JK LAKSHMIPAT UNIVERSITY
JAIPUR

Course Code and Name: CE 403 Hydraulic Engineering

Teaching Scheme: 3 0 2

Credit: 4

Learning Outcomes

After course completion, the student will be able to:

1. Explain the principles governing the open channel flow.
2. Classify the various types of flow in open channels.
3. Design the most efficient cross section of channel for uniform flow.
4. Compute the gradually varied flow profiles in prismatic and non-prismatic channels.
5. Analyze the flow in channels by open source software HEC RAS.
6. Compute the rapidly varied flow profile (hydraulic jump) in open channels.
7. Explain the basic equations and principles of unsteady flow in open channel.
8. Explain the principles governing the flow in rivers and canals with sediments.
9. Explain the various forms of river.
10. Explain the various sources of water in rivers.
11. Design the canals with and without sediments with IS standards.

Syllabus (Theory)

Unit 1: Basic Principles: open channel flow and its classifications, and properties, energy and momentum principles, Critical flow computation and its applications, transitions with sub critical and super critical flows.

Unit 2: Uniform flow, roughness coefficient, computation of uniform flow in prismatic channel, design of non- erodible channels for uniform flow, Most efficient channel section, compound sections

Unit 3: Gradually varied flow: Theory and analysis, gradually varied flow computations in prismatic channels, gradually varied flow in non-prismatic channels. Rapidly varied flow: Theory of hydraulic jump, evaluation of jump elements in rectangular and non-rectangular channel, location of jump on horizontal floor, channel controls and transitions, free over fall, thin plate weirs, broad crested weirs, and sluice gates.

Unit 4: Unsteady flow in open channels, surge movement in open channels, Numerical methods to solve Saint-Venant Equation

Unit 5 River regions and their characteristics - classification of rivers on alluvial plains - meandering of rivers, design of canals with sediments

Syllabus (Practical)

1. Calibration of triangular notch for field installation
2. Study on velocity distribution in an open channel
3. Study phenomena of hydraulic jump
4. Study on critical depth of flow
5. To perform the Reynolds experiment for determination of different regimes of flow.
6. To study the movement of surge in open channel
7. To study the sediment movement in channels

Activities Related to Skill Development and Employability

Field Visit

A field visit was organized for the students to Dravyavati River front.

Date of Visit: 20-9-2018

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

Number of Students: 21

Name of Faculty/ LT: Dr. Kedar Sharma

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Brief about Visit:

Department of Civil Engineering organized a field visit for III and V (2017-2021 and 2016 - 2020 Batch) semester students. Dr. Kedar Sharma was the faculty guide during the visit. He did his masters and PhD from IIT Kanpur in Hydraulics and Water Resources and have a vast experience in field of water resources management.

After this visit, the following Learning Outcomes were achieved:

1. Basics of open channel flow
2. Use of Weirs for water level increase
3. Connections of various local drains in main channel

The photographs of the visit are attached herewith:

River Front Project Site

Quiz

Quizzes were taken from each unit to improve the course understanding.

J K Lakshmipat University

Department of Civil Engineering

Hydraulic Engineering

Quiz 1

1. Describe the velocity distribution in open channels and what is one-, two- and three dimensional approach for solving flow in open channels?
2. What is the critical flow in channels?
3. A 5 m wide rectangular channel carries a discharge of 6.40 m^3/sec at a depth of 0.8 m. At a section there is a drop of 0.22 m in the bed. What is the water surface elevation downstream of the drop? What is the water surface elevation if the channel is reduced to 4.5 m? What is the water surface elevation if both transitions apply at a section?
4. What is choking in open channels?

J K Lakshmipat University

Department of Civil Engineering

Hydraulic Engineering

Quiz 2

1. A trapezoidal channel is 10m wide and has a side slope of 1.5 horizontal: 1 vertical. The bed slope is 0.0003. The channel is lined with smooth concrete of n = 0.012. Concept the mean velocity and discharge for a depth of flow of 3.0m.
2. A trapezoidal channel with bed width of 5.0 m and side slope 1H:1V is laid on a slope of 0.0004. Find the normal depth corresponding to discharge of (a) 10 m^3/sec and (b) 20 m^3/sec in the channel.
3. A trapezoidal channel of 4.0 m bed width and side slope of 1.5 horizontal : 1 vertical has sand bed (n = 0.025). At a certain reach, the side are lined by smooth concrete (n= 0.012). Calculate the equivalent roughness of this reach if the depth of flow is 1.50 m. (use Hortan's formula).
4. What is the most efficient channel section for rectangular channel and triangular channel?
5. What is compound channel?

Project Report

Each Student Submitted a Report related to various causes of project failure.

Report
On

IRRIGATION IN INDIA

COURSE CODE: **CE-1203**
COURSE NAME: **IRRIGATION ENGINEERING**

By:
AAYUSH BANSAL
(2016 BTECHCE001)

KULDEEP S. JANI
(2016BTECHCE005)

Faculty Guide:
Dr.Kedar Sharma

Department of Civil Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

SEPTEMBER 2019

JK LAKSHMIPAT UNIVERSITY, JAIPUR

Irrigation Engineering (CE1203)

A

Report

on

Classification of Canals Based on Different Factors

Prepared

By

SAGAR MEWARA
2016BtechCE015

KESHAV MUNDRA
2016BtechCE019

For

DR. KEDAR SHARMA
Associate Professor
Department of Civil Engineering

Institute of Engineering & Technology (IET)
JK Lakshmipat University, Jaipur

25th August 2019

VARIOUS METHODS OF IRRIGATION

CE-1203: Irrigation Engineering

Submitted in partial fulfilment of the requirements
for the course of

Irrigation Engineering

By:

Vineet singh solanki (2016BTechCE017)
Mahaveer kachhawa (2016BTechCE018)
Vikas yadav (2016BTechCE016)

Supervisor:
Dr.Kedar Sharma

Department of Electrical Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University, Jaipur

JK LAKSHMIPAT UNIVERSITY
JAIPUR

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
CE507	Design of RCC and Steel Structure	4	1	0	0	5

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test - II	End Term Test	Class Participation / Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation / Additional Continuous Evaluation*	Total Marks **
20	20	50	10	100	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

Design of RCC structures

Methods of Design of Concrete Structures: Concept of Elastic method, ultimate load method and limit state method, Advantages of Limit State Method over other methods, Design codes and specification, Limit State philosophy as detailed in IS code, Design of flexural members and slabs by working stress method, Principles of Design of Liquid retaining structures, Properties of un-cracked section, Calculation of thickness and reinforcement for Liquid retaining structure

Limit State Design for Flexure: Analysis and design of one way and two way rectangular slab subjected to uniformly distributed load for various boundary conditions and corner effects, Analysis and design of singly and doubly reinforced rectangular and flanged beams

Limit State Design for Bond, Anchorage Shear & Torsion: Behaviour of RC members in bond and Anchorage, Design requirements as per current code, Behaviour of RC beams in shear and torsion, Design of RC members for combined bending shear and torsion.

Limit State Design of Columns: Types of columns, Design of short column for axial, uniaxial and biaxial bending, Design of long columns.

RCC Slabs: Structural behaviour of slabs under UDL, Type of Boundary conditions, Design of one way slab, Design of two way slab with the help of tables of IS:456.

RCC Stairs: General principles for design of RCC stairs, Design of horizontally spanning stairs, Design of dog legged RCC stairs.

Design of Steel Structures

Introduction: Properties of Structural Steel, Corrosion, Fire Protection, Indian Standard Specifications and Sections.

Design Approach: Design Requirements & Design Process, Analysis Procedures & Design Philosophy, Introduction to Limit State Design, Other Design Requirements.

Connections: Bearing Type Bolts, Friction Grip Bolts, Welded Connections, Hanger Connections, Eccentrically Loaded Connections, Splice Connections.

Compression Members: Buckling Strength of Ideal Columns, Design of Axially Loaded Columns, Design of Angles Loaded through one-leg, Laced and Battenned Columns.

IS Codes:

1. Code of practice for plain and reinforced concrete IS : 456 (III revision) (with amendment I)
2. Code of practice for structural safety of Buildings IS : 875 Part I to V
   Loading standards.(revised)(with Amendment 1)

Activities Related to Skill Development and Employability

Field Visit

A field visit was organized for the students to Ring road to show various type of RCC and steel structures.

Date of Visit: 20-10-2018

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

Number of Students: 15

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Brief about Visit:

Department of Civil Engineering organized a field visit for V (2015 -2019 Batch) semester students to Ring road project of Jaipur to explain various RCC and steel structures. Dr. Kedar Sharma, Mr Amit Kumar and Mr. Vinod Kumar were the faculty members accomplish the students during the visit.

After this visit, the following Learning Outcomes were achieved:

1. Reinforcement used in the foundation of Culverts
2. Reinforcement used in the Pillars of Bridges
3. Girder Bridge on the railway line

The photographs of the visit are attached herewith:

Quizzes

Quizzes were taken from each unit to improve the course understanding.

J K Lakshmipat University

Department of Civil Engineering

Design of RCC and Steel Structure

Quiz 1

Q.1 : Design a footing for a column 450mm x 450mm carrying a load of 1500 KN, the SBC of soil is 100KN/sq.m. Use M20 Concrete & Fe 415 steel

Q. 2: Two plates 10mm x 60mm are connected in a lap joint with 5 no. M16 bolts of grade 4.6 & 410 plates. Calculate the design shear strength of bolt.

J K Lakshmipat University

Department of Civil Engineering

Design of RCC and Steel Structure

Quiz 2

Q. 1 Discuss the steps for calculation of design strength of tension members.

Q 2. Design a RCC slab for a room size of 3m x 7m carrying a load of 2KN/m. Use M30 Concrete & Fe 415 steel.

Course Title: Performance Evaluation of Computer and Communication Systems
(PhD course work Elective)

Course Objective: The objective of the course is to develop understanding of the concepts, techniques and tools for performance evaluation of computer and communication systems. The foundations of performance evaluation reside in statistics and queuing theory and hence the course contains topics on traffic modelling and queuing theory.

COURSE OUTCOME:

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

1. Explain the basics of Simulation and Modelling.
2. Model the real world system using Probabilities and Statistical methods.
3. For a given communication system, determine the metrics for Network Performance.
4. Apply standard procedures of Queuing theory for modelling the specified data.
5. Apply energy efficient techniques for performance evaluation of Communication System.

Evaluation Scheme

Course Title and Code: Performance Evaluation of Computer and Communication Systems		
Prerequisites		**Nil**
Module		**4**
Credits		**-**
Sr. No	**Specifications**	**Marks**
01	Attendance	0
02	Assignment	0
03	Class Participation	0
04	Quiz	20
05	Theory Exam-1(After Module 2)	25

06	Theory Exam-2(After Module 3)	25
07	Theory Exam(Final)	0
08	Report-1(Case Study)	30
09	Report-2	0
10	Report-3	0
11	Project -1	0
12	Project -2	0
13	Project -3	0
14	Lab Evaluation – I	0
15	Lab Evaluation – II	0
16	Course portfolio	0
	Total (100)	**100**

Syllabus (Theory)

Course Plan

Module -1

Introduction: Distributed System, Client server Architecture, Network Software Architecture, Protocol and Service, Packet Switching network.

Module-2

Classics of Evaluation of performance: Experiment, Analysis and Simulation, Basics of Simulation Modeling, Review of Probabilities and Statistics, Building Valid Credible Simulation Models.

Module-3

Parameters of Network Performance, Mathematical Tools for Simulation, Traffic Modelling, Queuing Theory, Output data analysis. Congestion control

References:

- Data Communication & Network : William Stallings, 3rd Edition
- Communication Network : A.S. Tanenbaum
- J. Walrand and P. Varaiya, High-performance Communication Networks, 2/e, Morgan Kaufmann, 2000
- Law, Kelton; Simulation Modeling and Analysis 3rd edition, Mc Graw-Hill,1999,ISBN0-07-116537-1
- Jain; The Art of Computer System Performance Analysis, J. Wiley& Sons,1991,ISBN0-471-50336-3
- T. G. Robertazzi, Computer Networks and Systems, Queuing Theory and Performance Evaluation, Third edition, Springer Verlag, 2000
- I. Katzela, Modeling and Simulating Communication Networks, A Hands-on Approach Using OPNET, Prentice Hall, 1999

CASE STUDY PAPER

- **New Innovations in Performance Analysis of Computer Systems**

Sample Paper –Student (Surbhi Maheshwari)

Performance Evaluation of Ice Cream Parlor using Queuing Theory: A Case Study

Abstract-Ice Cream Parlor is the good and best option for the summers. Ice cream parlors avoid losing their customers due to a long waiting queue. Some Ice Cream Parlors have some waiting chairs to avoid these types of mistakes, but waiting chairs alone would not solve a problem when customer withdraw the plan a knock the another door of another Ice Cream Center. This situation needs the numerical and mathematical model and calculations for the efficiency of the system and better performance evaluation and this will happen when management will do the numeric calculation and apply the systematic formula to achieve the customer satisfaction. This paper show the real case scenario of "NATURALS" the Ice Cream Parlor situated at vaishali nagar,Jaipur. In this Ice Cream Parlor the server is only one but they provide some waiters and waitresses for serving the Ice Cream to the customers. The Poisson distribution and exponential distribution will be featured in this queuing model. I obtained the data from this Ice Cream Parlor and after that define different terms such that arrival rate, Service rate, utilization factor etc. I have also find out the customers who balking and impatient in nature using Little's theorem and M/M/1 queuing model. At last I take out the probability of zero customer and n-customer through probability theorems.

Keywords-Queuing theorem, Little's theorem, Poisson distribution, exponential distribution, waiting lines

1. Introduction

Queuing theory is the mathematical study of waiting lines. A queuing model is constructed so that queue length and waiting time can be predicted. It is a branch of operational research because results are used in making the business decision.

Queuing are the most frequently encountered problems in everyday life. For example, queue at a cafeteria, library, bank, hospitals, educational area, etc. Common to all of these cases are the arrivals of objects requiring service and the attendant delays when the service mechanism is busy. Waiting lines cannot be eliminated completely, but suitable techniques can be used to reduce the waiting time of an object in the system. A long waiting line may result in loss of customers to an organization. Waiting time can be reduced by providing additional service facilities, but it may result in an increase in the idle time of the service mechanism.

Queuing theory is also describes the simulation and optimization theory. According to Sun hu and Xu Linwai (2009) simulation is the best technique to solve the utilization rate and the bottleneck of the model of queuing system. they apply this theory on noshery service system. Huimin Xiao, Guozheng Zhang (2010) apply the queuing theory on bank. According to them chains bank have done a great effort to increase the marketing but facing the serious problem in decreasing the customer queue, which leads to the low service rate of the bank. the problem of customers waiting for the shortest time is studied by means of the queuing theory the measure to reduce the time of customers queues is obtained to achieve the goal of people-oriented and the greatest effectiveness of the banks. Basically queuing system can be categorized into different models-

- Single queuing model
- Multiple server queuing model

Another single and multiple models Classification of Queuing Models

Model I (M/M/I): (∞/FCFS)

Model I (M/M/I): (∞/FCFS)

Model II (M/M/I): (∞/SIRO)

Model III (Birth-Death process) (M/M/I): (∞/FCFS)

Model IV (M/M/I): (N/FCFS)

Model V (M/M/C): (∞/FCFS)

Model VI (M/E/I): (∞/FCFS)

Model VII (M/M/R): (K/GD); K < R

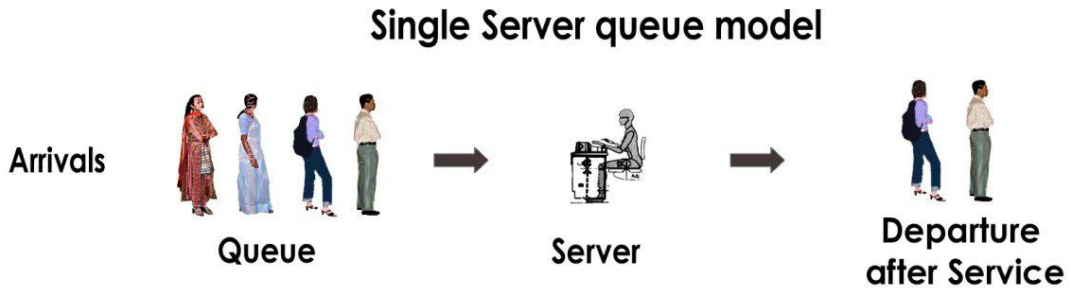
Model VIII – Power supply Model

Model IX – D/D/I

Model X – M/D/I

Model XI (M/G/I): (∞/FCFS)

In this research paper the single mode queuing model is applied. From this model we can calculate the This is a queuing model in which the arrival departure distribution is also, number of server is one and size of the queue is also infinite, no. of server is one and size of the queue is infinite and service discipline is 1st come 1st serve (FCFS) and the calling source is also finite.



According to S. Shanmugasundaram and P. umarani(2015) Queuing theory is the mathematical study of waiting lines and it is very useful for analyzing the procedure of queuing of daily life of human being. Queuing theory applies not only in day to day life but also in sequence of computer programming, networks, medical field, banking sectors etc. In this paper, we analyze the basic features of queuing theory and its applications.

"NATURALS" the Ice Cream Parlor situated at vaishali nagar,Jaipur is well and popularly known for the best flavored Ice Cream in Jaipur.It has 5 branches in Jaipur itself. It is also well known for its immediate service quality. This parlor also provide take away to the customers immediately after payment and also provide sitting area to the customers.

Queuing theory is the theory of waiting lines and waiting queues. Through the queuing theory we can analysis the expected queue length, expected waiting time, utilization factor(throughput of arrival rate and service rate),average time In the system, average waiting queue in the system, the probability of balking customers, and the system with probability of zero customer and n-customers.

This paper study the performance evaluation of the **"NATURALS" the Ice Cream Parlor situated at vaishali nagar,Jaipur** by using the queuing model and Kendall's notations. The Ice Cream Parlor provides the one server as a chef and 6-7 waiters and waitresses to serve the Ice Cream. On the daily basis the Ice cream parlor serves 300 Ice Creams in week days (Monday-

Friday) and more than 700 Ice Cream in weekends(Saturdays ,Sundays and public holidays).This study tells the practical use of queuing model in any system.

I) Little's theorem-

This describes the relationship between arrival rate and service rate.

$L = \lambda T$ **…….. (1)**

Where L is the throughput rate of arrival and service rate and it is the product of average number of customer arrival rate and average service time for a customer.

Three phenomenons can be derived from the Little's theorem

- λ increases if L increases or T decreases
- T increases if L increases or λ decreases
- L increases if λ or T increases

II) Queuing model have some definitions-

1. Arrival time distribution
2. Service time distribution
3. Number of Servers
4. Queue length
5. System capacity
6. Queue discipline

III) Kendall's Notations

A/B/P/Q/R/Z where

A describes the distribution type of the arrival time.

B describes the distribution type of the service times.

P describes the number of the servers in the system

Q describes the maximum length of the queue

R describes the size of the system capacity

Z describes the queuing discipline

II) Research Methodology

NATURAL'S QUEUING MODEL

The data were obtained by the observation and mostly by the interview with manager of the Ice Cream Parlor. The daily number of the customers, the waiting customers ,the number of waiters and waitresses ,average time spent by the customer etc. found after the interview with manager of NATURALS. Based on these data I conclude that the M/M/1 queuing model is best fit for this system. A quantitative research method is used in this work

This means the arrival time and service time are exponentially and Poisson distributed. The Ice Cream parlor consists only one server, In My observation the Ice Cream Parlor has several Waiters and Waitresses but in actually they have only one chef for all the customers.

Figure 1 illustrates the M/M/1 model:-

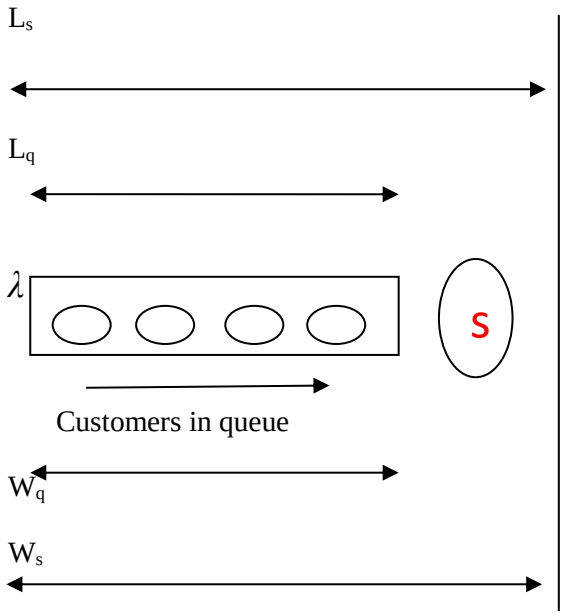


Figure 1: M/M/1 Queuing Model

In this model following variables will be used:-

λ : The mean customer arrival rate

μ: The mean service rate

μ: The mean service rate

ρ: λ/μ : utilization factor

Probability of the zero customers in the Ice Cream Parlor-

$P_0 = 1 - \rho$…… (2)

Probability of the n- customers in the Ice Cream Parlor-

$P_n = P_0 \rho^n = (1 - \rho)\rho^n$…….(3)

Average number of customers in the Ice Cream parlor-

$L_s = \rho / (1- \rho) = \lambda / (\mu - \lambda)$…….. (4)

Average number of customers in the queue-

$L_q = L \times \rho = \rho^2 / (1- \rho)$

$= (\rho \lambda) / (\mu - \lambda)$……..(5)

Average waiting time spent in Naturals-

$W_s = L / \lambda = 1 / (\mu - \lambda)$…… (6)

Average waiting time in the queue

$W_q = L_q / \lambda = \rho / (\mu - \lambda)$…… (7)

Table 1: Monthly customer Count

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1st Week	315	367	415	303	501	678	789
2nd Week	363	369	567	506	454	867	881
3rd Week	373	567	435	476	347	634	756
4th Week	300	409	678	378	489	598	888

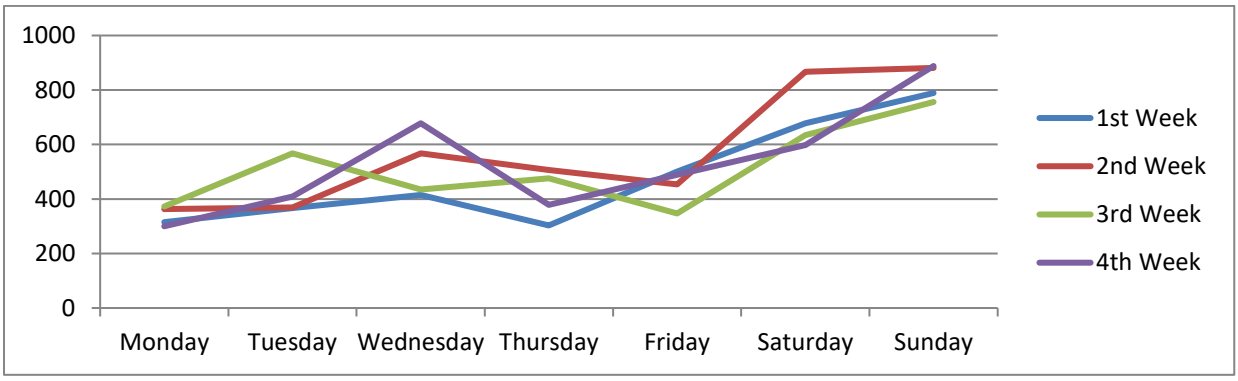


Figure 2: 1 Month Count of Ice Cream

As we see in Figure 2 and Table 1 that the data we get in weekends are just doubled and more than from week days data. So the busiest period for the Ice Cream Parlor is on during weekends and busiest time is 8.00pm to 10.00 pm (2 hours, according to research conducted). Now we can derive the different variables from these data

A) Calculations

I conducted research in summer from 8.00pm to 10.00pm.There are on an average 300 people are coming to the Ice Cream parlor. From this we can derive the following data-

1. Arrival rate

$L = \lambda T$

$\lambda = L/T$

$= 300/120 = 2.5$customer/minute (cpm)

Some observation are also found out by discussion with manager and some observation that each customer spends 25 minutes in the Ice Cream parlor(W) and the queue length is around 53 people(L_q) ,and the waiting time is around 30 minutes.

According to the formula for waiting time the actual waiting time is not so differ from the theoretical waiting time.

$W_q = 53 / 2.5 = 21.2$ minutes

Next we have to calculate the average number of people in the Ice Cream parlor

$L = 25 \times 2.5 = 62.5$ customer

Now from these much data we can also derive the service rate

$\mu = \lambda(1+L)/L = 2.5(1+62.5)/62.5 = 2.54$ cpm

also derive utilization rate here

$\rho: \lambda/\mu = 2.5 / 2.54 = 0.984$

Utilization rate is very high at 0.984 and from this we can derive the probability of zero customers in the Ice Cream parlor

$P_0 = 1 - \rho = 1 - 0.984 = 0.016$

Probability of the n- customers in the Ice Cream Parlor-

$P_n = P_0 \rho^n = (1 - \rho)\rho^n = 0.016(0.984)^n$

Now we can derive the probability of impatient or balking customer when they see more than 8 people in the queue (on assumption) and we also assume that the tolerable maximum queue length is 20 people. As we know the capacity of the system when it is fully occupied are 90 people according to manager.

So we can calculate the probability of 8 people in the queue as the probability of 98 people in the system so

Probability of customers going away is =P (more than 8 people in the queue) =P (more than 98 people in the queue) is

$$\mathbf{P_{9\text{-}21} = \sum_{n=9}^{21} P_n = 0.1543 = 15.42\%}$$

1. Evaluation

Utilization is directly proportional to mean number of customers. This means if number of customer's increases than utilization also increases and vice versa.

The utilization rate is very high at 0.984 this is however the utilization rate in weekends but in week days the utilization rate is less of this because

- The numbers of customers are also less. In addition to this the number of waiters and waitresses are same in weekends as well as week days.
- When the service rate higher that the utilization will be lower, this makes the customer decreases.

2. Proposed solution by using M/M/C model-

Now for reducing the waiting queue length, waiting time, and utilization rate we will propose a new method into this system i.e. M/M/C server model where c=2,by means we can add one more server into ice cream parlor and again derive the value of utilization factor and all terminologies.

M/M/C Model(c=2)

- In a M/M/C queuing model, there are c parallel servers, each serving customers, (c>1).
- All arriving customers after entering the service system join a single queue.
- If all c servers are already busy in serving customers, the first customer in the queue will be served by any of the c servers as soon as any server will be free from serving previous customer. The service rate in the case will be (μc).

- Hence the utilization factor for the M/M/C service system will be

$$\rho = \lambda/(c \times \mu)$$

Now we can derive the value for utilization factor (ρ) = 2.5/ (2 x 2.54) = 0.49

- **L (average number of people) = $2\rho / (1- \rho^2)$**

$=2 \times 0.49/(1-(0.49) \times (0.49))$

$=1.30$

- **W (mean spend time in the system) = $1/ \mu (1- \rho^2) = 1/ 2.54(0.75)$**

$= 0.52$

- **$W_q = \rho^2/ \mu (1- \rho^2) = 0.126$**

- **$L_q = 2 \rho^3/ (1- \rho^2) = 0.313$**

Table 2: Result analysis of M/M/C Queuing Model with two servers and M/M/1 model

Terminologies	M/M/1 queuing model	M/M/2 queuing model
1. Utilization factor	0.984	0.49
2. Mean of customer in the system (L)	62.5 customer	1.30 customer
3. Mean time for a customer to go through the system(W)	25 minutes	0.52 minutes
4. Mean of customer in the queue(L_q)	61.5customer	0.313 customer
5. Mean waiting time for a customer in the queue(W_q)	24.6 minutes	0.126 minutes

Terminologies	M/M/3 queuing model	M/M/4 queuing model
1. Utilization factor	0.3281	0.2461
2. Mean of customer in the system (L)	1.269 customer	0.9906 customer

3. Mean time for a customer to go through the system(W)	**0.4108 minutes**	**0.3962 minutes**
4. Mean of customer in the queue(L_q)	**0.0427customer**	**0.0063 customer**
5. Mean waiting time for a customer in the queue(W_q)	**0.0171 minutes**	**0.025minutes**

Again we can solve this by using M/M/3 and M/M/4 servers and now we can see that the values of L (Average number of customers in the system), L_q (Average customers in the queue), W (Average time spent in the system), W_q (Average time waiting in line) and utilization factor decreases. This result will give the better performance evaluation to the Ice cream parlor.

(IV) Conclusion:

This research paper has conducted the application of queuing theory of Ice Cream parlor. From the result we have obtained that the rate of arrival of customer is 2.2 cpm and the service rate is 2.54 cpm. Probability of customers going away is 15.42% .When we applied M/M/C model instead of M/M/1 queuing model than we will get better solution for this system. After that can apply M/M/3 and M/M/4 also and we will find better solution. This theory is also applicable for fast food center, restaurant if they want to know daily data. It can be conclude that the arrival rate is lesser and the service rate is much more. There are some constraints which affect this research are assumption based values, so the result gives the inaccuracy.

(V) Future Scope:

In the future scope of this we will develop a simulation model for Ice Cream Parlor. Through this simulation model we can find the perfect and exact values that we develop in this paper. Simulation model can solve the complexity of probability values and gives the better performance evaluation of the particular system.

VI) References:

- Oladejo M.O.1, Agashua N. U.2, Tamber J. A.3 International Journal of Recent Development in Engineering and Technology Website: www.ijrdet.com (ISSN 2347 - 6435 (Online)) Volume 4, Issue 8, August 2015)
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JK Lakshmipat University, Jaipur
Institute of Management
B. Com (H)
Academic Year- 2018-19
Digital Marketing

Course Code: MK25
Credits: 3
Semester: III

COURSE DESCRIPTION:
The marketing paradigm has transformed with the rise of digital technologies, Companies today face a constant proliferation of social media channels, the growing power of connected customers, and an explosion of new digital tools.

COURSE OBJECTIVES:
To succeed, marketers must be able to plan, implement, and measure the impact of digital strategies that are suited to today's customers and integrated with their traditional marketing and business goals. This program focuses on how marketers can reach digitally savvy audiences, build deep customer relationships, and influence the digital path to purchase.

TOPICS TO BE COVERED:

- Digital marketing Trends, common metrics in digital marketing, Google Analytics
- Blogs
- Search Engine Optimization
- SEM - Google AdWords
- Social media & E-mail marketing
- Affiliate and Mobile marketing
- E commerce

Activities Related to Skill Development and Employability

Group Project: on Social Media and E-mail Marketing

Certificate 1: Google's Digital Garage Certificate of Online Proficiency

Certificate 2: Google Analytics Certificate

Certificate 3: Hubspot Content Marketing Certification

JK Lakshmipat University, Jaipur
Institute of Management
Bachelor of Commerce
Academic Year- 2018-19
Financial Planning and Wealth Management

Course Code: FN18
Credit: 3
Semester: IV
Course Description:
This course provides an introductory study of wealth management and contemporary financial planning. This course provides an overview of the major components of financial planning, namely consumption planning, tax planning, insurance planning, retirement planning and estate planning. This course is designed in such a way to enable students to respond to the challenges posed by the changing nature of the financial products landscape. Students here will be exposed not only to theoretical concepts but also their practical applications for becoming wealthy. This course is about the process of creating wealth, the methods and instruments involved as well as managing wealth.

Course Learning Outcomes:
At the end of this course, a student should be able to:

- Acquire understanding of Financial Planning Profession and the role of a financial planning advisor.
- Analyze and evaluate basic investment avenues (including investment types, risk & return, passive vs. active management) and specific investment strategies necessary to allow clients a mechanism to achieve realistic goals.
- Apply knowledge of basic tax planning fundamentals for individuals and how taxes affect investment, retirement and estate decisions aimed towards SELF financial planning and wealth management.

Topics to be Covered:

- Financial Planning & Wealth Management: An overview
- Standard Life Cycle Hypothesis
- Investment planning
- Retirement Planning
- Tax planning
- Estate Planning

Activities Related to Skill Development and Employability

Project 1 on an analysis of Small Saving Schemes in India
Case study on Wealth Management Services at ICICI Bank
Class room discussion on Individuals attitude towards personal financial planning using research paper titled: An empirical analysis of personal financial planning in an emerging economy.
Class room discussion on Wealth Management in India: Challenges & Strategies using Cognizant Report.
Class room discussion on Life Cycle Hypothesis using research paper titled: Housing Wealth Dis-saving Choices of Indian Urban Homeowners in Later Life: The Influence of Uncertain Life Span and Demographics
Class room discussion and presentation on top 10 Wealth Management Strategies using Insurance.
Assignment on tax planning, insurance, retirement planning using small case lets.

JK Lakshmipat University, Jaipur
Institute of Management
Bachelor of Commerce (H)
Academic Year- 2018-19
Investment Planning

Course Code: FN19
Credit: 3
Semester: IV
Course Description:
This course covers the critical knowledge of different asset classes and interplay amongst them, the products constituting such classes and their investment risk profile to enable the management of a client's finances towards achieving various financial goals. The development of vital understanding of basic risk profile of the client so as to astutely recommend appropriate asset allocation is a crucial area requiring mastery. Another aspect that needs sharp skills is the measurement of investment risk and returns, their analysis in portfolio evaluation and alignment to suit the financial goals.

Course Learning Outcomes:
At the end of this course, a student should be able to:

- Analyze assets classes and factor affecting them, the interplay between asset classes, product constituting those asset classes and their complexity and riskiness.
- Evaluate investment choices in the context of client's financial planning needs.
- Determine the tax implication of the investment choices made, measure investment risk and the risk adjusted return in the strategy adopted.
- Recommend appropriate strategy to model a portfolio comprising varied investment products in tune with a well established asset allocation suited to achieve the client's financial goals.

Topics to be Covered:

- Investment Environment
- Investment Product Universe
- Regulatory framework: SEBI, Major Stock Exchange, Depositories
- Risk & Return Relationship
- Investment strategy-active & passive
- Portfolio Management: Creation, Analysis and Revision
- Derivative Instruments

Activities Related to Skill Development and Employability

Case 1: EIC framework: Two Wheeler Industry Analysis
Case 2: A portfolio Restructuring Dilemma
Case 3: Debacle of Reliance Power IPO
Assignment 1 on Calculation of risk & return of investment in single security
Assignment 2 on Calculation of risk & return of investment in a portfolio
In class room discussion on Investment Environment focusing on Systematic Risk referring case let of Learning from Tata's Nano Mistake

JK Lakshmipat University, Jaipur
Institute of Management
B.Com (H)
Academic Year- 2018-19
Sprints

Course Code: GN40
Credits: 2
Semester: VI

Course Description:
Sprints is an action encapsulated course designed for the students of final semester to refresh and strengthen the learnings congregated from all the completed semesters of their program specially in the area of marketing, human resource and finance. This course adopts the integrated problem oriented approach via the use of cases and simulation. It implies that complex business problems, in the form of cases and simulations require students to understand different dimensions of the problem and come up with holistic solutions. The course will help students to be abreast with trending management issues and at the same time apply the knowledge gained. It will induce students to understand trade-offs in decision making so that they are guided to improve from being a mere graduate to be a skillful work-force.

Course Learning Outcomes:
After the successful completion of this course, the students will able to

- Analyze multi-dimensional nature of present day organizations' challenges.
- Assess pitfalls in trying to resolve problems using a multi-functional approach.
- Highlight specific external and internal issues impacting businesses
- Integrate multiple dimensions of management lessons to solve business problems.

Topics to be Covered:
Marketing:

1. Elements of Marketing Mix
2. Segmentation, Targeting and Positioning
3. Consumer Behavior
4. Product and Brand Management
5. Pricing Decision
6. Marketing Channel Management
7. Integrated Marketing Communication
8. Gaining Competitive Advantage

Finance:

1. Accounting Cycle
2. Financial Statement Analysis and Interpretation
3. Cost Analysis and Cost Control
4. Tools for Financial Decision Making
5. Indian Financial System: Financial MIIS

HR:

1. Business organization- Current challenges
2. Talent Management
3. Training and development
4. Compensation
5. Performance Management
6. Leadership
7. Culture & Change
8. Recent Trends Shaping HR.

Activities Related to Skill Development and Employability

Case 1: Foodies Corner: Marketing To Elderly People
Case 2: Mascara to Deodorant
Case 3: Using New Product Development to Grow a Brand
Case 4: PIZZA HUT: Attractive Promotion Strategies
Case 5: Financial Statement Analysis: JK Lakshmi Cement Ltd.
Case 6: Cash in Hand: Revenue Recognition/Misrepresentation of Facts by Client
Case 7: Plant Automation (Capital Budgeting)
Case 8: Human Resource Management at TCS
Case 9: GE's Strategy Approach to Leadership
Case 10: Planning at an Indian Public Sector Unit
Case 11: Travails of a Training Managers
Assignment 1: on STP
Assignment 2: on Product Mix
Assignment 3: on Mass Media
Assignment 4: on Consumer Behavior
Assignment 5: on Preparation of Financial statement of a company
Assignment 6: on Time value of money
Assignment 7: on Review of Indian banking system
Assignment 8: on of Stock market operation
Assignment 9: on Mutual fund evaluation
Assignment 10: Challenges of HR in transforming landscape of business
Assignment 11: on Identifying Talent requirement
Assignment 12: on Assessing Training need of sales force in departmental store
Assignment 13: Crafting employee engagement program in Travel and tour company

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Introduction to Marketing

Course Code: MA2101
Credits: 3
Trimester: I

Course Description and Objectives:
This course introduces students to basic marketing concepts bucketed into four main topics -branding, customer-centricity, go-to-market strategies and effective brand communications strategies. The course has two components:

1. Videos introducing the subject from Coursera and The Wharton School. Students desiring to do so can also complete all the online course requirements like quizzes etc. to obtain certification from Wharton.
2. Classroom lectures. These lectures will discuss and expand upon the material in the online videos, and support these with case studies, discussions and a project that will help students obtain a more in-depth understanding of the subject.

Tentative Session Plan

Session No.	Topic	Reading Material
1	Building Strong Brands	Videos: Marketing 101: Building Strong Brands I & II. Kotler: Chapter 1
2	Strategic Marketing	Video: Strategic Marketing. Book: The Discipline of Market Leaders - Treacy & Wiersema
3	Segmentation, Targeting, Positioning & Brand Mantra - Part I	Videos: Segmenting and Targeting, Positioning, Brand Mantra Kotler: Chapters 9-12
4	Segmentation, Targeting, Positioning & Brand Mantra - Part II	
5	Brand Elements & Experiential Branding	Video: Experiential Branding
6	Customer Centricity -	Week 2 videos. Article: Customer-Centered Brand Management - Roland Trust, Zeithaml, Lemon
7	Go To Market Strategies	Videos 1-3, Week 3. Article: The Go-To-Market Approach Startups Need to Adopt; The Customer Has Escaped
8	Customers and Digital Marketing, Influence and How Information Spreads	Videos 8-9.

9	The Long Tail, Preference Isolation, How Internet Retailing Startups Grow	Videos 4-7, Week 3 Original article by Chris Anderson - The Long Tail - https:// www.wired.com/2004/10/tail/
10	Pricing Strategies - Part I	Videos 10-11
11	Pricing Strategies - Part II	
12	Pricing Strategies - Part I	Videos 10-11
13	Brand Messaging and Marketing Communication	Videos: The 7 Ms of Marketing Communication; Brand Messaging and Communication Kotler: Chapter 19
14	1. Brand Elements: Persuasion 2. Repositioning a brand	1. Video: Week 4 Video 5 Article: How Advertising Works - Peter Voyer. 2. Video: Week 4 Video 6
15	Student presentations of Marketing Magazine	Expectations 1. Showcase work done on the issues they made 2. Present one article they had put in the magazine, that they found most interesting

Note: Each Session will be of 2 hours

Activities Related to Skill Development and Employability

Case 1- Clean Edge Razor
Case 2 - Apple Stores
Case 3: EMC2: Delivering Customer Centricity
Case 4: Managing Online Reviews on Tripadvisor
Case 5: Virgin Mobile: Pricing For The Very First Time
Case 6: J.C. Penney's Fair and Square Strategy

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Marketing Research

Course Code: MA2111
Credits: 3
Trimester: II

Course Description and Objectives:
A clear understanding of consumers and trade customers is essential for taking appropriate marketing decisions for any marketing professional. Marketing Research provides the tools and techniques for enabling this understanding.
The objective of this course is to equip students with the understanding of these tools and techniques so that they are able to use marketing research as an aid to marketing decision making. needed to be able to use

Tentative Session Plan:

Session No. (2 hours/ session)	Topic
1	Introduction to Marketing Research and Problem Definition
2	Research Design and Writing a Research Brief
3	Exploratory Research Design - Secondary Data
4	Exploratory Research Design - Qualitative Research - 1
5	Exploratory Research Design - Qualitative Research - 2
6	Descriptive Research Design - Survey and Observation
7	• Questionnaire design
8	• Measurement and scaling • **Mid-term quiz**
9	Project Presentations Part 1 - upto findings of qualitative research ** The 10 marks for project presentation will be awarded basis this presentation, since the project completion will happen only after all the classes end
10	Sampling
11	Causal Research Design - Experimentation Measurement and Scaling
12	Fieldwork and Data Analysis 1
13	Data Analysis 2
14	Data Analysis 3
15	Report Preparing and Presentation

Activities Related to Skill Development and Employability

Case 1- Positioning Strategy for Akon Children's HospitalVideo
Case 2 - Dunkin Donuts
Case 3: The New Beetle 501023-PDF-ENG. HBR.
Project 1: Live exercises on secondary data analysis to be done in class
In-class exercises 1: Presentation on project topic - marketing issue and research questions - 5 min x 5 = 25 min
In-class exercises 2 : Design a discussion guide for an FGD on this topic - use text book as reference - 30 minutes + 10 min x 5 for presenting the guide
In-class exercises 3: Groups present findings of pilot qualitative research in class
In-class exercises 4 : Students evaluate & modify questionnaires they used for pilot study

BACHELOR OF COMMERCE (HONOURS)
AC
GST: PRINCIPLES AND PRACTICES
COURSE CODE- AC21- 2018-19
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 objective of the course is to help students understand the law and application of newly introduced Goods and Services Tax in India. The course aims to build upon the concepts covered in GST Law. The course will apply the concepts to facilitate Indirect Tax Planning, and in particular with respect to highlighting on hand experience of calculating, filing of GST in connection to SGST, CGST and IGST.

COURSE OBJECTIVES:

- Analyze GST issues as they apply to businesses in India.
- Demonstrate knowledge of the fundamental principles of GST law, applicable to a wide variety of different business types in India such as companies, trusts, partnerships and sole proprietors.
- Evaluate and synthesize information and existing knowledge from a number of sources.
- Communicate ideas effectively in informal group discussions
- Demonstrate knowledge of some of the more topical taxation issues affecting businesses in India in today's economy.

LEARNING OUTCOMES:

At the end of this course student will be able to

- Acquaint with the Concepts of GST in India and acquaint themselves with its terminology.
- Comprehend the application to GST in various types of business and services.
- Calculate the GST in connection with SGST, CGST and IGST.
- Do GST return file.

COURSE CONTENTS:

Fundamental of GST:
Constitution Amendment Act, 2016, What is GST, Advantage, Need, Concept of One nation on tax, Dual GST model, Interstate Vs. Intra State Stock Transfers, GSTN, GST Council, Important Definitions.

