of each follows.

Pulping: Waste paper is loaded into a pulper where it is mixed with hot water, alkali (pH = 9 to 11), and various solvents, detergents, and dispersants. This mixture is "cooked," which produces a "stock" of the resulting pulverized paper. The added chemicals dissolve and disperse adhesives, fillers, sizes, ink pigments, binders, and coatings, all of which eventually end up in one or another waste stream from the process. A built-in coarse screen allows smaller solids and liquids to continue on. Those solids that do not pass the screen are either returned for another pass through the pulper or enter the waste stream.

Prewashing: Gross amounts of ink, clay, and other materials are removed by prewashing, which consists of fine screening, partial dewatering, dissolved or dispersed air flotation, and/or settling.

Screening: The prewashed stock is next subjected to both coarse and fine screening. The fine screens are sometimes operated under pressure.

Through-flow Cleaning: Also called "reverse cleaning," this process is typified by a counter-current washing process. In one form, the stock flows down an inclined screen with several intermediate barriers. The stock is sprayed with water at each barrier, which washes substances such as ink particles through the screen. Clean water is applied at the lowest barrier and recycled. Progressively dirtier water is applied at progressively higher barriers. Due to the relatively large amount of water used, this process is a significant source of wastewater.

Forward Cleaning: Heavy contaminants that pass through the through-flow and fine screening processes are the target pollutants for the forward cleaning process. This process operates in a multistage sequence similar to that of the through-flow process. However, the stock is much more dilute (less than 1% solids). Large amounts of water are used. This water is cleaner than that used for through-flow cleaning.

Washing: The washing process makes use of counter current flow washing to remove ink from the stock that has not yet been successfully removed. Equipment includes sidehill screens, gravity deckers, and dewatering screws.

Flotation: Those colloidal substances, including inks that are resistant to screening and washing processes, are the target substances for the flotation process. Flotation does not make use of added water but may use coagulation chemicals, including organic polymers. In some instances, the flotation process is located ahead of the washing process. The high pH from the pulping process sometimes aids significantly in flotation.

Dispersion: Those quantities of inks that are not removed by screening, through-flow cleaning, forward cleaning, washing, and flotation are dispersed in order to make them undetectable in the finished paper.

Bleaching: Bleaching of the recycled pulp is highly specific to each individual mill. Bleaching can be done in the pulper, just after prewashing, or after flotation and dispersion. Bleaching chemicals can include chlorine, chlorine dioxide, peroxides, and/or hydrosulfites.
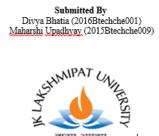
Water Recirculation and Makeup: While water recirculation and makeup are not a "step," they are inherent to each of the processes previously discussed.

Design a process flow block diagram for the deinking plant. Design a diagram for the purpose of initial estimation of cost details. Design a diagram for data are represented in a sequential manner with symbolic representation of equipments.

Minor project

Design of Water Treatment Plant Using Natural

Methods

Submitted By
Divya Bhatia (2016Btechche001)
Maharshi Upadhyay (2015Btechche009)

INDUSTRIAL VISIT:

1. DAIKIN INDIA, Neemrana Plant, September 25, 2019 (Residential, Commercial, Industrial Air Conditioning Systems)

2. DAINIK BHASKAR PLANT, Shivdaspura Jaipur, September 23, 2019 (Dainik Bhaskar Newspaper and Magazine Printing)

CS1308 Security Intelligence (in Collaboration with IBM)

Course Title and Code	
Security Intelligence: CS1308	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem VII(2016-2020) (CSE IBM-IS)

Course Objective: Cyber Security Overview, Status quo of IT security, Security Intelligence and operations, Security Intelligence Foundations, Designing a Security Intelligence solution, Security Intelligence functional components, Security Intelligence Engineer, Collecting and processing events, flows, and vulnerability data, Investigating an offense that is triggered by events, Investigating the events of an offense, Using asset profiles to investigate offenses, Investigating an offense that is triggered by flows, False positives overview, Investigating super flows, Using rules and building blocks, Creating Security information and event management (SIEM) reports, Performing advanced filtering.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Identify enterprise business and IT drivers that influence the overall IT Security Architecture
2. Define the role of a centralized Security Intelligence solution and how it integrates with other IT enterprise security components
3. Explain how a Security Intelligence solution can be used to investigate and stop advanced threats and address IT governance and regulatory compliance
4. Describe how QRadar SIEM collects data to detect suspicious activities
5. Navigate and customize the QRadar SIEM dashboard
6. Investigate suspected attacks and policy breaches
7. Search, filter, group, and analyze security data
8. Investigate the vulnerabilities and services of assets
9. Locate custom rules and inspect actions and responses of rules
10. Use QRadar SIEM to create customized reports
11. Use charts and apply advanced filters to examine specific activities in your environment.

Prerequisites		**Application Security**
Sr. No	**Specifications**	**Marks**
1	Attendance	Nil
2	Assignment	Nil
3	Class Participation	**10**
4	Quiz	**05**
5	Theory Exam-I	Nil

6	Theory Exam-II (certification exam by IBM)	**25**
7	Theory Exam-III	Nil
8	Report-I	**10**
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	**30**
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	**10**
15	Lab Evaluation-II	**10**
16	Course Portfolio	Nil
	Total (100)	100

Syllabus (Theory)

Module I – Cyber Security Overview
• Status quo of IT security
• Security Intelligence and operations

Module II – Security Intelligence Foundations
• Designing a Security Intelligence solution
• Security Intelligence functional components

Module III – Security Intelligence Engineer
• Collecting and processing events, flows, and vulnerability data
• Investigating an offense that is triggered by events
• Investigating the events of an offense
• Using asset profiles to investigate offenses
• Investigating an offense that is triggered by flows
• False positives overview
• Investigating superflows
• Using rules and building blocks
• Creating SIEM reports
• Performing advanced filtering

Text Books:
T1. Li, Qing, and Gregory Clark. Security Intelligence: A Practitioner's Guide to Solving Enterprise Security Challenges. John Wiley & Sons, 2015.

T2. Hsu, D. Frank, and Dorothy Marinucci, eds. Advances in cyber security: technology, operations, and experiences. Oxford University Press, 2012.

T3. Geers, Kenneth. Strategic cyber security. Kenneth Geers, 2011.

Reference Books:
R1. Johnson, Loch K. National security intelligence. John Wiley & Sons, 2017.
R2. Roberts, Scott J., and Rebekah Brown. Intelligence-Driven Incident Response: Outwitting the Adversary. " O'Reilly Media, Inc.", 2017.

Activities Related to Skill Development and Employability

Each Student has Submitted Assignment, given quizzes, performed simulation of QRADAR SIEM and Projects related to Security Intelligence also some of the students cleared IBM certificates.

Project Topic-

SI. No.	CSE1308 Security Intelligence Roll No.	Name		Project Name
1	2016BTechCSE301	Aman Bhargava	IBM-IS	Vyos Nmap Scanning on Vmware
2	2016BTechCSE302	Amit Bohra	IBM-IS	Creating CRE rules of Events
3	2016BTechCSE303	Jogendra Choudhary	IBM-IS	Assets Profiles over SaaS Qradar Cloud
4	2016BTechCSE304	Kapil Jain	IBM-IS	Investigating an Offense Triggered by Events
5	2016BTechCSE305	Raghav Tambi	IBM-IS	Qradar Using Reports with Saved Searches
6	2016BTechCSE306	Ritika Verma	IBM-IS	Filterted searches using AQL's and Saving it for Quick Searches
7	2016BTechCSE307	Roshan Kumawat	IBM-IS	Using Assets Profile to Investigating an Offense
8	2016BTechCSE308	Shivansh Kashyap	IBM-IS	Create Custom reports and Dashboard using Filters
9	2016BTechCSE310	Soniya Soni	IBM-IS	CRE and ADR
10	2016BTechCSE311	Surabhi Tomer	IBM-IS	Investigating a remote access offense
11	2016BTechCSE312	Tushar Sharma	IBM-IS	Network Hierarchy Over SaaS Qradar
12	2016BTechCSE313	Vibhore Mathur	IBM-IS	Qradar using Network Hierarchy and Assests Profile
13	2016BTechCSE314	Aakash Sharma	IBM-IS	Index and Aggregated Data Management

Online Assignments-

Security Intelligence-CS1308 2017
Course Batch

Type	Name	Marks	Expiry		Select		Actions
Assignment	Q radar Project Report	25.0	Expires On 01 Jun 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assignment	Project Report	25.0	Expires On 01 Jun 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assessment	Quiz_3	20.0	Expires On 23 Apr 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assignment	Assignment 2	10.0	Expires On 04 May 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assessment	Quiz_2	10.0	Expires On 09 Apr 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assessment	Quiz_1	15.0	Expires On 02 Apr 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assignment	Q Radar Assignment	10.0	Expires On 05 Apr 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗
Assignment	Assignment 1	10.0	Expires On 05 Apr 2020 | Re-Schedule	☐	Please Select ▾		⚙▾ ± ✎ ✗

Online Course Contents on TCS ion Platform-

Syllabus	Content	Delivery Control	SECURITY INTELLIGENCE-CS1308 2017

Select All   🗑 Delete

☐   Unit- 1- Security Intelligence Basics   Add Content

☐   Topic- 1.1- 📕 Course Handout   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 1.2- 📕 Attacks & Vulnerabilities   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Unit- 2- Cryptography   Add Content

☐   Topic- 2.1- 📕 Basics of Cryptography   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 2.2- 📕 Public Key Cryptography   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 2.3- 📕 Symmetric key Cryptography   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Unit- 3- Security Algorithm   Add Content

☐   Topic- 3.1- 📕 RSA algorithm   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 3.2- 📕 Diffie Hellman Key Exchange Algorithm   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 3.3- 📕 DES   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 3.4- 📕 AES algorithm   Edit Content   Revision ⬇≡ 🗐 ✖

☐   Topic- 3.5- 📕 Digital Signature   Edit Content   Revision ⬇≡ 🗐 ✖

Lab Through IBM Platform-

IBM Skills Academy Cloud

4.1b5

| Reset passphrase | Print credentials | Generate links table | Power on | Suspend | Restart |
| Reset [!] | Shut down | Power off [!] | Store | Restore | Revert to snapshot |

	VM ID	Template	Power	State	Reservation start	Reservation end	VNC port	Passphrase
☐	8310 (8309)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5953	
☐	8309 (8309)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6038	
☐	8308 (8307)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5974	
☐	8307 (8307)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5986	
☐	8306 (8305)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6024	
☐	8305 (8305)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6026	
☐	8304 (8303)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6043	
☐	8303 (8303)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5918	
☐	8302 (8301)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5965	
☐	8301 (8301)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5951	
☐	8300 (8299)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6040	
☐	8299 (8299)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6007	
☐	8298 (8297)	QRadar728_server_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	6011	
☐	8297 (8297)	QRadar728_client_2019	▷	Deployed	2020-03-03 00:00	2021-05-21 23:59	5942	

IBM Mastery Exam Certificate-

Skills Academy »X

IBM.

This document certifies that

Roshan Kumawat

Successfully passed the IBM Academic Certificate exam for

Security Intelligence Engineer 2018 Mastery Award for Students

This achievement also earns you a Mastery Award Badge which you can accept from Acclaim

10 December 2019

UNIQUE ID: 5432-1575-9587-3378

Randy Walker
General Manager
IBM Asia Pacific

Norishige Morimoto
Chief Technical Officer
Vice President
IBM Asia Pacific

IBM.

CS1207 Introduction to Networks
(In collaboration with CISCO Academy)

Course Title and Code	
Introduction to Networks CS1207	
Hours per Week	**L-T-P: 0-0-2**
Credits	**Audit Course**
Students who can take	B.Tech Sem IV Semester

Course Objective: Introduction to Networks(ITN) introduces the architectures, models, protocols, and networking elements that connect users, devices, applications and data through the Internet and across modern computer networks - including IP addressing and Ethernet fundamentals. In this curriculum, Cisco Networking Academy participants develop workforce readiness skills and build a foundation for success in networking-related careers and degree programs. With the support of video and rich interactive media, participants learn, apply, and practice CCNA knowledge and skills through a series of in-depth hands-on experiences and simulated activities that reinforce their learning. Upon completion of all three course offerings, learners will be prepared to take the Cisco CCNA Unified certification exam. CCNA teaches comprehensive networking concepts and skills, from network applications to the protocols and services provided to those applications. Learners will progress from basic networking to more complex enterprise and theoretical networking models later in the curriculum.

Learning Outcome:
On successful completion of this course, the students should be able to:

1. Build simple LANs, perform basic configurations for routers and switches, and implement IPv4 and IPv6 addressing schemes.
2. Define the role of a centralized Security Intelligence solution and how it integrates with other IT enterprise security components
3. Configure routers, switches, and end devices to provide access to local and remote network resources and to enable end-to-end connectivity between remote devices.
4. Configure and troubleshoot connectivity a small network using security best practices.
5. Configure a small network with security best practices.
6. Troubleshoot connectivity in a small network.
7. Develop critical thinking and problem-solving skills using real equipment and Cisco Packet Tracer.
8. Develop basic skills of routing, switching, and advanced technologies to prepare for the Cisco CCNA exam, networking related degree programs, and entry-level networking careers.

	Prerequisites	
	Evaluation Scheme	
Sr. No	**Specifications**	**Marks**
1	Attendance	Nil
2	Assignment	Nil
3	Class Participation	Nil
4	Quiz (CISCO Chapter Test)	**40**
5	Theory Exam-I	Nil
6	Theory Exam-II	Nil
7	Theory Exam-III (CISCO Certificate Test)	**40**
8	Report-I	Nil
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	Nil
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	**10**
15	Lab Evaluation-II	**10**
16	Course Portfolio	Nil
	Total (100)	100
Evaluation Scheme for Retest		
1	Theory Exam-III	40
2	Lab Evaluation-II	10
	Total	50

Syllabus (Theory + Practical)

Networking Today, Basic Switch and End Device Configuration, Protocols and Models, Physical Layer, Number Systems, Data Link Layer, Ethernet Switching, Network Layer, Address Resolution, Basic Router Configuration, IPV4 Addressing, IPV6 Addressing, ICMP, Transport Layer, Application Layer, Network Security Fundamentals, Build a small network.