Levy and Collection of GST:

Time and Value of Supply

Input Tax Credit

Registration under GST Law

Payment of Tax and Return files of GST

Session Plan:

Session No	Topic/Activitiy
1-2	Introduction and Constitutional Amendment
2-5	Concept of One nation on tax, Dual GST model, Interstate Vs. Intra State Stock Transfers, GSTN
6-7	GST Council, Important Definitions
8	Class Quiz/Test
9-15	Levy and Collection of GST
16	Case study/MCQ Test
17-21	Time and Value of Supply
22-28	Input tax Credit
28-32	Registration under GSTLaw
33-34	Class test/Group project
35-40	Payment of Tax and Returns files of GST

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%

ACTIVITIES RELATED TO EMPLOYABAILITY ENHANCEMENT SKILLS

CASE STUDIES/ WORKSHOP ON:

1. **Operation of GST Portal – A Walk through**
2. **Registration Process under GST Law Workshop**
3. **Preparation of Tax invoice, credit and debit notes and other documents under GST**
4. **Return files under GST: Introducing various forms**
5. **E-way bill under GST**

ASSIGNMENT ON:

1. **Classification of Goods and services under GST**
2. **Time of supply**
3. **Value of Supply**
4. **Place of Supply**
5. **Input tax Credit**
6. **TDS and TCs under GST**

The Power of Storytelling

Course Code: CCT101
Credit: 3
Programme: BBA & Btech Semester 1
L-T-P: 2-1-0
Course Instructor: Ms. Shradha Bharatiya

Course Description:

This course gets students started on the journey of storytelling by observing the world and themselves and weaving a narrative. At the end of this course the students will be able to observe, think, create and narrate their stories in an effective manner

Syllabus:

Concept of a Story- Build common understanding about the course, Introduction of the course and the concept of stories; How Stories Begin- Source of stories in our lives; Story Mapping- Introduction of Story Mapping ,Elements of Story Mapping, Use of elements in creating stories; Story Boarding- Introduction of Story Boarding, How story Boarding is used, Use of Story Boarding in creating stories; Identifying Different Narratives- Everyone and everything has a story, How different stories impact us; Power of Observation - Introduction of sensorium, How sensorium help us to create a story; The Art of Listening- Why listening, Active and passive listening, Be an active listener ; Creating Stories- Detailed practice of different importance components of storytelling- i. Delivery – Overcome stage fear, work on body language, ii. Content – Create story, Edit, iii. Voice - Voice modulation, enunciation, pronunciation

Evaluation Matrix:

Sr. No	Specifications	Marks
01	Attendance	10
02	Assignment	70
03	Class Participation	20
	Total (100)	**100**

Reading

- Unleash the Power of Storytelling: Win Hearts, Change Minds, Get Results, **Author**: Rob Biesenbach , **Publisher**: Eastlawn Media (19 February 2018)
- Storyworthy: Engage, Teach, Persuade, and Change Your Life through the Power of Storytelling
  Author: Mathew Dicks, Publisher: **Publisher:** New World Library - New World Library - New World Library (15 May 2018)

Activities Related to Skill Development and Employability

In-Class Activity-1- Art of mindful listening using following steps

- Focus on the person talking
-Be present
-Hold your tongue
-Learn

2- Reflective writing exercise.
3-Practicing effective delivery, body language & content creation techniques.
4-Sensorium activity
Assignment: - Group Presentation – **1**- Creating impactful story about a product using story boarding technique.
2- Play writing & performing a play.

JK Lakshmipat University, Jaipur
Institute of Management
MBA (2018-20)
Academic Year- 2018-19
Design Thinking for Business

Course Code: CC2102
Credits: 3
Trimester: II

Course Description:
This course intends to familiarize the students with the process of understanding an existing product, process, service or business method; and subsequently thinking creatively to identify the pain points or opportunity areas for finding new solutions immersing themselves in a problem space. Using a Project Based Learning approach, students will be applying creativity to come up with a number of ideas for solving a problem, evaluate and fine tune the alternate embodiments or processes of the potential solutions for the right value proposition, build a prototype of the new offering, explore patentability and commercial potential. During this experiential learning, students will be introduced to the underlying principles and essential steps of design thinking process: define scope of a project, create a design brief, conduct ethnographic interviews, mine research articles and patents for insights, generate the novel inventive steps, and implement in a real-world situation.

Course Learning Outcomes:

1. Enhance students' innovation abilities considering market impact and value creation for users
2. Strengthen students' individual and collaborative capabilities to identify customer needs and business opportunities through the application of design thinking process
3. Provide experience to translate broad opportunities into actionable innovation possibilities.

Activities Related to Skill Development and Employability

Case Study 1: Application of Design Thinking at health care provider Kaiser Permanente
Case Study 2: Application of Design Thinking for Shimano Bicycle Manufacturer
Case Study 3: Application of Design Thinking for Aravind Eye Care System
Case Study 4: Application of Design Thinking for Bank of America

Project Brief: Each Student was part of a group that developed a project applying Design Thinking steps to solve a real-life problem. The projects were evaluated in two stages- preliminary feasibility study, and more detailed analysis of the problem, evolving a solution by implementation of Design Thinking, followed by a final project presentation. Part of the project work was development of project specific Questionnaire conducting an ethnographic survey to assess the need and thus the market for a product or service.

Course Outline: Critical Thought in Communication

Course Title and Code–Critical Thought in Communication CC2103

Course Description

This course will train students to observe and think from multiple perspectives, examine information and knowledge critically, analyze skillfully, evaluate and take a well-reasoned position.

Course Outcomes

The students will be able to:

1-Formulate intelligent questions.
2-Evaluate information and evidence for correctness, consistency, and relevance.
3-Compose well-structured and well-reasoned arguments.
4-Evaluate an argument for consistency, logical validity, coherence, breadth and width, and relevance.

Prerequisites	**N/A**
Hours per Week	**L-T-P: 2-0-0**
Credits	**2**

Sr. No	**Specifications**	**Weightage**
01	Attendance	**10**
02	Assignment	**35**
03	Class Participation	**10**
04	Quiz	Nil
05	Theory Exam	**25**
06	Theory Exam	Nil
07	Theory Exam	Nil
08	Report-1	10
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	**10**
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation	Nil
15	Lab Evaluation	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus of Fundamentals of Critical Thinking

I. **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.

II. **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.

III. **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.

IV. **Application of Critical Thinking-** Students will learn to use critical thinking in workplace and business scenarios, case studies and write with a critical voice. They will learn to critique the information they gather.

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.

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

BATCH 2018- 20 (IM |MBA)

Course Title and Code – Design & Presentation CC2104

Course Description

As management students, presenting different ideas and to various kinds of audiences is an integral part of their course. This course enables students to create visual aids, persuasively deliver their content, and engage with their audience. It is intended to enable them to face the audience more confidently, remove their stage fear and discuss more assertively in English. The course will motivate them to look for and articulate the crux of a topic and present in a concise manner.

Course Outcomes

Through this course, the students will be able to -

1. Practice presentation skills to prepare for future business presentations
2. Craft content based on audience
3. Deliver persuasively using communication checklist
4. Practice the use of relevant tools such as MS PowerPoint for their presentations
5. Create simple and impactful presentations – use of graphs, charts, pictures, fonts and animation effectively
6. Prepare and present various types of presentations based on different scenarios and deliverables; Present on topics that have an impact globally and engage with their audience
7. Pitch their business ideas effectively and engagingly, learning about the various elements that is included in a pitch
8. Present and communicate their ideas more confidently in English
9.

Prerequisites	**N/A**
Hours per Week	**L-T-P: 2-0-0**
Credits	**2**

Sr. No	**Specifications**	**Weightage**
1.	Assignment I	30
2.	Assignment II	30
3.	Project Presentation	40
	Total (100)	**100**

Activities Related to Skill Development and Employability

In class activity 1: Storytelling through power point presentation. In groups students created a power point presentation while using storytelling to make ppt more effective.

In class activity 2: Pitch business idea through powerful presentation. In groups students prepared impactful ppt and pitch their business idea.

Fundamentals of Critical Thinking

Course Code: CCT201
Programme & Semester: BBA & Btech | Sem 2
Credit: 2
L-T-P: 2-0-0
Course Instructor: Ms. Shraddha Bharatiya

Course Description:
This course will train students to observe and think from multiple perspectives, examine information and knowledge critically, analyze skillfully, evaluate and take a well-reasoned position.

Learning Outcomes:
Students will be able to

- Formulate intelligent questions
- Evaluate information and evidence for correctness, consistency, and relevance
- Compose well-structured and well-reasoned arguments
- Evaluate an argument for consistency, logical validity, coherence, breadth and width, and relevance.

Course Content:

- **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.
- **Application of Critical Thinking-** Students will learn to use critical thinking in workplace and business scenarios, case studies and write with a critical voice. They will learn to critique the information they gather.

Evaluation Scheme:

Sr. No	Specifications	Weightage (in percentage)

01	Attendance	10
02	Assignments (4)	35
03	Class Participation	10
04	Theory Exam	25
05	Report-1	10
06	Project -1	10
	Total (100)	**100**

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)

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

Articulation and Elocution

Course Code: CCT202
Prog. & Semester: BBA & Btech | Sem 4
Credit: Audit Course
Total Number of Contact Hours: 6 Hrs.
Course Instructor: Ms. Shraddha Bharatiya

Learning Outcomes:

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

- Use richer vocabulary in their communication appropriate to the context.
- Use appropriate grammar, vocabulary and style which are essential to professional-level reading, writing, speaking, listening, and editing.
- Apply various strategies to make the speeches/ conversation interesting and captivating.
- Using the sentence structure effectively and connect ideas logically within a paragraph.
- Write descriptions on various objects and topics.

Course Outline (Tentative Session Plan):

Sessions	Content	Activities
1	Listening	• To inculcate the skills of content prediction, inference and discourse coherence. • Acquire proficiency in Prosodic Features (Pronunciation, enunciation, pitch, intonation/voice modulation) • Material will be drawn from TOEFL/IELTS • Reading and listening skills will be targeted simultaneously.
2	Ideation and Expression	• Proving situation/context to trigger thinking process • Just Minutes • Role Play/ Situational Dialogues • (Oral Narration) Describing people, places, events and things • Exchanging Ideas • To teach the students to express the information explicitly and implicitly through inferences and figurative language.

3	Reading	• Skimming, Scanning • Distinguishing the main idea and supporting ideas • Transcoding information to diagrammatic display, recognizing indicators in discourse, understanding conceptual meaning and summarizing. • Reading and writing skills will be targeted simultaneously.
4.	Writing	• To throw some light on the features of the connected speech/ composition such as use transitional words, connectives, etc. • To explain various strategies for the organization of ideas such as introduction, development, transition, conclusion, emphasis, explanation and anticipation. • Analytical writing, creative writing activities etc. • Writing Paragraph, short note, diary, experience. • Involving students in peer evaluation.
5	Vocabulary Building	• Introducing Idioms, Proverbs, Phrasal verbs and asking them to use the same. • Connotative and denotative meaning of the words. • To familiarize the students with the ways in which words are actually used in a particular context, especially with regard to their meanings, roots, prefixes suffixes, antonym & synonym.
6	Collecting and Analyzing Information	• Assigning students to read books, newspapers, magazines and stories to learn from, assess and improve analytical ability. • Allotment will be done before the class.

Course Evaluation:

Sr. No.	Evaluation Component	Marks
1	Attendance	10
2	Assignment(s)	30
3	Class Participation	10
4	Quiz	10
5	Project-I	15
6	Lab Evaluation-I	25
	Total (100)	100

SUGGESTED READINGS:

· Sanjay Kumar & Pushp Lata “Communication Skills”. New Delhi: Oxford University Press, 2011.

· M Ashraf Rizvi “Effective Technical Communication”. Chennai, McGraw Hill Education, 2018.

Activities Related to Skill Development and Employability

In Class activity: -1-Analytical & Creative writing.

2- Role Play/ Situational Dialogues

Assessment: - 1- Writing a speech.

2- Elocution.

BATCH 2016- 18 (MBA/IM)

Course Title and Code – Personal Communication |CCT 301		
Course Description This course helps students craft their personal brand to face the potential employer and be prepared for the workplace.		
Course learning outcomes In the end of the course, they will be able to – 1. Identify your USP - be it for a workplace or to pursue academic interests. 2. Craft a personal pitch for different options you might be pursuing. 3. Prepare and practice answers for FAQs 4. Building online presence on LinkedIn, Facebook, Twitter, etc 5. Create standout resumes, cover letters, and statements of purposes.		
Hours per Week		**L-T-P: 3-0-0**
Planned hours		**30**
Actual hours		
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	10
02	Assignment	70
03	Class Participation	20
	Total (100)	**100**

Syllabus of the Course

Topics	Content
Structure in Communication	Introduction of structure in communication, Three important elements in a structure, The Power of Three
Creating Resumes and Cover Letter-	Why standout resumes are important, How to build your own resume/cover letter, Do and Don't while creating a resume/cover letter, Tips on common errors
Email Etiquette	Structure in emails, Principles of email writing , How to deal with difficult emails
Social Media Presence-	Relevance of Social media presence in their context , Personal Branding through Social Media, Build professional profile on LinkedIn
Build Strong Physical Presence	Build Strong Physical Presence, Important Components of Communication, Practice the art of communicating effectively
Identify your Stories and Build your Brand	Identifying/creating stories by using story mapping, Use different components of a story
Presentation skills and Interviews Preparation-	Practice of Presentations, Mock Interviews, Tips on Do's and Don'ts
GD and Situational Thinking -	Mock GD's, Handle FAQ's related to technical or non technical area, Learn to handle different situations in GD's or PI's
Grooming and Work Ethics-	Why Grooming and Work Ethics are important in building a Brand, Tips on grooming and Basic etiquettes at workplace and Significance of work ethics at workplace

Activity related to Skills and Employability

S. No.	Activity
1.	Students were instructed to make their resumes and cover letters
2.	Mock Group Discussions were conducted for students with simulating environment
3.	Mock Personal Interview were conducted for students with simulating environment.
4.	Students made presentations and were evaluated based on their skills including communication, presentability, fluency , graphics, relevance to the topic etc.
5.	Students created stories and narrated their stories to their peers and facilitators.

JK Lakshmipat University, Jaipur

Institute of Management

BBA

Academic Year- 2018-19

Effective Communication Design

Course Code: CCCT309

Credit: 3

Semester: III

Course Description:
The course deals with written and verbal communication skills. Students will learn structuring their pieces of communication using various principles of effective communications. By the end of this course, the students will be able to articulate and present effective pieces of communication in the form of e-mails, monologues, presentations (small and long)

Course learning outcomes:

- Explain the principles of Effective Communication Design
- Apply the principles for structuring and designing written and oral communication.
- Reason and Prioritize the content of presentation and email
- Demonstrate improvement in speak-listen- feedback

Topics to be Covered:

Topics	Content
Introduction to principles of effective communication design	• Beginning-Middle-End • Pyramid Principle-Governing Thought • KISS Principle • Power of Three
E-mail writing	• E-mail etiquette • Analyzing good and bad examples of e-mails
Written Communication	• Practicing structure and summary

	• Applying principles of effective communication through various assignments
Flowchart and Mind Mapping	• Practicing putting thoughts in sequence • Speak-Listen-Feedback
Verbal Communication	• Important parameters to make oral presentation effective oral presentation. a. Delivery and Body Language b. Delivery-Voice c. Content • Audience analysis • Applying the principles of effective communication
Planning for presentation	• Essential elements of power point presentation • Common mistakes made in Power point presentation

References for Readings:

- Mitra, B.K. (2016). Personality Development and Soft Skills. New Delhi: Oxford University Press.
- Mukerjee, H. S. (2013). *Business Communication: Connecting at Work*. New Delhi: Oxford University Press.
- Raman, M., & Sharma, S. (2011). *Technical communication: Principles and practice*, 2/e. New Delhi: OUP.
- Mohan, K., & Raman, M. (2000*). Effective English communication*. New Delhi: Tata-McGraw Hill.
- Raman, M., & Singh, N.P. (1994). *Speaking English effectively*. New Delhi: Macmillan.
- Sasikumar, V., & Dhamija, P.V. (2007). *Spoken English: A self-learning guide to conversation practice.* New Delhi: Tata-McGraw Hill.
- Kaul, A. (2010). *Business communication*, 2/e. New Delhi: PHI.

Note: Latest edition of the readings will be used.

Assessment Scheme:

Assessment Component	Weightage
Assignments	70%
Class Participation	20%
Attendance	10%
Total	**100%**

Note: The mid-term/End term examination will not be conducted in the present course as there will be regular assessment.

Activities Related to Skill Development and Employability

Assignment 1: Essay writing with key words

Assignment 2: Drafting story based on picture

Assignment 3: Writing summary based on audio and video

Assignment 4 : E mail writing

Assignment 5: Analyzing good and bad mails in the mail box

Presentation: on emerging topics applying KISS and Power of 3 principle.

BATCH 2017- 21/20(IET/IM)

Course Title and Code - Advanced Communication & Interpersonal Dynamics| CCT401

Course Description

In this course student will be able to prepare for various group settings, manage difficult conversations, identify individual differences and opinions. This course will enable students to resolve interpersonal conflict by identifying possible sources of conflict and by using a range of techniques to bring about a solution.

Learning Outcomes

The students will be able to:

1. Formulate effective questions, differentiate facts from opinions.
2. Identify reasons for individual differences and their impact on the group dynamics.
3. Use inquiry and advocacy to engage with groups.
4. Identify possible sources of conflict and by using a range of techniques to bring about a solution.
5. Use and compare different problem-solving techniques to produce the best possible outcome from the group.

Prerequisites	**N/A**
Hours per Week	**L-T-P: 2-0-0**
Credits	**2**

Sr. No	**Specifications**	**Marks**
	Attendance	10
	Assignment(s)	30
	Class Participation	10
	Theory Exam	25
	Project -1	10
	Project -2	15
	Total	**100**

Syllabus:

I. **Introduction to Critical Thinking** - Critical thinking is the ability to think for one's self and reliably and responsibly make those decisions that affect one's life. Students will practice the formulating open-ended, inquiring questions, using available information differentiating facts from opinions, backing their claims with reasons, and thinking from many perspectives

II. **Introduction to Personality, Perception and Learning as source of differences in individual and groups -**Students will be able to understand the relevance of personality, perceptions and learning in a group and their impact on the group dynamics. Introduction to the stages of group development (forming, norming, storming and performing).

III. **Emotional Intelligence and Conflict Resolution Techniques -** Four quadrants of EI- Self-aware, manage their reaction, understand social dynamics and manage Relationships will be discussed. Through the Thomas Killman Conflict Mode Instrument, students will learn about the process of conflict resolution. Techniques for

managing conflict. Deep listening will be covered in this module for effective use of the techniques.

IV. **Difficult Conversation using Inquiry & Advocacy** – Concept of silence (Masking, Avoiding, Withdrawing) and violence (Controlling, Labeling, Attacking) . Students will be able to use techniques of inquiry and advocacy to engage with groups. They will be able to gain leverage for improving conversations by paying attention to advocacy and inquiry. They will be exposed to effects of high-low advocacy and inquiry.

V. **Empathy & Feedback-** Concept of empathy will be discussed. The requirements/prerequisites for Empathy ((Open-mindedness, imagination, Knowing and accepting yourself). Introduction to the concept of Giving & Receiving Feedback.

VI. **Problem solving techniques in a Group-** Concept of brainstorming, nominal group technique, interacting group and how it can be used to generate solution to conflict. Active & deep listening as a tool for problem solving.

Activities Related to Skill Development and Employability

1. Discussion on Scenarios will be given in which students will be using different styles of conflict management.
2. In class exercise on enquiry and advocacy: ">Activity where each student in the pair has to share examples of questions, we commonly use to elicit information, and reflect on the effects these questions have on others.
3. Case Study: NASA

BATCH 2016- 18 (MBA/IM)

Course Title and Code - Workplace Communication |CCT402

Course Description

This course helps students to identify and craft their personal brand to face the potential employer and prepare them for the workplace.

Course Outcomes:

The students will be able to:

1. Identify their brand, craft their brand statement and articulate their brand, using their strengths.
2. Create standout resumes and cover letters.
3. Craft an influential pitch and express their professional journey.
4. Identify and correct common communication errors.
5. Start building their professional network (online and offline) by identifying their areas of interest and use communication skills to connect with and maintain their networks.

Prerequisites		**N/A**
Hours per Week		**L-T-P: 2-0-0**
Credits		**2**
Sr. No	**Specifications**	**Weightage**
1.	Attendance	10
2.	Assignment(s)	40
3.	Class Participation	15
4.	Report-1	15
5.	Project -1	20
	Total (100)	**100**

Syllabus of the course

Topics	Content
Identify your brand	Personal branding: meaning, importance and how to create and use it; the three Cs' of personal branding and personal branding through social media
Language for better branding	Importance of language in communication and how language can build brand. Avoiding common errors in verbal and written English language, and dos and don'ts of non-verbal language
Professional Story Mapping	Articulation practice on the various aspects of their professional persona – such as background, interests, achievements, education, internships, and so on. Use of story map to create professional journey and prepare for all kinds of FAQs
The Art of Networking	Meaning and benefits of networking and use of various networking styles. Offline and online networking – offline one-minute talk and ice-breaking conversations and online – professional messaging, invitation & emailing.
Resume	Resume types, structure of a resume, writing tips on resume – drafting, formatting and editing resume to create their final resume
Cover Letter	Purpose of a cover letter, types of cover letter, structure of a cover letter and tips on cover letter, to craft their cover letter to be used for placements
Elevator Pitch	Elevator Pitch: Meaning and use of an elevator pitch in interview and workplace; techniques to craft and improve their pitch
Group Discussion	Practice different types of group discussions, dos and don'ts of group discussions and use of techniques to perform well in GDs

Students can refer the following links.

WEBLINKS:

1. https://www.fastcompany.com/28905/brand-called-you
2. https://hbr.org/2015/03/how-to-separate-the-personal-and-professional-on-social-media
3. https://brandyourself.com/definitive-guide-to-personal-branding
4. http://pwgmarketing.com/2008/10/what-does-branding-mean-to-you/
5. https://cra.org/cra-w/wp-content/uploads/sites/5/2015/05/Building-Your-Professional-Persona.pdf
6. https://www.inc.com/marc-ecko/be-a-brand-not-a-label.html

Activity related to Skills and Employability

S. No.	Activity
1.	Just a minute sessions for speaking enhancement.
2.	Sessions were organized to carry out activities such as story mapping technique through which they expressed their life journey, their career goals, expressing their strengths , weaknesses etc.
3.	Different labs were organized to carry out their resume building activities
4.	Different labs were organized to carry out their cover letter building activities
5.	Different labs were organized to carry out their creating elevator pitch
6	Simulated Mock Group discussion were carried out.
7	Simulated Mock Personal Interviews were carried out.

BATCH 2016- 20(IET)

S.no.	Name of Course	Course Code	Credits	Semester
1.	Professional Communication	CCT507	3	V

Course Title and Code – Professional Communication (CCT 507)

Course Description - This course introduces students to the nuances of communicating professionally. It equips students to understand the need and demand for professional communication, especially in the context of work. Students will be able to speak, write (in different formats) and present professionally, and create their online presence through this course.

Course learning outcomes

In the end of the course, they will be able to –

1. Develop their analytical abilities through case analysis and article review.
2. Demonstrate proficiency at writing professional articles and reports and to incorporate graphs, tables and other illustrative matter with textual content.
3. Inculcate the art of handling difficult conversations efficiently.
4. Inculcate the art of designing and delivering effective professional presentations.
5. Explain the nuances of formal and informal communication and use them in appropriate context.
6. Identify the basic structure of communication and its applicability in different context.
7. Develop the art of writing email professionally.

Hours per Week		**L-T-P: 2-1-0**
Planned hours		**30**
Actual hours		
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	10
02	Assignment	60
03	Class Participation	10
04	Report-1	20
	Total (100)	**100**

Syllabus of the Course

Topics	Content
Meaning of Professional Communication	Students are exposed to the difference as well as synergy between formal and informal communication

	Through various scenarios and exercises, students are made to understand the meaning of professional communication
Introduction to Structure	Basic structure of communication are introduced to the students; they understand the significance and formulation of beginning, middle and end Students are highlighted the use of the structure in different formats
Email Writing	Importance of writing professionally, especially through emails is established Dos and Donts of email writing shared; students practice email writing
Article Review	Students are taught the need and use of reviews and forming an opinion about things they read Format of crafting a review shared; practice of structured writing
Caselet Analysis	Students are introduced to analyse a Caselet and the format of writing the analysis in a structured format
Report Writing	Revision of Report Writing – purpose and format shared Practice the art of professionally crafting reports through practice and activities
Presentation Skills (Design)	Students are exposed to basic principles of making a good PPTs and are introduced useful tools and software to be used to making good presentations The importance of storytelling through presentations is explained
Presentation Skills (Delivery)	Detailed practice of different importance components of storytelling Delivery – Overcome stage fear, work on body language Content – Create story, Edit, Voice - Voice modulation, enunciation, pronunciation
Professional Conversations	Students practice ways of professional conversations through various scenarios Students are introduced to the art of handling difficult conversations

Activities Related to Skill Development and Employability

In class activity 1- Share two emails with a similar purpose (e.g., an invitation to a party): one formal and one informal. Students will compare both emails by discussing: potential audience, email structure, language, tone, and stance.

In class activity 2- Students record themselves while giving presentation and then assess themselves on the scale of 1 to 10 on different attributes of delivery, Content and voice.

BATCH 2016- 20(IET)

Course Title and Code - Personal Branding & Workplace Communication CCT601

Course Description

This course helps students to identify and craft their personal brand to face the potential employer and prepare them for the workplace.

Course Outcomes:

The students will be able to:

1. Identify their brand, craft their brand statement and articulate their brand, using their strengths.
2. Create standout resumes and cover letters.
3. Craft an influential pitch and express their professional journey.
4. Identify and correct common communication errors.
5. Start building their professional network (online and offline) by identifying their areas of interest and use communication skills to connect with and maintain their networks.

Prerequisites		**N/A**
Hours per Week		**L-T-P: 2-0-0**
Credits		**2**
Sr. No	**Specifications**	**Weightage**
1.	Attendance	10
2.	Assignment(s)	40
3.	Class Participation	15
4.	Report-1	15
5.	Project -1	20
	Total (100)	**100**

Syllabus of Personal Branding & Workplace Communication

Topics	Content
Identify your brand	Personal branding: meaning, importance and how to create and use it; the three Cs' of personal branding and personal branding through social media
Language for better branding	Importance of language in communication and how language can build brand. Avoiding common errors in verbal and written English language, and dos and don'ts of non-verbal language
Professional Story Mapping	Articulation practice on the various aspects of their professional persona – such as background, interests, achievements, education, internships, and so on. Use of story map to create professional journey and prepare for all kinds of FAQs
The Art of Networking	Meaning and benefits of networking and use of various networking styles. Offline and online networking – offline one-minute talk and ice-breaking conversations and online – professional messaging, invitation & emailing.

Resume	Resume types, structure of a resume, writing tips on resume – drafting, formatting and editing resume to create their final resume
Cover Letter	Purpose of a cover letter, types of cover letter, structure of a cover letter and tips on cover letter, to craft their cover letter to be used for placements
Elevator Pitch	Elevator Pitch: Meaning and use of an elevator pitch in interview and workplace; techniques to craft and improve their pitch
Group Discussion prep	Practice different types of group discussions, dos and don'ts of group discussions and use of techniques to perform well in GDs
Interview and FAQs prep	Practice FAQs and other behavioral questions, use of elevator pitch, refine GDs and PIs by using communication checklist - more practice of this in 7th semester

Reading Material will be provided by the facilitator to the students. Students can refer the following links.

WEBLINKS:

1. https://www.fastcompany.com/28905/brand-called-you
2. https://hbr.org/2015/03/how-to-separate-the-personal-and-professional-on-social-media
3. https://brandyourself.com/definitive-guide-to-personal-branding
4. http://pwgmarketing.com/2008/10/what-does-branding-mean-to-you/
5. https://cra.org/cra-w/wp-content/uploads/sites/5/2015/05/Building-Your-Professional-Persona.pdf
6. https://www.inc.com/marc-ecko/be-a-brand-not-a-label.html

Activities Related to Skill Development and Employability

In class activity 1: Asking students to write two adjectives for themselves on a chit, collecting the chits and then asking everyone in the class to tell who is the person with the help of the two adjectives.

In class activity 2: Brand logo's activity – showing a ppt in the classes with logo of famous brand and then asking students to write three words for the brand. Discussion the written words in the class and debrief by giving inputs on how did they arrived on these three words only. Why didn't they write others words written by other students? (You labelled the brand with these words!)

In class activity 3: on Writing your Personal Brading statement. Shared a worksheet with students and with the help of that they create the final draft of their personal brand statement.

In class activity 4: on Story Mapping. Shared a worksheet with students on story mapping question. Asked them to write the answers of all the question on a single paper. That helped them to create a story map for themselves.

In class activity 5: on creating a 60 secs. elevator pitch. Students sit in groups and with the help of story mapping they create their own influential elevator pitch.

In class activity 6: on using action words to create impactful content for resume.

In class activity 7: on bad versus good cover letters. Students identified the samples of bad and good cover letters. With the help of that they wrote their own cover letters as well.

In class activity 8: on group discussion. Different groups are created and then one student from each group was called for GD. Other group members observe each contestant and share their feedbacks on their GD performance

BATCH 2015- 19 (IET)

Course Title and Code – Workplace and Interpersonal Communication (CCT 708)		
Course Description - This course helps students craft their personal brand, face prospective employers, and prepare for the workplace.		
Course learning outcomes In the end of the course, they will be able to – 1. Craft a personal pitch 2. Create standout resumes, cover letters, and statements of purpose; learn how to explain the different sections of your resume clearly 3. Build online presence on LinkedIn, Facebook and Twitter 4. Practice professional etiquette and workplace best practices 5. Prepare answers to behavioral and technical questions; engage in interviews and group discussions confidently		
Hours per Week		**L-T-P: 3-0-0**
Planned hours		**30**
Actual hours		
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	10
02	Assignment	75
03	Class Participation	15
	Total (100)	**100**

Syllabus of the Course

Topics	Content
Craft your personal pitch	- Introduction to the concept of story map. - Students present their story map - Students present their pitch with the help of story map.
Translate your pitch into a resume	- Why standout resumes are important - How to build your own resume/cover letter - Do and Don't while creating a resume/cover letter - Tips on common errors
Translate your pitch into cover letters, statement of purpose	- Structure in communication, and the idea of beginning, middle (the power of 3) and the end - Relevance of a cover letter and uses examples to illustrate effective structure and content in cover letters - Different application of cover letter and ask each student to write, in bullet points, what s/he would say in each section of the cover letter
Manage your social media presence	- Relevance of Social media presence in their context - Personal Branding through Social Media - Build professional profile on LinkedIn

Practice professional etiquette (example - how to engage with a prospective employer), workplace etiquette	- How to build a strong physical presence - Important Components of Communication - Practice the art of communicating effectively - Do's and don'ts list on professional communication
List frequently asked interview questions and practice your responses	- Discuss common behavioral and current affairs questions. - Mock questions to students, and share patterns on what has been done well and where students' answers need to improve. - Mock sessions with a few students to review and share feedback on revised responses and presentation skills
Sharpen your content, delivery, and interaction skills to stand out in interviews and group discussions	- Share the before - during - after process of an interview, asks students to create a matrix of their strengths and pitfalls at each stage - Mock GD's - Handle FAQ's related to technical or non technical area - Learn to handle different situations in GD's or PI's
Engage with prospective employers after the interview, managing success and rejection	- Discuss possible outcomes - rejection and success and encourages students to discuss these concepts as a group (a touchy-feely style discussion. - Identify steps that should follow success and rejection.

Suggested Readings:

1. Levitt, J., & Harwood, L. (2009). *Your career: How to make it happen*. Cengage Learning.
2. Covey, S. (2011). *The 7 habits of highly effective teens*. Simon and Schuster.

Activities Related to Skill Development and Employability

In class activity 1: Asking students to write two adjectives for themselves on a chit, collecting the chits and then asking everyone in the class to tell who is the person with the help of the two adjectives.

In class activity 2: Brand logo's activity – showing a ppt in the classes with logo of famous brand and then asking students to write three words for the brand. Discussion the written words in the class and debrief by giving inputs on how did they arrived on these three words only. Why didn't they write others words written by other students? (You labelled the brand with these words!)

In class activity 3: on Writing your Personal Brading statement. Shared a worksheet with students and with the help of that they create the final draft of their personal brand statement.

In class activity 4: on Story Mapping. Shared a worksheet with students on story mapping question. Asked them to write the answers of all the question on a single paper. That helped them to create a story map for themselves.

In class activity 5: on creating a 60 secs. elevator pitch. Students sit in groups and with the help of story mapping they create their own influential elevator pitch.

In class activity 6: on using action words to create impactful content for resume.

In class activity 7: on bad versus good cover letters. Students identified the samples of bad and good cover letters. With the help of that they wrote their own cover letters as well.

In class activity 8: on group discussion. Different groups are created and then one student from each group was called for GD. Other group members observe each contestant and share their feedbacks on their GD performance.

Course Code and Name: CE402 **Engineering Geology and Building Construction**
Teaching Scheme: 3 0 2
Credit: 4

Learning Outcomes:
On successful completion of this course students will be able to:
1. Apply the geological concepts for the Civil Engineering applications.
2. Identify and classify common minerals, rocks and soils, and understand their significance to different types of engineering projects.
3. Analyze the possible geological problems to evaluate sites for the construction of Dam, Tunnel and Bridges.
4. Analyze the effect of weathering phenomenon on civil engineering works.
5. Plan precautions against faulting, folding, bedding planes, joints, cracks, fissures etc. and permeability and ground water conditions
6. Understand the components of a building and their functions,
7. Select appropriate building materials required for building construction as per IS Code.
8. Incorporate principles of sustainability in making building construction decisions that conserve natural resources.

Syllabus (Theory)

Part 1: Engineering Geology
Unit I-Earth Sciences: Introduction,
Basics of Engineering Geology: Scope of Engineering Geology for a Civil Engineer
Types of Geology: Physical geology and mineralogy
Unit II- Petrology: Classification of rocks and their uses as building and road materials
Failures in Earth crust: Historical geology; Structural geology: Folds, faults, unconformity etc.
Unit III-Investigation in Geology: Engineering geology: Geological investigations at dam, tunnel and bridge sites and influence of various structures
Precautions in different earth planes: Precautions against faulting, folding, bedding planes, joints, cracks, fissures, permeability and ground water condition.

Part 2: Building Construction and Materials
Unit IV Components of a building and their functions, foundation, shallow and deep foundation, grillage, raft, inverted arches, causes of failure of foundations and remedial measures, Masonry: types- Bricks and stone masonry, functions, material requirements, different bonds, damp proofing course
Unit V Shoring, under pining, scaffolding, horizontal and vertical shores, purpose and methods of under pinning, different types of scaffolding, floors and roofs: types, details of construction and materials
Unit VI Doors: paneled, glazed, flushed doors, collapsible steel doors, Windows: Casement, Sash, and Skylight windows, Staircase: Requirement of a good staircase, different types of staircases
Unit VII Physical and chemical characteristic of commonly used building materials in Civil Engineering construction – Clay, Sand, Stone, Lime, Cement, Concrete, Bricks, Silica, Aluminum and Timber with reference to its specifications. Plywood, asbestos, plastics and polymer-based materials.

Syllabus (Practical)

1. Megascopic study of minerals
2. Megascopic study: Igneous, Sedimentary, Metamorphic
3. Understand fold and faults within a rock mass
4. Study geological features of rocks such as strike and dip
5. Soil erosion and physical weathering in the rocks
6. Structural analysis using stereo nets or Wulff's net
7. Geological maps representing the geological structure of some segment
8. Use of GPS instrument for geological data generation.

Activities Related to Skill Development and Employability:

- **Mineral Identification by Students in Laboratory**

Figure 1. Identification of minerals and their geological properties by students

- **Students Performing Laboratory Experiments**

Figure 2. Students constructing different bonds used in the brick masonry

- **End-Term Theory Examination**

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
End Term Examination, May, 2019
B. Tech. in Civil Engineering, Semester IV

Roll No.....

CE402: Engineering Geology and Building Construction Time: 3 hours Max. Marks: 60

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. Answer ALL the questions.

1(a). In over-consolidated clayey soil, what kind of a foundation should be adopted for a residential building? Can grillage and raft foundations be provided as the supporting base for structures in loose sands and soft clays. Justify with comments. **(5 marks)**

1(b). For any given Civil Engineering structure located in an earthquake prone zone (assume zone 5), mention the types of failure that can be expected for a foundation in sand with water table located at 0.25 m below the ground surface. What could be the remedial measures to overcome the failure? **(5 marks)**

Figure 3. End-Term examination conducted to assess the skill developed by the students in this course

CS1201: Robotic Process Automation

Course Title and Code CS1201: **Robotic Process Automation**	
Hours per Week	**L-T-P: 2-0-4**
Credits	**4**
Students who can take	B.Tech.(CS/EC/EEE/CE/ME – V+VII, CHE-VII) Odd Sem

Course Objective:

- The course aim is to develop understanding about Robotic Process Automation for automating business processes using software robots with cost efficient digital delivery.

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

- Use and understand the various functionalities and features of UiPath Studio and Orchestrator.
- Design, implement, and use RPA activities.
- Develop basic robots using UiPath Community Edition.
- Explore various data extraction techniques.
- Deploy, monitor and control robots with UiPath Orchestrator.
- Identify processes which can be automated.
- Apply best practices in RPA projects.

Prerequisites: To understand and complete the course successfully the student must have basic programming skills.

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

Syllabus (Theory):

Unit I: Programming Basic & Recap: Programming concept basic; **Introduction to RPA:** scopes and techniques of automation, RPA components and various RPA platforms, Introduction to UiPath as RPA platform, Applications and Benefits of RPA, Introduction to UiPath Studio, UiPath robot, types of robots, and UiPath Orchestrator. Brief on Studio interface and components.

Unit II: **RPA Projects:** Types of Projects in RPA: Sequence, Flowcharts, and State machines; Variables, Arguments, Data Types and Control flow: flow chart activities and sequences activities. **Data Manipulation:** Text and Data Manipulation**,** Data tables, clipboard management, file operation, importing from and exporting to CSV/Excel file and data table.

Unit III: **Control of Controls:** Attach window activity, Finding the control, Waiting for a control, Act on Control- mouse and keyboard activity. Handling event driven controls as working with UiExplorer handling events. Introduction to Recorder, OCR, types of OCR and Screen Scrapping Using OCR. **Selectors:** Selectors, Defining and Assessing Selectors, Customization, Debugging, Dynamic Selectors, Partial Selectors, RPA Challenge.

Unit IV: **Application with Plugins and Extensions:** Java plugins, Citrix automation, Mail plugins, PDF plugins, Web integration, excel and word plugins. Extensions- Java, chrome, firefox, and Silverlight. **UiPath Advanced Automation concepts and techniques:** Image, Text and introduction of Citrix Automation; **Excel Data Tables & PDF:** Data Tables in RPA, Excel and Data Table basics, Data Manipulation in excel, Extracting Data from PDF, Extracting a single piece of data, Anchors. **Email Automation:** Incoming Email automation, Sending Email automation.

Unit V: **Debugging and Exception Handling:** Common exceptions and ways to tackle them, Strategies for solving issues, Catching errors. **Introduction to Orchestrator:** Tenants, Authentication, Robots, Environments, Asset. **Capstone Project.**

Syllabus (Practical):

1. Setup, configuration, and introduction of components of UiPath Studio.
2. Execution of prebuilt examples of sequence, flow chart and state machines projects.

Create a sequence/Flow chart activity defining various types of variable as:

3. Generic Value Variables, Text Variables, Boolean Variables, Number Variables,
4. Array Variables, Date and Time Variables, Data Table Variables

Managing Arguments:

5. Create two activities, one activity defined with arguments and second activity which manages the argument to receive value from first activity.
6. Create an activity to manage importing active namespaces.

Create a project to Manage the control Flow:

7. The Assign Activity, The Delay Activity, The Do While Activity, The If Activity
8. The Switch Activity, The While Activity, The For-Each Activity, The Break Activity.

The Recording toolbar Activity:

9. Exercises using basic, web, and Desktop recoding.
10. Automate manual recording projects on Left-click on buttons, check boxes, drop-down lists, GUI elements, and Text typing

Data Scrapping:

11. Bot to extract structured data from your browser, application or document to a database, .csv file or even Excel spreadsheet.
12. Image and Text Automation
13. Excel Data Tables & PDF
14. Email Automation
15. Deployment of plugins and extensions.
16. Deploying and maintaining the BOT.

Text Books:

T1 Tripathi, Alok Mani. Learning Robotic Process Automation: Create Software robots and automate business processes with the leading RPA tool–UiPath. Packt Publishing Ltd, 2018.

T2. Murdoch, Richard. "Robotic Process Automation: Guide to Building Software Robots, Automate Repetitive Tasks & Become An RPA Consultant." Middletown, DE. Omakustanne (2018).

Reference Books:

R1. Abhinav Sabharwal, "Introduction To RPA", Independently Published Kindle Edition on Amazon Asia-Pacific Holdings Private Limited, 201 8

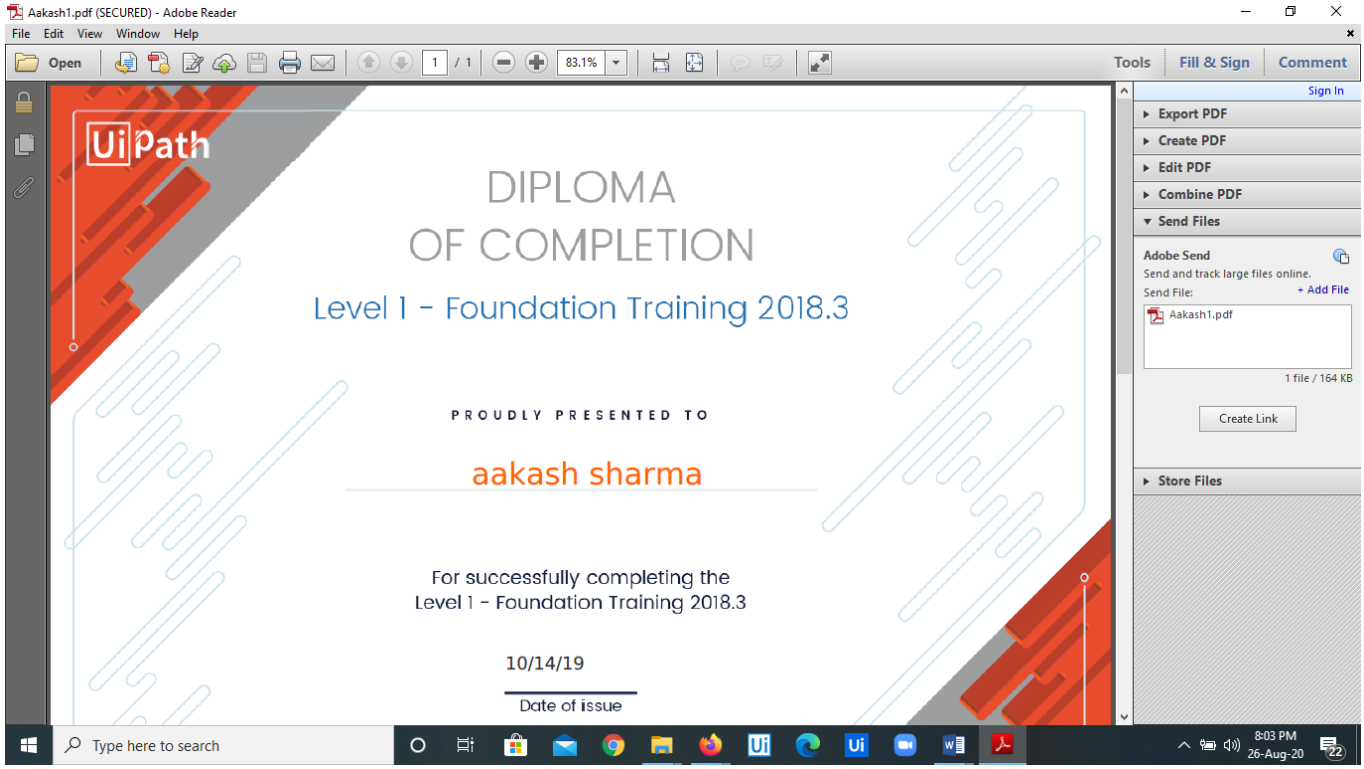
R2. Gerardus Blokdyk, "Rpa Robotic Process Automation", 5Starcook, Second Edition, 2018

R3. Kelly Wibbenmeyer, "The Simple Implementation Guide to Robotic Process Automation (Rpa): How to Best Implement Rpa in an Organization" Paperback, iUniverse, 2018

R4. Willcocks, Leslie P., Mary Lacity, and Andrew Craig. "The IT function and robotic process automation." (2015).

Activities Related to Skill Development and Employability

Certificates through Uipath Academy:


Aakash1.pdf (SECURED) - Adobe Reader
File Edit View Window Help
Open
Tools
Fill & Sign
Comment
Sign In
Export PDF
Create PDF
Edit PDF
Combine PDF
Send Files
Adobe Send
Send and track large files online.
Send File:
+ Add File
Aakash1.pdf
1 file / 164 KB
Create Link
Store Files
UiPath
DIPLOMA
OF COMPLETION
Level 1 - Foundation Training 2018.3
PROUDLY PRESENTED TO
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For successfully completing the
Level 1 - Foundation Training 2018.3
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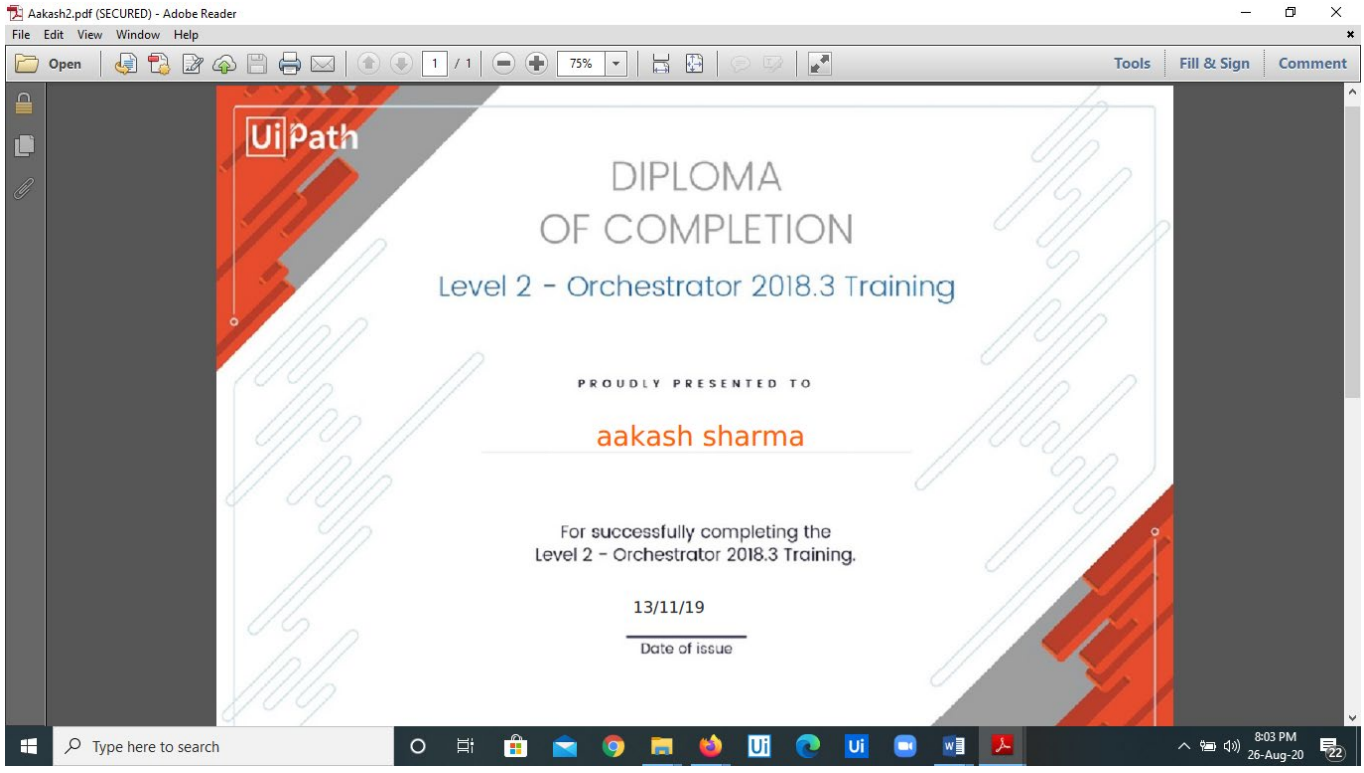
Aakash2.pdf (SECURED) - Adobe Reader
File Edit View Window Help
Open
Tools
Fill & Sign
Comment
UiPath
DIPLOMA
OF COMPLETION
Level 2 - Orchestrator 2018.3 Training
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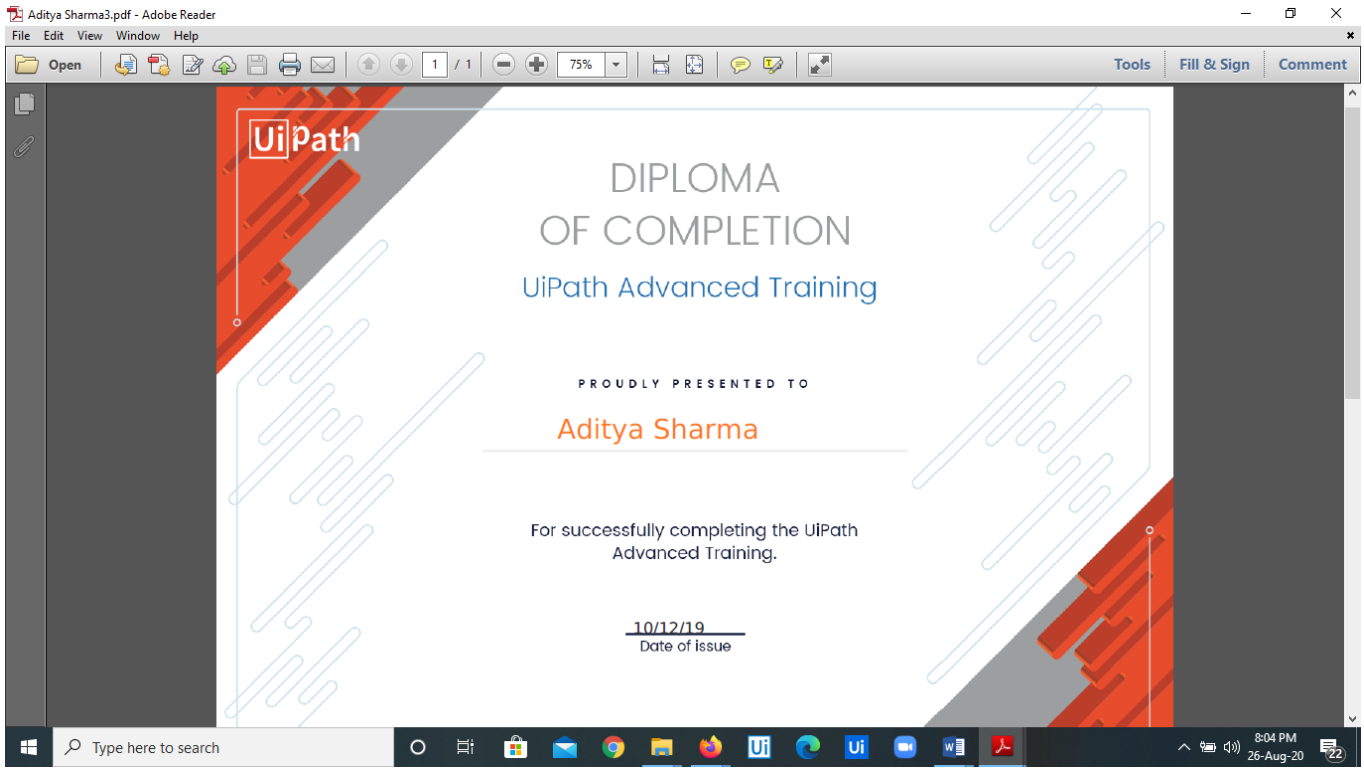
26-Aug-20



Quiz:

RPA is best suited for _____.

a) Repetitive process

b) Unstructured process

c) Complex data process

Who coined the term – Automation**?**

a) Henry Ford

b) DS Harder

c) Mark Austin

d) Graham Bell

Which of the following roles may be absent in a smaller RPA project?

a) Business Analyst

b) Project Manager

c) Software Architect

d) Change Manager

Which of the following is not an RPA technology?

a) GUI Automation

b) Screen Scraping

c) SAP Automation

d) Machine learning

Which of the following is a UiPath specific Variable?

a) GenericArray

b) GenericValue

c) GenericDates

Which of the following is used to pass data from one workflow file to another in UiPath Studio?

a) Namespaces

b) Variables

c) Arguments

Which of the following statements are interrupted using the Break statements?

a) Do While

b) While

c) For Each

Let's take a variable (V) initially assigned with a value of 10 and decreasing by 1 every time a sequence is executed in a Do While Statement. How many times will the sequence be executed if the expression is V > 0?

a) 11

b) 10

c) 9

How can we display today's date in the following format: March, 07 of 2019?

a) Now.ToString("mm, dd 'of' yyyy")

b) Now.ToString("MMMM, dd 'of' yyyy")

c) Now.ToString("mmmm, dd 'of' yy")

Spot the error in the following:

String.Format("First Name: (1) & Last Name: (2)","Adam","Smith")

Intended Output: "First Name: Adam & Last Name: Smith"

a) Use {} instead of ().

b) The indices start at zero and not at one.

c) Both

What is the best collection type to store a group of variables with their names?

a) Dictionary

b) String

c) List

In the UiPath Studio, the shortcut “Ctrl + K” is used to automatically create a variable with the appropriate data-type for the property used with.

a) True

b) False

Which is the correct option to extract the State and Zip Code “TX 75248” from the following addresses. Each address is a separate string of name “Addr” .

- 3159 Charla LaneDallas, TX 75248
- 3042 Desert Broom CourtWayne, NJ 07477
- 2159 Hewes AvenueBaltimore, MD 21201
- 4994 Corpening DriveTroy, MI 48084

a) Addr.Split(“,”c)(1).Trim.

b) Regex.Match(Addr,”[A-Z]{2} \d{5}”).

c) Both

Which of the following actions cannot be recorded under Automatic Recording?

a) Draw-down lists

b) Right-clicks

c) Checkboxes

Which of the following Recording modes does not support selectors?

a) Native Citrix

b) Web

c) Image

Which of the following actions is an action under both automatic and manual recording?

a) Type

b) Right click

c) Get text

Which output method does not capture the text position?

a) FullText

b) Native

c) OCR

Data scraping extracts structured data from…

a) Documents

b) Browsers

c) Apps

d) All of the above

Which types of selector are best suited for wildcard

a) Partial selectors.

b) Full selectors.

c) **Dynamic selectors.**

What is the full form of OCR?

a) Optical Character Recognition.

a) Optical Character Record.

b) Optimum Character Recognition

c) Optical Code Recognition.

How can we get column headers in an excel file?

a) By using add header

b) By using use filter

c) By using preserve format

Which of these activities can be used as an anchor in the Anchor base activity?

a) Find relative elements

b) Find Children

c) Find elements

Which activity can be used to merge data table?

a) Join Data table

b) Merge Data table

c) Filter data table

Which email processes can we automate in UiPath Studio?

a) Generating and sending automated messages

b) Retrieving messages and extracting data

c) Managing messages

d) Saving attachments

e) All of the above

Which activity groups do you have available for sending emails? (Multiple Select)

a) SMTP

b) Exchange

c) Outlook

d) All of the above

You have csv file with the test scores for 10 students. You want to automate sending each one an email with their grade. In this example email is an … .

a) Input

b) Output

Which of the following is a type of exception in UiPath?

a) Business Rule Exception

b) System Exception

c) Both

Which of the following enables a user to pause a program up to a specific location?

a) Breakpoints

b) Slow Step

c) Open Logs

Which of the following is an optional Block in Try Catch activity?

a) Try Block

b) Catch Block

c) Finally

What is Invoke Workflow?

a) Invoking workflow is an activity to develop robot

b) Invoking workflow is one of the methods of reusing code.

c) Invoking workflow is a template that helps the user to design processes.

What is Invoke Workflow?

a) Invoking workflow is an activity to develop robot

b) Invoking workflow is one of the methods of reusing code.

c) Invoking workflow is a template that helps the user to design processes.

Projects:

Project-1(A)

Create a sequence to input data into the Automation Challenge website.

1. First, use the "fakenamegenerator.com" to generate the random data. Extract values for Name, Phone number, Company name for five different Persons.
2. Next, type into "rpachalleng.com" website the three values in the First Name, Phone Number, Company Name fields for five times.
3. Use UiExplorer to build reliable selector, Try Anchor base activity and select relative element option in UiExplorer to get the target element relative to its label.

Project-1(B)

Create a sequence to scrap e-mails of 100 different Jaipur based companies from "www.zaubacorp.com" website.

1. First, use the "zaubacorp.com" to extract the URL of 100 different companies based at Jaipur in CSV file.
2. Next, Open the URL of all 100 companies to extract the email address of all companies by using attach browser and navigate to activity.
3. Use UiExplorer to build reliable selector. At last save all extracted email addresses in Text file.

Project-1(C)

Create a sequence in Uipath studio that does the following:

1. Asks the user to input a city name.
2. Opens a web browser and navigates to google.com.

3. Types in the search bar 'weather in <city>', and executes a search.
4. Scrapes the temperature data.
5. Displays the temperature in a message box.

Project-1(D)

Write step by step solution and draw the workflow in your answer sheet.

Create a sequence for PDF Automation:

1. Attach to the PDF Reader window using an Attach Window activity.
2. Extract the date from PDF on which bill is generated.
3. Extract the name of customer for which bill is generated.
4. Display the output for both requirements.

Note: Use PDF named "Perfect Match" (E-Mailed) for extraction.

Write step by step solution and draw the workflow in your answer sheet.

Assignment:

1. What is Robotic Process Automation? What can be automated? Define benefits of automation.
2. What is intelligent automation? **List the limitations of RPA.**
3. **Give difference between software development and automation. List the industrial applications of RPA.**
4. **Can you mention the steps of how to get started with RPA?**
5. List the different types of tools in RPA market. **What is Uipath studio, Uipath Robot and Uipath orchestrator?**
6. **Define the types of projects in Uipath with an example of each.**
7. **How do you invoke a UiPath workflow? Write steps to create a basic project that ask for a user's name and then displays it on the screen.**
8. **How to Create variables in UiPath? List the types of variables with an example of each.**
9. **How control flow can be achieved through the intelligent use of variables and activities. Explain with an example. List the name of control flow activities.**
10. **Which activities can be used to iterate through an array in UiPath Studio?**
11. **Why do you use Append Range, Write line, Assign and Delay Activity in UiPath? Explain.**
12. **Differentiate between log message and message box activity.**
13. **What is data manipulation?** How can we display today's date in the following format: April, 12 of 2020? Give syntax.
14. Write syntax to extract the record "1234" from the following addresses. String name is "status".
    - Operation completed successfully. Record 1234 has been created
15. **Differentiate between manual and automated recording. How do you perform Basic, Desktop and Web recording in RPA? List the steps.**
16. **What are Selectors in UiPath? Explain both full and partial selector.**
17. **How do you perform Screen Scraping in RPA?**
18. What is Orchestrator?

Course Name: Enterprise Programming using JAVA

Course Code: CSE428 (Open Elective-II) **(Backlog) L-T-P: 1-0-2 Credits: 3**

Course Description: The course focus onJava application programming interfaces (APIs), focusing on the APIsmost commonly used in real-world Java applications such as Collections,Input/Output (I/O), and Threads. The main concepts are: overview of exception handling and Multithreading, JDBC API, web applications using Servlet, JSP, Aspect Oriented Programming using Spring Framework. This course also covers basic concepts for software design and reuse.

Learning Outcome:

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

1. Design, develop and debug software applications in Core Java taking into account coding and documentation standards.
2. Apply concepts like multithreading, interfaces, generics in Java program design and implementation.
3. Use JDBC API for database-independent connectivity between the Java programs and MySQL database.
4. Develop server side solution using Servlet and JSP technologies.
5. Design, develop, and debug web applications using Aspect Oriented Programming using Spring Framework.

Enterprise Programming Using Java

Unit 1 – Object Oriented Programming Concepts-Java, JRE, JVM & JDK, Operators, Methods, Keywords, Control Structures, Method Overloading & Overriding, Input using Command Line Arguments & Scanner, Constructors, Finalizer(), Garbage Collection, Strings, Access Modifiers, Inner Classes, Cloning Objects, Abstract Classes, Interfaces, Packages, UTIL Package, File I/O using java.io package

Unit 2 - Exception Handling: The Idea behind Exception, Exceptions & Errors, Types of Exceptions, Control Flow in Exceptions, Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter Communication of Threads, Multithreading in JAVA.

Unit 3 – JDBC Programming - The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, The SQLWarning Class, The Statement Interface, PreparedStatement, CallableStatement The ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, ResultSetMetaData, Executing SQL Updates, Transaction Management. Servlet API & Overview - Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure & Deployment

descriptor ServletContext&ServletConfig interface, Attributes in Servlet, Request Dispatcher interface The Filter API: Filter, FilterChain, Filter Config Cookies and Session Management: Understanding state and session, Understanding Session Timeout and Session Tracking, URL Rewriting

Unit 4 –Java Server Pages (JSP) - JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, JSP Directives, JSP Action, JSP Implicit Objects JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing.

Unit 5 – Java Web Frameworks: Spring MVC Overview of Spring, Spring Architecture, bean life cycle, XML Configuration on Spring, Aspect Oriented Programming - Spring, Managing Database, Managing Transaction.

***NOTE:* Integrated Development Environments (IDEs) to be used in this Course are Eclipse or NetBeans – Both are compatible for Enterprise Programming using Java.**

Prerequisites		OOP
Teaching Scheme (Hours per Week)		L T P 1 0 2
Credits		3
Sr. No.	**Evaluation Component**	**Marks**
1	Attendance	
2	Assignment	10
3	Class Participation	5
4	Quiz	5
5	Theory Exam-I	
6	Theory Exam-II	20
7	Theory Exam-III	20

8	Report-I	
9	Report-II	
10	Report-III	
11	Project-I	
12	Project-II	20
13	Project-III	
14	Lab Evaluation-I	10
15	Lab Evaluation-II	10
16	Course Portfolio	
	Total (100)	100
Evaluation Scheme for Retest		
	Theory Exam-III	20
	Lab Evaluation-II	10
	Total	30

References

1. Liang, Y. Daniel. Introduction to Java programming: comprehensive version. Pearson Education, 2018.
2. Zambon, Giulio. Beginning JSP, JSF and Tomcat: Java web development. Apress, 2012.

Activities Related to Skill Development and Employability

Course Name: Enterprise Programming using JAVA
Course Code: CSE428

Assignment-1

Learning Outcome: Generics & Collections, Class & Objects, final keyword, super keyword, Inheritance, and StringBuffer.

Submission Deadline:19 January 2020

Q1. Write a Java Program using the concepts of Generics and Collections, to iterate through all the elements in an ArrayList.

Q2. Write a Java Program using the concepts of Generics and Collections, to clone an ArrayList to another ArrayList. [Hint: import Collections & ArrayList form Util package].

Q3. Write a Java Program that compares two given strings lexicographically, ignoring the case difference.

Q4. Write a Java Program to create a user defined data type for Complex Numbers.

Description: Data type for complex numbers.

The data type is "immutable" so once you create and initialize a Complex object, you cannot change it. The "final" keyword when declaring re and im enforces this rule, making it a compile-time error to change the .re or .im instance variables after they've been initialized.

After Execution the output should look like this (so implement as per the required output):

a = 5.0 + 6.0i
b = -3.0 + 4.0i
Re(a) = 5.0
Im(a) = 6.0
b + a = 2.0 + 10.0i
a - b = 8.0 + 2.0i
a * b = -39.0 + 2.0i
b * a = -39.0 + 2.0i
a / b = 0.36 - 1.52i
(a / b) * b = 5.0 + 6.0i

conj(a) = 5.0 - 6.0i
|a| = 7.810249675906654
tan(a) = -6.685231390246571E-6 + 1.00001031089811981

Q5. Write a Java Program to Implement Inheritance – use the example of an automobile as a base make two derived classes using the base/super class, which extends the functionality of the baseclass. The base class should have the following methods – AutoWheels (), accelerate (), applybreak(), changegear() etc.

Q6. Write a Java Program that shows the usage of 'super' keyword to call at least a data member, some methods and a constructor of the parent/base class in the derived or child class.

Q7. Write a Java Program that efficiently finds the longest common-subsequence if two strings are given.

Q8. Write a Java Program to show how to get a sub string of content of stringbuffer using substring method of java stringbuffer class.

Q9. Write a java program to calculate the longest common subsequence [lcs] from two input strings. The String should be fed into the program from user input. Input should be from command line.

Q10. Write a Java Program given a, b & c, solves for the roots of a quadratic equation. And assumes both roots are real valued. Take the user input from command line.

Quiz

Predict the output of following Java Programs.

```
   1. // filename Main.java
class Test {
    protected int x, y;
}

class Main {
    public static void main(String args[]) {
        Test t = new Test();
        System.out.println(t.x + " " + t.y);
    }
}
```

0 0

```
   2.  // filename Test.java

class Test {
    public static void main(String[] args) {
        for(int i = 0; 1; i++) {
            System.out.println("Hello");
```

```
            break;
        }
    }
}
```

Compile error

There is an error in condition check expression of for loop. Java differs from C++(or C) here. C++ considers all non-zero values as true and 0 as false. Unlike C++, an integer value expression cannot be placed where a boolean is expected in Java. Following is the corrected program.

```
   3. // filename Main.java
class Main {
    public static void main(String args[]) {
        System.out.println(fun());
    }
    int fun() {
        return 20;
    }
}
```

Compile error

Like C++, in Java, non-static methods cannot be called in a static method. If we make fun() static, then the program compiles fine without any compiler error. Following is the corrected program.

```
   4. // filename Test.java
class Test {
   public static void main(String args[]) {
       System.out.println(fun());
   }
   static int fun() {
       static int x= 0;
       return ++x;
   }
}
```

Output: Compiler Error

Unlike C++, static local variables are not allowed in Java. See this GFact for details. We can have class static members to count number of function calls and other purposes that C++ local static variables serve. Following is the corrected program.

```
   5. // filename: Test.java
class Test {
    int x  = 10;
    public static void main(String[] args) {
         Test t = new Test();
         System.out.println(t.x);
    }
}
```

10

```
   6. // filename: Test.java
class Test {
    int y = 2;
    int x  = y+2;
    public static void main(String[] args) {
```

```
        Test m = new Test();
        System.out.println("x = " + m.x + ", y = " + m.y);
    }
}
```

4 2

Output of the above program is “x = 4, y = 2”. y is initialized first, then x is initialized as y + 2. So the value of x becomes 4.

```
   7. // filename: Test.java
public class Test
{
    int x = 2;
    Test(int i) { x = i; }
    public static void main(String[] args) {
        Test t = new Test(5);
        System.out.println("x = " + t.x);
    }
}
```

Output of the above program is “x = 5”. The initialization with class declaration in Java

```
   8. // filename: Test2.java
class Test1 {
    Test1(int x) {
        System.out.println("Constructor called " + x);
    }
}

// This class contains an instance of Test1
class Test2 {
    Test1 t1 = new Test1(10);

    Test2(int i) { t1 = new Test1(i); }

    public static void main(String[] args) {
        Test2 t2 = new Test2(5);
    }
}
```

The output of the program is Constructor called 10 Constructor called 5.

First t2 object is instantiated in the main method. As the order of initialization of local variables comes first than the constructor,first the instance variable (t1), in the class Test2 is allocated to the memory. In this line a new Test1 object is created, constructor is called in class Test1 and ‘Constructor called 10’ is printed. Next the constructor of Test2 is called and again a new object of the class Test1 is created and ‘Constructor called 5’ is printed

```
   9. Which component is responsible for converting bytecode into machine
      specific code?
      a) JVM
      b) JDK
      c) JIT
      d) JRE
```

JVM

10. Which component is used to compile, debug and execute java program?

a) JVM
b) JDK
c) JIT
d) JRE

JDK

Course Code & Title: CSE429: Statistical Computing with SAS

Course Description: The aim is to introduce fundamental SAS programming language for use in database handling and preparation for analyses. Further, the aim is to introduce the student on how to use statistical procedures in SAS, with focus on descriptive statistics.

Learning Outcome

After course completion, the student will be able to

1. Describe statistical terms and symbols as per ISO standard ISO-3534.
2. Import/export, clean/process and transform data (e.g. Air quality dataset, Crime against woman dataset, Solar energy Dataset etc.) using SAS functions and programming statements.
3. Perform descriptive statistics using SAS procedures.
4. Write and debug the scripts, macros and programs with SAS system.
5. Analyze and interpret given data statistically as per ISO standard (ISO 5479, ISO 11453, and ISO 16269).
6. Use appropriate models of analysis, assess the quality of input, derive insight from results, and investigate potential issues.
7. Apply computing theory and algorithms, as well as mathematical and statistical models, and the principles of optimization to appropriately formulate and use data analyses.
8. Interpret data findings to any audience, orally, visually and in written formats.

Teaching Scheme and Credits

Hrs. per Week		Credits	Duration in Weeks
In Class	Out Class	03	12
05	10		

Evaluation Scheme

Sr. No	Specifications	Marks
01	Attendance	Nil
02	Assignment	20
03	Class Participation	10
04	Quiz	20
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam	Nil
08	Report-1	05
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	25
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation1	20
15	Lab Evaluation2	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

Data Structures: Introduction to SAS interface and library structure and definition, Reading data using Datalines and importing and exporting datasets, Infiles statement - reading raw data, Formats and Informats, Variable attributes and data modification using Data and Set statements

Data Management: Using conditional statements to modify data - Where, If and Nested If, Appending and Merging datasets, SAS Functions for data manipulation, Loops and Arrays in SAS,

Report Generation: Basic Proc steps - like Proc Contents, Proc Format, Proc Report and Proc Tabulate, Proc steps for basic statistics - like Proc Univariate and Proc Means

Proc SQL: Introduction to SQL - basic DBMS and RDBMS concepts, Using SQL Procedures in SAS, Using conditional statements in SQL and aggregate functions, Data manipulation using Proc SQL

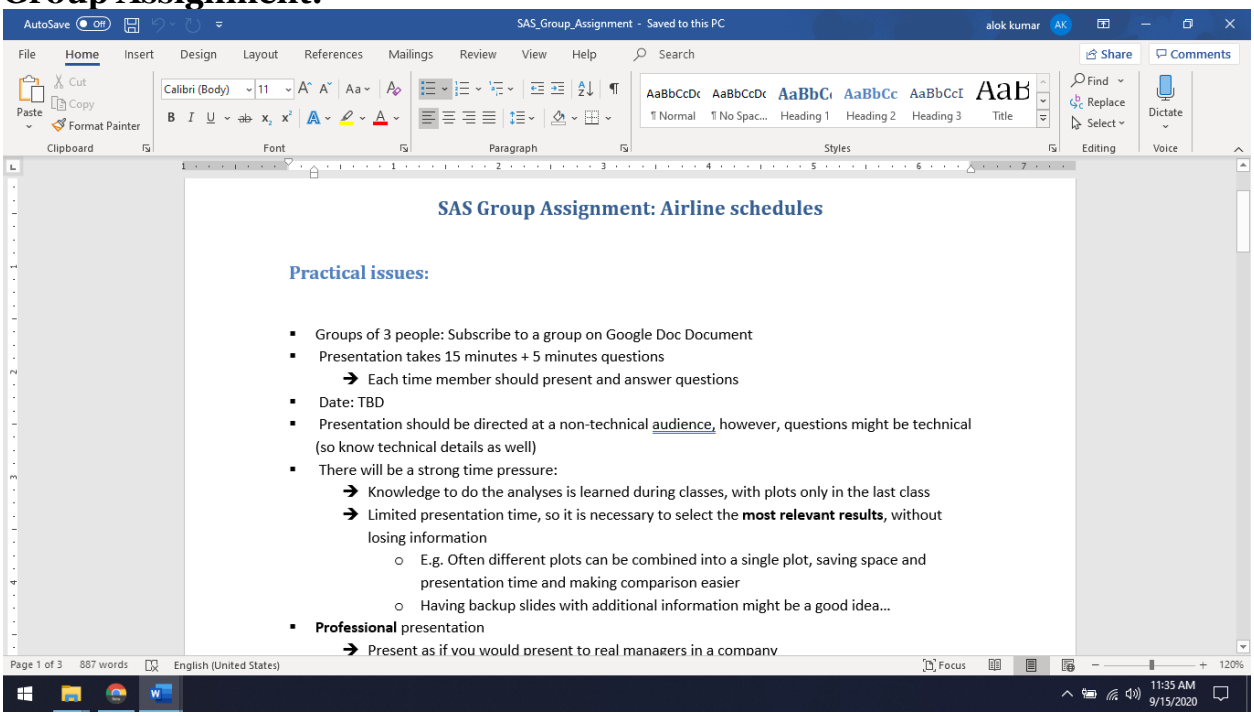
SAS Macros: Introduction to Macros, Local and Global declarations, Using built-in macro procedures and functions

Reference Books

1. Delwiche L. D. and Slaughter S. J., The little SAS book: a primer, fifth edition. SAS Institute
2. Alan C. Elliott and Wayne A. Woodward, SAS Essentials: Mastering SAS for Data Analytics, Wiley
3. Ron Cody, Learning SAS by Example, Second Edition, SAS Institute

Activities Related to Skill Development and Employability

Group Assignment:



SAS Group Assignment: Airline schedules

Practical issues:

- Groups of 3 people: Subscribe to a group on Google Doc Document
- Presentation takes 15 minutes + 5 minutes questions
  - ➔ Each time member should present and answer questions
- Date: TBD
- Presentation should be directed at a non-technical audience, however, questions might be technical (so know technical details as well)
- There will be a strong time pressure:
  - ➔ Knowledge to do the analyses is learned during classes, with plots only in the last class
  - ➔ Limited presentation time, so it is necessary to select the **most relevant results**, without losing information
    - E.g. Often different plots can be combined into a single plot, saving space and presentation time and making comparison easier
    - Having backup slides with additional information might be a good idea…
- **Professional** presentation
  - ➔ Present as if you would present to real managers in a company

Course Title and Code: Machine Learning: CSE724

Course Description: This course provides a concise introduction to the fundamental concepts in machine learning and popular machine learning algorithms. It includes the standard and most popular supervised learning algorithms including linear regression, logistic regression, decision trees, k-nearest neighbor, an introduction to Bayesian learning and the naïve Bayes algorithm, support vector machines and kernels and neural networks with an introduction to Deep Learning. It also includes the basic clustering algorithms. Feature reduction methods will also be discussed. In the course we will discuss various issues related to the application of machine learning algorithms. We will discuss hypothesis space, overfitting, bias and variance, tradeoffs between representational power and learnability, evaluation strategies and cross-validation. The course will be accompanied by hands-on problem solving with programming in Python/R and some project tutorial sessions.

Prerequisites		**Data Analysis, Programming, Statistics, Linear Algebra**
Hours per Week		**L-T-P: 1-0-4 /InClass-OutClass: 5-10**
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	Nil
03	Class Participation	Nil
04	Quiz	16
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam	Nil
08	Report-1	20
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	24
12	Project -2	10
13	Project -3	30
14	Lab Evaluation 1	Nil

15	Lab Evaluation 2	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

Introduction: what is ML; Problems, data, and tools; Visualization; Overview of Python, Linear regression; SSE; gradient descent; closed form; normal equations; features, Overfitting and complexity; training, validation, test data, Classification problems; decision boundaries; nearest neighbor methods, Probability and classification, Bayes optimal decisions, Naive Bayes and Gaussian class-conditional distribution, Linear classifiers, Bayes' Rule and Naive Bayes Model, Logistic regression, online gradient descent, Neural Network, Decision tree, Ensemble methods: Bagging, random forests, boosting, Model Selection and Regularization, Non-linear Model, Tree-based Methods,

Unsupervised learning: clustering, k-means, hierarchical agglomeration, Advanced discussion on clustering and EM, Latent space methods; Dimensionality reduction, PCA, Text representations; naive Bayes and multinomial models; clustering and latent space models, VC-dimension, structural risk minimization; margin methods and Support Vector machines (SVM), Support vector machines and large-margin classifiers, Introduction of Deep Learning

Reference / Text Books

1. Ethem Alpaydin, Introduction to Machine Learning, PHI/MIT press, 2014
2. Tom M. Mitchell, 'Machine Learning', Tata McGraw Hill, 2017

Yaser S. Abu-Mostafa, Malik Magdon-Ismail, 'Learning from Data', Publisher: AMLBook, 2012

Course Title and Code

Advance JAVA: CSE777 (Elective)

Course Description

This course introduces students to intermediate and advanced features of the Java programming language. Students will learn about object-oriented programming concepts such as inheritance, interfaces, abstract classes, abstract methods, and polymorphism; will learn how to write and read Java primitive types to and from files; how to serialize objects, and how to implement graphical user interfaces using JFrames components. Typical assignments, exercises, and projects include using built-in and programmer-defined classes, implementing inheritance, runtime polymorphism, different Java application programming interfaces (APIs), Java Server Pages (JSP) server-side programming technology that enables the creation of dynamic, platform-independent method for building Web-based applications.

Prerequisites		**C++**
Hours per Week		**L-T-P: 1-0-4**
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	20
03	Class Participation	10
04	Quiz	Nil
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam	Nil
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	20

12	Project -2	20
13	Project -3	Nil
14	Lab Evaluation	30
15	Lab Evaluation	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

- Introduction to Java, OOPs Concepts, Variables, Expressions, Control Structure, Constructor, Arrays, Strings, Java Architecture, Inheritance, Polymorphism, Abstract class, Interface in Java, Package in Java, UTIL package.
- Multithreading, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in Java, JFrames.
- Java Database Connectivity (JDBC): Merging Data from Multiple Tables: Joining, Manipulating Databases with JDBC. Introduction to Hibernate.
- Servlets: Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession.
- JSP architecture, JSP page life cycle, JSP elements, Expression Language, Tag Extensions, Tag Extension API, Tag handlers, JSP Fragments, Custom Tag Libraries. Remote Method Invocation, Spring Framework, MVC Architecture

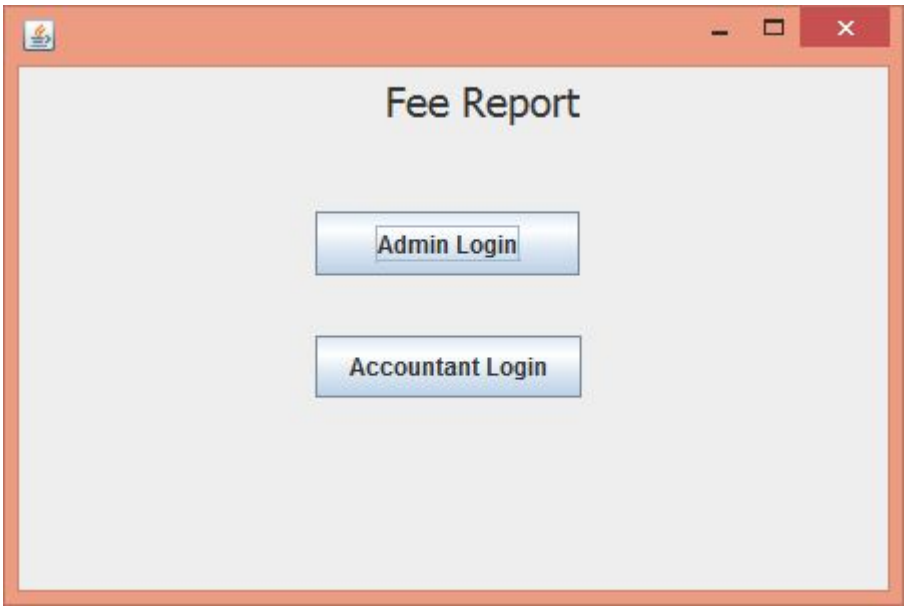
Reference / Text Books

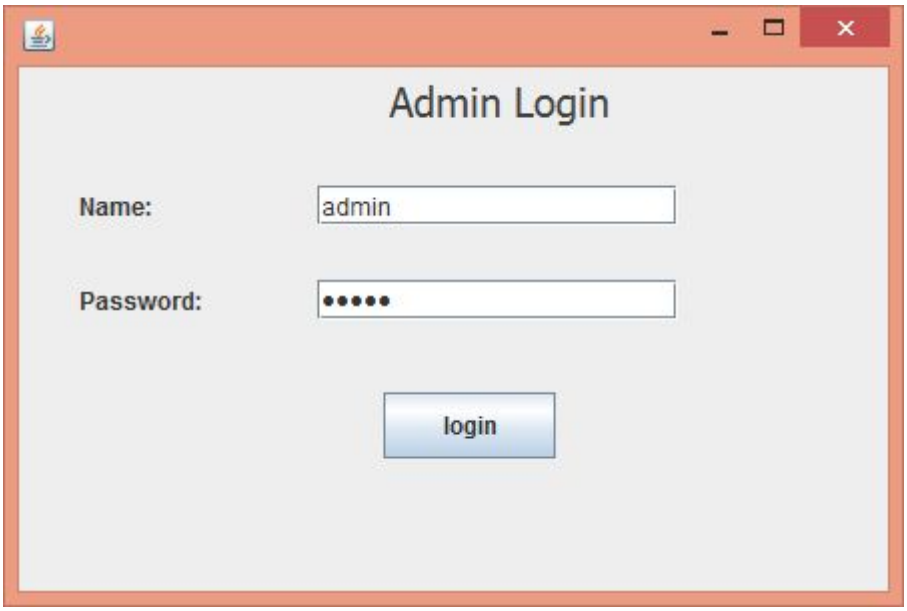
1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.
2. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
3. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.
4. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.
5. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.

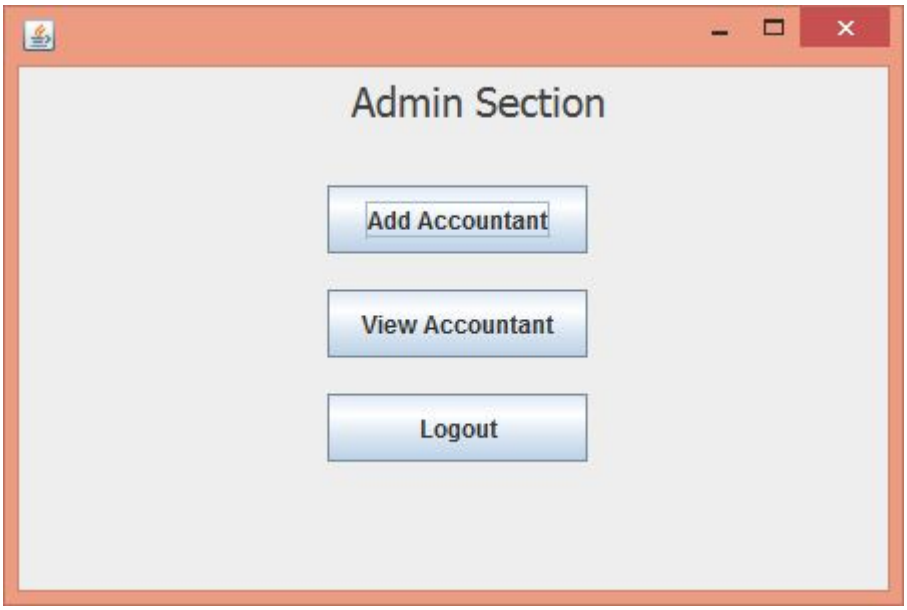
Activities Related to Skill Development and Employability

Project

Every student need to complete project as per below screenshots:



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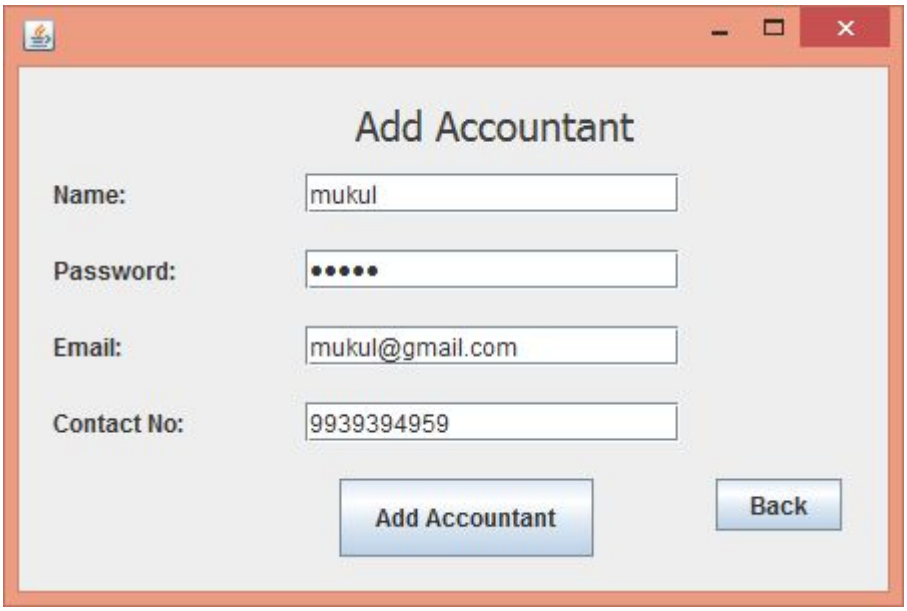
Logout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Name:
mukul
Password:
Email:
mukul@gmail.com
Contact No:
9939394959
Add Accountant
Back

Id	Name	Password	Email	Contac
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2	sonoo	sonoo123	sonoo@gmail.com	939292932
3	salman	salman	salman@gmail.com	939929322
4	varun	varun	varun@gmail.com	9399239239
5	abhi	abhi	abhi@gmail.com	93923923
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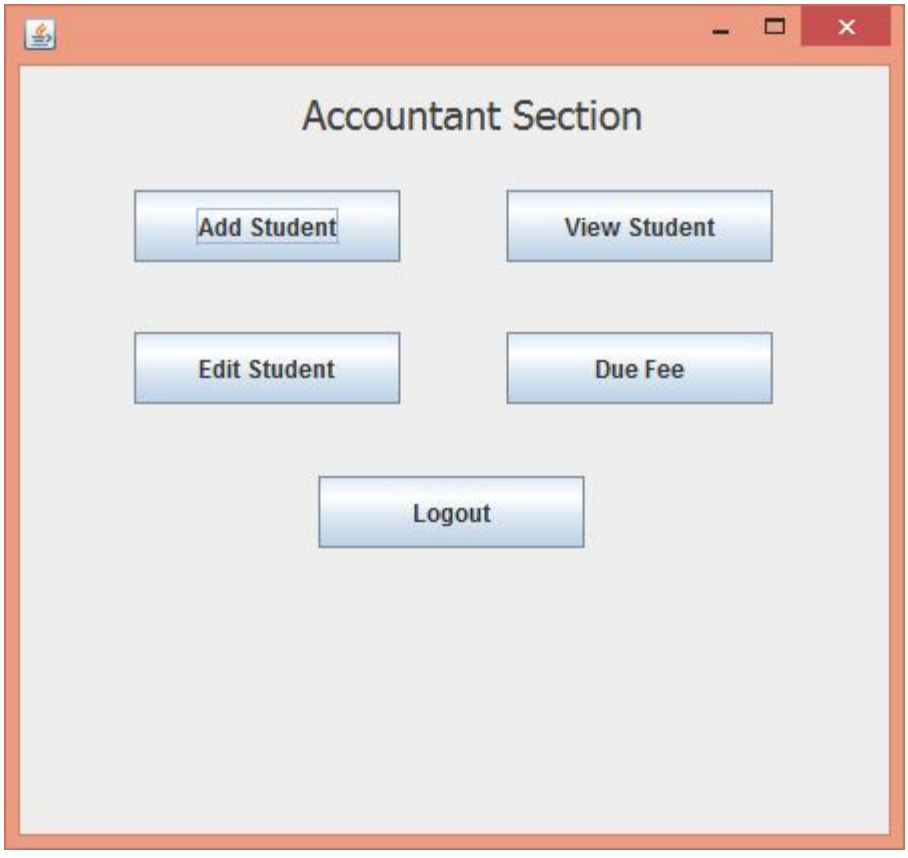

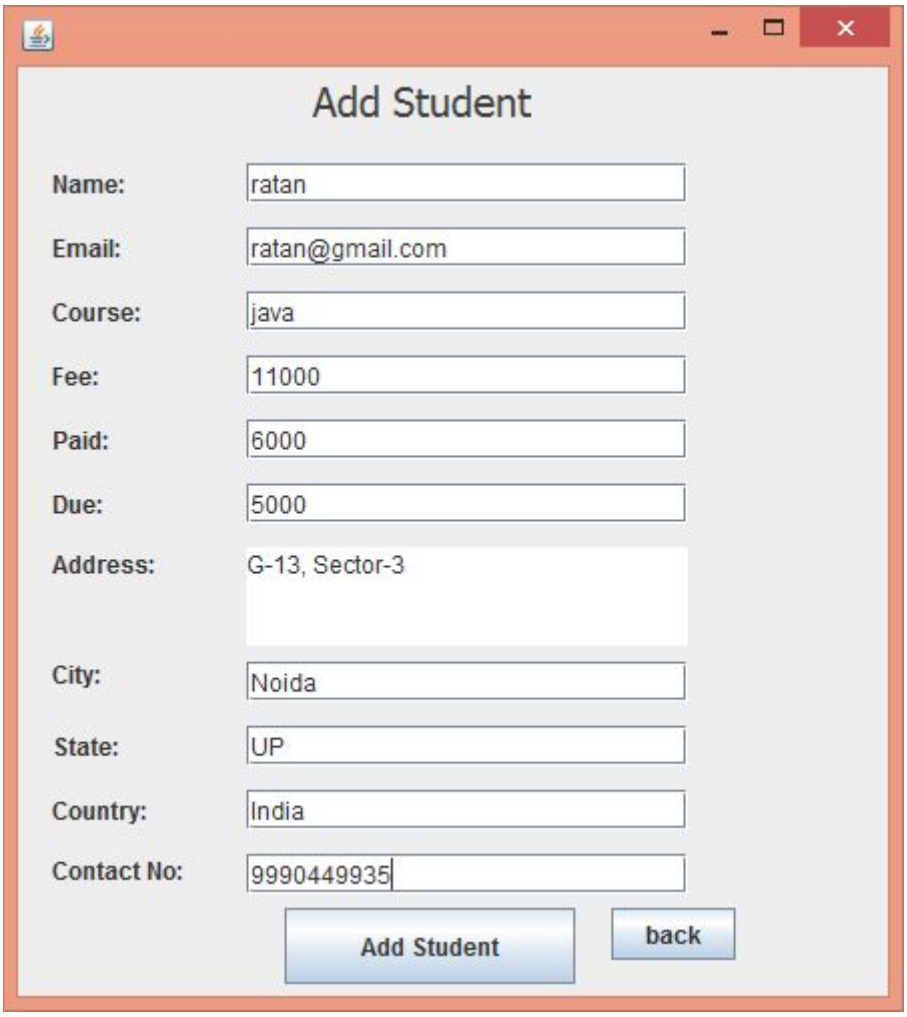
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ratan@gmail.com
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City:
Noida
State:
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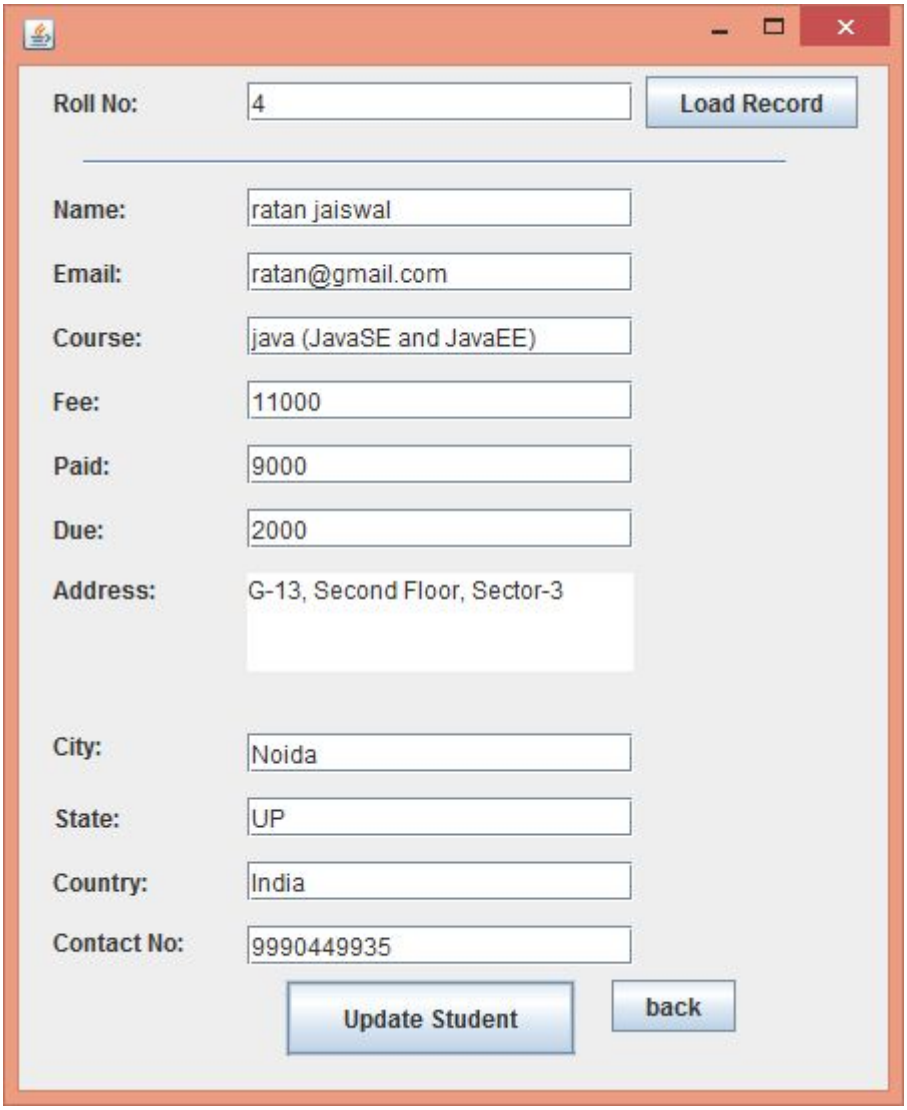
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Name:
ratan jaiswal
Email:
ratan@gmail.com
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Due:
2000
Address:
G-13, Second Floor, Sector-3
City:
Noida
State:
UP
Country:
India
Contact No:
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Update Student
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CSE888 Advanced Algorithms and Complexity

Course Title and Code: Advanced Algorithms and Complexity (CSE888)	
Hours per Week	**Curated MOOC**
Credits	**5**
Students who can take	**BTech+MTech**

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

CSE889 Advanced Probability and Statistics

Course Title and Code: Advanced Probability and Statistics (CSE889)	
Hours per Week	**Curated MOOC**
Credits	**3**
Students who can take	**BTech+MTech**

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

Course Name - Enterprise Reporting Using Business Intelligence
Course Code – CSEBD501
Credits -- 4

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test - I	**Mid Term Test - II**	**End Term Test**	**Class Participation/ Additional Continuous Evaluation***	**Total Marks ****	**Mid Term Test - I**	**End Term Test**	**Class Participation/ Additional Continuous Evaluation***	**Total Marks****
20	20	50	10	100	20	50	30	100

Syllabus (Theory)

Changing Business with Data, Insight Turning data into information, Building the data warehouse, Accessing the data warehouse, Overview of IBM COGNOS 10.2, BI Identify Common, Data Structure Gather Requirements, Creating a Baseline Project, Introduction to the Reporting Application, Focus Reports using Prompts, Extend Reports using Calculations, Customize Reports with Conditional Formatting, Drill Through From One Report to Another, Create a Report using Relational Data.