Text Books:
1. Lammle, T. (2016). CCNA Routing and Switching Complete Study Guide: Exam 100-105, Exam 200-105, Exam 200-125. John Wiley & Sons.
2. Lammle, T. (2013). CCNA routing and switching study guide: exams 100-101, 200-101, and 200-120. John Wiley & Sons.
3. Lammle, T. Cisco Certified Network Associate Study Guide. 2nd. Edition

Reference Books:
1. Stallings, W. (2004). Computer networking with Internet protocols and technology. Upper Saddle River, NJ, USA: Pearson/Prentice Hall.
2. Kurose, J., & Ross, K. (2010). Computer networks: A top down approach featuring the internet. Peorsoim Addison Wesley.
3. Lammle, T. (2011). CCNA Cisco Certified Network Associate Deluxe Study Guide. John Wiley & Sons.

Activities Related to Skill Development and Employability

Each Student has Submitted Assignment, given quizzes, performed simulations and certifications related to Switching , Routing and Wireless essentials.

Assignment and final exam percentage sheet-

☰ CCNA_2018_ITN › Grades

Gradebook ▾   View ▾   Actions ▾   🖮   Search…

Student Name	Modules 1 - 3: Basic N… Out of 100	Modules 4 - 7: Ethern… Out of 100	Modules 8 - 10: Com… Out of 100	Modules 11 - 13: IP A… Out of 100	Modules 14 - 15: Net… Out of 100
SAKSHAM BAIRATHI	74	76	79.6	83	78
Samyak Bhagat	84	74	79	83	79
Sushil K Dubey	92	84	78	86	76
Sushil Kumar Dubey	78	83	76	83	74
HARSH Gautam	76	86	79	86	93
Yash Goyal	78	83	76	84	94
Aishwaryaditya Jha	90.4	76	87	85	78
Yash Mishra	89	75	83	76	84
Varun Rawat	84	74	79	79	86
Sanket Sharma	83	78	93	74	79
Vanshika Sharma	97.9	91	85	87	75
Rishabh Singhal	94.2	94.4	88	88	83

Assignments -

Assignments

0% of Total

No assignments in this group

Course Content

0% of Total

Introduction to Networks Course
Course Content Module | 100 pts

Module Group Exams

40% of Total

Modules 1 - 3: Basic Network Connectivity and Communications Exam
Module Group Exams Module | 100 pts

Modules 4 - 7: Ethernet Concepts Exam
Module Group Exams Module | 100 pts

Modules 8 - 10: Communicating Between Networks Exam
Module Group Exams Module | 100 pts

Final exam percentage sheet-

	First Name	Last Name	Student ID	Email	Logge ∨	Cumul Grade	Final Exam
☐	Varun	Rawat	✎	varunrawat9410@...	21 Jul 2020	83.87%	93.40%
☐	Sanyukta	Tanwar	✎	sanyukta3023@g...	20 Jul 2020	88.28%	96.00%
☐	Samyak	Bhagat	✎	samyakbhagat1@...	23 Jul 2020	87.09%	95.80%
☐	HARSH	GAUTTAM	✎	harshgauttamoffici...	20 Jul 2020	85.71%	94.80%
☐	SAKSHAM	BAIRATHI	✎	sakshambairathi@...	20 Jul 2020	78.75%	62.10%
☐	Sushil Kumar	Dubey	✎	sushildubey@jklu....	18 Jul 2020	86.27%	94.90%
☐	Aishwaryaditya	Jha	✎	aishwaryadityajha...	25 Jul 2020	88.48%	97.00%
☐	Vanshika	Sharma	✎	007vanshikasharm...	23 Jul 2020	84.48%	85.90%
☐	Rishabh	Singhal	✎	rishabhboy09@gm...	18 Jul 2020	87.04%	91.10%

Certificate-

illıllı Corporate
CISCO. Social
        Responsibility
Certificate of Course Completion

Cisco Networking Academy

CCNAv7: Introduction to Networks
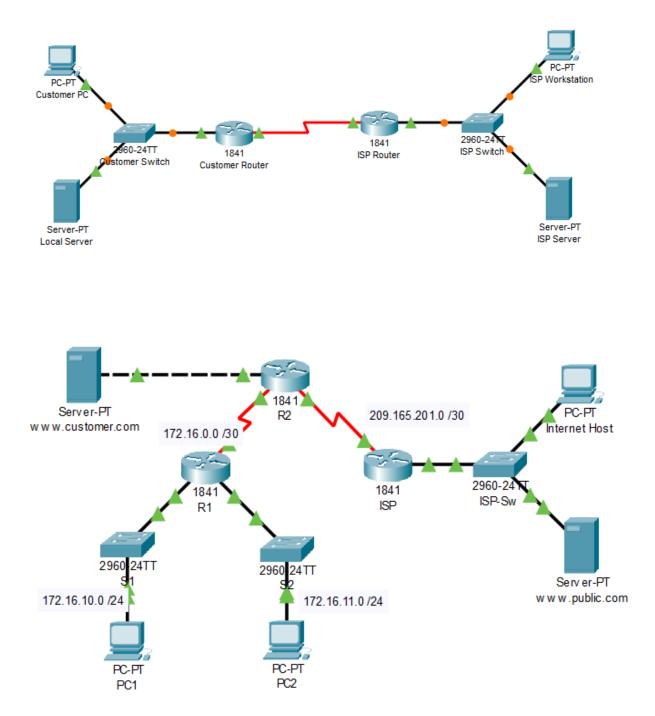
The student has successfully achieved student level credential for completing CCNAv7: Introduction to Networks course administered by the undersigned instructor. The student was able to proficiently:

- Configure switches and end devices to provide access to local and remote network resources.
- Explain how physical and data link layer protocols support the operation of Ethernet in a switched network.
- Configure routers to enable end-to-end connectivity between remote devices.

- Create IPv4 and IPv6 addressing schemes and verify network connectivity between devices.
- Explain how the upper layers of the OSI model support network applications.
- Configure a small network with security best practices.
- Troubleshoot connectivity in a small network.

Samyak Bhagat
Student

JK Lakshmipat University
Academy Name

India
Location

25 Jul 2020
Date

Laura Quintana
Laura Quintana
VP & General Manager, Cisco Networking Academy

CISCO Packet Tracer Simulations-

CS 1208 Routing, Switching and Wireless Essential
(In collaboration with CISCO Academy)

Course Title and Code	
Routing Switching and Wireless Essential CS1208	
Hours per Week	**L-T-P: 0-0-2**
Credits	**02**
Students who can take	B.Tech Sem VI Semester

Course Objective: Switching, Routing, and Wireless Essentials (SRWE) covers the architecture, components, and operations of routers and switches in small networks and introduces wireless local area networks (WLAN) and security concepts. Students learn how to configure and troubleshoot routers and switches for advanced functionality using security best practices and resolve common issues with protocols in both IPv4 and IPv6 networks. This course focuses on switching technologies and router operations that support small-to-medium business networks and includes wireless local area networks (WLAN) and security concepts. With the support of video and rich interactive media, participants learn, apply, and practice CCNA knowledge and skills through a series of in-depth hands-on experiences and simulated activities that reinforce their learning. Upon completion of all three course offerings, learners will be prepared to take the Cisco CCNA Unified certification exam.

Learning Outcome:

On successful completion of this course, the students should be able to:

1. Configure VLANs and Inter-VLAN routing applying security best practices.
2. Troubleshoot inter-VLAN routing on Layer 3 devices.
3. Configure redundancy on a switched network using STP and Ether Channel.
4. Troubleshoot Ether Channel on switched networks.
5. Explain how to support available and reliable networks using dynamic addressing and first-hop redundancy protocols.
6. Configure dynamic address allocation in IPv6 networks.
7. Configure WLANs using a WLC and L2 security best practices.
8. Configure switch security to mitigate LAN attacks.
9. Configure IPv4 and IPv6 static routing on routers.

Prerequisites		Basics of Computer Networks
Evaluation Scheme		
Sr. No	**Specifications**	**Marks**
1	Attendance	Nil
2	Assignment	Nil
3	Class Participation	Nil
4	Quiz (CISCO Chapter Test)	**40**
5	Theory Exam-I	Nil
6	Theory Exam-II	Nil
7	Theory Exam-III (CISCO Certificate Test)	**40**
8	Report-I	Nil
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	Nil
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	**10**
15	Lab Evaluation-II	**10**
16	Course Portfolio	Nil
	Total (100)	100
Evaluation Scheme for Retest		
1	Theory Exam-III	40
2	Lab Evaluation-II	10
	Total	50

Syllabus (Theory + Practical)

Basic Device Configuration, Switching Concepts, VLAN's, Inter-VLAN Routing, STP, Ether channel, DHCPv4, SLAAC and DHCPv6 Concepts, FHRP Concepts, LAN Security Concepts, Switch Security Configuration, WLAN Concepts, WLAN Configuration, Routing Concepts, IP Static Routing, Troubleshoot Static and Default Routes.

Text Books:
1. Lammle, T. (2016). CCNA Routing and Switching Complete Study Guide: Exam 100-105, Exam 200-105, Exam 200-125. John Wiley & Sons.
2. Lammle, T. (2013). CCNA routing and switching study guide: exams 100-101, 200-101, and 200-120. John Wiley & Sons.
3. Lammle, T. Cisco Certified Network Associate Study Guide. 2nd. Edition

Reference Books:
1. Stallings, W. (2004). Computer networking with Internet protocols and technology. Upper Saddle River, NJ, USA: Pearson/Prentice Hall.
2. Kurose, J., & Ross, K. (2010). Computer networks: A top down approach featuring the internet. Peorsoim Addison Wesley.
3. Lammle, T. (2011). CCNA Cisco Certified Network Associate Deluxe Study Guide. John Wiley & Sons.

Activities Related to Skill Development and Employability

Each Student has Submitted Assignment, given quizzes, performed simulations and certifications related to Switching , Routing and Wireless essentials

Assignment and final exam percentage sheet-

	First Name	Last Name	Student ID	Email	LAST ⌄	Cumul Grade	Final Exam	
☐	Dhruv	Khatri	✏	dhruvkhatri@jklu.e...	24 Jul 2020	86.06%	98.00%	
☐	SHUBHAM	BISHNOI	✏	shubham7799bish...	22 Jul 2020	87.61%	98.90%	
☐	Anuj	Verma	✏	anujverma@jklu.e...	23 Jul 2020	85.56%	95.90%	
☐	ASHISH KUMAR	SHARMA	✏	ashishkumarsharm...	Never (Delivered)	83.20%	82.00% *	
☐	LOKESH	GUJRAL	✏	lokeshgujral@jklu....	15 Jul 2020	80.85%	78.00% *	
☐	PRANAV KUMAR	JAIN	✏	pranavkumarjain@...	22 Jul 2020	81.02%	86.60%	
☐	Shashank	Mittra	✏	shashankmittra@j...	17 Apr 2020	83.15%	87.00% *	
☐	Shubham	Gupta	✏	shubhamgupta17...	19 Jul 2020	84.95%	92.40%	
☐	Harshaditya	Gaur	✏	harshadityagaur@j...	19 Jul 2020	83.43%	90.70%	
☐	Shubhanshu Dev	Puri	✏	sdevpuri@gmail.c...	23 Jul 2020	87.26%	97.90%	

Assignments dashboard-

Certificate of Switching, Routing and   Wireless essentials

Corporate
Social
CISCO Responsibility
Certificate of Course Completion

Cisco Networking Academy

CCNAv7: Switching, Routing, and Wireless Essentials

The student has successfully achieved student level credential for completing CCNAv7: Switching, Routing, and Wireless Essentials course administered by the undersigned instructor. The student was able to proficiently:
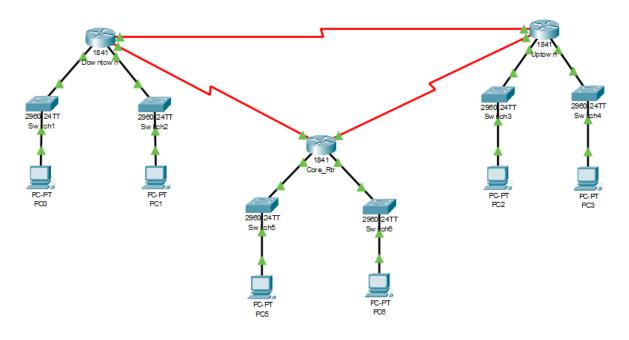
- Configure VLANs and Inter-VLAN routing applying security best practices.
- Troubleshoot inter-VLAN routing on Layer 3 devices.
- Configure redundancy on a switched network using STP and EtherChannel.
- Troubleshoot EtherChannel on switched networks.
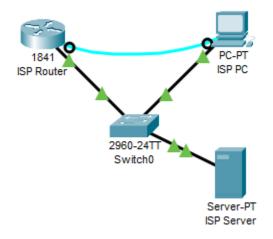
- Explain how to support available and reliable networks using dynamic addressing and first-hop redundancy protocols.
- Configure dynamic address allocation in IPv6 networks.
- Configure WLANs using a WLC and L2 security best practices.
- Configure switch security to mitigate LAN attacks.
- Configure IPv4 and IPv6 static routing on routers.

Parikshit Singhi

Student

JK Lakshmipat University

Academy Name

India   **25 Jul 2020**

Location   Date

Laura Quintana
Laura Quintana
VP & General Manager, Cisco Networking Academy

Cisco Packet Tracer Simulations-

Course Title and Code: Regulation for Health, Safety, and Environment Management (IL2104)			
Hours per Week	**L-T-P: 3-0-4**		
Credits	**5**		
Students who can take	M.Tech Semester-II (Batch: 2019-2021) **Core**		

Course Objective: This course aims to develop understanding of the regulatory standards and acts for applying policies, procedures, and occupational safety and health principles, and best practices for ensuring health and safety at workplace and protect environment.

After course completion, the student will be able to:

1. Explain the Guidelines of major occupational health safety (OHS) legislation and various Act.
2. Implement appropriate OHS legislation at different workplaces.
3. Prepare a work safety analysis, applying the concepts of danger, hazard and preventive measures in any activity at different workplaces.
4. Design Safety and Occupational Health Plans for different projects according to the OHSA 18001standard and the current laws.
5. Assess workplace conditions against relevant standards and regulations.
6. Evaluate and deploy appropriate control systems for air, noise and heat pollutants.

	Prerequisites	Before Covid-19	After Covid-19
Sr. No	**Specifications**	**Marks**	Marks
1	Attendance	Nil	Nil
2	Assignment	10	15
3	Class Participation	Nil	5
4	Quiz	10	10
5	Theory Exam-I	10	10
6	Theory Exam-II	10	Nil
7	Theory Exam-III	25	25
8	Report-I	15	15
9	Report-II	Nil	Nil
10	Report-III	Nil	Nil
11	Project-I (Case Study	Nil	Nil
12	Project-II	Nil	Nil
13	Project-III	Nil	Nil
14	Lab Evaluation-I	10	10
15	Lab Evaluation-II	10	10
16	Course Portfolio	Nil	Nil
	Total (100)	**100**	100
Evaluation Scheme for Retest			
1	Theory Exam-III	25	
2	Lab Evaluation-II	10	
	Total (35)	**35**	

SYLLABUS

Factories Act–1948: Statutory authorities, inspecting staff, health, safety, provisions relating to hazardous processes, welfare, working hours, employment of young persons, special

provisions, penalties and procedures, State Factories Rules 1950 under Safety and health chapters of Factories Act 1948

Environment Act–1986: General Powers of the central government, prevention, control and abatement of environmental pollution, Biomedical waste (Management and Handling Rules, 1989, the noise pollution (Regulation and Control) Rules, 2000, The Batteries (Management and Handling Rules) 2001, No Objection certificate from statutory authorities like pollution control board. Air Act 1981 and Water Act 1974: Central and state boards for the prevention and control of air pollution-powers and functions of boards, prevention and control of air pollution and water pollution, fund, accounts and audit, penalties and procedures.

Manufacture, Storage and Import of Hazardous Chemical Rules 1989: Definitions, duties of authorities, responsibilities of the occupier, notification of major accidents, information to be furnished, preparation of offsite and onsite plans, list of hazardous and toxic chemicals, safety reports, safety data sheets.

Environmental Measurement and Control: Sampling and analysis, dust monitor, gas analyzer, particle size analyzer, lux meter, pH meter, gas chromatograph, atomic absorption spectrometer. Gravitational settling chambers, cyclone separators, scrubbers, electrostatic precipitators, bag filter, maintenance, control of gaseous emission by adsorption, absorption and combustion methods, Pollution Control Board-laws. Pollution control in process industries like cement, paper, and petroleum, petroleum products, textile, tanneries, thermal power plants, dying and pigment industries, eco-friendly energy.

International Acts, Standards and Rules: Indian Boiler Act 1923, static and mobile pressure vessel rules (SMPV), motor vehicle rules, mines act 1952, workman compensation act, rules, electricity act and rules, hazardous wastes (management and handling) rules, 1989, with amendments in 2000, the building and other construction workers act 1996., Petroleum rules, Gas cylinder rules, Explosives Act 1983, Pesticides Act. Occupational Safety and Health act of USA (The Williams, Steiger Act of 1970), Health and safety work act (HASAWA 1974, UK), OSHAS 18000, OHSAS 18001, ISO 14000, and American National Standards Institute (ANSI). ILO Conventions; The Workmen's Compensation Act, ESIC Act., The Bio-Medical Waste Rules; Mines Act.1952 & Mines Rules, 1955; Water (Prevention & control of pollution) Act, 1974 and Rules; Air (Prevention & control of pollution) Act, 1981 and Rules.; Environment protection Act 1986 (Amended) and Rules; The Dock Workers (Safety, Health, and Welfare) Act, 1986 and the Regulations 1990 framed thereunder.

Syllabus (Practical):

Characterization physical, chemical and biological properties of water, wastewater, air and solid wastes.

References

1. The Factories Act 1948, Madras Book Agency, Chennai, 2000
2. The Environment Act (Protection) 1986, Commercial Law Publishers (India) Pvt. Ltd, New Delhi.
3. Water (Prevention and control of pollution) act 1974, Commercial Law Publishers (India) Pvt. Ltd. New Delhi.
4. Air (Prevention and control of pollution) act 1981, Commercial Law Publishers (India) Pvt. Ltd, New Delhi.
5. The Indian boilers act 1923, Commercial Law Publishers (India) Pvt. Ltd, Allahabad.

6. The Mines Act 1952, Commercial Law Publishers (India) Pvt. Ltd, Allahabad.
7. The manufacture, storage, and import of hazardous chemical rules 1989, Madras Book Agency, Chennai.
8. Explosive Act, 1884 and Explosive rules, 1883 (India), (2002), Eastern Book Company, Lucknow, 10th Edition
9. ISO 9000 to OHSAS P18001, Dr. K.C. Arora, S.K. Kataria & Sons, Delhi
10. Rao, CS, Environmental pollution engineering, Wiley Eastern Limited, New Delhi, 1992.
11. H. S. Peavy, D. R. Rowe, G. Tchobanoglous Environmental Engineering - McGraw- Hill Book Company, New York, 1987.
12. H.Ludwig, W.Evans, Manual of Environmental Technology in Developing Countries, International Book Company, Absecon Highlands, N.J., 1991.
13. Arcadio, P. Sincero and G. A. Sincero, Environmental Engineering – A Design Approach, Prentice Hall of India Pvt Ltd, New Delhi, 2002.
14. G. Masters Introduction to Environmental Engineering and Science, Prentice Hall of India Pvt Ltd, New Delhi, 2003.
15. S.P. Mahajan, Pollution control in process industries, Tata McGraw Hill Publishing Company, New Delhi, 1993
16. Varma and Braner, Air pollution equipment, Springer Publishers, Second Edition

Activity for Skills and employability

Quizzes

IL2104 > Quizzes > Air Pollution Control

Published · Preview · Edit

Air Pollution Control

Quiz Type	Graded Quiz
Points	30
Assignment Group	Assignments
Shuffle Answers	Yes
Time Limit	30 Minutes
Multiple Attempts	No
View Responses	Always
Show Correct Answers	No
Access Code	hse@Apc
One Question at a Time	Yes
Lock Questions After Answering	Yes

Due	For	Available from	Until
May 26 at 3am	6 students	May 26 at 2:30am	May 26 at 3am

Related Items

Quiz Statistics

Moderate This Quiz

SpeedGrader™

IL2104 > Quizzes > End Term Lab Exam_IL2104

Published · Preview · Edit

End Term Lab Exam_IL2104

Quiz Type	Graded Quiz
Points	20
Assignment Group	Assignments
Shuffle Answers	Yes
Time Limit	20 Minutes
Multiple Attempts	No
View Responses	Always
Show Correct Answers	No
Access Code	Regulations@lab
One Question at a Time	Yes
Lock Questions After Answering	Yes

Due	For	Available from	Until
Jul 16 at 6:20am	6 students	Jul 16 at 6am	Jul 16 at 6:20am

Related Items

Quiz Statistics

Moderate This Quiz

SpeedGrader™

Assignments:

1. Write the salient features of the petroleum act, 1934 and the petroleum rules, 2002 (amended 2011)

2. How would the release of a volatile gas from contaminated soil be affected by the soil temperature?

3. How does a governmental air pollution control agency or an industrial air pollution control organization organize to ensure that its registration of new sources does not miss significant new sources?

4. Explain the salient features of the hazardous wastes (management, handling & transboundry movement) rules, 2008 (amended 2010)

CASE STUDY: CONSIDER THE FOLLOWING INFORMATION FROM AN ACCIDENT REPORT FILED WITH THE US EPA

At about 10:15 a.m., on October 16, 1995, an explosion and fire occurred at Plant No. 1 of the Pennzoil Products Company refinery in Rouseville, Pennsylvania. After the initial explosion, flames quickly engulfed a large area of the refinery, including areas under construction, storage trailers, a trailer where contractors took work breaks, and many storage tanks. The flames ignited several tanks containing naphtha and fuel oil. During the fire, several loud explosions could be heard as compressed gas cylinders and other sealed containers exploded.

The explosions hurled some plant debris beyond the fenceline. Thick black smoke spread throughout the area. The fire forced Pennzoil employees and contractors at the plant, residents of the town of Rouseville and an elementary school, and the Pennzoil office across Route 8 from the facility, to evacuate. Firefighters extinguished the fire at about 12:30 p.m. that same day. Three workers were killed in the fire and three others were injured. Two of the injured died later as a result of their injuries. The fire resulted in extensive damage to the facility. Minor "sheening" was reported on the stream that runs past the refinery, but there were no reports of any materials spilled into the stream or environmental damage.

A welding operation was in progress on a service stairway located between two waste liquid storage tanks (tanks 487 and 488) at the time of the incident. These tanks contained mixtures of waste hydrocarbons and water. A hot work (welding, cutting) permit had been prepared, as required by Occupational Safety and Health Administration (OSHA) standard, which included combustible gas detection prior to welding to ensure the safety of the work.

The EPA Chemical Accident Investigation Team (CAIT) identified the immediate cause of the fire and the conditions which triggered the serious consequences. The immediate cause of the fire was the ignition of flammable vapors in storage tank 487. Although the CAIT could not determine the exact mechanism, there are at least two likely scenarios: undetected flammable vapors emitted from tank 487 were ignited by an ignition source which then flashed back into the tank; or an electrical discharge in the tank 487, generated by the arc welding, ignited flammable vapors in the tank. Write a brief contingency plan that would prevent such an incident occurring at any refinery

PROJECT REPORTS AND PRESENTAION

JKLU

Report

On

Design Safety & Occupational Health Plans For Airports According To The OSHA18001

Submitted By:-

Yash Kale

(2019MTHSE006)

JKLU

Report

On

Design Safety & Occupational Health Plans For Mines According To The OSHA18001

Submitted By:-

Aman Rathore

2019MTHSE001

REPORT ON
(THERMAL POWER PLANT)
DESIGH SAFETY AND OCCUPATIONAL HEALTH PLANS

SUBMITTED TO:-
Dr. Jitendra Kumar Singh

SUBMITTED BY:-
Pankaj Keshre (2019MTHSE004)

Chemical Safety Design

Roshan Roychen   5/27/20   2019MTHSE003

Design of Chemical safety in a plant keeping in mind OHSAS 18001 & other OSHA regulations

Context

In excess of 2,000 passing's from a methyl isocyanate substance spill in Bhopal, India, caused world to notice genuine dangers in the compound business. Following that disaster, the **Occupational Safety and Health Administration (OSHA)** created rules to help managers in lessening the quantity of potential risks in compound businesses. This distribution is intended to empower concoction industry audit and security precautionary measures to prepare for synthetic fiascos. It contains rules utilized by OSHA consistence officials to assess boss security programs, especially in the regions of catastrophe avoidance and crisis reaction. It additionally incorporates two arrangements of intensely poisonous synthetic concoctions whose nearness in the working environment should flag the requirement for security and wellbeing measures to ensure laborers.

JKLU

REPORT ON
DESIGN SAFETY AND OCCUPATIONAL
HEALTH PLANS ACCORDING TO THE
OHSAS 18001
at
GAIL India Ltd. VIJAIPUR

Submitted To: Submitted By:
Dr. Jitendra Kumar Singh   Tejaswee Singh Rathore
Head Of Department – M.Tech – HSE   2019MTHSE005
JK Lakshmipat University, Jaipur   M.Tech – HSE – 2nd Semester

1

LG POLYMERS PLANT STYRENE GAS LEAK GOPALAPATNAM

Presentation by
Name:- Bogella.Ravikanth
Roll No:- 2019MTHSE002
Health Safety Environment Engineering

Course Title and Code: Risk and Hazard Management (IL2103)		
Hours per Week	**L-T-P: 3-0-2**	
Credits	**4**	
Students who can take	M.Tech Semester-II (Batch: 2019-2021) **Core**	

Course Objective: The goal of this course is to introduce the student into the process for conducting a hazard/risk analysis and developing a hazard/risk management plan to support safety requirements as per safety standards. The course also aims to equip students with an understanding of basic electrical safety, identify, electrical hazards, plan & precautions to avoid injury at the workplace.

After course completion, the student will be able to:
1. Identify hazards in chemical and petrochemical workplace activities using hazard identification techniques and hazard assessment process.
2. Plan preventive actions needed to minimize hazards in chemical and petrochemical workplace activities
3. Assess health risks at different workplaces by integrating relevant data from a variety of sources.
4. Take appropriate corrective action in emergency situations, i.e., fire, explosion, and accident.
5. Assess risk and vulnerability for the electrical system considering both natural and manmade failures.
6. Plan restoration stages for integrated power systems considering multiple contingencies.