CSESP202: Python Programming

Course Name - Python Programming

Course Code – CSESP202

Course Objective: The aim of the course is to build up a clear understanding of the fundamentals of Python programming. The course will discuss and cover the topics necessary for the students to write and execute the programs on their own.

Learning Outcome:
On successful completion of this course, the students should be able to:
1. Design and program the standalone Python applications.
2. Use lists, tuples, and dictionaries in Python programs.
3. Identify Python object types.
4. Design structure and components of a Python program.
5. Use Python Control and Decision making Structures for writing programs
6. Write long iterative programs into recursive code.
7. Build programs that related to text analytics.
8. Build small graphics and animation programs.
9. Design machine learning model to perform data analysis.
10. Build own Python packages or modules for reusability.
11. Read and write files in Python.
12. Use Data Handling Techniques of Python
13. Use exception handling in Python applications for error handling, find syntax errors.

Evaluation Scheme:

Sr. No	Specifications	Weightage (in percentage)
01	Attendance	10
02	Assignment	10
03	Class Participation	10

04	Quiz	10
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam	Nil
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	20
12	Project -2	20
13	Project -3	Nil
14	Lab Evaluation I	10
15	Lab Evaluation II	10
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus - Running Python Scripts, Using the interpreter interactively, Using variables, String types: normal, raw and Unicode, String operators and expressions, Math, operators and expressions, Writing to the screen, Reading from the keyboard, Indenting, The if and elif statements, While Loops, Using List, Dictionaries, Using the for statement, Opening, reading and writing a text file, Using Pandas, the python data analysis library and data frames, Grouping, aggregating and applying, merging and joining, Dealing with syntax errors, Exceptions, Handling exceptions with try/except. Recursion Concept, Programs using recursion, RE Pattern Matching, Parsing Data, Basics of text analytics, Introduction to graphics using Python, Basic animation using Python. Introduction to Regression, Types of Regression, Use Cases, Exploratory data analysis, Correlation Matrix, Visualization using Matplotlib, Implementing linear regression. Machine Learning – Algorithm, Algorithms – Random forest, Support vector Machine, Random Forest, Build your own model in python, Solve classification problem with real-world dataset, Comparison between random forest and decision tree.

Course Name - Enterprise Application Development using Java
Course Code – CSESP501
Credits -- 4

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test - I	**Mid Term Test - II**	**End Term Test**	**Class Participation/ Additional Continuous Evaluation***	**Total Marks ****	**Mid Term Test - I**	**End Term Test**	**Class Participation/ Additional Continuous Evaluation***	**Total Marks****
20	20	50	10	100	20	50	30	100

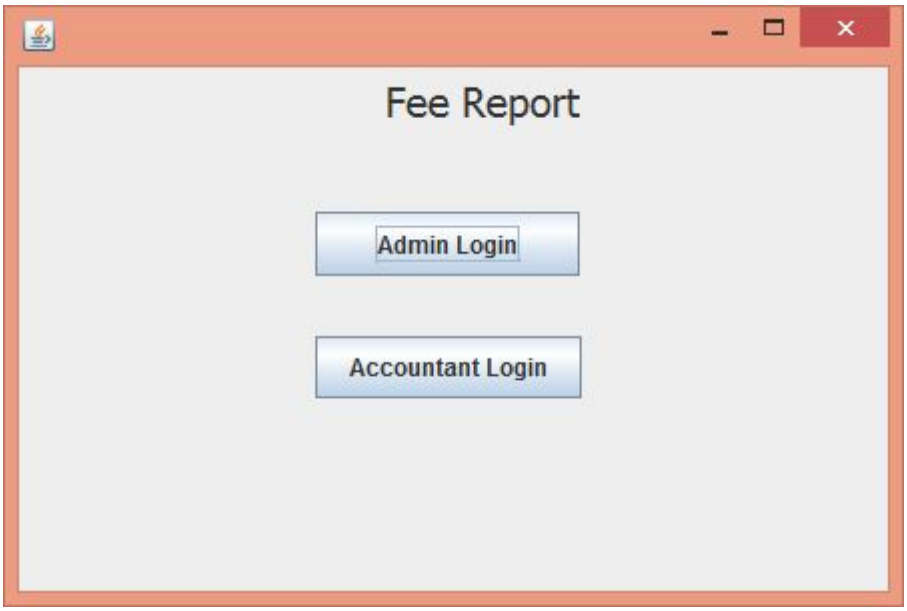
Syllabus (Theory)

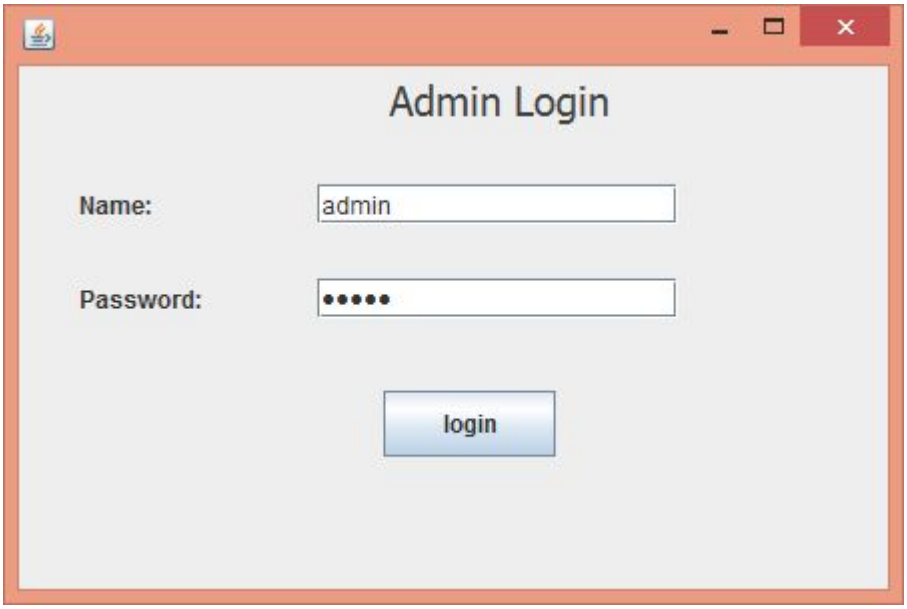
Introduction to Java EE Web Component, Overview of Servlets, Java EE Perspective of the Rational Application Developer, Java EE Container Services Overview, Servlet API, Library Case Study, Overview of JavaServer Pages, JavaServer Pages Specification and Syntax, Page Designer in Rational Application Developer, Debugging Web Applications, Web Archive Deployment Descriptor, Session State Storage Issues, Cookie API, HttpSession: Management of Application Data, URL Rewriting, Best Practices for Session Management, JavaBeans and the MVC Pattern, JavaServer Pages with JavaBeans, JSP Expression Language, JSP Custom Tags, JSP Tag Files, Servlet Filtering, Servlet Listeners, Best Practices for Server-Side Application Development, Java EE Packaging and Deployment, Installing an application in WebSphere Application Server V7.0, Web Application Security.

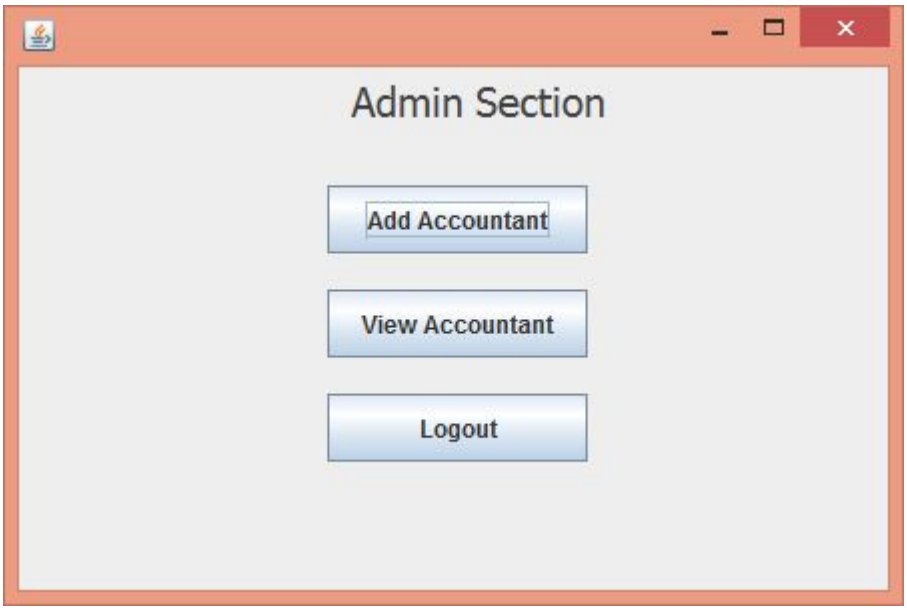
Activities Related to Skill Development and Employability

Project

Every student need to complete project as per below screenshots:



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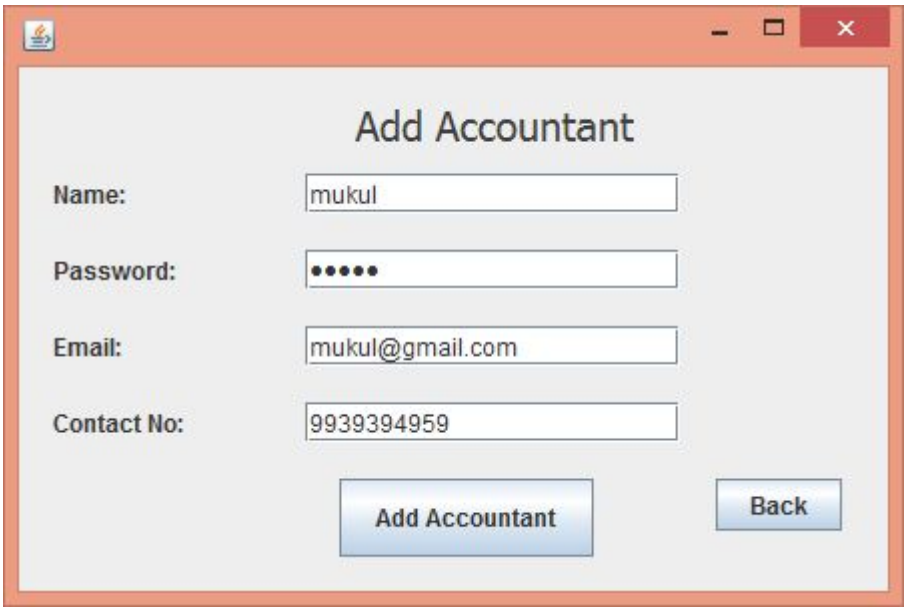
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Password:
Email:
mukul@gmail.com
Contact No:
9939394959
Add Accountant
Back

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2	sonoo	sonoo123	sonoo@gmail.com	939292932
3	salman	salman	salman@gmail.com	939929322
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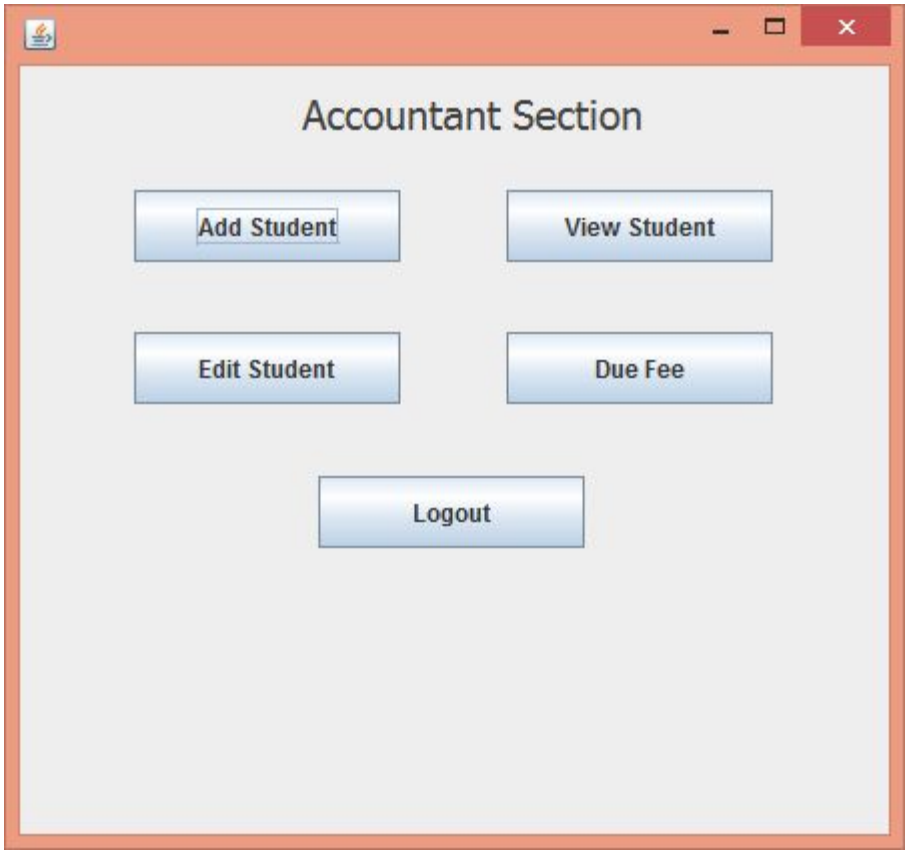

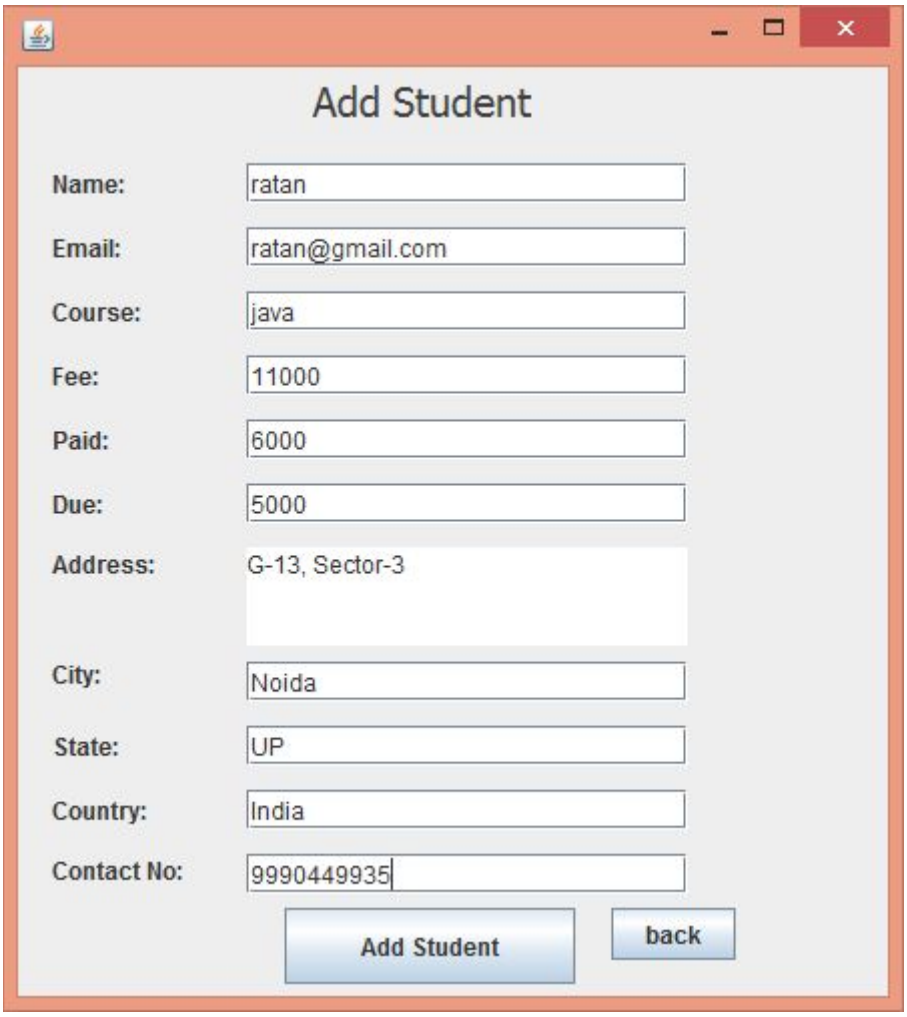
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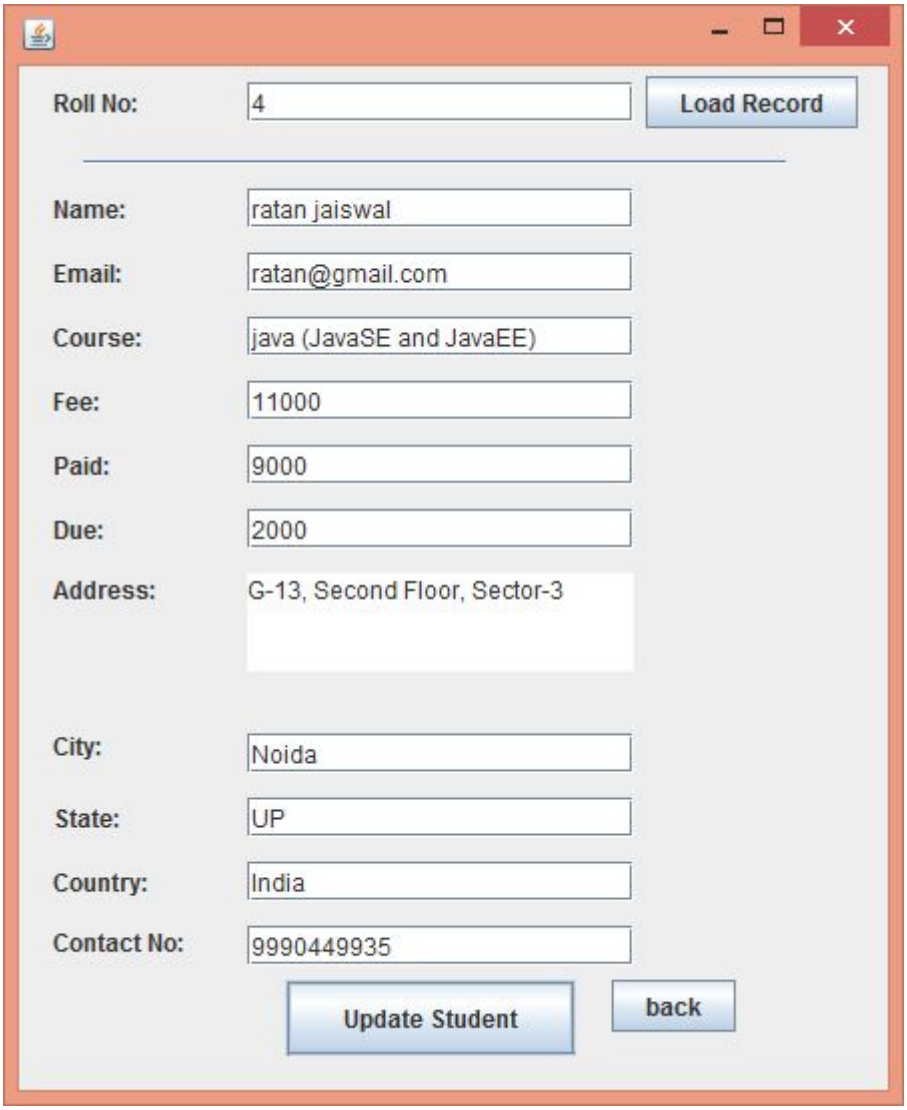
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State:
UP
Country:
India
Contact No:
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Update Student
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JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Startup Studio: Identifying Business Opportunities

Course Code: ED2101
Credits: 3
Trimester: I

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 emphasize 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- 2018-19
Startup studio: Entrepreneurial Mindset & Leadership

Course Code: ED2102
Credits: 3
Trimester: II

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.

Reading Materials:

1. Course handouts will be provided with relevant references to chapters, articles, and patents
2. Start with Why - Simon Sinek

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.

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Startup studio Idea Generation & Business Modeling

Course Code: ED2103
Credits: 3
Trimester: III

Course Description:
This course intends to familiarize students with designs pertaining to Innovation Matrix, Idea Generation Thesis and Business Model Canvas. The aim is to give students a deep understanding of these concepts around innovation and opportunity exploration while also explaining the relevance that each of them holds in the students' current context. With this course, they will be equipped at understanding their own strengths as potential startup founders and able to map the same to opportunities problems relevant in the Indian ecosystem. They will also undergo a unique, innovate& powerful brainstorming tool to realize their entrepreneurial dream. It is a card based educational game intended not just to spark the entrepreneurial fire within them but to empower them to become one. 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. The assignments included will be with the intention of generating them to apply their knowledge to test theoretically, as well as with practical usage.

Course Learning Outcomes:
1. To enable the process of visual idea generation techniques and create a platform for group brainstorming matrix
2. To introduce and engage the students to startup builder tools such as Lean Startup and Business Model Design towards building future ventures and creating entrepreneurial impact
3. To identify, explore and develop a startup idea that the students will work on for the rest of their studio model sessions across modules
4. To take them through an intense journey in the life of an "Entrepreneur" by means of an integrated hackathon which will include the key strategy elements: Ideate. Design. Build. Test. Deliver

Recommended reading for students:
1. Course handouts will be provided with relevant references to chapters, articles, and patents
2. Lean startup - Eric Ries

Activities Related to Skill Development and Employability

Field Project Briefs
Students will undertake a field project on to Innovation Matrix, Idea Generation Thesis and Business Model Canvas.to complete the course requirements. 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
Master of Business Administration
Academic Year- 2018-19
Financial Accounting for Decision Making

Course Code: FA2101
Credit: 4
Trimester: I

Module I (Credits: 3)

Course Learning Goals (CLGs): Upon completion of the course students will develop an understanding of the financial statements and utility of the financial statement to various stakeholders. Students will develop an overall understanding of various forms of business. Students will be able to analyze financial statements for decision malting and assess financial performance & position of organizations.

Course Intended Learning Outcomes (CILOs):

1. To prepare the three financial statements of a corporate enterprise – the Statement of Income, the Cash Flow Statement, and the Balance Sheet.
2. To account for various important elements in the above financial statements like Earning Per Share, Inventory & Long Lived Assets.
3. To be able to interpret the financial statements using comparative, common-size & ratios of a corporate enterprise.
4. To identify the accounting shenanigans and be aware about the accounting frauds.

Course Contents:

Session	Hours	Topics to be Covered
		Foundation (Focus on Non-Commercees)
1	2.5	Introduction to Accounting Basic Intro | Need for accounts | Basics on Flow of Information | Different Forms of Business
2	2.5	Income Statement and Balance Sheet through a case
3	2.5	Cash Flow Statement and Accounting Equation
4	2.5	Practice of Accounting equation through one full case, Journal Entry to Balance Sheet through a detailed example
		Core Classes
5	2.5	Income Statement: Preparation and Analysis Accrual vs Cash | Revenue and Expense Recognition | Provisions Earnings Per share
6	2.5	Balance Sheet: Preparation and Analysis

		Other Comprehensive Income
7, 8	5	Cash Flow Statement: Preparation and Analysis Direct Method | Indirect Method
9	2.5	Inventory Accounting: Valuation | Cost Assumption
10	2.5	Fixed Asset Accounting: Capitalization | Depreciation | Impairment | Disposal
11	2.5	Analysis of Financial Statement
		Ratios | Common-sizing | Importance of MD&A, Directors Report & Annual Report in general. This shall be done through a case study
12	2.5	Quality of Financial Reporting · Emerging issues and latest developments in Accounting · Case Study: Enron Corporation or Satyam Computers

Module II (Credits: 1)

Course Description:
This course is an introduction to the use of accounting information for internal planning, decision making and performance evaluation. The main objective is to equip you with the knowledge to understand, evaluate and make practical decisions on the many financial reports used in modern companies. An internal accounting system serves two fundamental purposes. It plans and supports decisions about products, processes, assets and customers. The course covers various aspects and role of managerial accounting in dynamic business environments, costs related to managerial decision-making and application of marginal costing and cost volume profit analysis.

Course Learning Objectives:

1. Understand the role of accounting information in common business decisions
2. Differentiate relevant and irrelevant cost information
3. Application of marginal costing in business decision making

Topics to be Covered:

- *The Changing role of Managerial Accounting in a Dynamic Business Environment:* Managing resources, activities and people, objectives of managerial accounting activity, the balance score card, Managerial accounting versus financial accounting and Managerial accounting in different types of organizations
- *Basic Cost Management Concepts:* Product Costs, Period costs and expenses, Costs on Financial statement: Income Statement and Balance Sheet, Manufacturing Operations and Manufacturing costs, Costs in Service industry firms and nonprofit organizations, different costs for different purposes
- *Marginal Costing and Cost-Volume- Profit Analysis:* Illustration of cost-volume- profit analysis, The break-even point, Graphing Cost-Volume-Profit, Target Profit: Contribution-margin approach, equation approach, and graphical approach, Applying CVP analysis: Safety margin, changes in fixed expenses, changes in the unit contribution margin, predicting profit given expected volume.

Activities Related to Skill Development and Employability

Case Studies

- Baron Coburg (Basic Introduction to Financial Statements)
- Symphony Theatre (Advance Case: For practice)
- Gemini Electronics (Ratio Analysis)
- Enron Corporation or Satyam Computers (Accounting Frauds)

Others

- Annual Report (Maruti Suzuki India Limited)
- Equity Analyst Report (Tata Motors Limited)

Projects

- Air India
- MTNL
- CCD
- Mahindra Satyam
- IL&FS

Assignments

- Preparation of Cost Sheet and ascertainment of cost
- CVP Analysis

BBA &B.COM (H)
FN27
BANKING AND CAPITAL MARKET FUNDAMENTALS
COURSE OUTLINE
SEMESTER III

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: 3-0-0
COURSE CREDITS: 3
SESSION DURATION: 60 MINUTES

COURSE DESCRIPTION:
Indian banking system has a great history in various phases. Capital markets are also changing rapidly. Banks and financial service providers are offering various services to end customers to retain them in this cut throat era. The once staid banking and financial market has become highly dynamic and the study of banking and financial markets has become one of the most interesting topics. It starts with an overview of the genesis of the Indian Banking system, Growth & Development of Commercial Banks, and the nature of financial services offered. This provides students with an understanding of the various functions performed by banks; role played by commercial banks and the relevant regulations governing those functions. The second part of this course is designed to familiarize the students with the Capital Markets in India. It starts with an overview of the Indian financial system and covers in depth, the various types of financial markets, viz., the Money Market, Capital Markets, Primary and Secondary Markets, Topics covered in the course have both theoretical and practical significance and it is expected that students would take up projects and case studies in this area for a better understanding.

COURSE OBJECTIVES:
The course is designed to make students able to:

- Develop an understanding about Indian banking system, traditional and modern banking methods.
- Understand different types of products and instruments used in banks and its implications.
- To make the students aware about the different types of Capital Markets in India.
- To make the students understand the operating environment of the various types of Capital Markets in India.
- To keep abreast of the latest developments in the Capital Markets in India.

LEARNING OUTCOMES:

By the end of the course the student would be able to:

- A comprehensive understanding of structure of Indian Banks and conceptual knowledge of other concepts
- Usage of different banking products and instruments available
- Understand the types of financial markets and the linkages between them,
- Know and understand the various financial instruments used therein

COURSE CONTENTS:

Banking Fundamentals: Banking institutions, Functions of Bank, Development of Banking in India, Scheduled Commercial Banks, Investment Banks, Reform in the banking sector

Capital Market Overview: Function, Primary and secondary Markets, Equity Trading in India, Capital Market scams, Reforms in the capital market.

Primary Capital Market: Intermediaries to an issue, Free pricing regime, Book building mechanism, Green Shoe option, Online IPOs, Right Issues, ASBA Process, Indian Depository Receipts, Private Placement, Preferential Issues, Offer for Sale, Institutions Placements,

The Secondary Capital Market: Functions, Regulations, organization, Management and membership of stock exchanges, De-mutualization, Listing of securities, Trading Rules and Regulation, Circuit breakers, Dematerialization and Depositories, Types of Deals- Bulk, Block, Negotiated, Rolling Settlement, Internet Trading, Stock Market Indices,

Stock Exchanges: NSE, BSE, OTCEI, ICSE, USE and Regional Stock Exchanges, Global Stock exchanges.

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%

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. **A note on Financial Evaluation of Projects**
2. **Takeover of Raasi Cement by India Cements**
3. **Lehman Brothers: Managing a Global Investment Bank**
4. **ICICI Bank: Innovations in Microfinance**
5. **The ITC Classic Story**
6. **Co-operative Bank Scams in India**
7. **The CRB Scam**

JK Lakshmipat University, Jaipur

Institute of Management

Bachelor of Business Administration

Academic Year- 2018-19

Personal Leadership

Course Code: HR24

Credit: 3

Semester: I

Course Description:

The overarching goal of this course is to help students understand their own potential to become the leader they would like to be and own responsibilities in achieving their goal. The course focus on making life choices i.e. what work excites learners, as well as understanding one's passions and responsibilities. The emphasis is less about being entitled to be a leader and more about how students can become leaders in their own life to achieve success. The activities and exercises will help students explore their behaviors, motivations, values, influences, and character in an effort to increase self-awareness, think critically and also understand their responsibility towards society. The learnings from the course hold relevance in present and future development of the students.

Course Objectives:

To enable Students to

- Clearly define their particular personal strengths and the activities they need to continue or eliminate to become who they want to be.
- Claim ownership over their actions and decisions by studying theories and internalizing methods of being proactive, managing their time, embracing empathy and practicing mindfulness.
- Identify their personal brand and understand the importance of personal brand management.
- Create Personal Leadership Development Plans to guide them throughout their lives.
- Acknowledge and internalize the debt they owe to society and embrace the importance of giving back to their community.

Course Learning Outcomes:

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

- More aware of their own passions and personal motivations that shape and inform their preferred leadership behavior and choices.
- Understand what is motivating them, both extrinsically and intrinsically, and to make life choices that engage them and draw on their own intrinsic drivers.
- Better equipped to make decisions about their life choices and personal goals.
- Articulate awareness and insights about their strengths and development drivers in managing their own development.
- Demonstrate awareness and application of key societal responsibilities relating to pro-social behavior, leading positive change and developing others.

Topics to be Covered

- Introduction and Getting to know yourself
- Passion and Purpose
- Engaged Leadership Intrinsic motivations and leadership
- Leading Positively How do emotions align with strengths, life goals and leadership style?
- Supporting your leadership: Managing stress and your mind
- Mindful Leadership Mindfulness tools to enhance your decision making
- Leading Personal Change, Appreciative Inquiry, Storytelling and improving your personal leadership.
- The debt you owe to society

Reading Materials:

- George, B. with Sims, P. True North: Discover Your Authentic Leadership.
- George, B.; McLean, A. and Craig, N. Finding Your True North: A Personal Guide
- George, B. Authentic Leadership: Rediscovering the Secrets to Creating Lasting Value

Note: Latest edition of the readings will be used.

Assessment Matrix:

Assessment Criteria	Percentage
Assignments	30%
Class Participation	20%
Attendance	10%
Presentation	20%

End Term	20%
Grand Total	100%

Note: The Mid-term examination will not be conducted in the present course.

Activities Related to Skill Development and Employability

Psychometric assessment:

- FIRO-B,
- Johari Window,
- Multiple Intelligence Test
- Positive Psychology Tool

Personal development growth Plan for the semester

- Assessing present
- Establishing future goals
- Assessing personal Strengths
- Formulating Action plan

Course Code and Name: ID302: Intelligent Automation

Course Description

This course introduces an understanding of the fundamental concepts of Artificial Intelligence and Machine Learning, Internet of Things and Robotics. Focus of this course would be on discussion of case studies on various aspects.

Learning Outcome

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

- Discuss insightfully role of artificial intelligence, IoT, robotics and data science in automation.
- Propose & Evaluate use-cases involving Intelligent Automation
- Evaluate basic philosophical, ethical and Sustainability issues related to the development of diverse technologies required for Intelligent Automation in various domains

Activities related to Employability

As the area has been interdisciplinary and inevitable for each and every, each student was supposed to prepare a case study and present in front of panel. Each student was also supposed to listen to other's case studies and marks were awarded for their adventives and understanding of case studies of other students as well.

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Sample Case Studies discussed in class

- P Pathak, "Want to be a Millionaire before 25? Study Artificial Intelligence or Machine Learning", India Today in Tech, OCTOBER 25, 2017
- Bernard Barr, "How AI and Machine Learning are used to Transform the Insurance Industry", Forbes, 24 OCTOBER 2017.
- Predicting Net Promoter Score to Improve Patient Experience at Manipal Hospitals
- 1920 Evil Returns – Bollywood and Social Media Marketing
- Breaking Barriers – Micro mortgage Analytics
- Consumer Analytics at Big Basket – Product Recommendations
- Customer Analytics at Flipkart.Com
- Forecasting Demand for Food at Apollo Hospitals
- HR Analytics at Scaleneworks – Behavioural Modelling to Predict Renege
- Predicting Earnings Manipulations by Indian Firms Using Machine Learning Algorithms
- Machine Learning Algorithms to Drive CRM in the online E-commerce site at VMWare

- Consumer choice between house brands and national brands in detergent purchases at Reliance Retail

Description of Task assigned

Area of Study:

Probable domain: Electrical/Electronics/Civil/Mechanical/CSE/Chemical

Problem Description

Objective(s)

Solution Approach

Probable sub Headings:

- Innovation History
- Data Collection Approach
- Affected Users/Market
- Possible Limits/Benefits

Related Work

References

Submissions:

- Word File (Maximum 5 Pages A4 Pages, Font Name: Georgia, Font Size 11, Margins: 1)
- Presentation (Maximum 10 slides, Duration 15 mins.)

Dates of Presentation: During Scheduled Classes of ID303 (25thJuly Onwards)

Group Size: Maximum 4

Group Formation Rules: Accommodation of Students of Different Disciplines.

Note that there would be Peer Evaluation during the class and thus it is mandatory for each group to remain present during presentation.

Each Group can prepare a small quiz (related to content presented) and use last three minutes of presentation to take a quiz in class. Student who is able to answer the question would get Bonus Point.