	Prerequisites	Before Covid-19	After Covid-19
Sr. No	**Specifications**	**Marks**	Marks
1	Attendance	Nil	Nil
2	Assignment	10	15
3	Class Participation	Nil	5
4	Quiz	10	15
5	Theory Exam-I	15	15
6	Theory Exam-II	15	Nil
7	Theory Exam-III	30	30
8	Report-I	Nil	Nil
9	Report-II	Nil	Nil
10	Report-III	Nil	Nil
11	Project-I	Nil	Nil
12	Project-II	Nil	Nil
13	Project-III	Nil	Nil
14	Lab Evaluation-I	10	10
15	Lab Evaluation-II	10	10
16	Course Portfolio	Nil	Nil
	Total (100)	**100**	100
Evaluation Scheme for Retest			
1	Theory Exam-III	30	
2	Lab Evaluation-II	10	
	Total (40)	**40**	

Syllabus (Theory)
Physical, Chemical & Biological Hazards: Noise, Ionizing radiation, non-ionizing radiations, cold environments, hot environments, Recognition of chemical hazards, Exposure vs. dose, TLV-Methods

Hazard, Risk Issues, And Hazard Assessment: Introduction, hazard, hazard monitoring-risk issue, group or societal risk, individual risk, voluntary and involuntary risk, social benefits Vs technological risk, approaches for establishing risk acceptance levels, Risk estimation. Hazard assessment, procedure, methodology; safety audit, checklist analysis, what-if analysis, safety review, preliminary hazard analysis (PHA), human error analysis, hazard operability studies (HAZOP), safety warning systems, Failure Mode and Effect Analysis (FMEA), fire explosion and toxicity index (FETI). (12)

Credibility of Risk Assessment Techniques: Past accident analysis as information sources for Hazard analysis and consequences analysis of chemical accident, Mexico disaster, Flixborough, Bhopal, Seveso, Pasadena, Feyzin disaster (1966), Port Hudson disaster; convey report, hazard assessment of non- nuclear installation; Rijnmond report, risk analysis of size potentially Hazardous Industrial objects; Rasmussen masses report, Reactor safety study of Nuclear power plant. (09)

Electrical risk management: Risk Management Process, Identify the hazards, Assess the risks, Control the risks, Review the control measures, Specific hazards and risk control of electrical equipment installations at the workplace, risk controls – energized electrical work, low voltage isolation, and access, risk Controls– energized electrical work, risk controls – working near energized electrical parts.(10)

Syllabus (Practical)

1. To identify the different classes of hazards in the JKLU Campus.
2. To study HAZOP and Hazid analysis of petrochemical industries.
3. To study a quantitative risk analysis of one refinery.
4. Design of earthling system for HV/EHV substation
5. To study electrical safety hazards awareness on the basic rule(s) for all electrical work as per OSHA regulation

Reference Book(s)

1. Frank P. Less, Loss Prevention in Process Industries, (Vol.I, II and III), Butterworth-Hein UK 1990.
2. Handbook of Occupational Health and Safety, NSC Chicago, 1982
3. McCormick, E.J. and Sanders, M.S., Human Factors in Engineering and Design, Tata McGraw-Hill, 1982.
4. Methodologies for Risk and Safety Assessment in Chemical Process Industries, pCommonwealth Science Council, UK.
5. Guidelines for Hazard Evaluation Procedures, Centre for Chemical Process Safety, AIChE 1992
6. ILO- Major Hazard control- A practical Manual, ILO, Geneva, 1988.
7. Trevor A Klett, "HAZOP and HAZOM," Institute of Chemical Engineering, 1983
8. Fordham Cooper, W., Electrical Safety Engineering, Butterworth and Company, London, 1986.
9. Accident prevention manual for industrial operations, National Safety Council, N.S.C., Chicago, 1982.
10. Indian Electricity Act and Rules, Government of India.
11. ABB Sustainability Affairs Code of Practice for Safe Working-Health, Safety, and Environmental (HSE) Guidelines

12. Moja SJ, Van Zuydam CS, Mphephu (2016) Hazard and Risk Assessment in Electricity Sector: A Case of Swaziland Electricity Company. J Geogr Nat Disast S6.

13. Health and Safety. Executive. Electricity at work. Safe working practices. HSG85 (Third edition). Published 2013

14. The safe isolation of plant and equipment, HSG253, ISBN 0717661718 http://books.hse.gov.uk/hse/public/saleproduct.jsf?catalogueCode=97807176617

15. Guidance on permit-to-work systems, HSG250, ISBN 0717629435 http://www.hse.gov.uk/pubns/priced/hsg250.pdf

16. HSE Safe Maintenance: http://www.hse.gov.uk/safemaintenance/index.htm,, Electricity at work: - Safe Working Practices, HSG85, ISBN 9780717621644 http://www.hse.gov.uk/pubns/priced/hsg85.pdf

Activity for Sills and employability

Quiz

ASSIGNMENT:

Write the minimum five control measures in petroleum industry as per statuary for the following hazards:

Trips and Slips.
Fall from Height,
Fall of Material from Height,
 Electrical Shock.
Hit By Speeding Vehicle,
Hit by Earth Moving Equipment.
Fire.
Accidental Actuation of Tools.
Disconnection of Pneumatic Tools.
Dust and Fumes.
Handling of Solvents, Paints, and Thinners Etc.
Explosives; Heat/Radiation.
Wrong Posture of Work.
Excessive Noise.
Unguarded Machinery.
Unstable Scaffold.
Manual Material Handling.
Mechanical Material Handling.

CASE STUDY:

JAIPUR TERMINAL FIRE, INDIA, OCTOBER 29, 2009

The Jaipur oil depot fire broke out on 29 October 2009 at 7:30 PM (IST) at the Indian Oil Corporation (IOC) oil depot's giant tank holding 8,000 kilolitres (280,000 cu ft) of petrol, in Sitapura Industrial Area on the outskirts of Jaipur, Rajasthan, killing 12 people and injuring over 300. The blaze continued to rage out of control for over a week after it started and during the period half a million people were evacuated from the area. The oil depot is about 16 kilometres (9.9 mi) south of the city of Jaipur. The incident occurred when petrol was being transferred from the Indian Oil Corporation's oil depot to a pipeline. There were at least 40 IOC employees at the terminal (situated close to the Jaipur International Airport) when it caught fire with an explosion. The Met department recorded a tremor measuring 2.3 on the Richter scale around the time the first explosion at 7:36 pm which resulted in shattering of glass windows nearly 3 kilometres (1.9 mi) from the accident site. Identifying the hazards and causes for terminal fire accident and write the all control measures as per statutory and also explain most effective control measure in details. Explain the methods which are used to calculate the quantitative risk and qualitative risk in details for this case. Design the safety checklist for permanent and temporary electrical connections for IOCL terminal facility at Jaipur. Prepare the appropriate corrective action plan for same premises in case of emergency situations like Jaipur terminal fire 2009. Identifying the gaps associated with the applicable legislations and in devising appropriate actions for closing the gaps for petroleum industry. Prepare the preventive action plant to minimize hazards for same premises workplace activities.

Course Title and Code: Industrial Safety Management (ME2101)	
Hours per Week	**L-T-P: 3-0-4**
Credits	**5**
Students who can take	M.Tech Semester-I HSE (Batch: 2019-2021) **Core**

Course Objective:

The goal of this course is to develop understanding about Industrial safety programs and toxicology, Industrial laws, regulations and source models. The course also aims to impart knowledge of the industrial hazard, fire and explosion, preventive methods, relief, and sizing methods.

After course completion, the student will be able to:

1. Analyse the effect of the release of toxic substances.
2. Explain the industrial laws, regulations and source models.
3. Apply the methods of prevention of fire and explosions.
4. Identified the relief and its sizing methods.
5. Explain the methods of hazard identification and preventive measures.
6. Apply standard safety procedures in an industrial environment.

	Prerequisites	Engineering Chemistry, Chemical Process Calculation, Mass Transfer, Heat Transfer
Sr. No	**Specifications**	**Marks**
1	Attendance	05
2	Assignment	05
3	Class Participation	05
4	Quiz	05
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	30
8	Report-I	05
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	05
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus (Theory)

UNIT I: Techniques of safety MANAGEMENT PERSPECTIVES

Introduction: Elements of safety Programming, safety management

Upgrading development programs: safety procedures, arrangements, and performance measures education, training and development in safety.

UNIT II: Safety performing planning

Safety performance: An overview of an accident, is it an accident, injury of the incident, the safety professional, occupational health and hygiene.

Understanding the risks: Emergency preparedness and response, prevention of accidents involving hazardous substances.

UNIT III: Structured Exercise in safety management

Investigation and Prevention: accidents of reasons, results, repair; the door of safety swings on the hinges of common sense.

Safety systems: the permit-to-work system, confined-space hazards

Safeguarding against common potential hazards: Trips, slips, and falls, prevention electrocution, static energy, hazard energy control

Specific hazard control measures: Forklift hazard control, Tractor hazard control

Safe handling and storage: materials handling, compressed gas cylinders, corrosive substances, hydrocarbons, waste drums, and containers.

UNIT IV: Accidents Case Histories

Bhopal gas tragedy, Gas-cutting a contaminated drum, tractor overturn, uncalled-for Enthusiasm, Lapse in safety organization, Lack of Procedural System and Supervision, Static Electricity, Failure of Anticipate Hazards, Malfunction and Failure of an ID Fan, Faulty Handling Equipment

Unit V: Accidents Case Studies

Process and chemical handling: an unexpected chemical reaction, expect the unexpected, lack of safety procedure, potential hazard not considered, Possibility of a toxic Gas leak not considered

Machines and Equipment: Faulty plant layout, Lack of Adequate Communication, a Makeshift Arrangement, Lack of work Organization, Transfer of Technology Versus Suitability of Application, Collapse of a Jib Crane, Fingers Trapped in Main-Loom-Drive, Wrong Position Button, Safe operating Procedure Not Followed.

Fire: Faulty Machine Connections, Chemical Vapours Catch fire, Manual Transfer of a Flammable Chemical, A Fire can Breakout Anywhere.

Explosions: Oxygen Cylinder-A potentials Explosion Hazard, Explosion of Condensate Receiver, An Air Compressor Explosion, Explosion in a Chemical Raw Material Store.

Electricity: Electrical Equipment Not Isolated, Connection without Plug.

Other Categories: Collapse of a factory Floor, An unplanned Operation, fall during Erection of a Pipeline, Lack of Safe Operating Procedure.

Syllabus (Practical)
1. Identified Chemical hazard in the JKLU laboratories.
2. Identified Noise hazard in the JKLU campus.
3. Identified Biological hazard in the JKLU campus.
4. Identified Fire hazard in the JKLU laboratories.
5. Identified Physical hazard in the JKLU campus.
6. Identified Ergonomic hazard in the JKLU Campus.

Main References

Textbooks
1. L.M. Deshmukh, "Industrial Safety Management" 15th edition, McGraw Hill Education (India) Pvt.Ltd.(2018).

Reference books
1. D.A. Crowl and J.F. Louvar, Chemical Process Safety (Fundamentals with Applications), Prentice-Hall, 2011.

Fawcett H.H. and W.S.Wood, Safety and accident prevention in Chemical operations 2nd edition John Wiley and Sons Inc. (1982).

Activity for Skills and employability

Quiz

CASE-1: INADEQUATE PREPARATION ON A DISTANT PLANT

Pipework connected to a tank that had contained a flammable liquid was being modified. The tank was "washed clean with water," to quote the report. The foreman checked that the tank

looked clean and that there was no smell. The valves on the tank and the manway cover were all closed, or so it was thought, and a permit was issued for welding on the pipework. One of the pipes was cut with a hacksaw and a section removed. When a welder started to weld the replacement section an explosion occurred in the tank. The welder was hit by the manway cover and hurled 5m (16ft) to the ground. He died from his injuries. What Went Wrong?

CASE-2: PRECAUTIONS RELAXED TOO SOON

When a whole unit is shut down for an extended overhaul, the usual practice is to isolate the unit at the battery limits by inserting blinds in all pipe lines, to remove all hazardous materials, and to check that any remaining concentrations are low enough for safety. Many publications describe how this can be done. It is then not necessary to isolate individually every piece of equipment that is going to be inspected or maintained. (However, equipment that is going to be entered should still be individually isolated by blinding or disconnection.)

After a long shutdown, there is obviously a desire to get back on line as soon as possible. A few jobs are not quite finished. Can we remove the battery limit isolations, or some of them, and start warming up a section of the plant where all the work is complete?

The correct answer is "Yes, but first the equipment that is still being worked on must be individually blinded. Do not depend on valve isolations. Valves can leak". The following incident occurred because this advice was not followed.

A fluid coker was starting up after a 4-wk shutdown. Work on some items of equipment, including the main fractionation column was not quite finished and its vent line was still open to the atmosphere. Some, but not all, of the lines leading to this column were blinded to support this work so it was decided to start removing the battery limit blinds. When the blind on the low pressure natural gas supply line was removed, passing gas was detected in the plant, as the natural gas isolation valve was leaking. The blind was replaced but removed the next day. The leak then seemed small. Six hours later there was an explosion in the fractionation column. The trays were displaced and damaged but the shell was unharmed.

The precise route by which the gas got into the column is uncertain and is not described in the report. It probably came from the leaking valve just described. However, the next level of cause is clear: before the battery limit blinds were removed, every line leading to equipment that was still being worked on or was open to the atmosphere should have been individually blinded. The underlying causes were taking chances to get the plant back on line quickly, and insufficient appreciation of the hazards.Explain the Lessons Learned from this case.

CASE-3: FAILURE TO ISOLATE RESULTS IN A FIRE

In the last incident, the equipment under maintenance was not isolated from a source of danger, natural gas, because blinds were removed prematurely and the consequences not thought through. In this incident, there as not only a leaking valve but no blinds were (or could be) inserted. A pin-hole leak occurred on a 6-in diameter naphtha draw-off line from fractionation column at a height of 34m (112ft) above ground level. Many attempts were made to isolate and drain the line but without success the valve between the line and the column was passing intermittently when it was supposed to be closed and the bottom of the line was plugged with debris. Nevertheless, it was decided to replace a corroded 30m (100ft) length of it with the plant on line, despite the fact that the workers doing so would be working at a height, with limited means of escape, and with hot pipework nearby. This decision was made at operator level and professional staff were not involved.

Two cuts were made in the pipe with a pneumatic saw. When naphtha leaked from the second cut, it was decided to open a flange and drain the line. As the line was being drained, there was a sudden release of naphtha from the first cut. It was ignited, probably by the hot surface of the column, and quickly engulfed the column. Four men were killed and another seriously injured. The immediate cause of the fire was the grossly unsafe method of working. The plant should have been shut down. (If the line had been narrower and not corroded, it might have been

possible to run a new line alongside the existing one and carry out an under-pressure connection.). Explain the underlying causes in this case.

CASE-4: UNINTENTIONAL ISOLATION

Many incidents have occurred because someone isolating a flow or an electricity supply has not realized that he or she was also isolating the supply to other equipment besides the equipment intended for isolation. If this is not obvious from the position of the isolation valve, then a label should indicate which equipment or unit is supplied via the valve. Similarly, labels on fuse boxes and main switches should indicate which equipment or unit is supplied.

The flow of compressed air to a sampling system was isolated unintentionally. This was not discovered for some time as the bulb in the alarm light had failed. The operator cancelled the audible alarm but with no indicator light to remind him he forgot that the alarm had sounded, or perhaps he assumed that flow had been restored. The alarm was checked weekly to make sure that the set point was correct but the alarm light was not checked.

Sometimes an unintentional isolation is the result of a slip. An operator was asked to switch a spare transformer on line in place of the working one. This was done remotely from the computer in the control room. He inadvertently isolated the working transformer before switching on the spare one. He realized his error almost immediately and the supply was restored within a minute. Prepare the report on the incident blamed distraction. Recommended a methodology for prevention and protection of the above all cases.

CASE STUDY-1

A production department supervisor of a chemical plant was in need of a medium-sized drum to use as a garbage can. He approached the stores department in search of a suitable container. The store in-charge informed him that there were empty drums, piled behind the stores shed and he could help himself to any. Accordingly, the supervisor proceeds to pick up a small ten-gallon drum and took it to a maintenance service welder and asked him if he could cut the top off. The welder, accepting his request, told him to come after an hour or so and pick it up. Unfortunately, the drum has been used to transfer carbon disulfide under the coverage of water several times from one place to another and was ultimately discarded. It was not labelled properly and if it was, the marking has been destroyed. The maintenance welder removed the top bung and was adjusting his torch to gas cut the top dish of the drum when the fumes ignited, causing an explosion and fire which blew the top off the drum. It struck the welder first on his shoulder and then the side of his neck causing severe lacerations, which partially cut his jugular vein. Fortunately his windpipe did not get cut. Another maintenance man who was working in the vicinity had the presence of mind to rush to the injured person's assistance and hold the injured person's jugular vein tightly with his thumb and finger until the first-aid man arrived on site and treated him. They were stop the bleeding. Three weeks of lost time resulted. Investigate the accident properly and explain the underlying causes in this case also suggest a corrective preventive action.
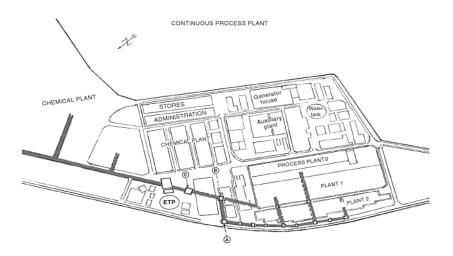
CASE STUDY-2.

Figure: The General Layout of the Company

The three manholes directly related to the incident are marked A, B, and C in the layout drawing. The task of cleaning out the main drain was immediately undertaking according to the specific instruction issued by the safety department. The contractor, in the initial stage, engaged eight workers, five men and three women experienced in the job, and one supervisor who facilitated cleaning materials, tools and equipments. They were entrusted with cleaning the portion of the main effluent drain between manhole A and manhole B.

One of the male workers Appa, entered the drain through manhole A along with his materials while another worker, Raju entered the large sump of the drain through manhole C. Female workers stood outside, between Manholes A and C to collect the debris from the manholes. The supervisor was also present, distributing the material.

Within five minutes of Appa's entering the drain, the people around heard screams emanating from manhole A. Appa was seen struggling to come out, shouting for help and screaming that he was gassed. The supervisor who happened to in the vicinity, rushed to the manhole. He too inhaled the noxious gases and lost his strength and control, with the result that Appa fell into the drain, unconscious. The supervisor shouted for help. The contractors' and the company's employees rushed to the side to rescue him.

On hearing the cries of Appa and the supervisor, Raju hurried in their direction by running inside the tunnel from manhole C towards manholes B and A. the supervisor and others showed a light inside from C and tried to guide him to search for Appa. Unfortunately, soon after the supervisor lost trace of Raju, he emerged from manhole C and started shouting for help. In less than half an hour, safety professionals rushed to the accident site, as soon as they were informed of the mishap by telephone. The Chief Engineer and Security Officer along with the security personal also arrived.

The safety professionals immediately took charge of the rescue operations with the help of the security department. Having no knowledge of the noxious gas concentration in the drain channel and of the chemical that had accumulated at the base of the manholes, a quick decision was made to send one of the trained operators with self-breathing apparatus inside in search of the victims. Subsequently, in five minutes, Raju was traced and brought out of the drain through manhole B. Raju had been found lying in the accumulated water in the drain, unconscious. He was immediately shifted to the company hospital. Another trained operator, who had entered the drain through manhole C and walked inside toward manhole B, located the other victim,

Appa. He was also found lying unconscious in a pool of effluent fluid. He too was brought out and rushed to the hospital. Both the victim were declared dead by the hospital authorities. Prepare the investigation report based on the Layered Method.

CASE STUDY-3.

In the Canadian manufacturing plant of a global automotive company with headquarters in Canada, a large number of engineering activities are carried out in a wide range of areas. These activities include design, production of parts, assembly, testing, and quality assurance.

Many of the manufacturing processes in the plant are performed using automated technologies and equipment. People also perform some of the manufacturing tasks and the plant employs over 400 workers. The decision on whether people or machines will be used for a particular task is dependent on many factors, including costs, time, quality and worker health and safety.

The plant considered here produces a many parts for vehicles and assembles them. Among the parts produced are engine materials and parts, pumps, fans, some exterior parts, and electronics components. The plant normally operates three shifts per day and has production lines including machining equipment, conveyers and overhead cranes, punch presses, and paint-spray booths. The plant utilizes electricity and natural gas extensively.

A number of workers at the plant have over the last six months been subject to several different health problems. The following information has been received by the head engineer at the plant.

In an assembly area that was installed recently, workers have to bend to the ground throughout the day to attach several small parts onto a large and heavy vehicle component. Some workers have begun to develop lower back pain, likely due to the repetitive bending. The problem has become so severe for one of the workers that he has been told by his doctor to stay off work for two weeks so his back can recover. The manufacturing engineers who designed the assembly operation had wanted to use an automated system, but that option was deemed not to be economic. So they used a manual operation, but did not take into account industrial ergonomics, as they had no expertise in that discipline.

An increased incidence of respiratory illnesses has been reported over the last month by workers operating near the paint-spray booths. Many of the substances used in the booths (paints, solvents, etc.) are known to be causes of the observed respiratory illnesses. But the workers are not supposed to come into contact with any of the substances because the paint-spray booths are designed to ensure that all materials exit the plant through a highcapacity ventilation system and that no materials can leak back into the plant. No tests had been carried out on the ventilation system, or on the air quality around the paint spray booths, so it is uncertain whether or not there have been any leaks into the plant from the paint-spray booths.

In an area of the plant where metal cutting occurs and workers use protective eyewear, workers have reported minor eye injuries. The area in question is one where it is common knowledge that the workers do not routinely use the protective eyewear. It is often observed to be hanging on nearby hooks or to be loosely hanging around the necks of workers. Workers complain that they find the protective eyewear uncomfortable and do not think it is needed or important. The plant manager knows of this behaviour but 11 overlooks it, since enforcing the use of the protective eyewear seems may make the workers unhappy and, consequently, less productive. That, he feels, could render the plant non-competitive. Evaluate the occupational hazard in the above case. Establish an Industrial safety policy as per OSHA for the above case. Explain the methodology of In-depth Investigation as per Kletz Investigation technique for the above case. Design an on-site and off-site emergency plans and responses for the above case.

CASE STUDY-4: IRON WORKER DIES AFTER FALLING OF   BEAM

A 42-year-old structural ironworker foreman died when he fell 38 feet from a steel roof beam to the floor below while working on a warehouse that was under construction. The company was installing the final bar joist (structural steel beam) in the roof of a new cold storage warehouse. After a crane lifted the beam into place, it was not quite straight and the ironworker foreman wanted to use a beater (30# double-sided hammer) to straighten it. The area where the foreman needed to work had been barricaded with wire rope safety lines on all four sides but he removed these lines to gain access. He was not using fall protection equipment. The foreman was standing on a portion of roof decking that had already been completed. To get to the beam, he reached his left foot out over an open un-decked area of the roof. He rested his left foot on the nearest joist girder. As he was preparing to strike a blow with the hammer, his foot slipped off the girder. His hands caught the bar joist but he couldn't hold on and fell. Explain the route cause for this situation? OSHA investigated this incident and made recommendations to employers? Design the fall-Protection programme for the trips, slips and falls hazards.

CASE STUDY-5: BRICK MASON EXPOSED TO SILICA DUST

A brick mason was removing deteriorating mortar from bricks in a building that was being renovated. To control the spread of dust, he was using a Vacuum Dust System that included a grinder shroud, a vacuum, a vacuum hose, and filters. His employer had also provided him with a respirator. The brick mason was not allowed to wet down the work area because his employer was worried about water damage to the interior of the building. After several days of work, the brick mason started to develop wheezing and shortness of breath. He went to his physician who told him that his symptoms were most likely caused by the silica dust. He informed his employer who subsequently hired an outside firm to collect air samples of the work area. The samples contained about 200 times the NIOSH Recommended Exposure Limit (REL) for crystalline silica. The type of respirator the worker was wearing had an Assigned Protection Factor (APF) of 25, which provided protection from hazardous concentrations only up to 25 times the NIOSH REL. Estimate the causes of the accidents in this situation. Design a prevention system for this exposure.

ASSIGNMENTS

1. The fire was a major disaster in terms of deaths, injury, loss of business, property and man-days, displacement of people, environmental impact in Jaipur, the capital city of the Indian state of Rajasthan and a popular tourist destination. As per eyewitnesses having factories and hotels around Indian Oil's Sitapura (Jaipur) Oil Terminal they felt presence of petrol vapour in the atmosphere around 4:00 p.m. on 29 October 2009. Within the next few hours the

concentration of petrol vapour intensified making it difficult to breathe. The Ayush Hotel in the vicinity of the terminal asked all its guests to vacate the hotel to avert any tragedy. Adjacent to the terminal wall was the workshop of Morani Motors (P) Limited where as per eyewitnesses cars parked on the roof top were thrown up into the air to about 10 feet and 35 new Hyundai brand cars were completely destroyed. The police, civil administration and fire emergency services were oblivious to the situation developing in the Indian Oil Terminal. Around half past six the staff in the terminal who had contained the leak and flow of petrol panicked and reported the matter to nearby Sanganer Sadar Police Station. Within the next 30 minutes the local police chief and District Collector were on the spot along with the terminal's general manager, but with no plan to deal with the situation. The nearby industries, which were running second shifts, were cautioned to vacate the area. At 7:35 p.m. a huge ball of fire with loud explosion broke out engulfing the leaking petrol tank and other nearby petrol tanks with continuous fire with flames rising 30–35 m (98–115 ft) and visible from a 30 km (19 mi) radius. The traffic on adjacent National Highway No.12 was stopped leading to a 20 km (12 mi) long traffic jam. The Jaipur International Airport is just 5 km (3.1 mi) away from the accident site. Both the army and experts from Mumbai were employed on 30 October 2009 to contain the fire in the Sitapura Industrial Area. The district administration disconnected electricity and evacuated nearby areas to limit the damage. The fire still raged on 31 October. By then, the accident had already claimed eleven lives and seriously injured more than 150 people. The District Administration and Indian Oil Corporation had no disaster management plan to deal with this kind of calamity. The local fire officers were ill-equipped to deal with fire accidents of this magnitude. They remained onlookers and no efforts were made to breach the terminal wall to get closer to kerosene and diesel tanks to cool them with water jets. The fire was blamed on non-observance of normal safety procedures. The depot fire raged for 11 days, killed 11 people in all and resulted in losses worth Rs 2.80 billion. Identify causes of accidents, is it an accident, Injury or Incident? Explain the roles of safety professional for developing and implementation hazard control designs, methods, procedures, and programmes. Explain the Basic Elements of the Permit-to-work System for the above case. Establish the safety objectives and control framework by public Authorities for the above case.

INDUSTRY VISIT

DAINIK BHASKAR PLANT, Shivdaspura Jaipur, September 23, 2019 (Dainik Bhaskar Newspaper and Magazine Printing)

Course Title and Code: Fire Engineering and Management (ME2201)	
Hours per Week	**L-T-P: 3-0-0**
Credits	**3**
Students who can take	**M.Tech Semester-III (Batch: 2018-2020) Elective**

Course Objective:

The goal of this course is **to** impart knowledge of the Fire Chemistry, Major Organizations in the Field of Fire Safety, Fire Detection Systems, Care, Maintenance, and Inspection, Legal Aspects, Organization, and Legislation, Emergency Response Planning for Safety Professionals, and Fire Codes and Standards.

After course completion, the student will be able to:

1. Identify agency resources for fire service operations and aid students with information based on the Fire Protection.
2. Determine organizational patterns for fire service operations.
3. Describe the uses and operations of various types of fire control equipment.
4. Determine and identify materials considered hazardous.
5. Recognize the training and educational experiences needed for fire service personnel.
6. Ascertain the components of fire service communications and dispatching.
7. Demonstrate accepted management practices needed to establish and improve fire service operation.

	Prerequisites	Engineering Chemistry, Chemical Process Calculation, Mass Transfer, Heat Transfer
Sr. No	**Specifications**	**Marks**
1	Attendance	05
2	Assignment	10
3	Class Participation	05
4	Quiz	10
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	30
8	Report-I	10
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	10
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	Nil
15	Lab Evaluation-II	Nil
16	Course Portfolio	Nil
	Total (100)	**100**

SYLLABUS

PHYSICS AND CHEMISTRY OF FIRE: Fire properties of solid, liquid and gases, fire spread, toxicity of products of combustion, theory of combustion and explosion, vapour clouds, flash fire, jet fires, pool fires, unconfined vapour cloud explosion, shock waves, auto-ignition, boiling liquid expanding vapour explosion; Understanding & Implementing Standards National Fire Protection Act 1407 and 1021. Case studies: Flixborough, Mexico disaster, Pasedena Texas, Piper Alpha, Peterborough, and Bombay Victoria dock ship explosions.

FIRE PREVENTION AND PROTECTION: Sources of ignition, fire triangle, principles of fire extinguishing, active and passive fire protection systems, various classes of fires: A, B, C, D, E, types of fire extinguishers, fire stoppers, hydrant pipes, hoses, monitors, fire watchers, layout of standpipes, fire

station, fire alarms and sirens; maintenance of fire trucks, foam generators, escape from fire rescue operations, fire drills, notice-first aid for burns.

INDUSTRIAL FIRE PROTECTION SYSTEMS: Sprinkler, hydrants, standpipes, special fire suppression systems like deluge and emulsifier, selection criteria of the above installations, reliability, maintenance, evaluation and standards, alarm and detection systems. Other suppression systems, CO system, foam system, dry chemical powder (DCP) system, halon system; the need for halon replacement, smoke venting. Portable extinguishers, flammable liquids, tank farms, indices of inflammability, firefighting systems.

BUILDING FIRE SAFETY: Objectives of fire-safe building design, Fire load, fire-resistant material and fire testing, structural fire protection, structural integrity, the concept of egress design, exists, width calculations; fire certificates, fire safety requirements for high rise buildings, snooker.