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List of Case Studies Prepared by Students

Group No.	Sr.No.	Enrollment No.	Name	Topic
1		2016btechcse024	Aditya Sharma	Automated tagger and tracker for raw materials in warehouse.
		2016btechcse021	Chirag Bansal	
		2016btechcse022	Akshat Goyal	
2		2016btechcse004	Archit Jain	Automatic Fruit plucking
		2016btechcse013	Natani Lucky Shyam	
		2016btechcse016	Sandeep Kumawat	
		2016btechcse019	Vikas Mishra	
3		2016btechcse010	Manoj Choudhary	Smart servillence/security system
		2016btechcse018	Varun Kumar Jha	
		2016btechcse314	Aakash Sharma	
		2016btechcse014	Rahul Dangi	
4		2016btechcse002	Alind sharma	Voice based assistance for senior citizen
		2016btechcse017	Shishir Singh	
		2016btechcse009	Kuldeep Sharma	
		2016btechcse301	Aman Bhargava	
		2016BTechCSE217	Tarun Dhawan	
5		2016btechcse020	Yash Saraswat	Computer vision for crop classification
		2016btechcse026	Anshika Pengoria	
		2016btechcse028	Yatharth Raj Sharma	

6		2016btechcse310	Soniya Soni	AI in Education
		2016BTechCSE123	Shweta	
		2016BTechCSE215	Seerat Sobti	
		2016BTechCSE226	Mridul Arora	
7		2015btechcse007	Kunal Shah	Job Recommendation System
		2016btechcse001	Ajit Singh Rajawat	
		2016btechcse012	Naman Dwivedi	
		2016btechcse023	Deepak Kumar	
8		2016btechcse305	Raghav Tambi	IoT Based smart Parking
		2016btechcse307	Roshan Kumawat	
		2016btechcse308	Shivansh Kashyap	
		2016BTechCSE228	Anish Gupta	
9		2016btechcse311	Surabhi Tomer	Smart pooling for female
		2016btechcse306	Ritika verma	
		2016btechcse003	anisha Goyal	
		2016btechcse007	Garima Pandey	
10		2016btechcse303	Jogendra Chaudhary	Chat bot for healthcare
		2016btechcse304	Kapil Jain	
		2016BTechCSE113	Kunal Kumawat	
11		2016btechcse30	Amit Bohra	AI based Recommendation system

		2		in healthcare
		2016BTechCSE112	Kanika Bhatia	
12		2016btechcse027	Abhishek Kumar	Smart parking for smart cities
		2016btechcse029	Aman Jain	
		2015btechcse002	Akashdeep	
13		2016BTechCSE211	Priyal Jain	Voice based assistance for education
		2016BTechCSE205	Kamal Kumar Appujani	
		2016BTechCSE213	Raveena Kodwani	
		2016BTechCSE224	Dishan Shukla	
		2016BTechCSE219	Asit Sharma	
14		2016BTechCSE107	Chetana Singhal	Smart City Mission(Govt. of India)
		2016BTechCSE109	Divya Sharma	
15		2017BCH015	Jay Majeji	AI in food industry
		2017BCH004	Jagesh Pal Singh	
		2017BCH008	Nishtha Majeji	
		2017BCH005	Krishna Choudary	
16		2016BTechCSE119	Rakshit Jayaswal	Flight prices prediction system
		2016BTechCSE120	Rishabh Jain	
		2016BTechCSE101	Abhijeet Bajpai	
		2016BTechCSE108	Devansh Aggarwal	

17		2016BTechCSE105	Ashutosh Gupta	Robotic process automation for admission process
		2016BTechCSE125	Divyank Singh	
		2016BTechCSE106	Ayush Misra	
		2016BTechCSE104	Anurag Soni	
		2016BTechCSE122	Satyam Singh	
18		2016BTechCSE221	Som Durgesh Gupta	Sensor based real time advisory for crop quality monitoring
		2016BTechCSE223	Rajeshwar Singh	
		2016BTechCSE222	Ayush Dadhich	
		2016BTechCSE313	Vibhore Mathur	
19		2017BCH001	Ayushi Khetan	Automated allocation of stocks
		2017BCH002	Basit Khan	
		2017BCH006	Manvi Sharma	
		2017BCH009	Paritosh Prasad	
20		2016BTechCSE117	Pranjal Tripathi	Customer Demand Prediction in Dairy Industry
		2016BTechCSE118	Rajkumar Gupta	
		2016BTechCSE111	Himanshu Rathore	
		2016BTechCSE114	Mukul Sharma	
21		2016BTechCSE128	Ankit Jain	Blood Storage management System using IOT
		2016BTechCSE116	Pallavi Bhandari	
		2016BTechCSE124	Vipin Agarwal	

		2016BTechCSE121	Roopesh Sharma	
		2016BTechCSE103	Adhisha Gupta	
22		2016BTechCSE209	Naman Dhingra	CANCER DETECTION USING IMAGE PROCESSING
		2016BTechCSE207	Karan Pratap Singh	
		2016BTechCSE212	Priyanshu Sharma	
		2016BTechCSE208	Mayank Bhimrajka	
		2016BTechCSE216	Shubham Sharma	
23				
		2016BTechCSE218	Astha Rai	Computer Vision in Cosmetic Industry
		2016BTechCSE220	Madhavi Chauhan	
24		2017BCH010	Sakshi Karnani	Improved customer services in health care
		2017BCH011	Shraddha Karnani	
		2017BCH012	Shardool Parashar	
		2017BCH003	Isha Uttam	
25		2016BTechCSE312	Tushar Sharma	CryptoCurrency Ranking & Predictor
		2016BTechCSE008	Jai Sharma	
		2016BTechCSE129	Prateek Dhalwal	

Group No.	**Enrollment No.**	**Name**	**Topic**
1	2016BTECHME005	Arpit Sharma	Automatic Accident Detection and Ambulance Rescue System using IoT
	2016BTECHME008	Devkaran Singh	
	2016BTECHME021	Ritwik Raman	
	2016BTECHEE002	Isha Narolia	

2	2017BBA007	Aslam Mehar	AI in Finance
	2017BBA029	Sudhir Jangir	
	2017BBA003	Anurag Bansal	
	2017BBA012	Jayant Bhandari	
3	2017BBA025	Sakshi Kothari	Waste Management in Indian Societies
	2016BTECHCHE002	Videsha BANSAL	
	2017BBA018	Mohammed Sahil Bagwan	
	2016BTechCE009	Nikhil Jhanwar	
4	2016BTechME006	Ashish Kumar Sisodiya	A case study on Automated Inspection of Axial Piston Motors at Kawasaki Precision Machinery, UK
	2016BTechME007	Deepansh Dikshit	
	2016BTechME019	Rajat Nebhnani	
	2016BTechME025	Shantanu Sharma	
5	2016BTechCE010	Punit Kumawat	AI in construction industry
	2016BTechCE003	Hitesh Kumar	
	2016BTechCE004	Hitesh Sain	
	2016BTechCE012	Raghvendra Singh Shekhawat	
	2016BTechCE013	Ravindra Singh Rathore	
6	2016BTechECE010	Chandresh Sharma	AI &ML in Airports and Air traffic control
	2016BTechECE004	Kanwar Deep Singh Gahlot	
	2016BTechME024	Sajal Jain	
7	2016BTechCE019	Keshav Mundra	AI Based Approaches for Crake Detection in Concrete Structure
	2016BTechCE015	Sagar Mewara	
	2016BTechCE008	Neeraj Lunawat	
	2016BTechCE001	Aayush Bansal	
8	2015BTechCHE009	Upadhyay Maharshi	predicting the need for student intervention to reduce higher education dropouts
	2016BTechEE004	Lokendra Rathore	
	2015BTechME023	T. Kishor	
9	2017BBA026	Shabana Mehar	AI in travel and tourism industry
	2017BBA010	Diksha Verma	

10	2016BTechME001	Abhishek Phogat	Production flow monitoring using IOT
	2016BTechME011	Jai Singh Rathore	
	2016BTechEE007	Rohit Sharma	
	2016BTechME018	Raj Agrawal	
11	2016BTechME015	Manvendra Singh	Driver-less Cars
	2016BTechME030	Arjun Gupta	
	2016BTechEE005	Mahesh Kumar Purohit	
	2016BTechCE016	Vikas Yadav	
12	2017BBA011	ISHANK AGARWAL	Chatbot in Education
	2017BBA033	VINIT SHARMA	
	2017BBA020	NIKUNJ BANSAL	
13	2017BBA017	MAYANK KARNANI	Fast Food Robots, Kiosks, and AI in restaurents
	2017BBA014	KAWISH PATEL	
	2017BBA027	SHIKHA SINGH	
	2017BBA021	PRAKHAR KUMAR GOYAL	
14	2017BBA009	Deepanshu Kaswal	Automotive repair equipment OEM uses AI to monetize repair service data
	2017BBA030	TARUN KUMAR	
	2017BBA019	NAMAN MEHTA	
	2017BBA037	AMAN LAKHOTIYA	
15	2017BBA006	ASHU KUSHWAH	chatboat in banking
	2017BBA015	KIRIT BATHICH	
	2017BBA023	RIYA GANGWAL	
	2017BBA016	KUNAL KHANDELWAL	
16	2016BTECHME013	KUSHLENDRA PANDEY	home automation using ai.
	2016BTECHECE006	MAYANK JHANWAR	
	2016BTECHCE014	RISHABH JAIN	
	2016BTECHECE009	RAJAT CHANDRA	
17	2017BBA028	SONAKHAI JHAWAR	Robotic Nurse
	2017BBA031	USHMITA MOHANTA	
	2017BAA036	VISHAL CHAURASIA	
	2017BBA038	ASHISH GHOGHWANI	

18	2016BTECHECE003	HARSHITA GUPTA	Smart Pill Dispenser
	2016BTECHEE001	GARIMA SHARMA	
	2016BTECHEE008	RONAK MATHUR	
	2016BTECHEE003	KANISHK SHARMA	
	2016BTECHCHE001	DIVYA BHATIA	
19	2017BBA002	ANISH KUMAR CHHABRA	AI and Automation in supply chain in milk and vegetable industry
	2017BBA035	SUNIL SHARMA	
	2017BBA032	VAIBHAV SHRIMAL	
	2017BBA004	Archies Bansal	
	2017BBA005	ARCHIT CHAUHAN	
20	2016BTECHME020	RAM UPADHYAY	Smart City 'Seoul"
	2016BTECHME022	ROHIT DHANRAJ	
	2016BTECHME023	RUDRA SUTHAR	
	2016BTechME002	Abhishek Sharma	
21	2016BTECHECE001	ANUDIT BHATT	Maintaining smart trends in farming
	2016BTECHECE007	ROHIT	
	2016BTECHECE008	SHREYASH PURWAR	
	2016BTECHME031	DEEKEHA PARWANI	
22	2016BTECHCE017	VINEET SINGH	Smart traffic control
	2016BTECHME012	JASWANT SINGH	
	2016BTECHCE018	MAHAVEER KACHHAWA	
	2016BTECHECE005	KASHISH RAWAT	
23	2016BTECHME026	SNEHASHISH BANERJEE	Prepaid smart energy meter
	2016BTECHME028	YASH MATHUR	
	2016BTECHEE010	YASH KUMAR SINGH	
	2016BTECHME017	PARAM GUPTA	
24	2016BTECHME003	AKSHAY TAPARIYA	predictive engine monitoring and maintenance
	2016BTECHME009	DEVVRAT SINGH CHAUHAN	
	2016BTECHME010	EKHLAK AHMAD	
	2016BTECHEE006	PRITHVI SINGH RATHORE	
	2016BTechCE005	Kuldeep Singh Jani	
25	2017BBA022	RAGHAV BANSAL	AI and IOT in Social

	2017BBA039	RAMESH CHOUDHARY	Activities
	2016BBA023	VISHAL CHOUDHARY	
	2017BBA040	HEMENT YADAV	

Guest Sesssion w.r.t Course

Expert lecture on Emerging trends and applications of Data sciences

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The event concluded with a Question – Answer round between the audience and experts followed by Vote of Thanks by Professor J.P. Naidu. The event was co-ordinated by Dr. Sonal Jain and Aditya Sharma, student, B.Tech CSE.

Robotic Process Automation: Process Overview

A Session of two hours on "Robotic Process Automation: An Overview" was scheduled on January 18, 2019. The speaker of the session was Mr. Nishant Goel, Founder and CEO, BotMantra.

RPA is IT Layer or Software Robots which mimics the way human interacts with the system to execute any process. The session started with discussion on Journey from Process Re-engineering to Resource Optimization and now from Automation to Intelligent Automation. Benefits of RPA including Productivity and Efficiency, Quality, Improved turnaround time, Scalability, Enhanced data security and traceability, Zero change in applications, Analytics and Reduced training time were discussed in detail. He also discussed Technology framework of Business Process Automation. He highlighted failure modes of RPA which includes Lack of alignment with all concerned stakeholders, Lack of thorough due diligence on process selection and business case creation, Lack of adequate time investment in Design, Lack of best practices utilization during implementation, Lack of clearly defined strategy and Lack of focus on change management, reporting and proactive monitoring. Session also included students in a team generating ideas of Robotic Process Automation. The session was co-ordinated by Dr. Sonal Jain.


g Implementation.
reporting & proactive monitoring.

Course Code and Name: ID303: Intelligent Automation

Course Description

This course introduces an understanding of the fundamental concepts of Artificial Intelligence and Machine Learning, Internet of Things and Robotics. Focus of this course would be on discussion of case studies on various aspects.

Learning Outcome

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

- Discuss insightfully role of artificial intelligence, IoT, robotics and data science in automation.
- Propose & Evaluate use-cases involving Intelligent Automation
- Evaluate basic philosophical, ethical and Sustainability issues related to the development of diverse technologies required for Intelligent Automation in various domains

Activities related to Employability

As the area has been interdisciplinary and inevitable for each and every, each student was supposed to prepare a case study and present in front of panel. Each student was also supposed to listen to other's case studies and marks were awarded for their adventives and understanding of case studies of other students as well.

Description of Task assigned

Area of Study:

Probable domain: Electrical/Electronics/Civil/Mechanical/CSE/Chemical

Problem Description

Objective(s)

Solution Approach

Probable sub Headings:

- Innovation History
- Data Collection Approach
- Affected Users/Market
- Possible Limits/Benefits

Related Work

References

Submissions:

- Word File (Maximum 5 Pages A4 Pages, Font Name: Georgia, Font Size 11, Margins: 1)
- Presentation (Maximum 10 slides, Duration 15 mins.)

Dates of Presentation: During Scheduled Classes of ID303 (25thJuly Onwards)

Group Size: Maximum 4

Group Formation Rules: Accommodation of Students of Different Disciplines.

Note that there would be Peer Evaluation during the class and thus it is mandatory for each group to remain present during presentation.

Each Group can prepare a small quiz (related to content presented) and use last three minutes of presentation to take a quiz in class. Student who is able to answer the question would get Bonus Point.

……

Sample Case Studies discussed in class

- P Pathak, "Want to be a Millionaire before 25? Study Artificial Intelligence or Machine Learning", India Today in Tech, OCTOBER 25, 2017
- Bernard Barr, "How AI and Machine Learning are used to Transform the Insurance Industry", Forbes, 24 OCTOBER 2017.
- Predicting Net Promoter Score to Improve Patient Experience at Manipal Hospitals
- 1920 Evil Returns – Bollywood and Social Media Marketing
- Breaking Barriers – Micro mortgage Analytics
- Consumer Analytics at Big Basket – Product Recommendations
- Customer Analytics at Flipkart.Com
- Forecasting Demand for Food at Apollo Hospitals
- HR Analytics at Scaleneworks – Behavioural Modelling to Predict Renege
- Predicting Earnings Manipulations by Indian Firms Using Machine Learning Algorithms
- Machine Learning Algorithms to Drive CRM in the online E-commerce site at VMWare
- Consumer choice between house brands and national brands in detergent purchases at Reliance Retail

……

NITIAyog Report on Artificial Intelligence was shared in class and students were divided into groups. Each chapter was assigned to group and they presented it in class. Detailed discussion on those was supported by faculties.

Div A

Artificial intelligence for ALL

Group No.	Sr.No.	Name	NitiAyog-Discussion Paper	Pages of Report
1	1	Aditya Sharma	What is AI	12 to 15, Appendix I
	2	Chirag Bansal		
	3	Akshat Goyal		
	4	Jai Sharma		
2	5	Archit Jain	Global Developments in AI (Benchmarking Select Countries)	16-17 and Apendix II
	6	Natani Lucky Shyam		
	7	Sandeep Kumawat		
	8	Vikas Mishra		
3	9	Manoj Choudhary	AI and India (Identifying priority areas for India's efforts in Artificial Intelligence)	18-22
	10	Varun Kumar Jha		
	11	Aakash Sharma		
	12	Rahul Dangi		
4	13	Alind sharma	Sectorial Deep Dive: AI and Health Care	23-29
	14	Shishir Singh		
	15	Kuldeep Sharma		
	16	Tushar Sharma		
5	17	Yash Saraswat	Sectorial Deep Dive: AI and Agriculture	30-34
	18	Anshika Pengoria		
	19	Yatharth Raj Sharma		
	20	Soniya Soni		
6	21	Kunal Shah	Sectorial Deep Dive: AI and Education	35-38
	22	Ajit Singh Rajawat		
	23	Naman Dwivedi		
	24	Deepak Kumar		
7	25	Raghav Tambi	Sectorial Deep Dive: Smart Cities and Infrastrcuture	39-45
	26	Roshan Kumawat		
	27	Vibhor Mathur		
	28	Aman Bhargava		
	29	Shivansh Kashyap		
8	30	Surabhi Tomer	Sectorial Deep	39-45

			Major Market Segments	
	53	Divya	Proposed modules of the National AI Marketplace (NAIM): a) Data marketplace b) Data annotation marketplace	
	54	Ashutosh		
	55	Prateek		
	56	Shweta		
14	57	Chetna		77-78, Apendix III
	58	Rakshit	Proposed modules of the National AI Marketplace (NAIM): c) Deployable model marketplace / Solutions marketplace	
	59	Rishabh		
	60	Satyam		
15	61	Anurag		79-84
	62	Devansh	Ethics, Privacy, Security and Artificial Intelligence Towards a "Responsible AI"	
	63	Divyank		
	64	Abhijeet		
	65	Kunal		
16	66	Kanika		85-88
	67	Som	Vision and Actions for The Government	
	68	Rajeshwar		
17	69	Ayush		91-94
	70	Seerat	Appendix III: Data Ecosystem A key enabler	
18	71	Tarun		111-113
	72	Ayushi Khetan	What Do the Markets Say? Approaches to evaluating focus sector areas	
	73	Basit Khan		
	74	Manvi Sharma		
19	75	Paritosh Prasad		114-115
	76	Pranjal	Intelligent Transportation	
	77	Adisha		
	78	Raj kumar		
	79	Himanshu		
20	80	Mukul		

	81	Ankit		
	82	Palavi		
	83	Vipin	Intelligent	
21	84	Rupesh	Infrastructure	
	85	Anish		
	86	Mridul		
	87	Naman		
	88	Karan	Intelligent	
22	89	Priyanshu	Fashion	
	90	Mayank		
	91	Shubham		
	92	Astha	Intelligent	
23	93	Madhavi	Manufacturing	
	94	Sakshi Karnani		
	95	Shraddha Karnani		
	96	Shardool Parashar	Intelligent	
24	97	Isha Uttam	Advertising	
	98	Rakshit		
	99	Rishabh		
	100	Satyam	Intelligent	
25	101	Anurag	Agriculture	

Div B

Group No.	Sr.No	Name	NitiAyog-Discussion Paper	Pages of Report
	1	Arpit Sharma		
	2	Devkaran Singh		
	3	Ritwik Raman		
1	4	Isha Narolia	What is AI	12 to 15, Appendix I
	5	ASLAM MEHAR		
	6	SUDHIR JANGIR	Global Developments in AI	
	7	ANURAG BANSAL	(Benchmarking Select	
2	8	JAYANT BHANDARI	Countries)	16-17 and Apendix II
	9	SAKSHI KOTHARI	AI and India	
	10	Videsha BANSAL	(Identifying priority areas for	
	11	SAHIL BAGWAN	India's efforts in Artificial	
3	12	NIKHIL JAHWAR	Intelligence)	18-22
	13	ASHISH SISODIYA		
	14	DEEPANSH DIKSHIT	Sectorial Deep Dive: AI and	
4	15	RAJAT NEVHNANI	Health Care	23-29

	93	YASH KUMAR SINGH		
	94	AKSHAY TAPARIYA		
	95	DEVVRAT SINGH CHAUHAN		
	96	EKHLAK AHMAD		
26	97	PRITHVI SINGH RATHORE	Intelligent Manufacturing	
	67	RAGHAV BANSAL		
	68	RAMESH CHOUDHARY		
	69	VISHAL CHOUDHARY		
27	70	HEMENT YADAV	Intelligent Advertising	

Guest Sesssion w.r.t Course

Expert lecture on Emerging trends and applications of Data sciences

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Singapore
JK LAKSHMIPAT UNIVERSITY
ज्ञानम् अमृतम्

Robotic Process Automation: Process Overview

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Course Code and Name: ID2101: Business and Intelligent Machines

Course Description: This Course is designed to offer learners an introduction to intelligent machines and related applications in the business world. Learners would be introduced to technologies like Artificial Intelligence, Machine Learning, Big Data, IoT and Robotics, enabling intelligence in machines. Learners will gain insights into how smartness is being harnessed from data and also would understand the implications of usage of Artificial Intelligence in Business Organizations.

Learning Outcome

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

- Discuss insightfully role of Artificial Intelligence, Machine Learning, IoT, Robotics and Data science in design and development of Intelligent Machines
- Use Weka for Clustering, Classification and Prediction
- Consider the opportunities and challenges brought about by Intelligent automation
- Analyze case studies pertaining to application of Intelligent Machines in business
- Propose and Evaluate use-cases involving Artificial Intelligence, IoT, Robotics and Automation considering economic, social, sustainability and ethical aspects

Prerequisites		**Nil**
Hours per Week		**L-T-P: 3-0-0**
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	10
03	Class Participation	10
04	Quiz	20
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam(Final)	Nil
08	Report-1 (One Case Study Evaluated in three stages)	40
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	Nil
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation1	10
15	Lab Evaluation2	10
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

Case Studies on Various Domains including Customer Service, Sales and Marketing, Customer Relationship Management, Human Resource Management, Manufacturing, Operations, Finance, Auditing, Trading, Smart City, Health Care, Social Impact and Ethics of AI.

Activities Related to Skill Development and Employability

Case studies discussed in Class.

Source: https://emerj.com/

Sr. No.	Enrollment Number		Title
1	2018MBA001	Aakash Khatri	6 Examples of AI in Business Intelligence Applications
2	2018MBA002	Aayush Kumar Shahi	7 Applications of Machine Learning in Pharma and Medicine
3	2018MBA003	Aditya Modi	7 Ways to Tell if an AI Company is Lying About Using AI
4	2018MBA004	Arnim Chauhan	Achieving Intelligent Automation - Leveraging IoT Data from Automated Systems
5	2018MBA005	Ayushi Dasani	Advocating a More Sustainable Business Culture in an Automated World - A Conversation with Douglas Rushkoff
6	2018MBA006	Ayushi Jasoria	Agricultural Robots - Present and Future Applications (Videos Included)
7	2018MBA007	Diksha Sachan	AI and IoT in Banking and Finance - Current Applications
8	2018MBA008	Hardik Gaur	AI Applications in Construction and Building - Current Use-Cases
9	2018MBA009	Hemendra Singh Shekhawat	AI for Crime Prevention and Detection - 5 Current Applications
10	2018MBA010	Karan Sharma	AI for Customer Segmentation and Marketing Campaigns
11	2018MBA011	Khushboo Kumari	AI for Fintech
12	2018MBA012	Manvi Mehra	AI for Inventory Optimization in Retail
13	2018MBA013	Nitin Kumar Tiwari	AI for Predictive Maintenance Applications in Industry - Examining 5 Use Cases

14	2018MBA014	Pooja Rathi	AI for Pricing - Comparing 5 Current Applications
15	2018MBA015	Pooja Sharma	AI for Sentiment Analysis in Finance - Current Applications and Possibilities
16	2018MBA016	Prateek Sharma	AI for Speech Recognition - Current Companies, Technology, and Trends
17	2018MBA017	Puneet Saraswat	AI in Banking - An Analysis of America's 7 Top Banks
18	2018MBA018	Rajul Kaushik	AI in Blockchain - Current Applications and Trends
19	2018MBA019	Supriya Gogoi	AI in Consumer Packaged Goods (CPG) - Current Applications
20	2018MBA020	Vishal Dutt Singh	AI in Fashion - Present and Future Applications
21	2018MBA021	Vishnu Agarwal	AI in Food Processing - Use Cases and Applications That Matter
22	2018MBA022	Yogendra Singh Rathore	AI in Law and Legal Practice - A Comprehensive View of 35 Current Applications
23	2018MBA023	Dimpy Malhotra	AI in Pharma and Biomedicine - Analysis of the Top 5 Global Drug Companies
24	2018MBA001	Aakash Khatri	AI in Taste and Art - The Current State of Machine Learning for Understanding Preferences
25	2018MBA002	Aayush Kumar Shahi	AI in the Indian Financial Sector - Current Traction, Opportunities and Challenges
26	2018MBA003	Aditya Modi	AI in the Indian Healthcare Sector - Current Applications
27	2018MBA004	Arnim Chauhan	AI in the Travel and Tourism Industry - Current Applications
28	2018MBA005	Ayushi Dasani	AI in Transportation - Current and Future Business-Use Applications
29	2018MBA006	Ayushi Jasoria	Artificial Intelligence and Security_ Current Applications and Tomorrow's Potentials
30	2018MBA007	Diksha Sachan	Artificial Intelligence and the Evolution of the Sales Process
31	2018MBA008	Hardik Gaur	Artificial Intelligence for Beauty and Cosmetics - Current Applications
32	2018MBA009	Hemendra Singh Shekhawat	Artificial Intelligence for Clothing and Apparel - Current Applications
33	2018MBA010	Karan Sharma	Artificial Intelligence for Customer Service - Current and Future Applications
34	2018MBA0	Khushb	Artificial intelligence for High Frequency Retail - Pricing,

	11	oo Kumari	Inventory and Margins Optimization
35	2018MBA012	Manvi Mehra	Data Collection and Enhancement Strategies for AI Initiatives in Business
36	2018MBA013	Nitin Kumar Tiwari	Artificial Intelligence In Industrial Automation - Current Applications
37	2018MBA014	Pooja Rathi	Artificial Intelligence in Marketing and Advertising - 5 Examples of Real Traction
38	2018MBA015	Pooja Sharma	Artificial Intelligence in Payment Processing - Current Applications
39	2018MBA016	Prateek Sharma	Artificial Intelligence in Retail - 10 Present and Future Use Cases
40	2018MBA017	Puneet Saraswat	Artificial Intelligence in the Asian Retail Industry - Applications and Trends
41	2018MBA018	Rajul Kaushik	Artificial Intelligence in the European Retail Industry
42	2018MBA019	Supriya Gogoi	Artificial Intelligence in the Textile Industry - Current and Future Applications
43	2018MBA020	Vishal Dutt Singh	Artificial Intelligence in Video Marketing - Emotion Recognition, Video Generation, and More
44	2018MBA021	Vishnu Agarwal	Artificial Intelligence Toys for Kids - Current Products and Categories
45	2018MBA022	Yogendra Singh Rathore	Automating White Collar Work - Two Examples and a Look Forward
46	2018MBA023	Dimpy Malhotra	Automotive Repair Equipment OEM uses AI to Monetize Repair Service Data
47	2018MBA001	Aakash Khatri	Bank Reduces Money-Laundering Investigation Effort with AI
48	2018MBA002	Aayush Kumar Shahi	Better Than Elasticsearch_ How Machine Learning is Improving Online Search
49	2018MBA003	Aditya Modi	Big Data in Retail - Current Applications
50	2018MBA004	Arnim Chauhan	Chatbot Comparison - Facebook, Microsoft, Amazon, and Google
51	2018MBA005	Ayushi Dasani	Chatbots for Customer Service - 4 Current Applications
52	2018MBA006	Ayushi Jasoria	Chatbots for Insurance - Progessive, Allstate, GEICO, and More
53	2018MBA007	Diksha Sachan	Chatbots for the Retail Industry - Current Applications
54	2018MBA008	Hardik Gaur	Chatbots for Travel and Tourism - Comparing 5 Current Applications

55	2018MBA009	Hemendra Singh Shekhawat	Crowdsourced Ad Reviews - How Human Input Helps Refine AI Systems
56	2018MBA010	Karan Sharma	Crowdsourced Machine Vision Training - Use Cases and Explanation
57	2018MBA011	Khushboo Kumari	Crowdsourced Search Relevance for eCommerce and Online Retail
58	2018MBA012	Manvi Mehra	Data Collection and Enhancement Strategies for AI Initiatives in Business
59	2018MBA013	Nitin Kumar Tiwari	Enterprise Adoption of Artificial Intelligence - When it Does and Doesn't Make Sense
60	2018MBA014	Pooja Rathi	Exploring the Business Use-Cases of Natural Language Generation - With Robbie Allen of Automated Insights
61	2018MBA015	Pooja Sharma	Facial Recognition Applications - Security, Retail, and Beyond
62	2018MBA016	Prateek Sharma	Facial Recognition in Banking - Current Applications
63	2018MBA017	Puneet Saraswat	Fast Food Robots, Kiosks, and AI Use Cases from 6 Restaurant Chain Giants
65	2018MBA018	Rajul Kaushik	GlaxoSmithKline Case Study_ Mining Online Discussions for Deeper Customer Insight
66	2018MBA019	Supriya Gogoi	Hospital Uses Natural Language Processing for Assisted Physician Documentation
67	2018MBA020	Vishal Dutt Singh	How America's Top 4 Insurance Companies are Using Machine Learning
68	2018MBA021	Vishnu Agarwal	How Machine Learning Will Become Accessible to Small Businesses
69	2018MBA022	Yogendra Singh Rathore	How Microtasking Helps Optimize AI-Based Search - in Media, eCommerce and More
70	2018MBA023	Dimpy Malhotra	How Recommendation Engines Actually Work - Strategies and Principles
71	2018MBA001	Aakash Khatri	How to Assess an Artificial Intelligence Product or Solution (Even if You're Not an AI Expert)
72	2018MBA002	Aayush Kumar Shahi	Indian AI Startups - Comparing 4 Companies - Applications, Teams, and Fundraising
73	2018MBA003	Aditya Modi	Industrial AI Applications - How Time Series and Sensor Data Improve Processes
74	2018MBA004	Arnim Chauhan	Is Artificial Intelligence for Small Business_ Factors to Consider for Technology Adoption
75	2018MBA005	Ayushi Dasani	Machine Learning for Credit Card Fraud - 7 Applications for Detection and Prevention

76	2018MBA006	Ayushi Jasoria	Machine Learning for Finance in the United Kingdom - Current Applications
77	2018MBA007	Diksha Sachan	Machine Learning for Marketing Agencies - Current and Future Applications
78	2018MBA008	Hardik Gaur	Machine Learning Healthcare Applications - 2018 and Beyond
79	2018MBA009	Hemendra Singh Shekhawat	Machine Learning in Finance - Present and Future Applications
80	2018MBA010	Karan Sharma	Machine Learning in Finance - Present and Future Applications1
81	2018MBA011	Khushboo Kumari	Machine Learning in Human Resources - Applications and Trends
82	2018MBA012	Manvi Mehra	Machine Learning in Manufacturing - Present and Future Use-Cases
83	2018MBA013	Nitin Kumar Tiwari	Machine Learning Marketing - Expert Consensus of 51 Executives and Startups
84	2018MBA014	Pooja Rathi	Machine Vision in Banking - Facial Recognition and OCR
85	2018MBA015	Pooja Sharma	Natural Language Processing in Banking - Current Applications
87	2018MBA016	Prateek Sharma	News Organization Leverages AI to Generate Automated Narratives from Big Data
88	2018MBA017	Puneet Saraswat	Online Education Company Improves Customer Support with Autosuggestion of Macros
89	2018MBA018	Rajul Kaushik	Personalized Marketing with AI - 8 Current Applications
90	2018MBA019	Supriya Gogoi	Predictive Analytics - 5 Examples of Industry Applications
91	2018MBA020	Vishal Dutt Singh	Recommendation Engines for Fashion - Comparing 6 Applications
92	2018MBA021	Vishnu Agarwal	Robotic Process Automation (RPA) in Finance - Current Applications
93	2018MBA022	Yogendra Singh Rathore	Robots in Retail - Examples of Real Industry Applications
94	2018MBA023	Dimpy Malhotra	Sentiment Analysis for Marketing and Product Development
95	2018MBA014	Pooja Rathi	Setting Up Retail Stores for Machine Learning - Cameras, Microphones, and More
96	2018MBA015	Pooja Sharma	Smart Home Services Provider Automates Report Creation with AI and Customer Data
97	2018MBA016	Prateek Sharma	Smart Home Services Provider Uses Natural Language Generation to Create Highly Personalized Website Copy

98	2018MBA017	Puneet Saraswat	Swedish Bank Uses Natural Language Processing for Virtual Customer Assistance
99	2018MBA018	Rajul Kaushik	The Department of Homeland Security Uses AI-Enhanced Entity Resolution for its Global Travel Assessment System (GTAS)
100	2018MBA019	Supriya Gogoi	Use Cases of AI for Customer Service - What's Working Now
101	2018MBA020	Vishal Dutt Singh	Using Wearable Data for Artificial Intelligence Applications - Current Use Cases
102	2018MBA021	Vishnu Agarwal	Virtual Mirrors and Computer Vision - 9 Current Applications
103	2018MBA022	Yogendra Singh Rathore	Virtual Reality Shopping and Artificial Intelligence - 5 Near-Term Applications

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Data Analysis for Decisions

Course Code: ID2112
Credits: 2
Term: III

Course Description:
The present course is a logical extension of the earlier course *(Foundation of Data Analysis)* in this series and largely focuses on developing hands-on skills in analyzing business data using statistical software, such as SPSS. It helps in taking your analytical skills for analyzing business data to the next level. During the course, many opportunities shall be created to put-to-use the spreadsheet and statistical analysis skills developed earlier. Students shall be working with a variety of data sets drawn from varying business and social contexts.

Course Learning Outcomes:
Upon successful completion, the student should be able to:

- Develop hands-on skills in working with statistical software (SPSS).
- Explore data distributions and check for assumptions for drawing statistical inference. Perform univariate, bivariate and multivariate analysis.
- Take their data visualization skills to the next level.
- Develop analytical skills to look at business situations from multiple perspectives.

Course Content:

Module 1: Data Exploration

Exploring data to understand central tendency, dispersion and shape of distribution

Module 2: SPSS Essentials

SPSS Environment, Data Editor (Data View, Variable View), Output Viewer, Saving and Retrieving Data Files, Chart Builder

Module 3: Using SPSS for Data Analysis

Data Description, Crosstabs, Exploring Assumptions, Correlation and Regression Analysis, Data Distributions (Normal, t, F, Chi-square), Hypothesis Testing involving mean comparison (t-Test and its variants, ANOVA), Exploratory Factor Analysis, Non-parametric Tests.

Activities Related to Skill Development and Employability

- Explore and visualize business data to better understand it.
- Use SPSS software to identify relationship between salient business metrics.
- Use SPSS software to formulate estimation models to predict business metrics and estimate the associated risks.

Course Title: Understanding & Leading Self | MBA
Course Code: LD2101
Credits: 3
Trimester: I
Course Instructors: Dr. R.L. Raina

Course Description:
The students are exposed to personality assessments including the Enneagram, StrengthsFinder and Multiple Intelligences Test to gain a deep understanding of their strengths before beginning their journey into the Programme. The course concludes with the students documenting their personal and professional visions.

Course Learning Outcomes:

- Students will explore and identify their core personal strengths and values.
- They will learn to understand and appreciate different personality types and how to make the most in a team with diverse strengths.
- They will learn to articulate and outline their personal and professional vision for the future.

Course Outline:

Topics	Class Exercises/Assignments
• Introduction to Understanding the self	
• The power of vulnerability • Takeaways from the Chappal story • Importance of an authentic self • Thinking through strengths and development goals	Video: Brene Brown, the power of vulnerability
• Personal anecdotes • Vulnerability and safe space • Managerial grid model • Being, thinking and doing • Moving the needle, making people successful • Followership, performance • Personal transformation	Video: Ben Zander
• Explanation of Multiple Intelligences Model by Howard Gardner. • Significance of understanding different types of intelligences to challenge conventional educational practices. • Multiple Intelligences and relationship with skills and career options. • The role of intelligences in organisations and teams.	·Taking the Multiple intelligences test. · Group activity related to primary, secondary and tertiary intelligences of students and their application in differentiated roles in an organization.
• Discussion on the importance of knowing one's authentic self and how to avoid self doubt.	· 2 assignments required around their personal vision. Peer Coach Exercise
• Ideating and discussing their strengths, mission, vision and development goals for the future. • Learning and assimilation of all psychometric tests. • Discussion around which test was found to be most useful by students through the week	· A problem solving activity and discussing the takeaways from the exercise.

• Reflections about situations where their new understanding of themselves would have made an impact on real life situations/decisions from the past – and how they may have behaved differently	
• Discussed 9 archetypal characteristics, different personalities based on the Enneagram results. • Group activities to understand the individual characteristic of each type and how personalities are always in motion. • Hypnosis-based activities to demonstrate behaviour modification.	· Enneagram Test Results
• The importance of identifying strengths and discussion around 34 themes listed in the assessment (Achiever, Competition, Learner, Strategic, Woo, etc). • Group activity to demonstrate how the combination of strengths affects person's behavior and performance in a team. • The significance of developing and leading with one's strengths • The conflict resolution types and how to navigate through the 5 types • Actions and emotional states leading to self awareness • Personal inventory for personal conduct.	• Identifying top 5 strengths based on StrengthsFinder test. • Emotional Intelligence test • Thomas Kilmann Self Perception Instrument • Think self assessment
• Understanding personal motivators and drivers. • Managing self at work and otherwise.	
• Introduction to NLP	

Reading Materials:

1. StrengthsFinder 2.0 by Tom Rath
2. *"Managing Oneself"* Peter Drucker
3. *"What's your vision of the good life"*, Harvard Business Review
4. *"How will you measure your life?,* Harvard Business Review
5. *"Be yourself but carefully"*, Harvard Business Review

Assessment Plan :

Components	Weightage
1. Continuous Evaluation (Exercises, Quizzes, Assignments, Class Participation)	60%
2. Final Presentation	40%

Activities Related to Skill Development and Employability

Activity are listed in the session plan.

Course Title: Values & Leadership | MBA
Course Code: LD2102
Credits: 2
Trimester: III
Course Instructors: D. R.L. Raina

Course Description:
Values are a basic set of beliefs and ideas held by an individual or organization. Values affect the way people conduct themselves, their decisions, behavior, and world view. In leadership terms, values are not to be confused with morals or ethics. Rather, they define what an individual finds worthy of his or her time and attention. Everything a leader says and does reveals his or her values and the sincerity with which he or she regards those values.

Course Objectives:
In line with the above backdrop, this course on 'Values & Leadership' focuses on identifying and developing values from self to a holistic perspective. It aims to enhance self-awareness, expand capacity of self-management and self-development. The course is designed to explore what leaders really do to meet adaptive challenges in their environment. It looks at leadership as a process of self-transformation and organizational renewal

Course Learning Outcomes:
Students will be able to explore, identify, understand, demonstrate, and relate to the following:

- Their core personal strengths and values.
- Their capacity of development.
- A positive mind set and a humanistic attitude to human actions.

Course Elements:

- Self-Understanding
- Personal Vision and Purpose
- Self-Discipline
- Positive Attitude
- Overcoming Fears
- Balance in Life
- Contribution to Others
- Achieving Success
- Achieving Happiness

Tentative Session Plan:

Topics	Class exercises/assignments
• Introduction to the course	Learning from Leading Self Course shared.
• **Self-understanding** It is understanding your personality, your beliefs, your values, why you do things the way you do, why you make the choices and decisions in your life and knowing your strengths and areas for development is important as it gives you the power of meta-cognition, the ability to think about thinking and ultimately help you shape the way you want to move forward on your journey towards personal growth.	Values &Leadership: Action Plan update shared. Project for the term discussed. *How do you see yourself*? *Wheel of Life*

• **Personal Vision and Purpose** It is about knowing where you want to go and how you're going to get there, it's like sailing through the ocean with the confidence and ability to set your compass, read your map and push full throttle until you reach your sacred island with the gold. A life without purpose and meaning is like sailing through the ocean with no direction and hoping that you may find an island that is good for you. Finding your purpose is the epitome of achieving personal mastery.	1. Values & Leadership – Action Plan submitted in last term discussed – Vision Statement, in particular 2. Role – model and the write-up discussed. SRK/Bill Gates /RLR dropped. Suggested: JRDTata, Pichhai, Indira Nooye, APJAK, Mother Teressa, Dhyan Chand, 3. Three readings shared for submitting learnings.
• **Self-Discipline** It is about being disciplined and being about to commit to your goals and stay on your journey. Your journey of personal mastery may change over time, and that's ok, but it's about you setting your journey and not being swept away with the waves.	Will be shared in the Class
• **Positive Attitude** It is is about having the right mental attitude to make decisions and take action in your life. It is about seeing the best in yourself, in others and the world in general. Personal mastery is about converting negative energy into positive energy, shaping your thoughts and thinking positively and powerfully.	Will be shared in the Class
• **Overcoming Fears** It is about understanding your fears and taking steps to overcome them. It is about being able to reframe your thinking and shaping challenges as opportunities. The journey towards personal mastery takes away the fear, eliminates any self-limiting beliefs you have had in your life and enhances your confidence, leading to a strong sense of self-belief.	Will be shared in the Class
• **Balance in Life** It is about balancing your life and ensuring you are experiencing and giving everything that is important to you. When you are realising personal mastery, you are more aware of your time and energy and how you are spending that time and energy. Personal mastery helps you to make better decisions on where to spend your time and energy so you can balance your life more effectively.	Will be shared in the Class
• **Contribution to Others** It is not just about understand oneself, but also about being able to contribute back to society and to others. It is about understanding how you can best help the lives of others and taking steps towards achieving this.	Involve the students in a debate (on pros and cons of the subject with examples like MNREGA, etc)

• **Contribution to Others** It is not just about understand oneself, but also about being able to contribute back to society and to others. It is about understanding how you can best help the lives of others and taking steps towards achieving this.	Involve the students in a debate (on pros and cons of the subject with examples like MNREGA, etc)
• **Achieving Success** It helps you achieve success in whatever it is that you pursue. When you start to truly understand and behave within the principles of personal mastery, you will start to see your success accelerate. Understanding yourself, knowing what your purpose is, thinking positively and utilizing your talents, skills and strengths are sure-fine ways to guide you on your path to personal growth and ultimately achieve success.	
• **Achieving Happiness** It is about achieving happiness in life. Happiness is, and ought to be, the ultimate goal of life. Your journey towards personal mastery is about finding what truly makes you happy, and living this out on a daily basis. If you can achieve this, then this is a massive step towards attaining personal mastery.	

Reading Materials:

1. Corey, G., & Corey, M. S. (2010). *I Never Knew I Had a Choice: Explorations in Personal Growth. (9th ed) Thomson*
2. *Unless You're Oprah, "Be Yourself" Is Terrible Advice (Adam Grant, The New York Times, 2016*
3. *Dalai Lama & Desmond Tutu with Douglas Abram. The Book of Joy, Cornerstone Publishers, 2016*
4. *Dalai Lama & Howard C Cutler. The Art of Happiness at Work. Easton Press, 1998.*
5. Debashis Chatterjee. Break Free: Discover Your Leadership Signature, 1 Dec 2006
6. Michael Williams. Mastering Leadership, (2nd ed)

Assessment Plan :

Components	Weightage
1. Continuous Evaluation (Exercises, Quizzes, Assignments, Group Work)	55%
2. Final Presentation	15%
3. Class Participation	10%
4. Term-End Exam	20%

Activities Related to Skill Development and Employability

1.Activity 1-How do you see yourself?

2. Activity 2-Wheel of Life

3. Debate on MANREGA

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Business and Sustainability

Course Code: LS2102
Credit: 1
Trimester: III

Course Description:
Sustainable development can be classified as development that meets the needs of the present without compromising the ability of future generations. The goal of sustainable development is to create and maintain prosperous social, economic, and ecological systems. These systems are intimately linked: humanity depends on services of ecosystems for its wealth and security.
Sustainable development is the organizing principle for meeting human development goals while at the same time sustaining the ability of natural systems to provide the natural resources and ecosystem services upon which the economy and society depends . The desired result is a state of society where living conditions and resource use continue to meet human needs without undermining the integrity and stability of the natural system. It has been suggested that "the term 'sustainability' should be viewed as humanity's target goal of human-ecosystem equilibrium (homeostasis), while 'sustainable development' refers to the holistic approach and temporal processes that lead us to the end point of sustainability"
The Brundtland Report1 emphasized that sustainability is a three-legged stool of people, planet, and profit. Every one of us affects the sustainability of the marketplace and the planet in some way. The aim of this study module is to expand the understanding of business graduates on the touch-points they could have in the larger socio-economic context they will live and work in, and the ways in which their decisions and actions have a multiplier effect on decisions within their organisations, their communities, their countries and eventually the planet.

Course Content:

- **Topic 1: Introduction to Sustainability**
- 1a) Introduction to the concept of sustainability and sustainable development
- 1b) Introduction to Sustainable Development Goals (SDGs): history, context, goals and targets, why they matter
- **Topic 2: The three pillars of sustainable development**
- This session will delve deeper into the three main pillars of sustainable development include economic growth, environmental protection, and social equality, and their inter-relationships to achieve triple bottom line.
- **Topic 3: Sustainable Business Model Canvas**
- This session will help scholars understand how to create a sustainable business model, based on which any organisational design and approach can be made sustainable for both new and existing businesses.
- **Topic 4: Measuring Sustainability**
- Measurement of sustainability necessitates a key understanding of a few terms and processes, and this session will introduce scholars to the same, including
- 4a) Sustainability Reporting
- 4b) Sustainability Governance
- 4c) Sustainability Indicators
- **Topic 5: Sustainability as a Business Driver**

- This session will highlight through case studies ways in which businesses and institutions have benefitted by adopting a more sustainable agenda.
- 5a) Case Study 1- NHS
- 5b) Case Study 2- SAP
- 5c) Case Study 3- Patagonia

Activities Related to Skill Development and Employability

Case Analysis 1: UN 2015. Transforming Our World: The 2030 Agenda for Sustainable Development
Case Studies on Market Transformation (Case Study 1- NHS, Case Study 2- SAP , Case Study 3- Patagonia)
Assignment 1 on Sustainable Development Goals (SDGs)
Assignment 2 on The three pillars of sustainable institutions

Course code and name: Introduction to Machine Learning

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS103 (M. Tech elective III)	Introduction to Machine Learning	3	1	2	0	5

Syllabus (Theory)

UNIT I:
Basic concepts, Supervised learning, Supervised learning setup. LMS.

UNIT II:
Logistic regression. Perceptron. Exponential family. Generative learning algorithms. Gaussian discriminant analysis. Naive Bayes.

UNIT III:
Support vector machines. Model selection and feature selection, Ensemble methods: Bagging, boosting, Evaluating and debugging learning algorithms.

UNIT VI:
Learning theory, Bias/variance tradeoff. Union and Chernoff/Hoeffding bounds, VC dimension. Worst case (online) learning, Usage of learning algorithms.

UNIT V:
Unsupervised learning., Clustering. K-means, EM. Mixture of Gaussians., Factor analysis, PCA (Principal components analysis), ICA (Independent components analysis). Reinforcement learning and control, MDPs. Bellman equations, Value iteration and policy iteration, Linear quadratic regulation (LQR). LQG, Q-learning. Value function approximation, Policy search. Reinforce. POMDPs.

MBA/ BBA

Course Title: Supply Chain Concepts and Planning
Course Code: OM15
Credits: 3
Semester: IV

COURSE DESCRIPTION:

This course provides an understanding of fundamental concepts of supply chain management. All functional areas of supply chain management are explored in an integrated view of procurement, manufacturing and operations management, transportation and logistics, production planning and inventory control, order fulfillment and supply chain coordination.

COURSE LEARNING OUTCOMES:

At the end of the course, the students should be able to:

- Explain the fundamental supply chain management concepts.
- Apply knowledge to manage a supply chain effectively.
- Analyze critical dimensions of logistics and distribution in a supply chain to make significant contribution to overall business results.
- Analyze areas in which SCM processes can be improved to gain competitive advantage in the marketplace.