EXPLOSION PROTECTING SYSTEMS: Principles of explosion, detonation and blast waves, explosion parameters; Explosion Protection, Containment, Flame Arrestors, isolation, suppression, venting, explosion relief of large enclosure, explosion venting, inert gases, plant for generation of inert gas, rupture disc in process vessels and lines explosion, suppression system based on carbon dioxide (CO_2) and halons, hazards in LPG, ammonia (NH_3), sulphur dioxide (SO), chlorine (Cl) etc.

Text Book

1. Derek, James, Fire Prevention Hand Book, Butterworths and Company, London, 1986.
2. Daniel E. Della-Giustina, Fire Safety Management Handbook, Third Edition, CRC Press, Taylor & Francis Group, 2014

References

1. Gupta, R.S., Hand Book of Fire Technology, Orient Longman, Bombay 1977.
2. Accident Prevention manual for industrial operations, N.S.C., Chicago, 1982.
3. Dinko Tuhtar, Fire and explosion protection – A System Approach, Ellis Horwood Ltd, Publisher, 1989
3. William E. Clark, "Firefighting Principles & Practices", Fire Engineering Books and Videos, 2nd edition 1991.
4. Dennis P. Nolan, "Handbook of Fire & Explosion Protection Engineering Principles for Oil, Gas, Chemical, & Related Facilities ", William Andrew Publishers, 1997
5. Firefighter's hazardous materials reference book, Fire Prevention in Factories, a Nostrand Rein Hold, New York, 1991.

Activity for Skill Development and Employability

QUIZ

1: Locate and list the various types of fuels, oxidizer, and heat sources in JKLU Campus.

2: Identify the fire prevention strategies that could be implemented to reduce the likelihood of a fire occurring at JKLU campus.

3: Develop an action plan for implementing a fire safety management program for JKLU campus.

Google Image of JKLU Campus

ASSIGNMENTS

1: Explain the Indian standards on fire safety for the following purpose:

1. Accessories; 2. Buildings; 3. Detector and Alarm; 4. Electrical; 5. Equipment; 6. Extinguish Media
7. Hoses; 10. Hydrant; 11. Industry; 12. Mobile Equipment for fire bridge use; 13. Monitors
14. Others; 15. Portable fire extinguishers; 16. Pumps; 17. Sprinklers; 18. Tenders

2: Explain the major fires accidents in India from 2016 to 2019 and Give the Statistical Data on causes of fires & explosions, number of incidents, persons died and injured during 2015. Also list of state acts and rules on fire safety in India.

3: Explain the National Building Code, 2016-Fire and Life safety requirements; also explain about Statutory requirements for fire safety.

4: Explain the Environment protection amendment rules, 2018 and the environment impact assessment notification amendment, 2018.

5: what are the typical reasons of safety incidents, electrical faults in thermal power plant? How to achieve the objectives of complete safety in thermal power plant and explain the hazards /risk at different location in power plants with class & corrective action.

CASE STUDY-1: FIRE INCIDENT EVENT

The fire began in Room 418 apparently as a result of improper use of smoking materials, which ignited bedding that included an "air flotation" mattress with foam plastic padding. The fire intensified due to the damage to a wall-mounted oxygen regulator. When tested, it released oxygen at normal pressure, which contributed to the fire's fast growth leading to the untenable conditions. The oxygen continued to flow until a maintenance person shut off a zone valve that allowed oxygen to flow to several rooms, including the patient's room. A nurse discovered the fire when the fire was already established in the patient's bed. The fire had not been detected sooner because there were no smoke detectors in any of the patient rooms. Smoke detectors were located in the corridor at 30-foot intervals. The nurse had to leave the room to find a blanket to try to smother the fire. Upon returning to the room, she tried unsuccessfully to remove the patient from the room and put out the fire. The fire was growing too fast at this point, and she had to leave the room before being able to extinguish the fire or shut the door.

Smoke then spread out into the corridor because the door to the room where the fire began had not been closed. Smoke also spread into the noncombustible space above the ceilings of patients' rooms on the same side of the hallway as the room of the fire origin. The smoke entered these spaces because the rooms were not continuous from the floor to the underside of the floor above. Smoke spread from these spaces to other rooms on the same floor.

The switchboard operator initiated the emergency procedures, including a building-wide, coded announcement to the fire department. However, the fire department was not contacted until after the fire had broken the windows in the patient's room and was venting smoke outside. This rapid fire growth was a significant factor in the loss of life and property because it rendered the staff unable to successfully complete the emergency procedures.

The Petersburg Fire Department responded to the 911 call that was initially received by the Petersburg Police Department Emergency Communication Center, which is the Public Safety Answering Point (PSAP) for Petersburg. The call to the PSAP was answered within 30 seconds with the fire department dispatching two engines, a truck, ambulance, and a battalion chief. The battalion requested a second alarm response and the last two engines were dispatched. A neighboring community also sent a truck to the fire. Damages caused by the fire included extensive smoke damage to the south wing of the hospital and the loss of five patients' lives due to smoke inhalation. The contents of Room 418 were completely destroyed. Describe the main attributes of an automatic fire detection system. Describe the proper care and maintenance of an automatic sprinkler. Determine factors necessary when selecting an appropriate fire detection system for the controlling the fire. Explain how property management and fire safety can be profit-protecting activities. Describe the National Fire Protection Association's consensus standard development process for the above case.

CASE STUDY-2: BEVERLY HILLS SUPPER CLUB, KENTUCKY, 1977

Around 8.45 p.m. on the evening of 28 May, 1977, a fire occurred at the Beverly Hills Supper Club at Southgate, Kentucky. In addition to the total destruction of the Club, the fire resulted in the death of 164 persons. Best (1978) and Lawson (1984) give detailed information about this tragic fire.

The Club had dining facilities, a nightclub with live entertainment, lounges, and a number of rooms used for private parties. A rebuilt club was opened in 1972, but there had been numerous addition and alterations since then, the latest being in 1976. The total floor area had become approximately 5000 m^2 by the time of the fire (see Figure-1).

The building was mainly unprotected, noncombustible construction. The ground floor of a small two-story front section contained the main entrance, foyer, and main dining room, main bar area, the Zebra Room, office areas, coat-check room, and part of the Viennese Room. The upper story contained a number of small party rooms, lavatories, and dressing rooms. The remainder of the building was single story. It contained the other part of the Viennese Room, the kitchen, various utility and storage areas, the Cabaret Room, the Empire Room, and the Garden Rooms.

The interior finishes were primarily wood or dense fiberboard panels on the walls and carpet on the floors. There were suspended ceiling assemblies with noncombustible ceiling tiles, which supported recessed lighting fixtures. In the oldest part of the building where the fire started, evidence was found of combustible tiles in ceiling assemblies installed earlier and left in place when the noncombustible assembly was installed beneath. Furnishings consisted of tables, tablecloths, and other dining and entertainment accessories including padded, vinyl-clad chairs throughout the various rooms.

There were ten exits from the building, including an employee exit from the kitchen. A main corridor connected all ground floor dining areas and entertainment areas to the main entrance. This corridor had no smoke or fire partitions. There were no internal fire division walls anywhere in the building, no smoke or fire detectors, no fire alarm system, and no automatic sprinkler system.

When the fire occurred, there were about 3500 patrons and 250 employees in the club. All the major rooms and most of the smaller rooms were occupied. Investigation established that the fire started in the unoccupied Zebra Room, at the front of the building (Figure-1). The most probable cause was electrical and combustibles located there, which would have fed the fire. The concealed combustible tiles and wooden supports provided fuel for continued fire spread in the concealed spaces. Evidence indicated that the fire burned for a considerable time prior to its discovery at 8.45 p.m. The county police-fire communications center received notice of the fire at 9.01 p.m. Despite attempts at extinction, flashover occurred in the Zebra room. The fire subsequently broke out of the room through the double doors at the north end and then spread rapidly throughout the building.

The biggest crowd, about 1000 persons, was in the Cabaret Room, some 45m away from the room of origin, down the main corridor (Figure-1). Most of the victims were occupants of the Cabaret Room. After a bus boy warned patrons in the room that there was a fire and indicated the emergency exits, some exiting began. Soon after, smoke came into the Cabaret Room through its main entrance (from the main corridor). This main entrance provided the exit used normally by patrons (in nonfire conditions). Two other exits were available. One, at the northwest corner, led through double doors to a service bar area and then to another set of double doors to the outside. The other, at the northeast corner, led through a door and across a short corridor to a single door to the outside.

Bright (1977) undertook a qualitative analysis of fire spread from the Zebra Room to the Cabaret Room. He concluded that the rapidity of the spread down the main corridor, somewhere between 2 and 5 min was undoubtedly a factor in the large loss of life in the Cabaret Room.

The corridor had combustible wall linings and a combustible carpet assembly on the floor, which would have assisted rapid spread. Emmons (1983) applied principles of fluid dynamics to derive numerical estimates that would explain the fire behavior. There was an apparent discontinuity, because the rate of fire and smoke spread was minimal for about 15min after discovery and then it suddenly increased in the long corridor, extending about 45m in less than 5min. He hypothesized that smoke migration was minimal initially because with all doors closed there was no significant force to move it. There was a strong movement of smoke in a northerly direction once the doors in the Garden Room were opened, which is consistent with reports that the prevailing wind was from the south. Emmons estimated a rate of smoke travel, and Figure-1 shows a plot of smoke volume against time. This was based on principles of conservation of energy and mass in a fluid network, supplemented by eyewitness information. He also developed an estimate of the rate at which the flame spread down the north–south corridor and he concluded that there would have been rapid spread regardless of the combustibility of the linings. Evaluating Building Construction and Management Approaches for Assuring Life Safety. Describe the main attributes of an automatic fire detection system and AFFF special type of foam is it used? Develop an action plan for conducting the hot work safely during the sprinkler system's impairment. Develop a detailed strategy for determining which buildings should receive sprinkler protection first. Develop a letter that requests bids from local companies for a 5-year fire extinguisher inspection and maintenance contract and includes some basic performance criteria.

CASE STUDY-3—POWER PLANT EXPLOSION

Plant Description: The Cheshire Power Station, located just upriver from Pittsfield, Massachusetts, has two 550-megawatt electric-generating coal fed boilers. The plant was constructed in the early 1970s and is a part of the State Power Systems Utility. The two units are combustion engineering boilers that are fired on pulverized coal crushed in CE-Raymond Roller Mills located inside the plant building. Normal operating conditions of the boilers are 1000 degrees and 3600 psi at full load.

Description of the Event: On November 12, 1999, there was an indication of a fire in the 1A coal pulverizer. The supervisor in charge made the decision to spray water on the outside jacket of the pulverizer in an attempt to cool the hotspot. The water appeared to have cooled the hotspot and everything appeared to, return to normal operations when temperatures in the mill dropped from 150 degrees to 130 degrees. The day shift relieved the night shift on the morning of November 13 and continued to observe the 1A mill with no indications of any trouble. At approximately 1:00 p.m., a series of explosions occurred in and around the 1A pulverizer mill. The initial explosion separated a discharge pipe leading from the pulverizing mill to the boiler, releasing coal dust into the atmosphere. The explosion stirred the coal dust in the atmosphere, creating a rolling fireball that ripped through the plant in all directions, feeding on the fugitive plant structure. The force of the explosion downed several internal block walls near the 1A mill. Numerous small fires were started throughout the plant in cable trays and any combustible material. Several employees were injured with burns ranging from mild to very severe. The sprinkler system throughout the plant operated as designed and department damage from fires to a minimum. The sprinklers also kept the flammable materials including a large storage of hydrogen used for turbine cooling, from igniting. Analysis and investigation the event and conclude the most responsible factors contributed to the explosion of the CE-Raymond Roller Mill; the analysis also pinpointed several conclusions for improving the system to ensure explosion prevention during future operation. Develop the key elements of an emergency response plan and also indicate the key points for training employees for the above accidents. Define an evacuation plan and explain the key elements in implementing an emergency response action program for the similar case of accidents. Discuss the strength of laws and legal rights of fire departments. Describe Subpart L of the OSHA Safety and Health Standards (29 CFR 1910) with establishing requirements and standards for fire brigades. Explain the importance of a facility evaluation for potential fire sources.

PROJECT: Design and fabrication of Automatic fire deduction and control systems.
Reports:

Assignment of Fire Engineering and Management

Submitted by:
Saransh Gupta
(2018MTHSE003)

Submitted To:
Dr. Jitendra Kumar Singh
HSE Coordinator

JKLU

Health, Safety & Environmental Engineering
Institute Department of Engineering and Technology
(IET)
JK Lakshmipat University Jaipur

Dec 2019

INDUSTRIAL VISIT:

1. DAIKIN INDIA, Neemrana Plant, September 25, 2019 (Residential, Commercial, Industrial_Air Conditioning Systems)

2. DAINIK BHASKAR PLANT, Shivdaspura Jaipur, September 23, 2019 (Dainik Bhaskar Newspaper and Magazine Printing)

Course Title and Code: Project 01	PR2101	
Hours per Week	**L-T-P: 0-0-2**	
Credits	**2**	
Students who can take	M.Tech Semester-I (Batch: 2019-2021) **Core**	

Course Objective: This course aims to develop scientific aptitude and lab skills in students and also understand the important role of solid waste management for society and industry. And apply knowledge for preparation of organic compost and generation of methane gas from bio-digester..

After course completion, the student will be able to:
1. Identify and understand the various types of solids wastes and their sources.
2. Determine the important parameter for preparation of organic compost from solid wastes.
3. Determine the impact of different parameter on C: N ratio of organic compost.
4. Design and carry out scientific study of bio-digester for methane gas production from food waste.
5. Learn field sampling, analytical techniques and preservation of samples.

Sr. No	Specifications	Marks
1	Attendance	NIL
2	Assignment	NIL
3	Class Participation	NIL
4	Quiz	NIL
5	Theory Exam-I	NIL
6	Theory Exam-II	NIL
7	Theory Exam-III	NIL
8	Report-I	**10**
9	Report-II	NIL
10	Report-III	NIL
11	Project-I (Mid-term exam)	**20**
12	Project-II (Day to day observation)	**30**
13	Project-III (End term exam)	**40**
14	Lab Evaluation-I	NIL
15	Lab Evaluation-II	NIL
16	Course Portfolio	NIL
	Total	**100**

SYLLABUS:

Types and Sources of solid wastes; Need for solid and hazardous waste management; Elements of integrated waste management; Legislations on management and handling of municipal solid wastes.

REFERENCE BOOKS:

Refer all courses related books, other than text books here.

R1: George Tchobanoglous, Hilary Theisen and Samuel A, Vigil, Integrated Solid Waste Management, McGraw- Hill, New York, 1993

R2: CPHEEO, Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.

R3: Environmental engineering, HS Paevy, DR Rowe, G Tchobanoglous, McGraw Hill

R4: Industrial waste treatment by Nelson Leonard Nemarow

Activity for Skills and employability

Project Report

On

Design the bio-digester and produce the methane gas from the different wastes

Submitted by

Yash Kale (2019MTHSE006)

Submitted to

Dr Shahnawaz Khan

Course Title and Code: Project 02	PR2102	
Hours per Week	**L-T-P: 0-0-2**	
Credits	**2**	
Students who can take	M.Tech Semester-II (Batch: 2019-2021) **Core**	

Course Objective: This course aims to develop scientific aptitude and lab skills in students and also understand the important parameter of air and water pollution for society and industry. And apply theoretical and practical knowledge for the determination of air and water pollution and identify the best method to reduce both pollutions.

After course completion, the student will be able to:
1. Identify and assess the major air pollutants.
2. Monitor the major ambient air quality parameters.
3. Analyze the key water pollutant in domestic as well as industrial wastewater discharge.
4. Test the different chemical, physical and biological parameters of waste water.
5. Interpret, compare the data of air and water quality parameters for better impact mitigation.

Sr. No	Specifications	Marks
1	Attendance	NIL
2	Assignment	NIL
3	Class Participation	NIL
4	Quiz	NIL
5	Theory Exam-I	NIL
6	Theory Exam-II	NIL
7	Theory Exam-III	NIL
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	**50**
12	Project-II	**50**
13	Project-III (End term exam)	Nil
14	Lab Evaluation-I	NIL
15	Lab Evaluation-II	NIL
16	Course Portfolio	NIL
	Total	**100**

SYLLABUS:

Types and Sources of pollution; Identify and assess the major air pollutants and monitor the major ambient air quality parameters.; Analyze water pollutant in domestic as well as industrial waste water discharge and Test the different chemical, physical and biological parameters of waste water.; Legislations on management of air and water pollution.

REFERENCE BOOKS:

R1:Environmental engineering, HS Paevy, DR Rowe, G Tchobanoglous, McGraw Hill.

R2: Environmental engineering: Wastewater engineering, SK Garg, Khanna Publishers .

R3: Water supply and sanitation engineering, GS Birdie, JS Birdie, Galgotia Publishing Ltd.

R4: Water Supply Engineering, Dr. B.C. PunmiaLaxmi Publications Pvt. Ltd.

R5: Water and wastewater engineering, Metcalf and Eddy, McGraw Hill

R6: Standard Handbook of Environmental Engineering, by Robert A. Corbitt, McGraw-Hill Professional publication.

R7: Textbook Of Environmental Engineering by by P. Venugopala Rao.

R8: Environmental Engineering by D. Srinivasa

Activity for Skills and employability

PROJECT REPORT

ON

STUDY & ANALYSIS OF DIFFERENT LOCATIONS WATER SAMPLES OF JAIPUR, RAJASTHAN

Submitted by

Aman Rathore (2019MTHSE001)

Bogella.Ravikanth (2019MTHSE002)

Roshan Roychen (2019MTHSE003)

Pankaj Keshre (2019MTHSE004)

Tejaswee Singh Rathore (2019MTHSE005)

Yash Kale (2019MTHSE006)

Submitted to

Dr Shahnawaz Khan

Assistant Professor, Deparment of Chemistry

Institute of Engineering & Technology; JKLU, Jaipur

JK LAKSHMIPAT UNIVERSITY PM$_{10}$ AQI STUDY

Prepared By

Aman Rathore   (2019MTHSE001)

Bogella.Ravikanth   (2019MTHSE002)

Roshan Roychen   (2019MTHSE003)

Pankaj Keshre   (2019MTHSE004)

Tejaswee Singh Rathore (2019MTHSE005)

Yash Kale   (2019MTHSE006)

Submitted To

Mr.Vinod K. Vishwakarma

Assistant Professor,Dept.of Civil Engineering

Institute of Engineering & Technology

JK Lakshmipat University, Jaipur

Course Title and Code: Industrial Project-I (PR2104)	
Hours per Week	**L-T-P: 0-0-20**
Credits	**10**
Students who can take	M.Tech Semester-III (Batch: 2018-2020) **Core**

Course Objective:

The purpose of the Industry Project is to give students the opportunity to gain an insight into the operation of their field of study and develop an understanding of their profession in a professional context. By enabling students to observe the day-to-day operations of an organization and to prepare a research project based on these observations, with the guidance of a work place and academic supervisor, students will develop a critical perspective of their profession. Students will attend pre and post placement classes to guide the development of their research project, the sourcing of their host organization and the protocols associated with the placement.

After course completion, the student will be able to:
1. Identify skills and capabilities that intersect effectively with the needs of industry.
2. Apply and practice good communication skills in the workplace setting.
3. Reflect and evaluate on experiences that might lead to future employment.
4. Report research findings in written and verbal forms.
5. Demonstrate and apply research skills to complete a project.

	Prerequisites	
Sr. No	Specifications	Marks
1	Attendance	Nil
2	Assignment	Nil
3	Class Participation	Nil
4	Quiz	Nil
5	Theory Exam-I	Nil
6	Theory Exam-II	Nil
7	Theory Exam-III	Nil
8	Report-1 (Synopsis)	10
9	Report-II	Nil
10	Report-III	Nil
11	Project-I (Mid Term Exam)	20
12	Project -2 (Day to Day work) (Demo, Presentation, Viva, Report)	30
13	Project -3 (End Term) (Demo, Presentation, Viva, Report)	40
14	Lab Evaluation-I	Nil
15	Lab Evaluation-II	Nil
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus:

Dissertation-I/ Industrial Project-I/ Entrepreneurial Project-I, Research and development projects based on problems of practical and theoretical interest. Students may choose a project based on any subject of Health, safety and Environmental Engineering. The student will submit a synopsis at the beginning of the semester for

approval from the departmental committee in a specified format. Evaluation will be based on student seminars, written reports, and evaluation of the developed system and/or theories.

Operation Procedure

- Student has to devote full semester for Dissertation-I/ Industrial Project-I/ Entrepreneurial Project-I.
- Student has to report to the Supervisor regularly.
- Seminars evaluation has to be carried out in the presence of a two member Committee comprising.
- Experts in the relevant area constituted by the Supervisor.
- Final Dissertation-I/ Industrial Project-I/ Entrepreneurial Project-I Report to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

Reference Books and Tools:

Based on literature survey to be done with peer reviewed journals and magazines and relevant tools required to build the project.

Activities Related to Skill Development and Employability

INDUSTRIAL PROJECT-I, REPORT ON
QUANTITATIVE RISK ASSESSMENT (QRA)

Submitted By:

Jay B. Patel (2018MTHSE001)

Tejas N. Patel (2018MTHSE002)

Saransh Gupta (2018MTHSE003)

Submitted To:

Dr. Jitendra Kumar Singh

HSE Coordinator

Department of Health, Safety & Environmental Engineering

Institute Engineering and Technology (IET)

JK Lakshmipat University Jaipur

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Figure 1: DEKRA Consulting – Portfolio

2. QRA Methodology:

We conducted the quantitative risk analysis utilizing the protocols and methods published by the Center for Chemical Process Safety (CCPS) in their Guidelines for Chemical Process Quantitative Risk Analysis and the Dutch Government in their Guidelines for Quantitative Risk Assessment, known as the TNO Purple Book. These guidelines provide the methodologies for:

- Identification of Process Hazards
- Consequence and Impact Analysis
- Likelihood Analysis
- Calculation of Risk
- Presentation of Risk Results
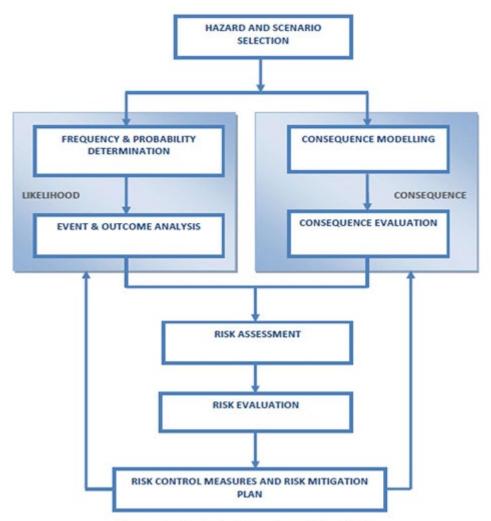
Figure 2: Methodology adopted for QRA

2.1 Project Steps

This project was completed following these six (6) main project steps:

- Data Collection
- HAZID
- Release Scenario Development
- Consequence and Impact Analysis
- Frequency Analysis
- Risk Integration and Results

Step 1 – Data Collection

The data that was collected provides the basis for the assumptions applied in the QRA. This information includes the following (with section references within the QRA report, which detail the specific assumptions):

- Plant Layout and Equipment Locations (Section 3)
- Loss of Containment Scenarios (Section 4)
- Process Conditions (Section 4)
- Consequence Modeling (Section 5)
- Equipment Failure Rate Data (Section 6)
- Meteorological Data and Surrounding Area Topography (Section 7)
- Onsite Building Construction and Building Occupancy (Section 7)
- Offsite Population (Section 7)
- Vulnerability to fire, explosion overpressure and toxic exposures (Section 7)
- Risk Criteria (Section 8)

Step 2 - HAZID

To develop the accidental release scenarios for the QRA, AcuTech facilitated a HAZard IDentification (HAZID) with personnel from the project, Johnson Matthey Davy Technologies, Worley Parsons, Williams Northwest Pipeline, Endeavour EHS LLC and Port of Kalama. The goal of the HAZID was to review all proposed processes, storage areas and loading/unloading operations to identify the potential for hazardous material releases that could result in fire, explosion and toxic hazards.

Step 3 – Release Scenario Development

Based on the HAZID, the final set of release scenarios for the QRA were selected by grouping equipment within each plant, into a "node" based on the following factors:

- Type of material being processed (toxic, flammable or both)
- Material phase (gas, liquid, two phase)
- Process conditions (temperature and pressure)
- Type, size and location of equipment

The range of the release sizes (e.g., leak to rupture) applied for each scenario is based on the TNO Purple Book and is based on the equipment component failure rates. The final equipment grouping, and the range of release sizes are the main input for the consequence and impact analysis in Step 4 (below).

Step 4 - Consequence and Impact Analysis

Consequence is the measure of the expected outcomes for a given accidental release. In this QRA, consequence is defined as the hazard distance or hazard zone to various fatality endpoints. For the release scenarios developed in Step 3, the consequences were modeled using the Phast model. The specific consequences evaluated include:

- Fire (jet fire, pool fire)
- Boiling Liquid Expanding Vapor Explosion (BLEVE)
- Vapor Cloud Explosion
- Toxic Gas Dispersion

In general, the hazard zones were determined using various parameters. These parameters include:

- Release Quantity
- Duration of Release
- Source Elevation
- Prevailing Atmospheric Conditions and Surrounding Terrain
- Chemical Flammability, Toxicity and Reactivity

Step 5 - Frequency Analysis

Initiating event failure frequencies for each release scenario developed in Step 3 were estimated using the TNO Purple Book. Since the scenarios are based on a grouping of equipment, the initiating event frequencies are the sum of the individual component failure rates of the equipment within the node. The initiating event frequencies are input in to an event tree analysis to determine the range of possible outcomes. Depending on the process conditions the hazards could range from fire or explosion (if ignited) or toxic release.

Step 6 - Risk Integration and Results

Once the onsite/ offsite population data, consequence modeling results, likelihood calculations and weather data were collected, the information was combined to generate the final risk results, using Safeti. The following results were developed:

- **Individual Risk**: Defined as the risk at a specific location to a single person/ individual to a hazard. The hazard can be a single incident, or a collection of incidents. The scale of any incident, in terms of the number of people impacted by an event(s), does not affect the individual risk level a distance from the hazard location(s). Individual risk is presented in this QRA on a geographical basis. The risk contours developed can be used to assess potential risk to the surrounding community and assist in the land use planning decision for the particular site location.

- **Societal Risk**: Defined as the risk to a group of people to a hazard. The hazard can be a single incident, or a collection of incidents. Thus, societal risk evaluated the scale of the incident in terms of the number of people that could be impacted from the hazard(s). Societal risk is expressed as the cumulative risk to a group(s) of people who might be affected by accidental release events. The calculation for societal risk uses the same consequence and frequency results as the individual risk calculation, but uses information about the number, geographical distribution, occupied building construction and occupancy levels of the population group(s) to determine the risk level.
- **Overpressure Contours**: Overlay of the overpressure levels on a plot plan of the facility. The contours enable a visual illustration of the vulnerable buildings/ areas within various overpressure damage levels.

2.2 HAZID:

To develop a QRA, an initial list of accidental release scenarios is determined. For this QRA, a HAZID was completed with an extensive list of nodes to evaluate the full range of hazards and potential accidental releases throughout the proposed plant. Nodes are defined by:

- Sectioning the operations at the plant:
- Grouping equipment that operates under consistent or nearly consistent process conditions, with similar hazards or consequences if there were an accidental release;
- Analyzing the failure frequencies and consequences for each node; and,
- Considering a range of release scenarios for each node.