TOPICS TO BE COVERED:

- What is SCM
- Practices in SCM
- Features and importance of SCM
- Case studies on 7' Eleven, Zara, IKEA, Walmart, H&M.
- Integrated SCM and its issues
- Sourcing in Supply Chain Management
- Distribution and Logistics Network in Supply Chain Management.
- Demand Forecasting and Aggregate Planning.
- Sales and Operations Planning.
- Sustaining Competitive Advantage.
- Best practices in SCM
- Warehousing Management in SCM

READING MATERIALS:

- Sunil Chopra, Peter Meindl. D. V. Kalra (2016). *Supply Chain Management: Strategy, Planning, and Operations. 5th* Edition. New Delhi**, Pearson.**
- D. S. Levi, P. Kaminsky, E. S. Levi, R. Shankar (2011), Designing & managing the *Supply Chain – Concepts, Strategies & Case Studies, 3rd edition,* Tata McGraw Hill
- Janat Shah (2016), Supply Chain Management: Text and Cases, Pearson New Delhi.
- R. B. Chase, R. Shankar, F. R. Jacobs, N. J. Aquilano (2010), Operations & Supply *Management, 12th edition, McGraw Hills*
- V. V. Sople. (2010). *Logistics Management*. 2nd Edition. Noida. Pearson Education.
- D. K. Agrawal. (2010). Supply *Chain Management: Strategy, Cases and Best Practices*. 1st edition. New Delhi. Macmillan Publishers India Ltd.
- D. J. Bowersox, D. J. Closs, M. B. Cooper. (2010). *Supply Chain Logistics Management*. 2nd edition. New Delhi. Tata McGraw Hill Education Pvt. Ltd.

Online resources

- http://www.scdigest.com/

- http://www.scmr.com/
- http://www.logisticsworld.com/

Note: Latest edition of the readings will be used.

ASSESSMENT SCHEME:

Assessment Component	Weightage
Class Participation	10%
Quizzes	20%
Assignment	10%
Project Presentation	20%
End-term Examination	40%
Total:	**100%**

Activities Related to Skill Development and Employability

Case #	Case Title
1	Apple Inc.: Managing a Global Supply Chain

MBA/ BBA

Course Title: Materials and Inventory Management
Course Code: OM19
Credits: 3
Semester: IV

COURSE DESCRIPTION:

Materials and Inventory Management is one of the key support functions in Business Operations, which has direct impact on the bottom line of the business. Materials cost generally accounts for 60-70 percent of the cost of the product. In a competitive business environment, while enhancing revenue through sales is becoming increasingly difficult, enhancing profitability by optimizing materials cost through effective management of inventory is relatively easier. In this context, Materials Management function assumes greater importance. Sourcing of Supplies and Management of Inventories are two important Drivers of Supply Chain, which can be effectively leveraged to generate substantial surplus in overall Supply Chain Management. Business Managers irrespective of their functional domain, need to familiarize with techniques and practices used in industry for effective management of Sourcing / Procurement/ Warehousing and Inventory control.

COURSE LEARNING OUTCOMES:

At the end of the course, the students should be able to:

- Describe integrated materials management system in a business organization.
- Apply Tools and Techniques for effective Inventory Management.
- Evaluate vendors through a Vendor Rating System
- Develop a global and an effective inventory management system.

TOPICS TO BE COVERED:

- **Unit 1: Principles of Materials Management:** Integrated Materials Mgmt. System, 5-R Principle of Materials, Planning and Procurement, Key Influencing Factors in Materials Planning, Codification, Standardization and Variety Reduction, Value Analysis Technique for Materials Cost Reduction.
- **Unit 2: Inventory Management Techniques and Practices:** Single Period Inventory System, Elements of Inventory Costs and concept of EOQ, Numerical Examples on computation of EOQ with and without Discounts, P and Q- Systems of Inventory Replenishment, Need and importance of Safety Stock, Impact of Safety Stock on Supplier Selection, Risk Pooling, Selective Inventory Control: ABC, VED, FSN, XYZ, SDE Analysis, Interactive 3-D Approach in Inventory Control, Just-in-Time /Lean Inventory System, Optimizing Operating Cost through Lead Time Reduction / Materials Handling and Transport Cost Reduction
- **Unit 3: Procurement:** Procurement & Outsourcing Strategies, E-Procurement & Reverse Auction, Vendor Selection and Performance Evaluation, Familiarization with Two -Bid Tendering / E-Tendering and Auctioning Procedures and Practices for Procurement, Tender Evaluation, Landed Cost Computation and Selection of Suppliers for award of Purchase Contract, Supply Contracts
- **Unit 4: Warehousing and Ethical Materials Management:** Warehouse Management, Stock Valuation and Verification, Ethics in Materials Management

READING MATERIALS:

- P Gopalkrishnan, Purchasing and Materials Management, 36th reprint 2015, McGraw Hill Education (India) Private Limited Publication
- A.K. Chitle & R.C. Gupta, Materials Management Text and Cases, PHI Publication
- Chatterjee S, Applied Materials Management

- D M Dan, Principles of Purchasing
- Monczka. Trent.Handfield, Purchasing: An Integrated Supply Chain Approach Cengage Publication
- N K Nair, Purchasing and Materials Management, Vikash Publication

ASSESSMENT SCHEME:

Assessment Components	Weightage
Class Participation	10%
Quizzes / Class Test	20%
Assignment	10%
Project Presentation	20%
End-term Examination	40%
Total:	**100%**

Activities Related to Skill Development and Employability

Case #	Case Title
1	Aggregate Planning at Green Mills

Course Title: Management of Operations & Supply Chains

Course Code: OP2101

Credits: 3

Trimester: III

Course Instructors: Dr. Prabhu Aggarwal and Dr. Manoj Bhatia

Course Description:

This course is concerned with the "production" or "operations" function of an enterprise and some of the tools, which managers have used to deal with problems in this functional area. The operations function of an organization is that part of the (public or private, profit or non-profit) organization which produces goods and/or services. The basic mission of this course is to provide an understanding of some of the fundamental problems faced by operations managers and ways to deal with these problems. In general, we will discuss the design, planning, and control of operations systems.

Effective OM blends the interests of customer, employee, and manager, along with those of the public, stockholders, and other stakeholders. Diverse resources, changing technologies, and hard-to-predict demands add to the challenge.

Recent trends such as the emergence of global competition and the rise of service economy, efficient purchasing, production and delivery of goods and services has become a vital part of the survival and success of every organization. This has become an increasingly critical managerial issue in the presence of more frequent introduction of new products, shorter product life cycle and more sophisticated and quality conscious consumers when competing in the global markets. In this module, important concepts and the state of the art techniques essential for managing any organization such as Efficient Delivery Systems, Inventory and Supply Chain Management, Logistics, and Quality Management are introduced.

Course Objective:

The objective of this course is to familiarize management students who will either manage operations and also those who manage other areas. For example, the commitment of order completion dates is set by marketing people but has a direct impact on manufacturing.

Throughout this course, we will study operations problems and policies using both case studies and theory, and in most instances, we will also develop analytical models to understand the operations function of a firm. These studies will involve a certain amount of complexity and an array of management tools and techniques. Both the soft side (guidelines, procedures, and flowcharts) and the hard side (formulas and management science models) will be involved.

Course Outline:

Day	Session	Description	Resources
Feb 28th	1 and 2	Course Information and requirements Pizza App Case	**Notes** **Team Assignment**
Feb 28th	3 and 4	Service Ops: The Big Picture Student presentations	
March 1	5 and 6	Manufacturing Operations The Toy Wagon Factory	**Notes, Team Assignment – In class**
March 1	7 and 8	Production planning and Control issues Student Presentations	
Work from Home		Case analysis: Crane Inc	**Team Based Project for students to do at home – Analysis due: March 14th**
March 14	9 and 10	Crane Inc Discussions Introduction to Inventory Systems, Basic Models	**Notes, The missing cupcakes case**
March 14	11 and 12	Advanced concepts in Inventory Management	**Notes**
March 15	13 and 14	Supply Chain Management: The Beer Game	**In class simulation**
March 15	15 and 16	Beer Game De brief, summarizing the big issues	**Notes**
March 19th		Final Exam – In class (2 hours)	

Teaching and Learning resources:

Books and reference materials: Class Notes will be provided, Required case studies will be provided.

Assessment Plan:

Assessment Components	Group work or Individual assessment (% of total of 100)
1. Case Studies	30% (Group)
2. Class Participation	30% (Individual)
3. Final Exam	40% (Individual)

Activities Related to Skill Development and Employability

Case #	Title
1	Pizza App Case
2	The Toy Wagon Factory
3	Crane Inc

Activity #	Title
1	Simulating Supply Chain Environment with the help of 'The Beer Game'

JK Lakshmipat University, Jaipur
Institute of Management
MBA
Academic Year- 2018-19
Capstone-I

Course Code: PW2101
Credits: 2
Term: III

Course Description:
Students go through numerous courses and subjects during the year. They go through these courses in an independent and standalone manner. The emphasis is on learning the basics and the theoretical aspects of the subjects. Application if any, is limited.
The capstone is a large case study that students solve in the course of a week. It is designed to give students an opportunity to apply what they have learnt throughout the year, not as standalone subjects, but as connected and interdependent disciplines.

Course Learning Objectives:
1. To translate learnings to action/ application
2. To understand how various disciplines are connected
3. To enable revision of subjects that students have taken through the year

Topics to be covered:
1. Financial Analysis of a company leading to recommendations
2. Strategy Analysis company leading to recommendations
3. Marketing Analysis company leading to recommendations
4. New product idea basis insights from consumer research
5. Production management to set up manufacturing facility for the new product
6. Talent/ HR structuring of an independent business unit that will own the new product
7. Marketing strategy for the new product, from scratch

Activities Related to Skill Development and Employability

Group Presentation, Discussion and Critical Thinking on Case**:** Dabur Ltd.

a) Indian FMCG Company Dabur Ltd. 5n year cross sectional Financial Analysis compared with HUL, Bajaj corp & Merico. (Based on Liquidity, Solvency, Efficiency, Profitability and Valuation ratios)
b) Presentation on Strategy Analysis of Dabur Ltd along with competitors
c) Presentation on Marketing Analysis of Dabur Ltd along with competitors
d) Presentation on New product idea of Dabur in substitution of Dabur Chavanprash
e) Presentation on Production management to set up manufacturing facility for the new product though through by students
f) Presentation on Talent/ HR structuring of an independent business unit that will own the new product
g) Presentation on Marketing strategy for the new product

JK Lakshmipat University, Jaipur
Institute of Management
BBA

2018-19

Buisness Economics

Course Code: EC09

Course Credits: 3

Semester: I

Course Description:

Economics is the study of the way people and societies use limited resources in decision making. Economics as a subject is traditionally branched into microeconomics and macroeconomics based on unit of decision making. Microeconomics focuses on the individual decision making units such as the customer and producer, which constitute two forces of supply and demand in the market. Macroeconomics, in contrast, is the study of the working and performance of the economy as whole. The world economies are becoming increasing market oriented and has faced many economic issues and financial crises in the last decades. Thus, economics is both a preparation for taking day-to-day decisions in a firm or other organization, and training in the analysis of many of 'big issues' of our time. This course equips the students with the knowledge of the basic concepts of microeconomics and macroeconomics, and enables them to understand the recent trends and tendencies in business environment and help them in efficient decision making.

Topics to be Covered:

- Business Economics and Fundamental Concepts
- Cardinal and Ordinal Concepts of Utility
- Laws of Demand and Supply and Market Equilibrium
- Elasticity of demand, its measurements and application
- Production Function and its Laws
- Concepts of Costs and Cost Functions
- Concepts of Revenue and Breakeven Analysis
- Price and output determination in different market structures
- Circular Flow
- National Income

- Consumption, Saving and Investment function
- Business cycles
- Inflation and unemployment
- Foreign Exchange Rate
- Balance of Payment

Activities Related to Skill Development and Employability

Project: Exhibit the economic concepts through live examples, movie clippings and animations

Assignment: Prepare dictionary of economic terms

Assignment: Write an article on any current issue

JK Lakshmipat University, Jaipur
Institute of Management
B.Tech

2018-19

Basic Entrepreneurship

Course Code: IM311

Course Credits: 3

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
B. Tech

2018-19

Advance Course in Entrepreneurship

Course Code: IM411

Course Credits: 3

Course Description:

This course is the second of a two-part entrepreneurship development curriculum from Wadhwani Foundation. The first part i.e. Basic Course in Entrepreneurship is the prerequisite for this course. In this course, students will learn how to achieve sustainable growth by pivoting, refining business models, and business planning. This course is supported by Wadhwani Foundation and facilitated through Learnwise.

Topics to be Covered:

- Recap and Review the Fundamentals
- Refining the Business Model and Product/Service
- Business Planning
- Exploring Ways to Increase Revenue
- Funding the Growth
- Building the A-Team
- Creating a Branding and Channel Strategy
- Leveraging Technologies and Available Platforms
- Measuring Your Progress
- Legal Matters
- Seeking Support
- Final Project Presentation
-

Activities Related to Skill Development and Employability

Project: Bring product to market

Case Study: Discuss various start-ups stories, who pivoted.

Out-class exercises 1: Survey on various start-up, who refined their product

In-class Activity 2: Prepare business plan and present

In-class exercises 3: Built A team

Out-class exercises 4: Preparing position statement of your start-u

Computing Using Python : CSE555

Course Title and Code: Computing Using Python : CSE555		
Course Description In this computer science course, students will learn about foundational computing principles, such as how to write and read computer code and how to run and debug code. Students will learn about general principles of programming like procedural programming, control structures, and data structures in Python. Demonstration of computing principles and domain applications that use programming concepts and computing principles in real applications would be done in this course.		
Prerequisites		**Nil**
Hours per Week		**L-T-P: 2-0-4**
Credits		**4**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	20
03	Class Participation	10
04	Quiz	Nil
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam(Final)	Nil
08	Report-1	Nil
09	Report-2	Nil
10	Report-3	Nil
11	Project -1	20
12	Project -2	20
13	Project -3	Nil
14	Lab Evaluation1	30
15	Lab Evaluation2(Final)	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

gitHub, Functions, Booleans and Modules,Sequences, Iteration and String Formatting, Dictionaries, Sets, and Files,Exceptions, Testing, Comprehensions, advanced Argument Passing, Data Frames, Libraries , Lambda -- functions as objects, Object Oriented Programming, More OO -- Properties, Special methods, Iterators, Iterables, and Generators, Decorators, Context Managers, Regular Expressions

Reference / Text Books

1. William Punch, Richard Enbody, 'The Practice of Computing Using Python' Pearson, 2016
2. Eric Matthes, Python Crash Course: A Hands-On, Project-Based Introduction to Programming, No Starch Press
3. Mark Lutz, Learning Python, O'Reilly,2013

Assignments, Presentations

Course Title and Code: Design and Prototyping (BES102)		
Course Description The objective of this course is to open the students to learn free and lateral thinking and initiate creative problem-solving. The course will encourage students to learn through hands-on experience and break away from traditional learning methods. This course will initiate by introducing the role of design thinking in process of designing a product and it will emphasize the role of research in the design process. The course will run by providing the operational skills to conduct design research and how to use the research insights for creating a product. Students will also get the exposure to manufacturing techniques such as casting, forging, joining, laser cutting, 3D printing etc. In a nutshell, the course will move around the user-centric approach of design research and methods for working out an appropriate solution for a problem space.		
Prerequisites		**None**
Hours per Week		**L-T-P: 6-2-0 /In Class-Out Class: 6-12**
Credits		**6**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	10
03	Class Participation	20
04	Quiz	05
05	Theory Exam	Nil
06	Theory Exam	Nil
07	Theory Exam	Nil
08	Report-1	10
09	Report-2	10
10	Report-3	10
11	Project -1	15
12	Project -2	15
13	Project -3	Nil
14	Lab Evaluation	Nil
15	Lab Evaluation	Nil
16	Course portfolio	05
	Total (100)	**100**

Syllabus

Basics engineering drawing with AutoCAD, Fundamental manufacturing processes including metal joining, metal cutting, additive manufacturing, laser cutting, casting, sheet metal working etc.

Basic Design cycle, project definition, vision in product designing, base of pyramid model, context mapping, mind mapping, Life cycle analysis, process tree, SWOT analysis, VRIO analysis, perpetual mapping, Fish trap model, SCAMPER, PreMo, C-Box, VALUE, Design Drawing, TecDoc.

Reference / Text Books

"The Design of Everyday Things" by Donald A. Norman

Course Name: Signals and Systems (EE408)	
Hours per Week	**L-T-P: 3-1-2**
Credits	**5**
Students who can take	

Course Objective: This course aims to provide a foundation on deterministic signals and systems. It covers the fundamentals of analysis problems, tackling both continuous and discrete time domains.

Learning Outcome:

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

1. Classify signals as continuous-time vs. discrete-time, periodic vs. non-periodic, energy signal vs. power signal, odd vs. even
2. Perform basic operations in signal processing, including convolution
3. Calculate the average value, average power and total energy of basic signals
4. Write the expressions for Fourier/Z series and transform
5. Analyze the fundamental characteristics of continuous-time signals using Fourier transform
6. Analyze the fundamental characteristics of discrete-time signals using Z transform
7. Classify systems based on their properties and determine the response LTI systems
8. Identify suitable engineering standards to meet technical, safety, regulatory, societal and market needs for signal processing applications

Syllabus

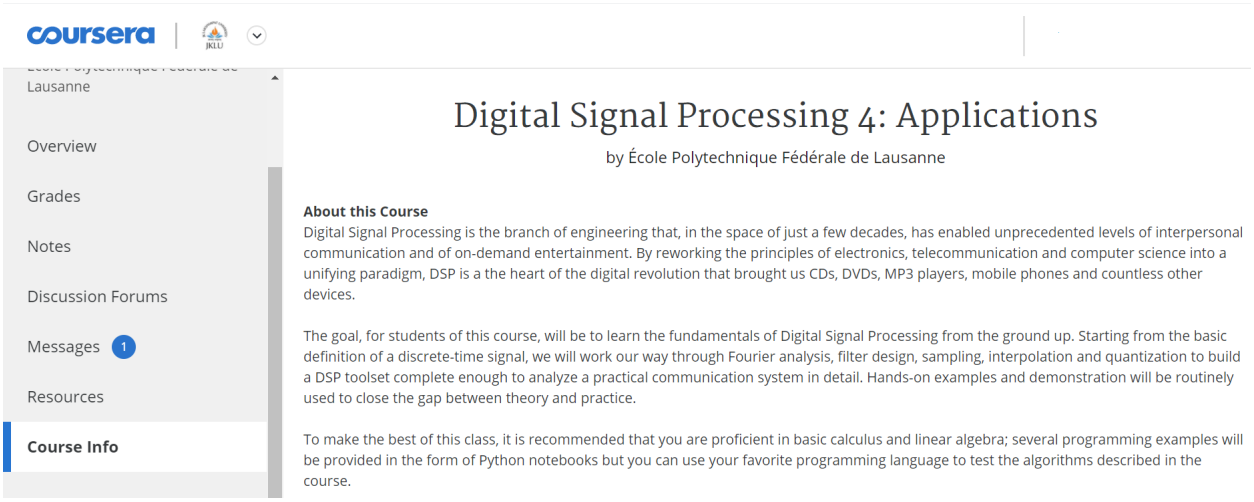
1. Signals and Systems: Motivation and introduction to the course, Basic concepts of signals and systems, signal transformations, continuous and discrete time systems, basic systems properties.
2. Linear time invariant (LTI) systems: Discrete and continuous – time LTI systems, convolution, properties of LTI systems, system described by differential and difference equations.
3. Fourier representation of periodic signals: Representation of continuous time periodic signals and their properties, representation of discrete time periodic signals and their properties, Fourier series and LTI systems, filtering.
4. Fourier Transform of aperiodic signals: Continuous and discrete time Fourier transform, properties of transforms, convolution and multiplication property, duality, time-frequency characterization, sampling.
5. Laplace and z-transform: The Laplace and z-transform, region of convergence, properties, analysis and characterization of LTI system using Laplace and z - terization of LTI system using Laplace and z - transform.
6. Introduction to Sampling.

Activities Related to Skill Development and Employability

Students work in practical applications like:

1) Audio signal processing
2) Biomedical instrumentation
3) Basic control and communication systems

Certificates acquired Coursera



Course Name: Industrial IoT (ECE480)	
Hours per Week	**L-T-P:**
Credits	
Students who can take	
Course Objective: This course aims at creating the fundamentals skills required to design, implement and maintain an industrial IoT system	
Learning Outcome: On successful completion of this course students will be able to: 1. Explain the key components that make up an Industrial IoT system and differentiate between Internet of Things (IoT) and Operational Technology (OT). 2. Discuss protocols and standards employed at each layer of the IIoT stack. 3. Design, deploy and test a basic Industrial IoT system, including data analysis functionalities. 4. Apply best practices in order to meet desired requirements for IIoT applications. 5. Analyze the environmental effects and incorporate robustness in design of IIoT system. 6. Choose technology for constrained nodes and network while maintaining real time data collection. 7. Explain the importance of cybersecurity for IIoT networks.	

Syllabus

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

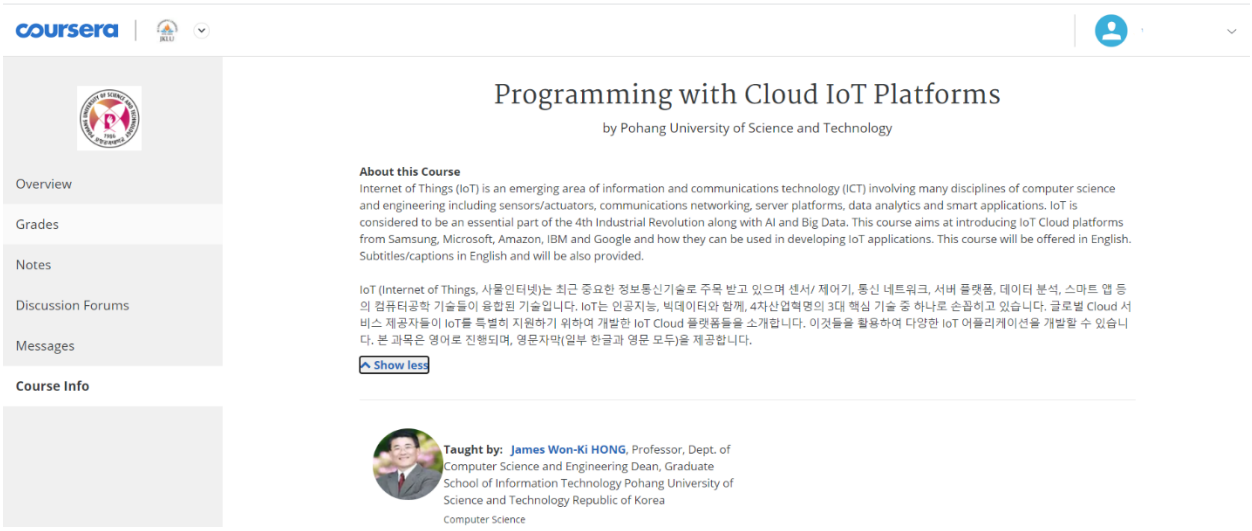
1. Explain the key components that make up an Industrial IoT system and differentiate between Internet of Things (IoT) and Operational Technology (OT).
2. Discuss protocols and standards employed at each layer of the IIoT stack.
3. Design, deploy and test a basic Industrial IoT system, including data analysis functionalities.
4. Apply best practices in order to meet desired requirements for IoT applications.
5. Analyze the environmental effects and incorporate robustness in design of IoT system.
6. Choose technology for constrained nodes and network while maintaining real time data collection.
7. Explain the importance of cybersecurity for IoT networks.

Activities Related to Skill Development and Employability

Students work in practical applications like:

- Remote asset monitoring
- Predictive maintenance

Certificates acquired Coursera



Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
ECE489	Analog Linear Integrated Circuits	3	0	2	0	5

Course Objectives: The course aims to discuss the working of analog integrated circuits and their applications.

1. **Learning Outcomes:**
2. On successful completion of this course, the students should be able to:
3. Evaluate IC parameters to choose appropriate IC's for given applications with a sensitivity to sustainability.
4. Explain electrical characteristics of op-amps and their open loop configurations.
5. Design inverting, noninverting, and differential amplifiers.
6. Find out frequency response, stability, transient response, bandwidth, maximum output voltage, and other important parameters of an op-amp.
7. 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.
8. Design and analyze filters and oscillators viz., low-pass filters, high-pass filters, band-pass filters, band-reject filters, Butterworth filters, Chebyshev filters, Cauer filters, phase shift oscillators, Wien bridge oscillators, quadrature oscillators, square wave generators, triangular wave generators, and sawtooth wave generators.
9. 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.
10. Test the performance of different circuits as per IEEE, IEC, ISO and other standards.
11. Refine the design of devices with a sensitivity to sustainability.

Assessment Scheme:

Sr. No.	Evaluation Component	Marks
1	Theory Exam-I	12
2	Theory Exam-II	12
3	Theory Exam-III	24
4	Class Performance	12
5	Lab Performance	24
6	Lab Evaluation	16
	Total (100)	100

1. **Syllabus (Practical):**
2.
3. To study Op-Amp 741 characteristics and its various parameters from data sheet.
4. To study Op-amp based inverting and non-inverting amplifiers, voltage comparator and zero crossing detectors.
5. To study Op-Amp as scalar, summer and voltage follower.
6. To study Op-Amp as differentiator and integrator.
7. To design 1st order low pass and high pass active filters using Op-Amp 741.
8. To design Band Pass and Band Reject Active filters using Op-Amp 741.
9. To design Oscillators using Op-Amp (i) RC phase shift (ii) Wien bridge at 1 kHz.
10. To design (i) Astable (ii) Monostable Multivibrators using IC-555 timer.
11. To design Triangular & square wave generator using 555 timers.

12. To study operation of IC NE/SE 566 Voltage Controlled Oscillator and determine output frequency for various voltage levels.
13. To study Op-Amp based sample and hold circuit.
14. To design Schmitt trigger using op-amp.

Text Books:

1. Gayakwad, Ramakant A. Op-amps and linear integrated circuit technology. Englewood Cliffs, NJ: Prentice-Hall, 1983.
2. Roy, D. Choudhury. Linear integrated circuits. New Age International, 2003.
3. Bell, David A. "Op-amp & Linear ICs." (1997).

Reference Books:

1. Gray, Paul R., Paul J. Hurst, Stephen H. Lewis, and Robert G. Meyer. Analysis and design of analog integrated circuits. New York: Wiley, 2010.
2. Franco, Sergio. Design with operational amplifiers and analog integrated circuits. Vol. 1988. New York: McGraw-Hill, 2002.

Activities Related to Skill Development and Employability

Projects:

1. Design of voltage control oscillator.
2. Design of Schmitt trigger.
3. Design of zero crossing detectcor circuit.
4. Design Square wave Generator.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
ECE507	Analog and Digital Communication	3	0	2	0	5

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test - II	End Term Test	Class Participation Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation Additional Continuous Evaluation*	Total Marks**

Syllabus (Theory):

Review of signals and systems, Frequency domain representation of signals, Principles of Amplitude Modulation Systems- DSB, SSB and VSB modulations. Angle Modulation, Representation of FM and PM signals, Spectral characteristics of angle modulated signals. **Review of probability and random process**. Gaussian and white noise characteristics, Noise in Amplitude modulation systems, Noise in Frequency modulation systems. Threshold effect in angle modulation.

Pulse modulation. Sampling process. Pulse Amplitude and Pulse code modulation (PCM), Differential pulse code modulation. Delta modulation (DM), Noise in PCM and DM systems.

Digital Modulation and Transmission: Phase Shift Keying (PSK), Quadrature Amplitude Shift Keying (QAPSK), Frequency Shift Keying (FSK).

Text/Reference Books:

1. Haykin S., "Communications Systems", John Wiley and Sons, 2001.
2. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education, 2002.
3. Taub H. and Schilling D.L., "Principles of Communication Systems", Tata McGraw Hill, 2001.
4. Wozencraft J. M. and Jacobs I. M., ``Principles of Communication Engineering'', John Wiley, 1965.
1. Barry J. R., Lee E. A. and Messerschmitt D. G., ``Digital Communication'', Kluwer Academic Publishers, 2004.

Proakis J.G., ``Digital Communications'', 4th Edition, McGraw Hill, 2000.

Activities Related to Skill Development and Employability

List of Projects

Each student has to complete one hardware project and one software project (Matlab, python based) with proper literature survey along with report. Some examples are given below for the project ideas.

1. Design of amplitude modulation and demodulation system.
2. Designing of SSB-SC modulation and demodulation system.
3. Design of Frequency modulation and demodulation system
4. Design of amplitude shift keying modulation and demodulation system.
5. Designing of frequency shift keying modulation and demodulation system.
6. Design of binary phase shift keying modulation and demodulation system
7. Designing of QPSK modulation and demodulation system.
8. Designing of all above system (1 to 7) in the presence of AWGN using software.

Workshop organized:

Two-days workshop on “Embedded System Project Design”.on Oct. 27-28, 2018. The resource person for the workshop is Prof. Dhananjay V. Gadre (Netaji Subhas University of Technology, New Delhi, India).

Students are also motivated to attend the workshop, take part in the various competition, hachthon etc to make them enable to compete with the external world.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
ECE509	Microwave Engineering	3	0	2	0	4

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test - II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks**
20	20	50	10	100	20	50	30	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/other **The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

- **Transmission structures and Resonators:** RF and microwave spectrum, historical background, application of RF and microwave. 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. Cavity Resonators– Introduction, Transmission cavity, Rectangular and Cylindrical Cavities, Dominant Modes and Resonant Frequencies, Q factor and Coupling Coefficients.
- **Microwave network theory and passive devices:** Scattering matrix -Concept of N port scattering matrix representation-Properties of S matrix- S matrix formulation of two-port junction. Power divider, 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
- **Microwave Generators:** Transit-time effect, Limitations of conventional tubes, Two-cavity and multi-cavity Klystrons, Reflex Klystron, TWT, Magnetrons.
- **Microwave semiconductor devices:** operation -Principles of tunnel diodes Transferred Electron Devices -Gunn diode- Avalanche Transit time devices- IMPATT and TRAPATT devices, MASER.
- **Applications of microwave:** Radar systems, Satellite Communication System, Industrial Applications

Course Syllabi (Practical):

1. To study the basic components of Microwave Lab
2. To examine the frequency characteristics using direct reading frequency meter.
3. To calculate the frequency characteristics using formula.
4. To become familiar with the basic technique for measuring voltage standing wave ratio.
5. To study the attenuation characteristics of a variable attenuator.
6. To study I-V characteristics of Gunn Diode.
7. To measure coupling factor, directivity and insertion loss of a directional coupler.
8. To obtain the radiation pattern of a Horn Antenna.
9. To measure the gain of Horn Antenna.
10. To determine impedance of unknown load by measuring VSWR and the position of first field minimum.

Text Books:

1. Microwave Engineering by David M. Pozar, WILEY India
2. Microwave Devices and Circuits by S.Y. Liao, Pearson

Reference Books:

1. Microwave Engineering by Annaparna & Sisir Das, McGraw Hill
2. Foundations for Microwave Engineering by Robert E. Collin, Wiley India.
3. Microwave Engineering by Sushrut Das, Oxford University Press.
4. Electronic Communication Systems by Kennedy, Davis and Prasanna, TMH.

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 Two-cavity and multi-cavity Klystrons, Reflex Klystron, TWT, Magnetrons.
4. Students implemented antenna projects using CST.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
ECE510	Microcontrollers and Microprocessors	0	1	0	4	5

Prerequisites: Digital Electronics (ECE 306), C Programming

Course Objectives:
The course aims to make students adept at designing microprocessor/microcontroller-based projects/ devices/gadgets. The course builds foundation for higher level courses like Internet of Things, Robotics and Machine learning where microcontroller are used as central processing units.

Learning outcomes: On successful completion of this course, students should be able

(A) to demonstrate:

☐Programming for Microprocessors, ATMEGA 328 & ARM Cortex Microcontrollers

☐Interface sensors/peripherals to microprocessors/ microcontrollers.

☐An in-depth knowledge of applying the concepts on real- time applications

(B) able to answer following questions:

☐What are the specifications of the processor/controller and peripherals required for any project?

☐Is there requirement for any circuit like opto-coupler or amplifier for interfacing any particular sensor or peripheral to a microprocessor?

☐What is the advantage of using 8255 peripheral interface controllers with microprocessor?

☐What are advantages of microcontrollers?

Syllabus: Overview of microcomputer systems, Von Neumann and Harvard architectures, memory interfacing, concepts of Interrupts, instruction sets of microprocessors;
Interfacing with peripherals - timer, serial I/O, parallel I/O, A/D and D/A converters
Microcontrollers: ATmega 328 and programming in embedded C
Introduction to RISC processors: TIVA series low power controllers
32 bit controller and programming in C.

Projects: The course is conducted in Project Based Learning Mode with following domains for various projects:
a) Environment monitoring and Pollution control
b) Smart agriculture
c) Object Detection and safety applications
d) Home automation
e) Water harvesting/ conservation
f) Health monitoring

Activities Related to Skill Development and Employability

Following Projects were made by students and demonstrated in Project Exhibitions at JKLU:

Name	Project Title
Garima Sharma	Transmission of Data on Arduino Nano using Li-fi technology
Harshita Gupta	
Kanwar Deep Singh Gahlot	
Chandresh Sharma	

Isha Narolia	Smart Solar Power Monitoring System
Kanishk Sharma	
Prithvi Singh Rathore	
Yash Kumar Singh	
Anudit Bhatt	Smart Farming
Rohit Kumar	
Shreyash Purwar	
Mayank Jhanwar	Gesture Controlling Robot using Bluetooth
Rajat Chandra	
Raghav Tambi	IoT based Home Automation System Using ATMega328 Microcontroller
Roshan Kumawat	
Vipin Agarwal	
Priyanshu Sharma	
Ritika Verma	Smart Mirror With News & Temperature using Raspberry Pi
Surabhi Tomer	
Astha Rai	
Madhavi Chauhan	
Ronak Mathur	Smart Medicine Dispenser using Arduino
Priyal Jain	
Mridul Arora	
Manoj Choudhary	Blind Stick using Arduino System
Rahul Dangi	
Kapil Jain	
Ashutosh Gupta	
Karan Pratap Singh	Autamated Restaurant System using AtMega328 Microcontroller
Mayank Bhimrajka	
Naman Dhingra	
Rakshit Jayaswal	Arduino based health monitoring system using IoT
Kashis Singh Rawat	
Mahesh Kumar Purohit	
Rohit Sharma	

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
ECE731	Wireless Communication & Networks	3	0	0	0	3

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks**	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks**
					-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

UNIT I History of Wireless Communication & Cellular Concepts
History of wireless communication system, Multiple Access techniques - FDMA, TDMA, CDMA – Capacity calculations–Cellular concept- Frequency reuse - channel assignment- hand off- interference & system capacity, Coverage and capacity improvement.

UNIT II Wireless Channels
Large scale path loss – Path loss models: Free Space and Two-Ray models – Small scale fading- Parameters of mobile multipath channels – Time dispersion parameters-Coherence bandwidth – Doppler spread & Coherence time, Fading due to Multipath time delay spread – flat fading – frequency selective fading – Fading due to Doppler spread – fast fading – slow fading.

UNIT III Digital Signaling For Fading Channels
Structure of a wireless communication link, Principles of BPSK, Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle

UNIT IV Multipath Mitigation Techniques
Equalisation – Adaptive equalization, Linear and Non-Linear equalization, Zero forcing and LMS Algorithms. Diversity – Micro and Macrodiversity, Diversity combining techniques

UNIT V Multiple Antenna Techniques
MIMO systems – spatial multiplexing -System model -Pre-coding - Beam forming - transmitter diversity, receiver diversity- Channel state information-capacity in fading and non-fading channels.

Text Book(s)

1. Wireless Communications by Andrea Goldsmith (Cambridge University press, 2005)
2. Wireless Communication Principles and Practice, Theodore S. Rappaport, Second Edition, Pearson Education, 2002.

Reference Book(s)

1. Wireless communications by Andreas Molisch, Wiley –IEEE Press, 2 nd Ed, 2011
2. Principles of Mobile Communications by G. L. Stuber. 2nd Ed. Kluwer Academic Publishers, 2001.
3. Fundamentals of Wireless Communication by D. Tse and P. Viswanath, Cambridge University Press, 2005

Activities Related to Skill Development and Employability

1. Wireless Protocols were understood and analyzed through Lab simulations on MATLAB.
2. Lab simulations were conducted on NS2.
3. Assignments were given on topics like Principles of BPSK, Offset-QPSK, p/4-DQPSK, Minimum Shift Keying, Gaussian Minimum Shift Keying, Error performance in fading channels, OFDM principle, etc.
4. Antenna design simulations were done on CST Microwave studio.
5. Students implemented projects.

Course Title and Code: Electrical Safety (EE611)

(Open Elective-I)

Hours per Week	**L-T-P: 3-0-0**
Credits	**3**
Students who can take	**All B. Tech Students**

Course Objective:

The goal of this course is to discuss electrical hazards, Safety standards, protection issues, identification of sensors for protection and develop understanding of the CEA regulations for Electrical safety. This course will facilitate students to find solutions of electrical hazards.

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

1. Identify the hazards associated with electricity: shock and fire.
2. Investigative the cause of electrical accidents and fires.
3. Identify and explain how to respond to electrical emergencies.
4. Identify safe work practices when exposed to electrical hazards (including risk assessment)
5. Apply the acts in accordance with the risk and safety issues, legal obligations codes of safety practice.
6. Explain the Indian electricity safety code and rules
7. Plan and take measures to minimize hazards
8. Formulate the suitable methodologies to determine safety risks in relevant practical applications.
9. Review the design of existing electrical systems as per the standard electrical safety code.
10. Integrate the sensors for the monitoring and automation of electrical systems.

Prerequisites		Basics of Electrical Engineering,
Sr. No.	**Evaluation Component**	**Marks**
1	Attendance	-
2	Assignment	05
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	05
9	Report-II	05
10	Report-III	-
11	Project-I	10
12	Project-II	10
13	Project-III	-
14	Lab Evaluation-I	-
15	Lab Evaluation-II	-

16	Course Portfolio	-
	Total (100)	100

Syllabus (Theory)

UNIT I: Concepts and Statutory Requirements

Introduction – electrostatics, electromagnetism, stored energy, energy radiation and electromagnetic interference –Working principles of electrical equipment -Indian electricity act and rules-statutory requirements from electrical inspectorate-international standards on electrical safety –first aid- cardiopulmonary resuscitation (CPR).

UNIT II: Electrical Hazards

Primary and secondary hazards-shocks, burns, scalds, falls-human safety in the use of electricity. Energy leakage-clearances and insulation-classes of insulation-voltage classifications-excess energy- current surges-Safety in handling of war equipments-over current and short circuit current-heating effects of current-electromagnetic forces-corona effect-static electricity –definition, sources, hazardous conditions, control, electrical causes of fire and explosion-ionization, spark and arc-ignition energy- national electrical safety code ANSI. Lightning, hazards, lightning arrestor, installation –earthing, specifications, earth resistance, earth pit maintenance.

UNIT III: Protection Systems

Fuse, circuit breakers and overload relays –protection against over voltage and under voltage –safe limits of amperage –voltage –safe distance from lines-capacity and protection of conductor-joints-and connections, overload and short circuit protection-no load protection-earth fault protection. FRLS insulation-insulation and continuity test-system grounding-equipment grounding-earth leakage circuit breaker (ELCB)-cable wires-maintenance of ground-ground fault circuit interrupter-use of low voltage-electrical guards-Personal protective equipment –safety in handling handheld electrical appliances tools and medical equipment.

UNIT IV: Selection, Installation, Operation and Maintenance

Role of environment in selection-safety aspects in application -protection and interlock-self diagnostic features and fail-safe concepts-lock out and work permit system-discharge rod and earthing devices- safety in the use of portable tools-cabling and cable joints-preventive maintenance.

UNIT V: Hazardous Zones

Classification of hazardous zones-intrinsically safe and explosion proof electrical apparatus-increase safe equipment-their selection for different zones-temperature classification-grouping of gases-use of barriers and isolators equipment, certifying agencies.

Reference Books:

1. Mary Capelli-Schellpfeffer, Dennis Neitzel, John Cadick, Al Winfield, "Electrical Safety Handbook" McGraw-Hill Education.
2. Mohamed A. El-Sharkawi, "Electric Safety: Practice and Standards" CRC Press.
3. Krishnan, N.V., Safety Management in Industry, Jaico Publishing House,
4. Cooper W.F., Electrical Safety Engineering, Newnes.
5. Cadick, J., et. al., Electrical Safety Handbook, McGraw Hill Education.
6. Bureau of Indian Standards, National Electrical Code 2011, Bureau of Indian Standards, New Delhi, 2011.

Activities Related to Skill Development and Employability

Industrial Visit

Industrial Visit on February 04, 2019 Tanwar Industries Ltd. Kaladera, Jaipur, (An AUTHORISED OEM OF M/S MAHINDRA & MAHINDRA LTD) and students have submitted the case study report.

Paper Presented in National Conference

1. Yash Mathur, Pushpendra Singh, "Safety Issues with Electric Vehicles" in 4th National Conference on Technology Enabling Modernization of Rural India (TMRI-2019) in association with IE(India) on 30 March 2019 at Suresh Gyan Vihar University, Jaipur.
2. Saransh Gupta, Jay Patel, Tejas Patel and Pushpendra Singh, "Electrical Safety Audit findings and Do's and Don'ts in Industries" in 4th National Conference on Technology Enabling Modernization of Rural India (TMRI-2019) in association with IE(India) on 30 March 2019 at Suresh Gyan Vihar University, Jaipur.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
EE706	Advances in Power Delivery	3	1	0	0	5

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)				
Mid Term Test – I	Mid Term Test – II	End Term Test	Class Participation/ Additional Continuous Evaluation	Total Marks	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation		Total Marks
20	20	40	20	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory)

UNIT I: DISTRIBUTION SYSTEMS & LOAD FORECASTING: Distribution of power, future distribution systems, load forecasting, power factor improvement, system harmonics, monitoring and compensation in distribution system, earthing and grounding.

UNIT II: DISTRIBUTION AUTOMATION: Distribution System Topology and Structure, Distribution Automation (DA) and Control, Distribution Automation Function, Distribution Management Systems, Voltage/VAr Control, Reconfiguration of Distribution Systems, Intelligent Systems in Distribution Automation, Automatic Meter Reading, Communication Systems for Distribution Automation Systems, Utility Communication Architecture.

UNIT III: EHV AC transmission: Engineering Aspects of EHV AC Transmission System: Principles, configuration, special features of high voltage AC lines, power transfer ability, reactive power compensation, audible noise, corona, bundle conductors, electric field, right of way, tower configuration, Principles of radio interference, origin of radio interference, method of propagation, factors to be considered in line design.

UNIT IV: HVDC transmission: HVDC Transmission: Types of D.C. links, advantages and disadvantages of HVDC transmission, Basic scheme and equipment of converter station, Ground return, Basic principles of DC link control and basic converter control characteristics, multi-terminal HVDC systems, HVDC circuit breaker, Application of HVDC transmission.

UNIT V: FACTs: Introduction to FACTS controllers, types of FACTS controllers, Brief description of STATCOM, Thyristor controlled series capacitors and unified power flow controller, Shunt capacitors and reactors, saturable reactors, Thyristorised static VAR compensators- TCR, FC-TCR and TSC- TCR.

Text Books:

1. A S Pabla, "Electric Power Distribution", TMH
2. B R Gupta, "Power System Analysis & Design" S. Chand Publishers
3. Nagrath Kothari,"Modern Power System Analysis", TMH
4. Rokosh Das Begamudre, "EHV AC. Transmission Engineering" Wiley Easter Ltd. New Delhi.
5. K. R. Padiyar,"HVDC Power Transmission Systems", New Age International.

Reference Books:

1. J. J. Grainger & W. D. Stevenson, "Power System Analysis", TMH.
2. Kamaraju, "Electrical Power Distribution Systems", TMH
3. P.Kundur," Power System Stability & Control", TMH.
4. H.V.D.C. Transmission – P.Kundur, TMH.
5. James A. Momoh, "Electric Power Distribution, Automation, Protection and control" CRC press, 2007.

Activities Related to Skill Development and Employability

1. Industrial Visit on March 05, 2018, State Load Dispatch Center, Jaipur.
2. Industrial Visit on March 05, 2018, 400 KV Grid Sub-Station switchyard, Jaipur.

Course Code: EE731 **Course Name: Industrial Drive and Electric Vehicles**
Semester: VII EE **Weekly Contact Hours: 6 Hrs. (2 0 4) per week**

Course Description: Industrial drive and electrical vehicles subject focuses in imparting education in the field of power electronics applications for electrical machines and industrial equipments. This subject emphasizes on design, modeling and analysis of conventional and advanced electrical machines. This course enables to design various control strategies for AC & DC machines and selection of proper size & type of motor as per industry requirements.