The nodes of given P & ID are as following:
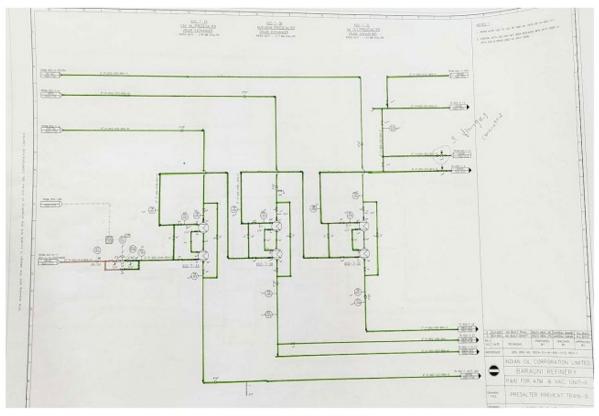
Figure 3: P & ID Diagram of IOCL
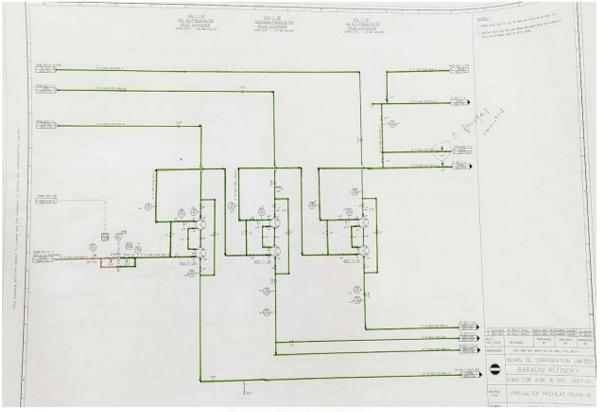
Figure 4: P & ID Diagram of IOCL
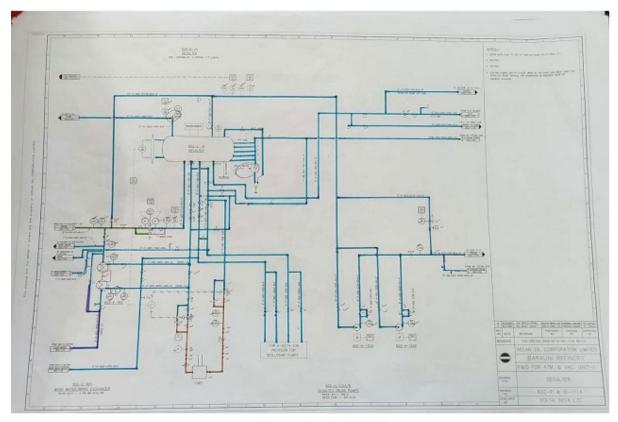
Figure 5: P & ID Diagram of Desalter
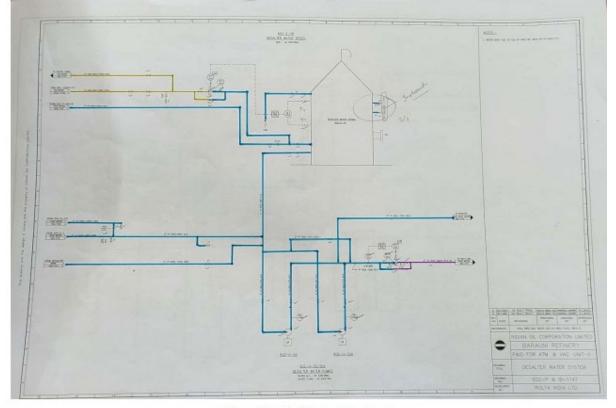
Figure 6: P & ID of Desalter Water Vessel

2.3 QRA Release scenario development:

The QRA considers a range of release scenarios for each node from the HAZID. The final accidental release scenarios in the QRA were developed by determining the applicable accidental release or loss of containment scenarios for the equipment within each node.

Loss of Containment Scenarios:

Loss of containment scenarios (LOCs) were completed in accordance with guidance from the TNO Purple Book. A set of LOCs is defined for each type of equipment; therefore, the type of equipment associated with each node defines the LOCs developed for each node. Table 1 indicates the LOCs for each equipment type that was reviewed in the study.

<div align="center">

Table 1: Loss of Containment Events

</div>

Vessels/ Reactors	Piping	Pumps	Heat Exchangers
G.1 Instantaneous release of the complete inventory	G. 1 Full bore rupture - outflow is from both sides of the full-bore rupture	G. 1 Full bore rupture - full bore rupture of the largest connecting pipeline	G.1 Instantaneous release of the complete inventory
G.2 Continuous release of the complete inventory in 10 min at a constant rate of release	G.2 Leak - out flow is from a leak with an effective diameter of 10% of the nominal diameter, a maximum of 50 mm	G.2 Leak - out flow is from a leak with an effective diameter of 10% of the nominal diameter of the largest connecting pipeline, with a maximum of 50 mm	G.2 Continuous release of the complete inventory in 10 min at a constant rate of release
G.3 Continuous release from a hole with an effective diameter of 10 mm			G.3 Continuous release from a hole with an effective diameter of 10mm

2.4 Consequence and Impact Analysis:

In the terminology of risk assessment, consequence is a measure of the expected outcome of an event and is measured or expressed as a hazard distance, hazard zone, or a hazard value at a specific location. Consequence analysis is normally carried out using mathematical models and computer software addressing the physical and chemical phenomenon. The results of the consequences modeling are included in an impact analysis (Section 7), which considers the presence of people, property and sensitive environments that can be adversely affected by a chemical release from the site.

Before conducting a consequence analysis, it is necessary to identify events that could follow the release of a hazardous material. The consequence analysis considers a range of potential hazards:

- If an accident involves a flammable liquid spill, ignition and complete engulfment of a flammable tank, a Boiling Liquid Expanding Vapor Explosion, or BLEVE, may occur.
- If the release is a gas or high-pressure liquid, a jet fire will result upon immediate ignition.
- In the absence of immediate ignition, a large flammable vapor cloud may form. A delayed ignition may lead to a Vapor Cloud Explosion or Flash Fire depending on the location of the vapor cloud in relation to obstructed regions.
- The resulting overpressure from a vapor cloud explosion, or BLEVE, can cause significant damage to surrounding processes, control rooms, or other adjacent structures.
- For an unignited toxic release, toxic vapor dispersion with downwind impacts may occur.

Table 2:Damages to Human Life Due to Heat Radiation

Exposure Duration	Radiation energy (1% lethality, kW/m^2	Radiation energy for 2nd degree burns, kW/m^2	Radiation energy for first degree burns, kW/m^2
10 Sec	21.2	16	12.5
30 Sec	9.3	7.0	4.0

Table 3: Effects Due to Incident Radiation Intensity

INCIDENT RADIATION – kW/m^2	TYPE OF DAMAGE
0.7	Equivalent to Solar Radiation
1.6	No discomfort for long exposure
4.0	Enough to cause pain within 20 sec. Blistering of skin (first degree burns are likely)
9.5	Pain threshold reached after 8 sec. second degree burns after 20 sec.
12.5	Minimum energy required for piloted ignition of wood, melting plastic tubing's etc.

Table 4: Damage Due to Overpressure

Peak Overpressure	Damage Type	Description
0.30 bar	Heavy Damage	Major damage to plant equipment structure
0.10 bar	Moderate Damage	Repairable damage to plant equipment & structure
0.03 bar	Significant Damage	Shattering of glass
0.01 bar	Minor Damage	Crack in glass

In general, a hazardous material release may exhibit one or more of the following types of hazards:

- Flammable exposure (thermal radiation, flame impingement)
- Explosions (blast overpressure)
- Toxic exposure

2.5 Dispersion Modeling:

The Phast Unified Dispersion Model (UDM) was used to assess the impacts of the releases, the downwind dispersion distance, the concentration profile and the width of flammable releases. Dispersion models use an average time to calculate the maximum concentration and the plume width. The value used in this QRA are detailed below and consistent with the Phast default parameters. A short averaging time is usually used for flammable gas dispersion effects since the peak concentration is more important, and a longer averaging time is usually used for toxic dispersion effects since the long-term concentration is more important.

- All flammable dispersion models used an averaging time of 18.75 seconds (Phast default)
- All toxic dispersion models used an averaging time of 600 seconds (Phast default)

2.5.1 The Consequence Event Tree:

Each accidental release scenario in the QRA involves the potential for ignition or no ignition. If ignited, a range of fire and/or explosion consequences could occur. For each release modeled in the QRA, a range of potential outcomes is assessed, each with its own probability of occurrence, and include:

- Jet Fire
- Pool Fire
- Flash Fire
- Boiling Liquid Expanding Vapor Explosion (BLEVE)
- Vapor Cloud Explosion
- Toxic (streams with carbon monoxide or methanol)

The ultimate consequence resulting from an accidental release is determined by the following factors:

- The duration of the release (continuous or instantaneous);
- The phase after release (vapor/liquid/two-phase);
- The time of ignition (immediate or delayed); and,
- The level of obstruction in the area of the vapor cloud.

Table 6: Parts count of Blue nodes

Plant:
Isolatable Section No.:   1   Blue
Isolatable   Section
Name:
Stream No.:

Equipment Diameter		IN-LINE EQUIPMENT				
		Valves		Flanges	Instruments / Small Bore Connections	Piping Length
		Actuated	Manual			
(mm)	(inches)	No.	No.	No.	No.	(m)
300	12		1 1/2			
250	10		3	2		
200	8	0.5	5.5			
150	6		4.5	3		
100	4	2.5	35.5	16		
80	3	0.5	2	3		
60	2 1/2					
50	2	0.5	24	3		
40	1 1/2		2		22	
25	1		3			
20	3/4		2			
<= 15	<= 0.5					

4. Conclusion:

In case of risks identified for the facility, the risk control measures mainly should aim at preventing the failure of tanks /pipeline and release of material to the external environment. Mitigation measures should also aim at minimizing the quantity that may get released during major releases, detection of such leaks and containing it without affecting the environment.

It should be noted that all observations, conclusions and recommendations are relevant only to this QRA project and the proposed operations at the site. These include, and are not limited to:

- Facility plot plan
- Heat and material balance
- Equipment and piping sizes
- Safety systems
- Meteorological data
- Onsite staffing
- Onsite buildings construction and occupancy
- Surrounding offsite businesses and community

In this QRA the level of risk was compared to the risk criteria published by the Health and Safety Executive of the United Kingdom (UK-HSE), which is a widely accepted international authority, and their criteria are utilized by many government organizations and companies to the evaluate risk of similar industries and hazards.

Course Name: Industrial Automation and IoT (EE2101)	
Hours per Week	**L T P: 3 0 2**
Credits	**4**
Students who can take	**M. Tech Semester-I**

Course Objective: This course aims to provide an introduction to industrial automation and IoT technologies and standards.

Learning Outcomes:

On successful completion of this course, the students should be able to:

1. Analyze the link between Information Technology and Operational Technology.

2. Specify the key components to design an Industrial automation & IoT system.

3. Choose technologies for communication and real time data collection.

4. Design, deploy and test a basic Industrial automation & IoT system.

5. Apply recommended engineering practices to meet desired requirements for applications, considering sustainability, security and safety as design constraints.

Syllabus

UNIT1: Introduction. Classical hierarchical industrial automation model. Essential functions of each level. Elements of industrial control (sensors, actuators, transmitters, controllers, etc.). ISA 95 / ISA S88 – Enterprise integration. Emergent architectures.

UNIT2: Instrumentation. Characteristics of instruments: accuracy, precision, sensitivity, etc. Units and standards. Voltage, current and electrical power measurements. Measurement of temperature, position, speed, force, pressure, light, level, humidity and other variables. Signal conditioning and transmission. Indicators, recorders. Actuators. Valves and motors. Instrumentation symbols. Functional identification. Standards: ISA 5.1 – Instrument symbols and identification. IEC 61511 Safety Instrumented Systems.

UNIT3: IoT fundamentals, Architecture and protocols,

UNIT4: Industrial IoT fundamentals. Convergence of IT and OT. Industrial communication: principles, protocols and technologies. Design methodology. Design of IoT systems for industrial safety processes.

UNIT5: CASE STUDIES

Design and test a basic IIoT system involving prototyping, programming and data analysis. Application to sustainability problems: health, energy, water, smart cities, etc.

Activities Related to Skill Development and Employability

Students work in practical applications like:

- Remote asset monitoring, Safety instrumented Systems
- Predictive maintenance

ISA/IEC 61511 Safety Instrumented Systems Certificate Programs

ISA/IEC 61511 Safety Instrumented Systems Certificate Programs

Certificate 1
ISA/IEC 61511 SIS
Fundamentals
Specialist

Certificate 2
ISA/IEC 61511 SIL
Selection
Specialist

Certificate 3
ISA/IEC 61511 SIL
Verification
Specialist

ISA/IEC 61511
EXPERT

Apply for an ISA/IEC 61511 Certificate Program

Apply for an ISA/IEC 62443 Certificate Program

ISA/IEC 61511 Certificate Program Requirements

ISA/IEC 61511 Safety

ISA Certified Automation Professional® (CAP®) Certification Program

ISA CAP certification provides a non-biased, third-party, objective assessment and confirmation of an automation professional's skills – specifically, the CAP exam is focused on direction, definition, design, development/application, deployment, documentation, and support of systems, software, and equipment used in control systems, manufacturing information systems, systems integration, and operational consulting. The CAP certification exam reflects the documented knowledge, skills, and abilities needed for competent job performance.

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CAP Associate Recognition Program

The ISA Certified Automation Professional® (CAP®) Referral Program

Certificates acquired Coursera

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Overview

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Course Info

Programming with Cloud IoT Platforms
by Pohang University of Science and Technology

About this Course
Internet of Things (IoT) is an emerging area of information and communications technology (ICT) involving many disciplines of computer science and engineering including sensors/actuators, communications networking, server platforms, data analytics and smart applications. IoT is considered to be an essential part of the 4th Industrial Revolution along with AI and Big Data. This course aims at introducing IoT Cloud platforms from Samsung, Microsoft, Amazon, IBM and Google and how they can be used in developing IoT applications. This course will be offered in English. Subtitles/captions in English and will be also provided.

IoT (Internet of Things, 사물인터넷)는 최근 중요한 정보통신기술로 주목 받고 있으며 센서/제어기, 통신 네트워크, 서버 플랫폼, 데이터 분석, 스마트 앱 등의 컴퓨터공학 기술들이 융합된 기술입니다. IoT는 인공지능, 빅데이터와 함께, 4차산업혁명의 3대 핵심 기술 중 하나로 손꼽히고 있습니다. 글로벌 Cloud 서비스 제공자들이 IoT를 특별히 지원하기 위하여 개발한 IoT Cloud 플랫폼들을 소개합니다. 이것들을 활용하여 다양한 IoT 어플리케이션을 개발할 수 있습니다. 본 과목은 영어로 진행되며, 영문자막(일부 한글과 영문 모두)을 제공합니다.
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Taught by: James Won-Ki HONG, Professor, Dept. of Computer Science and Engineering Dean, Graduate School of Information Technology Pohang University of Science and Technology Republic of Korea
Computer Science