Prerequisites: Electrical Machines and Industrial Electronics

Course Objective:

- Understand basic requirements placed by mechanical systems on electric drives.
- Understand the basic principles of power electronics in drives using switch-mode converters and pulse width modulation to synthesize the voltages in dc and ac motor drives.
- Understand the operation of dc motor drives to satisfy four-quadrant operation to meet mechanical load requirements.
- Learn about the energy efficiency of electric drives and converter-motor interactions.
- Understand all the sensors and actuators used in electrical drive systems.

Course outcomes (*after completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes)*

(A) The students will demonstrate:

Knowledge:

- power electronic converters and their application in electrical motor drives
- common load models for electrical motor drives
- control principles for electrical motor drives
- apply the theories of electrical machines, power electronic converters and control system design to implement drive systems which are appropriate for certain specific applications requiring adequate performance.

Skills:

- model and analyze electrical motor drives and their sub systems (converters, rotating machines and loads)
- choose a suitable rotating machine for an electrical motor drive

- choose a suitable power electronic converter structure for an electrical motor drive
- choose a suitable control structure and calculate control parameters for an electrical motor drive

(B) After successful completion, the students will be able to answer the relevant questions:

- Size selection of drive for various applications.
- Converter and control strategies for electrical drives.
- Specifications of electric drives

Domain Specific Knowledge: Modeling and Simulation, MATLAB programming, designing of control circuit, Interface unit hardware details.

Professional Skills:
Creativity, Team-work, Leadership, Professionalism, Time Management, Communication Skills and Report Writing.

Expectations from the Students

1. To adhere the course guidelines throughout its duration
2. Active engagement with the learning opportunities provided for them.
3. Responsible towards learning and practicing skills through assigned exercises.
4. Involvement in teamwork to achieve the learning objectives.
5. To dedicate 12 hours a week for this course (for self-study, assignments, report writing and designing of project) beyond the classroom sessions and 05 hours classroom sessions. (total workload 17 hours a week)

Expectations from the faculty members

1. To assess student progress by continuous evaluation in the form of quizzes, assignments, project reports, project demonstrations and presentations.
2. To discuss with students about their progress at every evaluation stage and guide them to achieve the course goals through regular interactions one to one and group exercises.
3. **Evaluation Plan** (Tentative):
4. **Course Evaluation:**

Components	Weight (%)	Details	Weightage in %
Theory Examinations	20	Theory Exam 1	10
		Theory Exam 2	10

Continuous Evaluation	30	Assignments (04)	15
		Quiz (04)	15
Projects	50	Project-1	25
		Project-2	25
			100

Projects Evaluation Components – 50 Marks

Attendance	Time Mgmt.	Execution	Presentation	Documentation
10%(05)	20%(10)	20%(10)	20%(10)	30%(15)

Syllabus

UNIT I

INTRODUCTION: - Definition & classification of different type of drives, Dynamics of electrical drives, Review of characteristics and components of electric drives, acceleration and retardation time, energy consideration.

UNIT II

BRAKING OF DRIVES:- Various methods of braking of a.c. and d.c drives, Automatic control arrangement, Speed control methods of various a.c. and d.c. drives, its advantages and applications.

UNIT III

INDUCTION MOTOR DRIVES: - Basic principle of induction motor drives, 3 Ø a.c voltage controller fed I.M drive, variable frequency control, voltage source inverter (VSI) and current source inverter (CSI), cycloconverter fed IM drive, Slip Power control, static rotor resistance control, chopper control of 3 -Ø slip ring induction motor.

UNIT IV

DC MOTOR DRIVES: - Rectifier controlled circuits, Single phase fully controlled and half controlled rectifier fed separately excited d.c motor, 3Ø fully and half controlled fed separately excited d.c. multiquadrant operation of dc separately excited motor, Motor, performance and characteristics, Control techniques of d.c. Drives using chopper.

UNIT V

ELECTRICAL VEHICLES: - Concept of electrical vehicles, Hybrid electrical vehicle, plug-in electrical vehicle, battery electrical vehicle., choice of motors for EVs, storage technology, Grid integration of EVs, Sensors for EVs, Introduction of tesla car

Text Book(s)

1. G.K.Dubey," Fundamentals of Electric Drive". Narosa Publishing House. Bimbhra.P.S. "Power Electronics" Khanna Publisher.
2. R. Krishnan, "Electric Motor Drive" Pearson Education.
3. Singh M.D. & Khanchandani K.B. "Power Electronics" Tata McGraw Hill
4. Sen P.C. "Power Electronics", Tata McGraw Hill
5. Chau K.T. "Electrical Vehicle Machines and Drives Design, Analysis and Application", Willey, IEEE Press.

Reference Book(s)

1. M. Ramamurthy: An Introduction to Thyristors and their Applications, East West Press Pvt Ltd.
2. Mohammad H. Rashid: Power Electronics Circuits, Devices and Applications, Prentice Hall of India Pvt Ltd.
3. Seth Leitman Bob Brant: Build Your Own Electrical Vehicle, Tata McGraw Hill.

Online Resources:

1. https://freevideolectures.com/course/3114/advanced-electric-drives.
2. https://www.youtube.com/watch?v=Ub-csHc4VhA, Lecture on electrical drive.
3. https://www.coursera.org/.../electric-vehicles-and-storage-technologie. Video lecture.
4. **nptel, video lecture.**
5. **ebook,** Chau K.T. "Electrical Vehicle Machines and Drives Design, Analysis and Application", Willey, IEEE Press.
6. **Ebbok,** Seth Leitman Bob Brant: Build Your Own Electrical Vehicle, Tata McGraw Hill.

Activities Related to Skill Development and Employability

Student has developed projects, related to Industrial Drive and E-Vehicles. Students has participated in expert talks, Mock interview and power point presentation.

1. **Sample List of Projects.**

S.N.	Title of Projects
	Speed control of DC shunt Motor using IGBT Chopper

	Single phase induction motor speed control using power electronic based regulator
	Design variable frequency drive (VFD) for 3-phase induction motor
	Four quadrant controlled of DC Drive

2. **Expert Talk**

   - An Expert Talk on Energy Efficiency in Industries Dated July 27, 2018 by by Mr. Reetesh Kocheta, Faculty of Petroleum Conservation Research Association, Ministry of Petroleum & Natural Gas, Government of India was organized on July 27, 2018.
   - An expert talk on 'Gas Insulated Sub-Station' by Sh. Akhilesh Pandey, working as Manager (Projects-GIS) Siemens Ltd., India was organized on July 17, 2018 for BTech V semester EE students. Mr. Akhilesh Pandey talked about the requirement of gas insulated substation.

3. **Mock Interview and Presentation by department faculty.**

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
EE732	Testing and Commissioning of Electrical Equipment	3	1	0	0	4

Course Objectives:

1. Equip students with the comprehensive and crucial guidelines to understanding procedures involved in the testing and commissioning of power transformer, rotating electrical machines, transmission line and cable.
2. Provide the safety considerations for power transformer, rotating electrical machines, transmission line and cable.
3. Develop students' skills to design needed for electrical equipment.

Learning Outcomes:

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

1. Analyze electrical equipment's/systems failure and interpret observations
2. Analyze commissioning and testing procedure for power transformer, rotating machine, transmission line and cable as per standards
3. Identify and interpret safety practice to electrical testing and commissioning process for electrical installations
4. Identify relevant items for visual inspection on electrical equipment's
5. Conduct detailed study of Indian Standard on transformers IS: 2026-2011(part I)
6. Making maintenance schedule for different electrical equipment and machines?
7. Design project on performance analysis/ testing of electrical system

S. No	Evaluation Component	Marks
1	Attendance	Nil
2	Assignment	15
3	Class Participation	Nil
4	Quiz	15
5	Theory Exam-I	Nil
6	Theory Exam-II	20
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	Nil
15	Lab Evaluation-II	Nil
16	Course Portfolio	Nil
Total		100
Evaluation Scheme for Retest		
1	Theory Exam-III	40

Course Syllabi (Theory):

Unit–I: Need for Tests on Electrical Installation, Pre-commissioning Tests, Commissioning Test, checking current ratio, current transformer tests check list

UNIT II:Power Transformer Testing and Protection: type tests, routine tests, and special tests ,specified in is:2026 (part i),general precautions to be taken in conducting tests, need for standardization of specification, standard specifications of a power transformer, dielectric strength of transformer oil, dissolved gas analysis sweep frequency response analysis test, winding insulation test, bushing insulation test, magnetizing current test , magnetic balance test , vector group and polarity test, short circuit impedance test, measurement of winding resistance and winding insulation resistance test, bushing CT of transformer, clock notion, vector group test, polarization index number and drying out procedure, partial discharge test, measurement of earthing pit resistance of transformer, various operational tests and checks on transformer accessories, various checks the clearances for live parts and final commissioning checks of transformer, procedure for energization of transformer unit and site closing

T III:Testing and Commissioning of Rotating Electrical Machines: Degree of protection, cooling system, degree of cooling with IP- IC code (brief discussion) installation, Slip measurement, Noise level test. Drying out methods, Polarization Index, Troubleshooting and maintenance of induction motor

UNIT IV:Commissioning of Transmission Line and Cable: De-rating of cable capacity, HV

test, AC and DC Resistance check, Insulation resistance, Impedance measurement, Location finding technique for fault in underground cables (Murray loop test and Warley loop test), Testing of open circuit faults in cables.

Text Book(s)/ Reference Book(s)

1. Paul Gill, "Electrical power equipment maintenance and testing", CRC Press, 2008.
2. Philip Kiameh, "Electrical Equipment Handbook: Troubleshooting and Maintenance", McGrawHill, 2003.
3. Relevant Indian Standards (IS Code) and IEEE Standards for-Installation, maintenance and commissioning of electrical equipment's/machines.
4. Singh Tarlok, "Installation, commissioning and maintenance of Electrical equipment", S.K. Kataria and Sons, New Delhi
5. Rao, S., "Testing, commissioning, operation and maintenance of electrical equipment", Khanna Publishers, New Delhi

Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development

- **Content with direct bearing on Employability:** Installs and repairs electrical systems, diagnoses malfunctioning apparatus, such as transformers, motors, and lighting fixtures and preventive Maintenance with updated Check sheet.
- **Activities:** How to make preventative maintenance chart for substation

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
EEE610	Automation Projects	0	0	2	2

Learning outcomes:

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

1. Develop C programs on microcontroller for reading or writing to ports.
2. Interface sensors with microcontroller and read the sensor values in digital form.
3. Process the sensor values (for edge device) and transmit the results to server/users.
4. Design printed circuit board layout and implement the hardware with optimum components with minimum energy consumption and cost.

Syllabus:

Familiarization with MSP430 architecture and Code composer Studio, MSP430 Programming with C, Working with I/O ports, Interrupt handling, Signal Processing, Digital Communication with internal UART, SPI, IIC modules.

Assessment scheme:

Sr. No	Specifications	Marks
01	Attendance	Nil
02	Assignment	Nil
03	Class Participation	Nil
04	Quizzes	10
05	Theory Exam	Nil
06	MID Term Theory Exam	20
07	END Term Theory Exam	20
08	Report -1	Included with Project 1
11	Project -1	50
15	Lab Evaluation	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Activities Related to Skill Development and Employability

Students have developed the following projects using Microcontrollers under supervision of Industry Expert Mr Divanshu Dodeja.

1. Solar tracker using MSP430
2. IoT based Medicines dispenser
3. Pan-tilt camera for video surveillance
4. Hydroponics for smart crops
5. Belt tension monitoring using IoT

एक निश्चित दूरी तक चार दिशाओं में घूम कर मॉनिटर करने में सक्षम

इंजीनियरिंग स्टूडेंट्स ने बनाया आइओटी बेस्ड सर्विलांस कैमरा, एक्टिविटी करेगा ट्रैक

छोटे-छोटे हार्डवेयर से किया गया है तैयार

रेस्पबेरी पीआइ इंटरफेसेबल कैमरा

इससे व्यक्ति विशेष की गतिविधियों पर रखी जा सकेगी नजर

फिलहाल 8 मीटर तक है रेंज

कई स्थानों पर उपयोगी

31 मार्च तक ले सकते हैं ऑनलाइन कॉन्टेस्ट में हिस्सा

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Smart Hydroponic System

Shreyash Purwar , Anudit Bhatt, Devika Kataria

Abstract— Hydroponic farming is an emerging method for sustainable agriculture. With growing demands for variety of food, countries have to become self-sustaining in agricultural growth. Dependence on soil and weather for food production are reduced by using scientific methods like hydroponics. In this technology, plants are grown in water by providing necessary nutrients to the roots through nutrient solutions. This paper discusses the state of art in this technology and their work on

Study of state of art reveals that few research groups are working on developing solutions for high yield of exotic crops so as to produce these locally and reduce the requirement for transportation and imports.
Scientist at Defence Institute of Bioenergy Research at Haldwani have developed hydroponic system for cultivating various vegetables like cucumber, tomatoes using rain water as well as river water added with nutrients [1]. They have studied the plant growth in these systems installed at various research centres at different altitudes and environmental conditions. Artificial

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CHE702	Process Utilities and Industrial Safety	3	1	0	4

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)				
Mid Term Test - I	Mid Term Test - II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks	Mid Term Test - I	End Term Test	Class Participation	Additional Continuous Evaluation*	Total Marks
20	20	50	10	100	-	-	-	-	-

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

Syllabus (Theory):

Water: Water resources, Storage and characterization, Conditioning.

Steam: Boilers, Steam Handling and distribution, Steam nozzles, Condensate utilization, Steam traps, Flash tank analysis, Safety valves, Pressure reduction valves, Desuperheaters.

Air: Air compressors, Vacuum pumps, Air receivers, Piping systems, Different types of ejectors, Air dryers.

Hazards and Safety: Classifications and assessment of various types of hazards, Risk assessment methods, General principles of industrial safety, Hazards due to fire, explosions, Toxicity and radiations, Industrial hygiene, Maximum allowable concentration and threshold limit value, Protective and preventive measures in hazards control, Introduction to industrial safety regulations.

Case studies of hazardous incidents in industries using HAZOP.

Text Books

1. Vasandhani, V. P., and Kumar, D. S, Heat Engineering, Metropolitan Book Co. Pvt. Ltd. (2009).
2. Crowl, D.A. and Louvar, J.F., Chemical Process Safety-Fundamentals with Applications, Prentice Hall, (2002).

Reference Books

1. Peavy, H. S., and Rowe, D. R, Environmental Engineering, McGraw Hill (1985).
2. Banerjee, S., Industrial Hazards and Plant Safety, Taylor & Francis 2003).
3. Lees, F.P., Prevention in Process Industries. Butterworth's (1996).
4. Sanders, R. E. Chemical Process Safety-Learning from Case Histories, Oxford (2005).
5. Perry, R.H., and Green, D. W, Chemical Engineer's Handbook, McGraw Hill (1997).

Activity for Skill Development and Employability

Industry Visit

JK Paper Limited, Paper Manufacturing Plant, Songadh Tapi Gujarat, 4 April 2017.

CASE STUDY-1

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-2

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.

CSE 601 [Cyber-Security- 3 Credits]

Course Title and Code Security Intelligence**:** CS1308	
Hours per Week	**L-T-P: 2-0-2**
Credits	3
Students who can take	Open Elective Third Year

Syllabus-Theory/Lecture Class

UNIT 1: Introduction to Cyber Security: - Need for Cyber Security, Vulnerability – Threat – Control Paradigm, Cyber threats of various kinds, Introduction to Computer Networks and its terminology, IP Address/Sub-Netting, Important Principals of Cyber Security, Different kinds of cyber threats. Business Needs -Threats and Countermeasures – Attackers - Policies and Standards - Legal, Ethical and Professional Issues. AAA-Standard. Introduction to Various Organizations and Standards related to Computer Networks and Security. OSI Layer Model and the TCP/IP model. Introduction to Penetration Testing – How to be a White Hat?

UNIT 2: Introduction to Cryptography: Some History of Cryptography, Classical Cryptography Schemes and Algorithms (Encryption and Decryption), Symmetric or Public Key Cryptography and its common algorithms – DES, AES etc., Asymmetric or Private Key Cryptography and its most common algorithm – RSA. Introduction to Steganography. Hashing Techniques – MAC, HMAC etc. Digital Signature Algorithms. Certifying Authorities (CAs).Introduction to End-to-End Encryption. Introduction to Cryptanalysis.

UNIT 3: Introduction to Network Security: Securing Network Transmission - Analysing Security Requirements for Network Traffic -Defining Network Perimeters -Data Transmission Protection Protocols. Common attacks on Computer Networks & networks in general – Introduction to Network Scanning/Monitoring software like Wireshark, Nmap etc. Intrusion Detection - Detection and Prevention - Honeypots, Honeynets. Scanning and Analysis Tools -Biometric Access Controls – Forensics -Incident Response Procedures

UNIT 4: Introduction to Application Security: Web Browser Security - Email Security – Firewall – VPN - Transport Layer Security (TLS) – Handshake Protocol – Alert Message Protocol – Change Cipher Spec Protocol – Secure Electronic Transfer Protocol (SET) – IPSec – HTTPS – SSL. Disaster Recovery and Fault Tolerance. Planning for the Worst -Creating a Backup Strategy -Designing for Fault Tolerance – Antivirus Software – Antivirus Features – Typical signature - Byte-Streams – Checksums - Custom Checksums - Cryptographic Hashes Advanced Signatures - Fuzzy Hashing

UNIT 5: Cyber Crimes and Cyber Laws: Various types of Cyber Crimes - Cyber privacy – Crimes against property – Crimes against the Person- Crimes against the State- Crimes against the computer network- Financial Crimes; Information Technology Act, 2000 - Outline of the Act- Aims and Objectives of the Act- Applicability of the Act; Types of Jurisdiction – Jurisdiction for Internet cases -Territorial Jurisdiction and Cyber Space – Minimum Contacts theory and Purposeful Availment theory – French Yahoo case, Dow Jones case- IT Act on Jurisdiction. Cyber Crime Cells – Law Enforcement.

CSE 601(Cyber-Security)
Lab. Syllabus.

Lab. /Experiment#0: Some basic MS-DOS network command run in Administrator Mode on System Command Prompt.

Lab./Experiment#1 and # 2: Creating some viruses using C- Programing Language, understanding their coding and then deploying them on an Isolated machine – to show how a Computer Virus Functions and how it infects a computer system and to know the differentiation between various types of computer malwares.

Lab./Experiment#3: Installing Kali Linux on your own system/laptop using Virtual Machine-like Virtual Box or VMWare. And getting familiar with the Kali Linux Distribution and its various tools and learning some of the basic Linux terminal commands and basic Linux networking commands.

Lab./Experiment#4: Conceptualizing and Implementing the following algorithms using a Programming Language of your own choice (C/C++/or Java) - Classical Ciphers:
i.) Caesar Cipher (Mono-Alphabetic Substitution Cipher) [To Implement – Both Encryption and Decryption Algorithms, Do Cryptanalysis of the Cipher If Possible]
ii.) Rail Fence Cipher (Transposition Cipher) [To Implement – Both Encryption and Decryption Algorithm, Do Cryptanalysis of the Cipher If Possible]

Lab./Experiment#5: Conceptualizing and Implementing the following algorithms using a programming language of your own choice (C/C++/or Java) – Common Symmetric Ciphers:
1.) DES (Data-Encryption Standard) [To Implement – Both Encryption and Decryption Algorithm]
2.) AES (Advanced-Encryption Standard) [To Implement – Both Encryption and Decryption Algorithm]

Lab./Experiment#6: Conceptualizing and Implementing the following algorithms using a programming language of your own choice (C/C++/or Java) – Common Asymmetric Ciphers and Hashing Algorithms:
i) RSA Algorithm – [To Implement both Encryption and Decryption Algorithms.]
ii) HMAC Algorithm – [To implement both Encryption and Decryption Algorithms.

Lab./Experiment#7: Introduction to Wireshark (Kali Linux Tool – Can be downloaded and installed on any MS-Windows OS Version also from url: https://www.wireshark.org/#download) It is an open source tool for network analysis

and monitoring of the network packets and much more to prevent network attacks on any scalable computer network.

1.) Introduction to Wireshark Lab. – Getting Started with Wireshark- Lab. Details Explained in a Separate Lab. Document – to be given to Students before the scheduled lab. period.

Lab./Experiment#8: Using Wireshark do network traffic capture analysis in detail. This experiment is the extension of the Lab. Experiment#7 to give students more hands-on wireshark experience and answer questions related to the lab. More details about the lab. will be shared with the students before the scheduled lab. period.

Lab./Experiment#9: Introduction to Nmap (an open-source tool- Also present as a tool in Kali – Linux) – Can also be installed in any MS-Windows OS from its url- https://nmap.org/

1.) The lab. is about introduction to Nmap on Kali and how it can be used as a Network Penetration testing tool. The students will run several scans on Nmap and analysis of the scan results will be done in this lab.

Lab./Experiment#10: Introduction to Intrusion detection (IDS) tools – here we will see SNORT- and doing some simple exercises with it. SNORT url for download: https://www.snort.org/ - available for KALI and other Linux Variants and also for Windows OS.

Lab./Experiment#11: Introduction to Web Application Security Scanner Tools – In First Lab. We will See VEGA Web Application Vulnerability Scanner Tool and explore it in a comprehensive manner. VEGA Can be downloaded from url: https://subgraph.com/vega/

Lab./Experiment#12: Introduction to Web Application Security Scanner Tools – In this Lab. we will see the OWASP – ZAP [Web – Application Penetration Testing Tool – From OWASP] and explore it in a comprehensive manner. OWASP-ZAP can be downloaded from the URL: https://www.owasp.org/index.php/OWASP_Zed_Attack_Proxy_Project

Some Reference Books:

1.) Vacca, John R. *Computer and Information Security Handbook*. 2nd ed. San Francisco, CA: Morgan Kaufmann Publishers In, 2013. (ISBN No.: 978-0-12-394397-2)

2.) Ciampa, Mark. *Security+ Guide to Network Security Fundamentals*. 4th ed. Boston, MA: Course Technology, Cengage Learning, 2011. (ISBN No. : 978-1-111-64012-5)

3.) William Stallings, "Cryptography & Network Security", 6th Edition, Pearson Education.

4.) Kamath Nandan, "Law Relating to Computers Internet & E-commerce (A Guide to Cyber laws & the Information Technology Act, Rules, Regulations and Notifications along with Latest Case Laws)", 2012, Universal Law Publishing, 2016

5.) S.K. Verma and Raman Mittal, "Legal Dimensions of Cyber Space", Universal Law Publishing, 2004

6.) Sachin Rastogi, “Insights into E - Contracts in India”, LexisNexis, Ist Edition, 2013
7.) Karnika Seth, “Computers, Internet and New Technology Laws”, LexisNexis, 2013
8.) Rafay Baloch, “Ethical Hacking and Penetration Testing Guide”, CRC Press, 2015. ISBN: 78-1- 4822-3161-8.

Activities Related to Skill Development and Employability

Each Student has Submitted Assignment, given quizzes, performed simulation of Wireshark Packet Analyzer and Projects related to Cyber Security.

Online Quiz Through TCS ION LX platform-

Cyber Security Batch 1
Course Batch

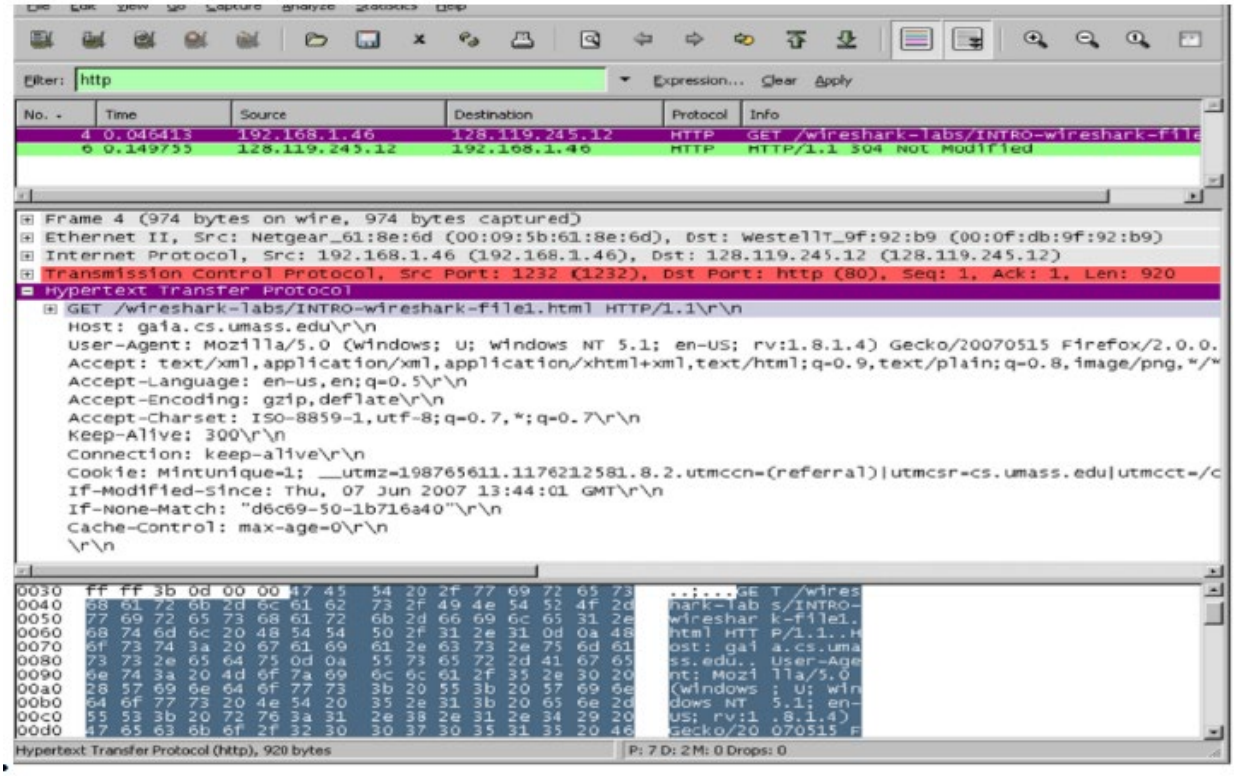
Participant stats

Info! Scores of monitoring dashboard and participant stats are in sync

Assessment Name : Quiz_1 | Total Marks : 15.0 | Passing Marks : 7.0

Participants	Login-ID	Start Time	End Time	Status	Score	Action
Abhishek Kumar	abhishekkumar17@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 10:02AM	Completed	7.0	View Detail
Abhishek Singh	abhisheksingh16@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 10:00AM	Completed	4.0	View Detail
Ajit Rajawat	ajitrajawat@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 09:52AM	Completed	8.0	View Detail
Anisha Goyal	anishagoyal@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 10:00AM	Completed	8.0	View Detail
Anubhav Chhillar	anubhavchhillar@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 09:55AM	Completed	7.0	View Detail
Archit Jain	architjain@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 10:00AM	Completed	9.0	View Detail
DEEP CONTRACTOR	deepcontractor@jklu.edu.in	04 Apr 2019 09:54AM	04 Apr 2019 09:58AM	Completed	11.0	View Detail
Garima Pandey	garimapandey@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 09:53AM	Completed	9.0	View Detail
HARSHAL JAJU	harshaljaju@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 09:58AM	Completed	9.0	View Detail
Harshita Gupta	harshitagupta@jklu.edu.in	04 Apr 2019 09:40AM	04 Apr 2019 10:00AM	Completed	5.0	View Detail

Wireshark Simulations-



Project Groups-

CSE 601 Cyber Security [B.Tech CSE Open Elective]
[Dec.2018 – April/May-2019 Semester]

GroupWise Project Details

S.No#	Student Name and Semester	Student Roll. No#	Group No#	Project Title
1.	Ajit singh Rajawat (VI)	2016BTechCSE001	1	Implementing a Secure Client Server Chatting Application with GUI [For Security can use SSH or any other hashing algorithm.] [6th Sem. Students only.]
2.	Vijyal Jain (VI)	2016BTechCSE211	1	
3.	Harshita Gupta (VI)	2016BTechECE003	1	
4.	Kuldeep Sharma (VI)	2016BTechCSE009	2	Implementing Steganography with the use of GUI (students need to develop a standalone desktop application) [6th Sem. Students Only]
5.	Shishir Singh (VI)	2016BTechCSE017	2	
6.	Garima Pandey (VI)	2016BTechCSE 007	2	
7.	Archit Jain (VI)	2016BTechCSE004	3	Developing & implementing a Desktop application with uses a fingerprint data bases and implements a Biometric Security Application. [6th Semester Students Only]
8.	Lucky Natani Shyam (VI)	2016BTechCSE 013	3	
9.	Sandeep Kumawat (VI)	2016BTech CSE016	3	
10.	Abhishek Kumar Singh (VI)	2016B.TechCSE027	4	Implementing Buffer Overflow Attack on a Guest OS like Kali Linux. Ubuntu etc. running over a Virtual Machine [6th Semester Students only]
11.	Anisha Goyal (VI)		4	
12.	Naman Divedi (VI)		4	
13.	Abhinav chillar (IV)	2017BTechCSE204	5	Developing and Implementing a Hybrid AES-DES algorithm. (GUI should be used for User Interface-if possible)
14.	Parikshit Mistry (IV)	2017BTechCSE223	5	
15.	Pranjal Bhada (IV)	2017BTechCIE018	5	
16.	Kashi Arora (IV)	2017BTECHCSE007	6	Develop a Small Dynamic Web-Application and make it secure form SQL injection Attacks and XSS (Cross Site Scripting Attack) [VEGA can be used as a WEB-APP VULNUREBLITY SCANNER]
17.	Harshal Jaju (IV)	2017BTECHCSE003	6	
18.	—	—	6	
19.	Meghna Shrivastav (IV)	2017BTECHCSE214	7	Develop a Small Dynamic Web-Application and make it secure form SQL injection Attacks and CSRF (Cross Site Request Forgery) [VEGA can be used as a WEB-APP VULNUREBLITY SCANNER]
20.	Shruti Sharma (IV)	2017BTECHCSE218	7	
21.	Umang Mohan (IV)	2017BTECHCSE222	7	
22.	Rohini Mishra (IV)	2017BTechCSE217	8	Developing a Web-Based Application that uses and allows for three factor authentication. [E.g. Password, OTP, Email etc.]
23.	Mani Agarwal (IV)	2017 BTechCSE016	8	
24.	Prayjival Goel (IV)	2016 BTechCSE210	8	

P.T.O.

Course Title Predictive Analytics Modeler CSEBD601 (IBM-BDAVI SEM) (In Collaboration with IBM)

Course Title and Code Security Intelligence**:** CSEBD601	
Hours per Week	**L-T-P: 3-0-2**
Credits	**4**
Students who can take	B.Tech Sem VII(2016-2020) (CSE IBM-BDA)

Course Description- This course will introduce to some of the most widely used predictive modeling techniques and their core principles. This course will form a solid foundation of predictive analytics, which refers to tools and techniques for building statistical or machine-learning models to make predictions based on data using IBM SPSS Modeler. This course will lead to exploratory data analysis to gain insights and prepare data for predictive modeling, an essential skill valued in the business.

Learning outcomes of course

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

1. Understand the importance of analytics and how it's 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. Improve efficiency, sample records, and work with sequence data
5. Explain data transformations, and functions
6. Understand modeling, relationships, derive and reclassify fields
7. Integrate and collect data
8. Understand the principles of data mining
9. Use the user interface of modeler to create basic program streams
10. Read a statistics data file into modeler and define data characteristics
11. Review and explore data to look at data distributions and to identify data problems, including missing values
12. Use the automated data prep node to further prepare data for modeling
13. User a partition node to create training and testing data subsets

Teaching Scheme and Credits

Hrs. per Week		Credits	Duration in Weeks
In Class	Out Class		
05	05	04	12

Evaluation Scheme

Prerequisites		**Business Intelligence**
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	Nil
4	Quiz	**05**
5	Theory Exam-I	**10**
6	Theory Exam-II	Nil
7	Theory Exam-III	**25**
8	Report-I (Case Study)	**10**
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	**25**
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I	Nil
15	Lab Evaluation-II	**15**
16	Course Portfolio	Nil
	Total (100)	**100**

Syllabus-

Business Analytics Overview, Trends, Case Studies, Understanding Business Intelligence and Analytics, Introduction to Data Mining CRISP-DM, Nodes and streams, Initial data mining, storage and field measurement, Understanding the data (valid and invalid values),Integrating data (methods, options, merging, and sampling) Deriving and reclassifying fields (CLEM), Looking for relationships (matrix, distribution, means, histogram, statistics and plot), Functions (conversion, string, and statistical), Data transformation, Statistical, graphical and sample nodes, Automated data mining and modeling, Predictive models and customer segmentation.

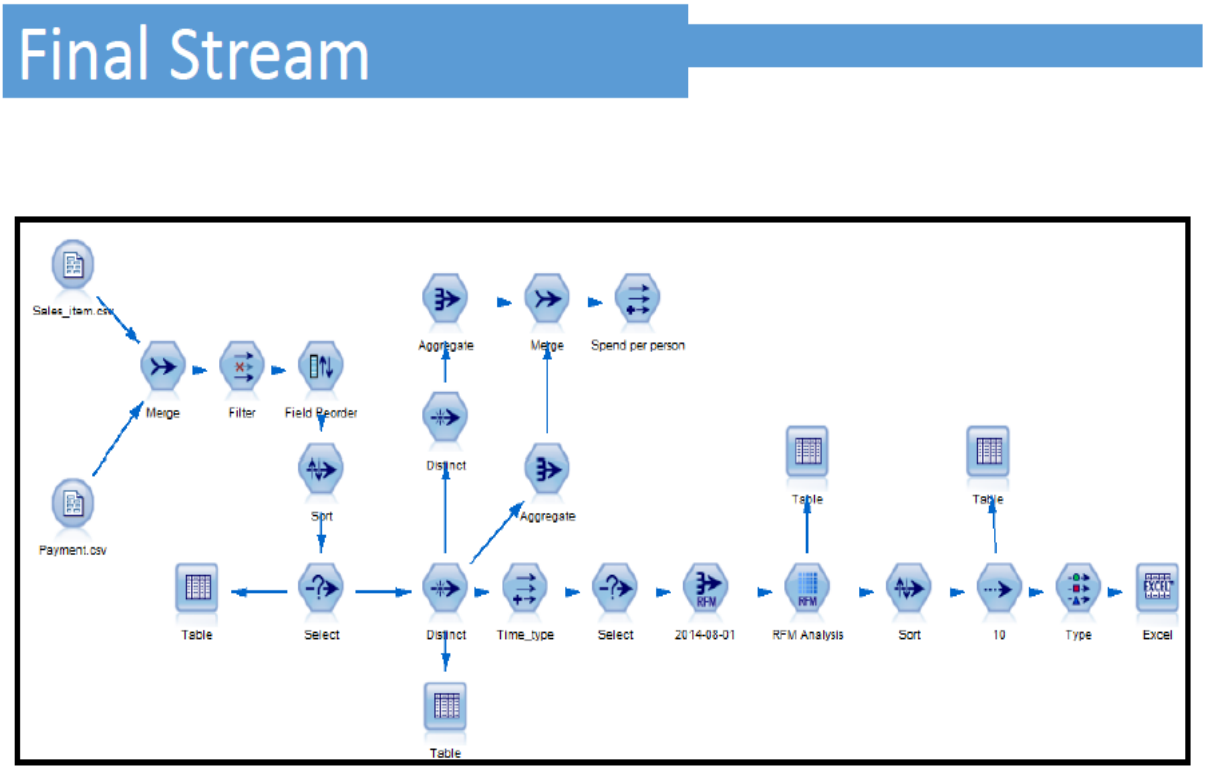
Reference Books-

1. Keith McCormick and Dean Abbott. IBM SPSS Modeler Cookbook Paperback Packt Publishing (2013)
2. Axel Buecker, Theresa Morelli and Colin Shearer. IBM SPSS predictive analytics: Optimizing decisions at the point of impact (November 2010)

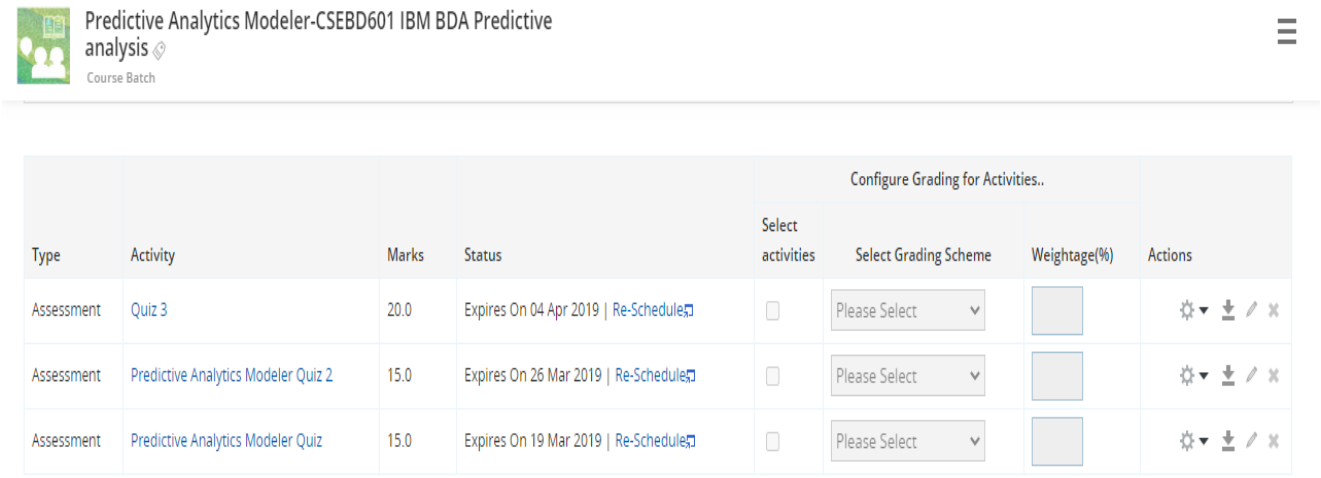
Activities Related to Skill Development and Employability

Each Student has Submitted Assignment, given quizzes, performed simulation of IBM SPSS and Projects related to Predictive Analytics, also some of the students cleared IBM Mastery certificates.

SPSS Modeler Simulation-



Online Assignment-



Online Quizzes-

Predictive Analytics Modeler-CSEBD601 IBM BDA Predictive analysis

Course Batch

Participant stats

Info! Scores of monitoring dashboard and participant stats are in sync

Assessment Name : Quiz 3 | **Total Marks :** 20.0 |**Passing Marks :** 10.0

Participants	Login-ID	Start Time	End Time	Status	Score	Action
Som Durgesh Gupta	somdurgeshgupta@jklu.edu.in	04 Apr 2019 12:15PM	04 Apr 2019 12:39PM	Completed	9.0	View Detail
Seerat Sobti	seeratsobti@jklu.edu.in	04 Apr 2019 12:15PM	04 Apr 2019 12:40PM	Completed	11.0	View Detail
Shubham Sharma	shubhamsharma16@jklu.edu.in	04 Apr 2019 12:16PM	04 Apr 2019 12:32PM	Completed	9.0	View Detail
Madhavi Chauhan	madhavichauhan@jklu.edu.in	04 Apr 2019 12:16PM	04 Apr 2019 12:41PM	Completed	10.0	View Detail
Astha Rai	astharai@jklu.edu.in	04 Apr 2019 12:16PM	04 Apr 2019 12:41PM	Completed	10.0	View Detail
Mayank Bhimrajka	mayankbhimrajka@jklu.edu.in	04 Apr 2019 12:16PM	04 Apr 2019 12:36PM	Completed	15.0	View Detail
Dishan Shukla	dishanshukla@jklu.edu.in	04 Apr 2019 12:16PM	04 Apr 2019 12:39PM	Completed	8.0	View Detail
Asit Sharma	asitsharma@jklu.edu.in	04 Apr 2019 12:17PM	04 Apr 2019 12:42PM	Completed	10.0	View Detail
Raveena Kodwani	raveenakodwani@jklu.edu.in	04 Apr 2019 12:17PM	04 Apr 2019 12:51PM	Completed	9.0	View Detail
Tarun Dhawan	tarundhawan@jklu.edu.in	04 Apr 2019 12:18PM	04 Apr 2019 12:40PM	Completed	14.0	View Detail

IBM Mastery Certificate-

Skills Academy

IBM

This document certifies that

Mayank Bhimrajka

Successfully passed the IBM Academic Certificate exam for

Predictive Analytics Modeler 2018 Mastery Exam

This achievement also earns you a Mastery Award Badge which you can accept from Acclaim

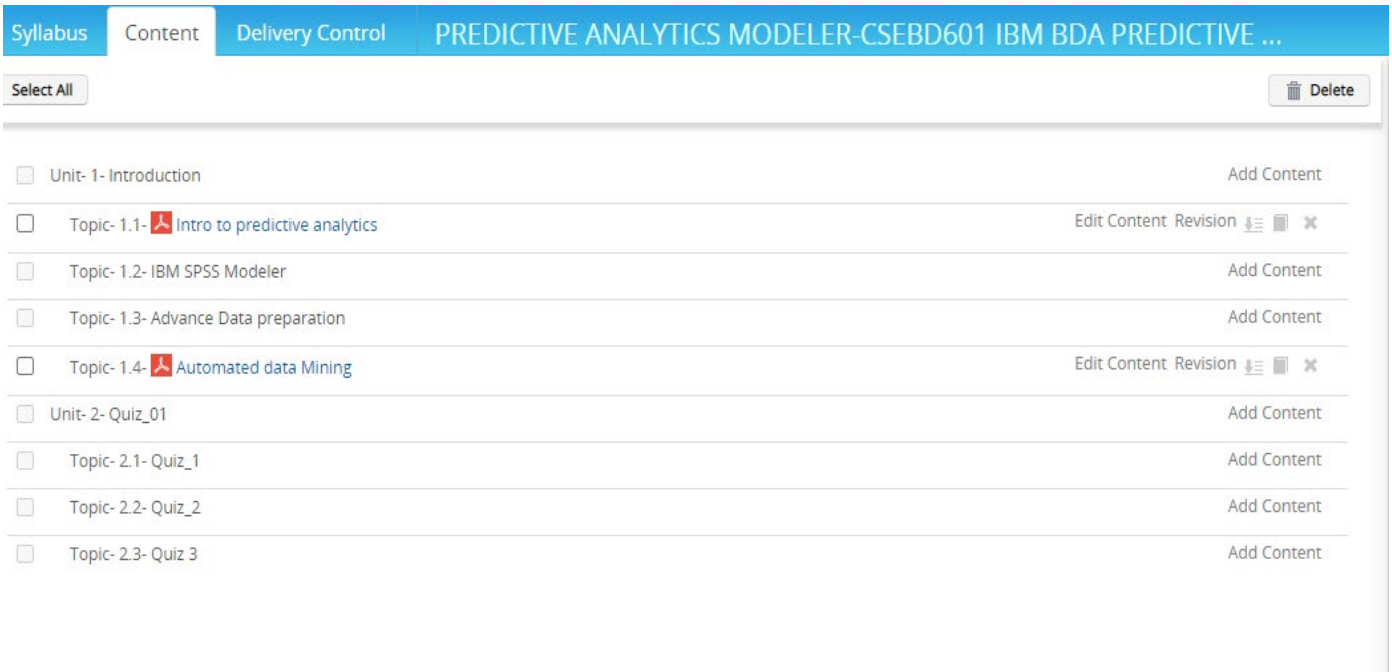
16 May 2019

UNIQUE ID: 3203-1557-9834-0632

Randy Walker
General Manager
IBM Asia Pacific

Norishige Morimoto
Chief Technical Officer
Vice President
IBM Asia Pacific

Online Contents on TCS ION LX Platform-



Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTHSE 101	Environmental Pollution Control	3	0	4	5

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test – II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **
20	20	50	10	100	20	50	30	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

AIR POLLUTION Classification and properties of air pollutants – Pollution sources – Effects of air pollutants on human beings, Animals, Plants and Materials - automobile pollution hazards of air pollution-concept of clean coal combustion technology - ultra violet radiation, infrared radiation, radiation from sun-hazards due to depletion of ozone - deforestation-ozone holes-automobile exhausts-chemical factory stack emissions- Chloro Fluoro Carbon(CFC).

WATER POLLUTION Classification of water pollutants-health hazards-sampling and analysis of water-water treatment -advanced wastewater treatment - effluent quality standards and laws- chemical industries, tannery, textile effluents-common treatment.

Hazardous Waste Management Hazardous waste management in India-waste identification, characterization and classification-technological options for collection, treatment and disposal of hazardous waste-selection charts for the treatment of different hazardous wastes-methods of collection and disposal of solid wastes-health hazards-toxic and radioactive wastes incineration and vitrification - hazards due to bio-process-dilution-standards and restrictions – recycling and reuse.

ENVIRONMENTAL MEASUREMENT AND CONTROL Basic Principles of pollution control devices, Sampling and analysis – dust monitor – gas analyzer, particle size analyzer – pH meter – gas chromatograph – atomic absorption spectrometer. Gravitational settling chambers-cyclone separators-scrubbers-electrostatic precipitator - bag filter – maintenance - control of gaseous emission by adsorption, absorption and combustion methods- Pollution Control Board-laws.

PERSONAL EXPOSURE TO ENVIRONMENTAL CONTAMINANTS: Methods for assessing the personal exposure to environmental contaminants, Exposure Assessment in Occupational and Environmental Epidemiology.

NOISE POLLUTION AND HEALTH MEASUREMENT, Noise measurement techniques and analysis: worksite, ambient and road transport. Noise predication and modelling, noise impact assessment: scultz fraction impact method; value function curves. Noise abatement measures sound absorption, acoustic barrier, vibration isolation. Vibration damping, muffling, personal protector and green belt principles and design considerations. Noise pollution and management in mines, washeries, Power plants, fertilizer plants, cement plants, etc. Human vibration-whole body vibration problems in opencast mines, health effects and control measures.

TEXT BOOKS & REFERENCES

1. Rao, CS, "Environmental pollution engineering:, Wiley Eastern Limited, NewDelhi, 1992.
2. S.P.Mahajan, "Pollution control in process industries", Tata McGraw Hill Publishing Company, New Delhi, 1993.
3. Varma and Braner, "Air pollution equipment", Springer Publishers, Second Edition.

Activities Related to Skill Development and Employability

QUIZZES: Two Quizzes were conducted for the students. Which was helpful in developing their skills.

QUIZ-1

Q1. What are the various methods used for pollution control in thermal power plants?
Q2. What is the difference between Normal and super critical thermal power plants?
Q3. What are the alternatives used in place of coal?
Q4. What is the importance of use of glass or plastic bottles for water sample?
Q5. What is oxidation pond?

QUIZ-2

Q1. What are the effect of hazardous waste on human health?
Q2. What are the different type of treatments used for hazardous waste?
Q3. What is Pyrolysis?
Q4. What is the procedure and instruments for measuring SO_2 and CO?
Q5. What is the procedure and instruments for measuring NO_X?
Q6. What do you understand by Activated sludge process?

ASSIGNMENTS: Students submitted assignments from each unit for better understanding of the subject and skill development.

ASSIGNMENT-1

Q1. Define environment and pollution in detail.
Q2. What are the different sources of air pollution?
Q3. Classify the pollutants.
Q4. What are the harmful effect of air pollutants on human beings, animals and plants?
Q5. What is the greenhouse effect?
Q6. Name the various methods to control the air pollution.
Q7. Write a short note on various type of scrubbers.

ASSIGNMENT-2

Q1. Define the effect of various sources on the greenhouse effect. (Basically Methane, Carbon di Oxide, Carbon Mono Oxide and Other sources)
Q2. What is the importance of Ozone gas in the environment?
Q3. What are the various layers of atmosphere? Draw a neat sketch for it.
Q4. Is there any chance for cooling of the earth? Define and describe your answer.
Q5. What is the importance of coal in global energy requirement? What are the various pollutants generated when coal is burned?
Q6. What do you understand by the clean coal technology?

ASSIGNMENT-3

Q1. What are the different pollutants for water sources? What are the major pollutants for surface water and ground water?
Q2. What are the effects of water pollutants on human being and vegetation?
Q3. How the pollutants are concentrated at a particular location?
Q4. Write a short note on thermal pollution of water.
Q5. What are the different type of water sampling?

ASSIGNMENT-4

Q1. Draw a neat sketch of Water Treatment plant.
Q2. What is sedimentation and flocculation?
Q3. What are the various water standard for municipal supply?
Q4. What is the difference between slow sand filter and rapid sand filter?
Q5. Draw a neat sketch of Waste Water Treatment plant.
Q6. What is the difference between Water treatment and waste water treatment processes?

ASSIGNMENT-5

Q1. What is the difference between hazardous waste and normal waste?
Q2. What is the classification of H W on the basis of Schedule I, II and III?
Q3. What is the role of SPCB and CPCB in H W management?
Q4. List the items banned for import and export in schedule IV in India?
Q5. Write a short note on the case in which India did not allow the entry of a old ship in Alang Port and why?
Q6. What are the characteristics of H W?
Q7. What are the type of hazardous waste?

ASSIGNMENT-6

Q1.What is the noise pollution?
Q2. What are the different sources of noise pollution?
Q3. What are the classification of Noise Pollution?
Q4. What are the various problems due to noise pollution?
Q5. What are the various measures to control the noise pollution?
Q6. What are the various air sampling techniques?
Q7. What are the various criteria to select the site for air sampling? What is time for sampling?
Q8. What are the various methods for data handling?

PROJECT REPORT: Students submit a Project report on PM_{10} concentration in J K U campus.

Project Report on
Pm_{10} concentration in JKLU campus

Prepared By
Mr. Jay B. Patel [2018MTHSE001]
Mr. Tejaskumar N. Patel [2018MTHSE002]
Mr. Saransh Gupta [2018MTHSE003]

Submitted To
Prof. Dr. Kedar Sharma
Health, Safety and Environmental Engineering
JKLU, Jaipur.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTHSE 102	Occupational Health and Hygiene	3	0	0	3

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test – II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **
20	20	50	10	100	20	50	30	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

PHYSICAL HAZARDS: Noise, compensation aspects, noise exposure regulation, properties of sound, occupational damage, risk factors, sound measuring instruments, octave band analyzer, noise networks, noise surveys, noise control program, industrial audiometry, hearing conservation programs vibration types, effects, instruments, surveying procedure, permissible exposure limit. Ionizing radiation, types, effects, monitoring instruments, control programs, OSHA standard non-ionizing radiations, effects, types, radar hazards, microwaves and radio-waves, lasers, TLV- cold environments, hypothermia, wind chill index, control measures- hot environments, thermal comfort, heat stress indices, acclimatization, estimation and control.

CHEMICAL HAZARDS : Recognition of chemical hazards-dust, fumes, mist, vapour, fog, gases, types, concentration, Exposure vs. dose, TLV - Methods of Evaluation, process or operation description, Field Survey, Sampling methodology, Industrial Hygiene calculations, Comparison with OSHAS Standard. Air Sampling instruments, Types, Measurement Procedures, Instruments Procedures, Gas and Vapour monitors, dust sample collection devices, personal sampling Methods of Control - Engineering Control, Design maintenance considerations, design specifications - General Control Methods - training and education.

BIOLOGICAL AND ERGONOMICAL HAZARDS Classification of Bio hazardous agents –bacterial agents, rickettsial and chlamydial agents, viral agents, fungal, parasitic agents, infectious diseases - Biohazard control program, employee health program-laboratory safety program-animal care and handling-biological safety cabinets - building design. Work Related Musculoskeletal Disorders –carpal tunnel syndrome CTS- Tendon pain disorders of the neck-back injuries.

OCCUPATIONAL HEALTH AND TOXICOLOGY Concept and spectrum of health - functional units and activities of occupational health services, pre-employment and post-employment medical examinations - occupational related diseases, levels of prevention of diseases, notifiable occupational diseases such as silicosis, asbestosis, pneumoconiosis, siderosis, anthracosis, aluminosis and anthrax, lead-nickel, chromium and manganese toxicity, gas poisoning (such as CO, ammonia, coal and dust etc) their effects and prevention – cardio pulmonary resuscitation, audiometric tests, eye tests, vital function tests. Industrial toxicology, local, systemic and chronic effects, temporary and cumulative effects, carcinogens entry into human systems.

OCCUPATIONAL PHYSIOLOGY Man as a system component – allocation of functions – efficiency – occupational work capacity – aerobic and anaerobic work – evaluation of physiological requirements of jobs – parameters of measurements – categorization of job

heaviness – work organization – stress – strain – fatigue – rest pauses – shift work – personal hygiene.

Text books &References

1. Handbook of Occupational Health and Safety, NSC Chicago, 1982
2. Encyclopedia of Occupational Health and Safety, Vol. I & II, International LabourOrganisation, Geneva, 1985.
3. McCornick, E.J. and Sanders, M.S., Human Factors in Engineering and Design, Tata McGraw-Hill, 1982.

ACTIVITY FOR SKILL DEVELOPMENT AND EMPLOYABILITY

Quizzes

QUIZ-1: TOXICOLOGY

1. Which of these groups is usually designated as one of the most sensitive sub-populations for exposures to toxic substances?
   a. Adult women; b. Infants; c. Adult men; d. Adolescents
2. You have worked at a chemical facility for 10 years. The facility does not require protective equipment, and you have developed a number of serious health effects in the last 7 years. You are possibly experiencing what type of exposure?
   a. Chronic
   b. Acute
3. You are worried about contamination of vegetables grown in contaminated soils. What type of toxicologist would you contact?
   a. Descriptive
   b. Environmental
   c. Regulatory
   d. Food
4. You are concerned about the risks associated with growing vegetables in soil with naturally high lead and arsenic concentrations. You are speaking of what type of substance?
   a. Toxin
   b. Toxicant
5. The larger the amount of exposure and the greater the dose, the greater the observed response, or effect.
   a. True
   b. False
6. What type of toxicologist takes samples of blood, urine or hair for testing?
   a. Descriptive
   b. Analytical
   c. Mechanistic
   d. Forensic
7. Toxic agents can be classified in terms of their physical state, their effects, and their source.
   a. True
   b. False
8. Which agency deals with the health effects that may occur from environmental exposure to toxic chemicals?
   a. The Environmental Protection Agency
   b. The Centers for Disease Control and Prevention
   c. The Agency for Toxic Substances and Disease Registry
   d. The Nuclear Regulatory Commission
9. Which database has information on emergency handling procedures, environmental data, regulatory status and human exposure?
   a. TOXNET
   b. HazDat
   c. IRIS
   d. MEDTREC
10. HazDat contains information on hazardous substances found at NPL and non-NPL waste sites, and on emergency events.
    a. True
    b. False
11. The no observed adverse effect level (NOAEL) is also known as the no effect level (NEL).
    a. True
    b. False
12. The term toxicant is used when talking about toxic substances that are produced by or are a by-product of human-made activities.
    a. True
    b. False

QUIZ-2 RISK ASSESSMENT

1. Which of the following is NOT a step in the Risk Assessment Process?
    a. Hazard identification
    b. Hazard evaluation or dose-response assessment
    c. Exposure dose
    d. Risk characterization
2. Epidemiology is the study of causative factors associated with the occurrence and number of cases of disease and illness in a specific population.
    a. True
    b. False
3. Exposure tells the toxicologist what dose causes a "response" usually illness or death, in the test animal.
    a. True
    b. False
4. What activities should be conducted during the hazard identification step of the risk assessment?
    a. Identifying the substance name
    b. Describing the physical/chemical properties of the toxic substances
    c. Identifying the sources of toxicity information
    d. Identifying the exposure pathway
    e. All of the above
5. Prospective epidemiological studies gather information from the past.
    a. True
    b. False
6. The exposure assessment step in the risk assessment process identifies all EXCEPT which of the following?
    a. Frequency of exposure
    b. Type of chemical exposure
    c. Length of time of exposure
    d. Route of exposure
    e. Calculation of the amount of exposure
7. Susceptible populations that may be more at risk for illness than others includes the following EXCEPT:
    a. Young children
    b. Older adults
    c. Teenagers
    d. Women of Childbearing Age

Assignments

ASSIGNMENTS:

1. What are some effects from arsenic exposure? Death, fever, anorexia, and liver enlargement are some of the effects listed in the module.
2. What form of mercury is the most toxic? Methyl mercury is the most toxic form of mercury.
3. List some solvents you may use in the home. Participant answers
4. List the different classes of pesticides. Insecticides, Herbicides, Fungicides, Fumigants, Rodenticides
5. How does carbon monoxide affect the body? Decreases amount of oxygen available to the body. Also causes headache, shortness of breath, nausea, irritability, increased respiration, chest pain, impaired judgment, and fainting.
6. What are some sources of ozone? Lightning, high voltage electrical equipment, and air- and water-purifying devices are some sources of ozone.
7. List the different outdoor air pollutants discussed in the Module. Carbon monoxide, Sulfur oxides, Ozone, Nitrogen oxides, Particulates.
8. Explain the difference between grab sampling and integrated sampling?
9. Explain the reasons why the magnitude of occupational health hazards is increasing in health care industries (hospitals, health centers, laboratory etc).
10. Evaluate your classroom in terms of biological hazard, noise, dust, ergonomic and other physical hazards.

Industry Visit

INDUSTRY VISIT

1. Saras Dairy Jaipur 06 September 2018

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTHSE 103	Safety in Engineering Industry	3	0	0	3

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test – II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **
20	20	50	10	100	20	50	30	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/Mock Interviews/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%.

Syllabus (Theory)

SAFETY IN METAL WORKING MACHINERY AND WOOD WORKING MACHINES: General safety rules, principles, maintenance, Inspections of turning machines, boring machines, milling machine, planning machine and grinding machines, CNC machines, Wood working machinery, types, safety principles, electrical guards, work area, material handling, inspection, standards and codes- saws, types, hazards.

SAFETY IN WELDING AND GAS CUTTING: Gas welding and oxygen cutting, resistances welding, arc welding and cutting, common hazards, personal protective equipment, training, safety precautions in brazing, soldering and metalizing – explosive welding, selection, care and maintenance of the associated equipment and instruments – safety in generation, distribution and handling of industrial gases-colour coding – flashback arrestor – leak detection-pipe line safety-storage and handling of gas cylinders.

SAFETY IN COLD FORMING AND HOT WORKING OF METALS: Cold working, power presses, point of operation safe guarding, auxiliary mechanisms, feeding and cutting mechanism, hand or foot-operated presses, power press electric controls, power press set up and die removal, inspection and maintenance-metal sheers-press brakes. Hot working safety in forging, hot rolling mill operation, safe guards in hot rolling mills – hot bending of pipes, hazards and control measures. Safety in gas furnace operation, cupola, crucibles, ovens, foundry health hazards, work environment, material handling in foundries, foundry production cleaning and finishing foundry processes.

SAFETY IN FINISHING, INSPECTION AND TESTING: Heat treatment operations, electro plating, paint shops, sand and shot blasting, safety in inspection and testing, dynamic balancing, hydro testing, valves, boiler drums and headers, pressure vessels, air leak test, steam testing, safety in radiography, personal monitoring devices, radiation hazards, engineering and administrative controls, Indian Boilers Regulation.

Laboratory Safety: Machine Safety, Cryogenics Safety, Fire Safety, Laser Safety, Radiation Safety, Gas Cylinder Safety**,** Chemical Safety and Bio Safety

Safety in Water treatment plants: Safety in Effluent Treatment plants (ETP), Hazard Identification, hazards in ETP O & M, Dos and Don'ts in ETP Operation for Safety, Personnel Protective Equipment (PPE) for ETP O & M, Safe Handling of Chemicals, Safe Handling of Chlorine, Toxic Effects of Chlorine, Handling Chlorine equipment, Chlorine Leak detection and control, Safety in Handling of Corrosive substances such as Acids, Alkalis, Corrosive Substances used in ETP, Use and Storage of Corrosives, Health Hazards Associated with Corrosives, First Aid.

Text books &References

1. "Accident Prevention Manual" – NSC, Chicago, 1982.
2. "Occupational safety Manual" BHEL, Trichy, 1988.
3. "Safety Management by John V. Grimaldi and Rollin H. Simonds, All India Travelers Book seller, New Delhi, 1989.
4. "Safety in Industry" N.V. Krishnan JaicoPublishery House, 1996.
5. Indian Boiler acts and Regulations, Government of India.
6. Safety in the use of wood working machines, HMSO, UK 1992.
7. Health and Safety in welding and Allied processes, welding Institute, UK, High Tech. Publishing Ltd., London, 1989.

Activity for Skill Development and Employability

Quiz

1. 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.

2. 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.

ASSIGNMENT

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-1: Jaipur Fire 2009

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.

CASE STUDY-2. CONFINED SPACE CASE

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. CANADIAN MANUFACTURING PLANT

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.

INDUSTRY VISIT

1. IOCL LPG Gas Botteling Plant and IOCL Jaipur Terminal

2. Saras Dairy Jaipur

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTHSE 104	Regulation for Health, Safety and Environment	3	0	0	3

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test – II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **
20	20	50	10	100	20	50	30	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/ Mock Interviews/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%.

Syllabus (Theory)

Factories act and rules; Workmen compensation act; Indian explosive act; Gas cylinder rules; SMPV Act - Indian petroleum act and rules. Environmental pollution act Manufacture, Storage and Import of Hazardous Chemical rules 1989, Indian Electricity act and rules. Overview of OHSAS 18000 and ISO 14000

Text books & Reference books

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.
3. Air (Prevention and control of pollution) act 1981, Commercial Law Publishers (India) Pvt.Ltd., New Delhi.
4. Explosive Act, 1884 and Explosive rules, 1883 (India), (2002), Eastern Book company, Lucknow, 10th Edition
5. The manufacture, storage and import of hazardous chemical rules 1989, Madras Book Agency, Chennai.
6. ISO 9000 to OHSAS 18001, Dr. K.C. Arora, S.K. Kataria& Sons, Delhi

Activity for Skill Development and Employability

QUIZ:

Q.1A Objective type multiple choice questions

i. TLV is
   a- threshold limit value b- threshold linear value
   c- Threshold limited value d- none

ii. Saliva and urine are involve
   a- biological monitoring b- physical monitoring
   c- Chemical monitoring d- all of the above

iii. Risk Assessment is

a- industrial process b- industrial process to calculate risk for hazard

c- Industrial technology d- none

iv. Chemical hazards in the workplace are often the most complex hazards to implement proper controls due to the multitude of variables that affect the situation.

a- True

b- False

v. Most of the particle size exhaled from body

a- 1.0 – 2.5 micron b- 0.1-0.01 micron c- none d- all of these

vi Desuperheaters is

a- heat transfer or industrial process purposes

b- A device that lowers the temperature of superheated steam

c- It can be used effectively for heating

d- all of the above

vii Bhopal tragedy associated with

a- MIC b- Nuclear accident

c- Air pollution d- Both a & c

Short answer type questions

Q1- Write short note on hazard substance and give full classification of hazards waste.

Q2- Short note on ISO 140001 how this standard impact industrial management.

Q3- Discuss critical review on environmental pollution act.

ASSIGNMENTS:

Q1.OHSAS 18001 and its comparison with ISO 14001 and ISO 9001 only key point to be discuss.

Q2. Discuss the hazardous wastes (management and handling) rules, 1989.

Q3. Discuss the specific point of OHSAS 18000 standard. How this standard play important role for safety in industry

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTHSE 105	Project Studio-I	0	0	4	2

Evaluation Scheme (Theory)					Evaluation Scheme (Practical)			
Mid Term Test – I	Mid Term Test – II	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **	Mid Term Test - I	End Term Test	Class Participation/ Additional Continuous Evaluation*	Total Marks **
20	20	50	10	100	20	50	30	100

*Additional Continuous Evaluation: Quizzes/Assignments/Presentations/Practical Records/ Mock Interviews/others

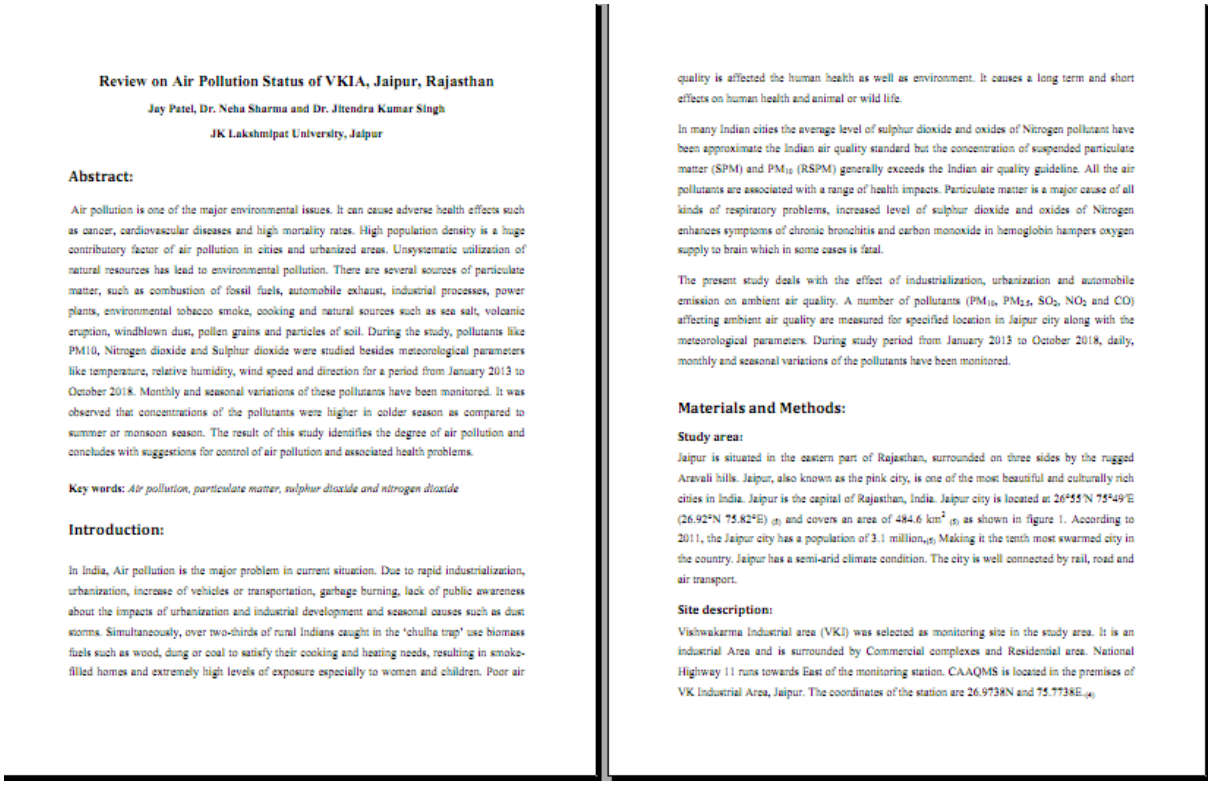
**The ratio of weightage between Theory and Practical content will be 60%: 40%.

Syllabus (Theory)

In this exercise students will work in small groups and undertake studies on environment engineering or Industrial safety and management. The aim of this project is to make students able to understand safety needs of organizations in a variety of occupational environments.

Activity for Skill Development and Employability

Report and Review Paper Writing



Review on Air Pollution Status of VKIA, Jaipur, Rajasthan

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Abstract:

Air pollution is one of the major environmental issues. It can cause adverse health effects such as cancer, cardiovascular diseases and high mortality rates. High population density is a huge contributory factor of air pollution in cities and urbanized areas. Unsystematic utilization of natural resources has lead to environmental pollution. There are several sources of particulate matter, such as combustion of fossil fuels, automobile exhaust, industrial processes, power plants, environmental tobacco smoke, cooking and natural sources such as sea salt, volcanic eruption, windblown dust, pollen grains and particles of soil. During the study, pollutants like PM10, Nitrogen dioxide and Sulphur dioxide were studied besides meteorological parameters like temperature, relative humidity, wind speed and direction for a period from January 2013 to October 2018. Monthly and seasonal variations of these pollutants have been monitored. It was observed that concentrations of the pollutants were higher in colder season as compared to summer or monsoon season. The result of this study identifies the degree of air pollution and concludes with suggestions for control of air pollution and associated health problems.

Key words: *Air pollution, particulate matter, sulphur dioxide and nitrogen dioxide*

Introduction:

In India, Air pollution is the major problem in current situation. Due to rapid industrialization, urbanization, increase of vehicles or transportation, garbage burning, lack of public awareness about the impacts of urbanization and industrial development and seasonal causes such as dust storms. Simultaneously, over two-thirds of rural Indians caught in the 'chulha trap' use biomass fuels such as wood, dung or coal to satisfy their cooking and heating needs, resulting in smoke-filled homes and extremely high levels of exposure especially to women and children. Poor air quality is affected the human health as well as environment. It causes a long term and short effects on human health and animal or wild life.

In many Indian cities the average level of sulphur dioxide and oxides of Nitrogen pollutant have been approximate the Indian air quality standard but the concentration of suspended particulate matter (SPM) and PM_{10} (RSPM) generally exceeds the Indian air quality guideline. All the air pollutants are associated with a range of health impacts. Particulate matter is a major cause of all kinds of respiratory problems, increased level of sulphur dioxide and oxides of Nitrogen enhances symptoms of chronic bronchitis and carbon monoxide in hemoglobin hampers oxygen supply to brain which in some cases is fatal.

The present study deals with the effect of industrialization, urbanization and automobile emission on ambient air quality. A number of pollutants (PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO) affecting ambient air quality are measured for specified location in Jaipur city along with the meteorological parameters. During study period from January 2013 to October 2018, daily, monthly and seasonal variations of the pollutants have been monitored.

Materials and Methods:

Study area:

Jaipur is situated in the eastern part of Rajasthan, surrounded on three sides by the rugged Aravali hills. Jaipur, also known as the pink city, is one of the most beautiful and culturally rich cities in India. Jaipur is the capital of Rajasthan, India. Jaipur city is located at 26°55'N 75°49'E (26.92°N 75.82°E) [3] and covers an area of 484.6 km^2 [5] as shown in figure 1. According to 2011, the Jaipur city has a population of 3.1 million.[5] Making it the tenth most swarmed city in the country. Jaipur has a semi-arid climate condition. The city is well connected by rail, road and air transport.

Site description:

Vishwakarma Industrial area (VKI) was selected as monitoring site in the study area. It is an industrial Area and is surrounded by Commercial complexes and Residential area. National Highway 11 runs towards East of the monitoring station. CAAQMS is located in the premises of VK Industrial Area, Jaipur. The coordinates of the station are 26.9738N and 75.7738E.[4]

Figure 1: Location off Rajasthan in India

Figure 2: Area covered by Jaipur city

Monitoring and Analysis:

Air pollutants like PM_{10}, NO_2 and SO_2 and meteorological parameters like Wind speed, temperature and relative humidity were monitored continuously from January 2013 to October 2018. The measurement of particulate matter is carried out by Environment S.A.MP101M Analyzer which determines particulate mass concentrations in ambient air. Working principle for measurement PM_{10} is Beta Ray Attenuation. The Oxides of Nitrogen (NO, NO_2 and NO_X) are measured by the Environment S.A. AC32M analyzer. The principle of ESA AF22M Analyzer for the measurement of Sulfur Dioxide in ambient air is the UV fluorescent spectroscopy method.[4] Pollutant selected for study and their measurement principle are given in table 1. The concentration of air pollutant (PM_{10}, NO_2 and SO_2) is expressed in micro gram per cubic meter ($\mu gm/ m^3$). The national ambient air quality standard of air pollutant (PM_{10}, NO_2 and SO_2) is given in table 2.

Table: 1: Pollutants selected for study and their measurement principle

Parameter	Description	Principle
Particulate Matter (PM_{10})	Respirable Suspended Particulate Matter (RSPM) <10µm particle size	Beta Ray Attenuation
Nitrogen Dioxide (NO_2)	Nitrogen Dioxide	Gas Phase Chemiluminescence
Sulfur Dioxide (SO_2)	Sulphur Dioxide	Pulsed Fluorescence

Table: 2 NAAQS of air pollutant

Pollutants	Time- weighted Average	Concentration in	
		Industrial, Residential, Rural &other Areas	Ecologically Sensitive Areas (Notified by Central Govt.)
Particulate Matter (PM_{10})	Annual Average	60	60
	24hour	100	100
Sulfur Dioxide (SO_2)	Annual Average	50	20
	24hour	80	80
Nitrogen Dioxide (NO_2)	Annual Average	40	30
	24hour	80	80

Result and Discussion:

A concentration of air pollutant was changed due to change in atmospheric condition. So it is directly related to atmospheric condition. Monthly average concentration of air pollutant from January 2013 to October 2018 is shown in table.

Maximum concentration of PM_{10} was observed during winter months. While minimum observed value of PM_{10} was recorded in the month July and August. During winters, there occurs slow dispersion of pollutants which results in more stable atmospheric conditions. These conditions favour build up of pollutants near to the source of pollution which give rise to higher concentrations. Similarly concentration of NO_2 was maximum in January, while a minimum was monsoon season. Highest concentration of SO_2 was obtained in the winter season and lowest concentration in monsoon. Captured value of SO_2 may be attributed to congested traffic, garbage burning at nearby Highways and residential areas. The high value of SO_2 may be likely due to heavy traffic load and stationery fuel combustion. Other than anthropogenic sources, many environmental conditions may also result in the buildup of high SO_2 concentration in the ambient air.

Table: 3: Concentration of NO_2

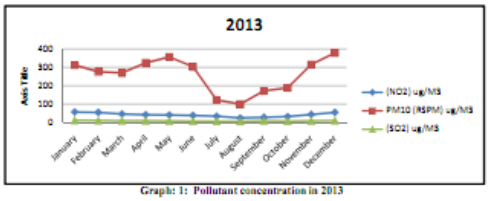
Month	2013	2014	2015	2016	2017	2018
January	56.25	58.93	52.25	45.24	44.57	43.78
February	54.14	61.2	50.46	40.98	38.93	41.54
March	45.73	51.13	43.18	42.55	35.6	38.89
April	41.5	41.64	39.52	38.34	33.47	39.31
May	39.8	35.2	36.41	34.78	34.43	38.14
June	37.55	28.05	31.88	32.13	24.15	33.69
July	33.16	32.5	26.79	22.22	19.97	29.97
August	23.8	26.83	26.05	23.27	18.86	25.97
September	27.3	29.84	29.75	28.21	30.37	36.34
October	31.09	47.42	36.15	40.42	41.67	39.36
November	43.02	47.9	41.78	42.24	35.84	
December	54.35	56.4	42.74	45.18	40.24	

Table: 4: Concentration of PM_{10}

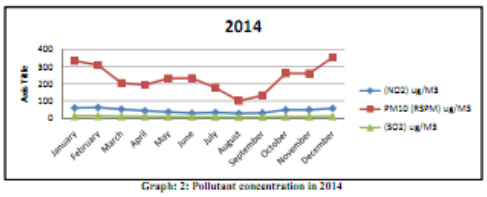
Month	2013	2014	2015	2016	2017	2018
January	312	336	301	322	388	346
February	276	311	197	254	278	378
March	269	205	201	288	263	289
April	324	194	284	332	274	385
May	356	232	348	331	303	399
June	303	234	184	289	224	304
July	122	178	125	101	155	186
August	99	100	143	106	158	180
September	171	132	233	269	223	130
October	188	262	275	299	293	190
November	315	261	366	391	295	
December	378	356	335	424	390	

Table: 5: Concentration of SO_2

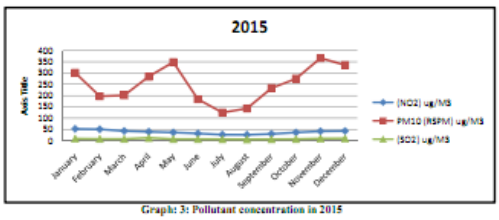
Month	2013	2014	2015	2016	2017	2018
January	11	11.16	8.81	10.9	13.16	8.22
February	10.26	11.52	7.63	9.91	9.7	9.15
March	9.2	8.69	7.36	10.3	9.39	8.62
April	8.77	8.24	12.37	9.68	7.74	8.45
May	7.73	7.05	6.89	8.46	8.34	8.82
June	6.46	6.35	6.78	8.32	6.59	8.79
July	5.75	6.12	6.32	6.52	5.43	7.41
August	4.82	5.17	5.81	6.24	6.11	7.45
September	8.59	5.38	6.19	7.47	9.98	8.11
October	6.09	7.12	7.03	9.25	10	8.29
November	8.36	7.45	8.84	10.68	9.85	
December	9.83	9.3	9.78	11.92	10.52	



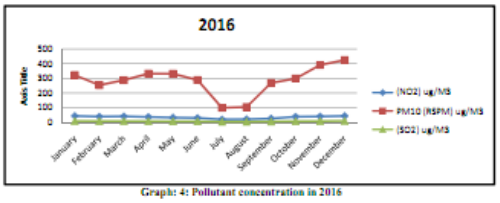
Graph: 1: Pollutant concentration in 2013



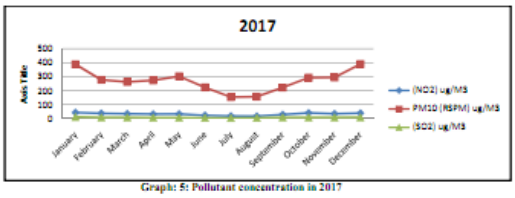
Graph: 2: Pollutant concentration in 2014



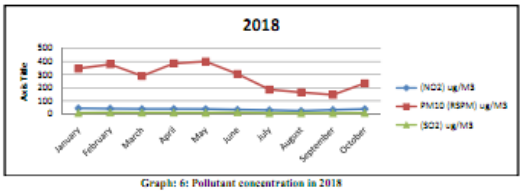
Graph: 3: Pollutant concentration in 2015



Graph: 4: Pollutant concentration in 2016



Graph: 5: Pollutant concentration in 2017



Graph: 6: Pollutant concentration in 2018

Conclusion:

From the above study I conclude that the particulate pollutants, PM 10 are mostly above permissible limits at study site. High particulate concentration is due to semi arid geographical conditions of Rajasthan, heavy transport activities in the nearby area, construction/ demolition activities, dust from paved unpaved roads etc. apart from industrial emissions. All pollutants were observed to be high in concentration during winters as compared to summer and monsoon, due to slow dispersion and dilution of pollutants. It can be summarized that air pollution at the study site is primarily because of traffic. Traffic diversions, provision of alternate routes, restricting heavy vehicles movement through residential roads, arranging for periodic vehicle maintenance and encouraging public transport instead of private vehicles are worthy considerations to control air pollution due to transportation. Regular monitoring for adequacy of pollution control equipments installed at various industries should be undertaken to check emissions from industrial processes. In addition to above, public awareness for environment protection should be adopted and green plantation along highway and within industries should be encouraged. It may, thus be concluded that strict implementation of environmental regulations and adoption of adequate pollution control measures is need of the hour.

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3. **Kumar, S.S., Kriti, S., 2016. Ambient Air Quality Status of Jaipur City , Rajasthan, India. Int. Res. J. Environ. Sci. 5, 43–48.**
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REPORT ON

AIRBORNE WASTE

Submitted By

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[2018MTHSE001]

Submitted To

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Health, Safety and Environmental Engineering

Institute of Engineering and Technology

JKLU, Jaipur.

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Introduction:

Air Pollution:

Airborne waste is vapor, gases or particulate introduced into the atmosphere by evaporation, chemical or combustion processes; a frequent cause of smog and an irritant to eyes and breathing passages. Air pollution is a mix of particles and gases that can reach harmful concentrations both outside and indoors. Its effects can range from higher disease risks to rising temperatures. Soot, smoke, mold, pollen, methane, and carbon dioxide are a just few examples of common pollutants.

Air pollutants are usually classified into suspended particulate matter (PM) (dusts, fumes, mists, and smokes); gaseous pollutants (gases and vapors); and odors.

Suspended PM can be categorized according to total suspended particles: the finer fraction, PM_{10}, which can reach the alveoli, and the most hazardous, $PM_{2.5}$ (median aerodynamic diameters of less than 10.0 microns and 2.5 microns, respectively). Much of the secondary pollutants $PM_{2.5}$ consists of created by the condensation of gaseous pollutants—for example, sulfur dioxide (SO_2) and nitrogen dioxide (NO_2). Types of suspended PM include diesel exhaust particles; coal fly ash; wood smoke; mineral dusts, such as coal, asbestos, limestone, and cement; metal dusts and fumes; acid mists (for example, sulfuric acid); and pesticide mists.

Gaseous pollutants include sulfur compounds such as SO_2 and sulfur trioxide; carbon monoxide; nitrogen compounds such as nitric oxide, NO_2, and ammonia; organic compounds such as hydrocarbons; volatile organic compounds; polycyclic aromatic hydrocarbons and halogen derivatives such as aldehydes; and odorous substances. Volatile organic compounds are released from burning fuel (gasoline, oil, coal, wood, charcoal, natural gas, and so on); solvents; paints; glues; and other products commonly used at work or at home. Volatile organic compounds include such chemicals as benzene, toluene, methylene chloride, and methyl chloroform. Emissions of nitrogen oxides and hydrocarbons react with sunlight to eventually form another secondary pollutant, ozone, at ground level. Ozone at this level creates health concerns, unlike ozone in the upper atmosphere, which occurs naturally and protects life by filtering out ultraviolet radiation from the sun.

Sources of Air Pollution:

Natural Sources:

- **Volcanoes –** Erupting volcanoes eject large quantities of particulates including volcanic ash and gases into the atmosphere, volcanic eruptions have been directly associated with climate change since studies began.
- **Dust storms –** Strong winds can pick up vast clouds of dust which in turn are dispersed into the atmosphere and can take years to return to the surface.
- **Forest and grassland fires –** Wood and grass smoke contain a complex mixture of particulates such as carbon monoxide and hydrogen cyanide, which are lifted into the air and rest in the atmosphere.
- **Living vegetation –** Vegetation that emits particles to the air, such as isoprene, methanol and spores. These particles can be carried upwards by the wind and add to the level of particulates in the atmosphere.
- **Sea spray –** Due to the large amounts of plastics that have broken down to nano scale, particles and can be found in ocean water all over the world. These hazardous particles can be thrown into the air by strong sea spray.
- **Tornado's and hurricanes –** These powerful weather systems can pick up large quantities of resting dust and pollutants just from the countryside, let alone when they pass through cities and encounter cement dust and higher levels of overall pollutants.

Man Made Sources:

- **Coal Combustion –** Coal burning is still used in the majority of countries to generate heat and supplying energy, the burning of coal directly increases the amount of carbon monoxide and other hazardous particles into the atmosphere.
- **Oil Combustion –** Used for fueling vehicles, which in turn emit a large number of exhaust fumes containing hazardous particulates all over the globe, in huge quantities. Due to the large amounts if these pollutants in cities, countless deaths are caused by particulates.
- **Wood combustion –** The burning of wood is a wide scale cause of particulates, used for many purposes such as heating and generating power, the combustion process sends many toxic cocktails of pollutants into the atmosphere, such as soot.
- **Construction –** Cement dust is a large portion of overall global pollutants, because of the dust's small particle size, it can hang around in the air for quite some time. The use of vehicles in the construction industry and other known pollutants makes the construction industries in dire need of reforming.
- **Demolition –** Huge amounts of dust are thrown into the air during even the smallest demolition project, these particles are picked up into the wind, and again due to the small size of said particles, they can stay airborne for a very long time.
- **Road dust –** Roads are covered in microscopic dust and pollutants which are sent airborne by the air pressure changes and wind caused when a car uses a road, this happens all over the planet.
- **Power plants –** Plants that burn fossil fuels for energy and even nuclear plants disperse particulates on a huge scale, vast plumes of smoke will be found at most power plants, dispersing hundreds of cubic feet of pollutants every hour.
- **Industrial –** Manufacturing plastics and other materials which create toxic fumes are dispersed into the oceans, air and land. This in turn adds to the huge amount of man-made pollutants.
- **Agricultural –** Pesticides and other volatile chemicals are sent into the air via sprayers and liquid jets. Again the agricultural industries use a large number of vehicles running on fuels such as petrol and diesel, which all attribute to the level of air pollution.
- **Livestock –** The livestock industry creates a huge amount of particulates which are dispersed into the air, ground and oceans. Even the animals themselves have been found to disperse great quantities of methane into the atmosphere.
- **Deforestation –** Felling trees for various industries impacts the rate at which trees would naturally produce carbon dioxide worldwide, however recent trends of replanting and harvesting cycles have reduced this.
- **Poor condition of anti-pollution technology –** In recent years the world has made a strong effort to combat the high levels of lethal pollutants, but unfortunately, some countries have produced very minimal reductions in annual pollution output.
- **Tobacco smoke –** Hundreds of toxic chemicals are present in tobacco smoke, and due to the millions of smokers worldwide, this leads to further pollution.

Table: 1: : Common atmospheric pollutants and their sources

Category	Source	Emitted pollutants
Agriculture	Open burning	SPM, CO, VOC
Mining and quarrying	Coal mining	SPM, SO_2, NO_x, VOC
	Crude petroleum and natural gas production	SO_2
	Non-ferrous ore mining	SPM, Pb
	Stone quarrying	SPM
Manufacturing	Food, beverages and tobacco	SPM, CO, VOC, H_2S
	Textiles and leather industries	SPM, VOC
	Wood products	SPM, VOC
	Paper products, printing	SPM, SO_2, CO, VOC, H_2S, R-SH
Manufacture of chemicals	Phthalic anhydride	SPM, SO_2, CO, VOC
	Chlor-alkali	Cl_2
	Hydrochloric acid	HCl
	Hydrofluoric acid	HF, SiF_4
	Sulphuric acid	SO_2, SO_3
	Nitric acid	NO_x
	Phosphoric acid	SPM, F_2
	Lead oxide and pigments	SPM, Pb
	Ammonia	SPM, SO_2, NO_x, CO, VOC, NH_3
	Sodium carbonate	SPM, NH_3
	Calcium carbide	SPM
	Adipic acid	SPM, NO_x, CO, VOC

	Alkyl lead	Pb
	Maleic anhydride and terephthalic acid	CO, VOC
	Fertilizer and pesticide production	SPM, NH_3
	Ammonium nitrate	SPM, NH_3, HNO_3
	Ammonium sulphate	VOC
	Synthetic resins, plastic materials, fibres	SPM, VOC, H_2S, CS_2
	Paints, varnishes, lacquers	SPM, VOC
	Soap	SPM
	Carbon black and printing ink	SPM, SO_2, NO_x, CO, VOC, H_2S
	Trinitrotoluene	SPM, SO_2, NO_x, SO_3, HNO_3
Petroleum refineries	Miscellaneous products of petroleum and coal	SPM, SO_2, NO_x, CO, VOC
Non-metallic mineral products manufacture	Glass products	SPM, SO_2, NO_x, CO, VOC, F
	Structural clay products	SPM, SO_2, NO_x, CO, VOC, F_2
	Cement, lime and plaster	SPM, SO_2, NO_x, CO
Basic metal industries	Iron and steel	SPM, SO_2, NO_x, CO, VOC, Pb
	Non-ferrous industries	SPM, SO_2, F, Pb
Power generation	Electricity, gas and steam	SPM, SO_2, NO_x, CO, VOC, SO_3, Pb
Wholesale and retail trade	Fuel storage, filling operations	VOC
Transport		SPM, SO_2, NO_x, CO, VOC, Pb
Community services	Municipal incinerators	SPM, SO_2, NO_x, CO, VOC, Pb

Health Effects of Air Pollution:

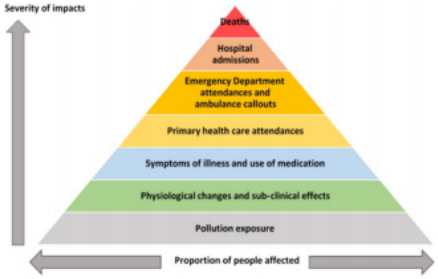

Figure 1: hierarchy of effect of particulate matter

- **Asthma –** A rising rate of diagnoses have been linked to the increased levels of fine pollutants in countries worldwide, particularly in areas with higher pollution.
- **Lung cancer –** Fine particles that penetrate deep into the human respiratory system and attack the bronchi, affecting the health of the lungs and leading to cancerous growths.
- **Cardiovascular disease –** Numerous different particulates have drastic effects on the heart and its functions, again caused by the fine particulates that easily pass into the human system unfiltered.
- **Premature delivery –** Exposure to high levels of air pollutants has led to an increase in the amount of failed pregnancies, especially in towns and cities with higher levels of pollution.
- **Birth defects –** Particulates pass through the mother and into the child at any point of the pregnancy and can lead to a wide range of birth defects.
- **Premature death –** Typically higher in regions with high levels of air pollutants and aerosols.
- **Vascular inflammation –** Caused by a plaque build-up in the arteries, directly caused by particulates inhaled.
- **Atherosclerosis –** Hardening of the arteries that reduces elasticity, leading to heart problems, also caused by plaque build-up.
- **Radiation exposure –** A large number of particulates are formed up of radioactive material such as uranium and thorium, which is then inhaled or finds its way into crops which in turn are consumed.

Control Measures:

Table: 2: Steps in selecting pollution controls

Step 1: Define emissions.	The first part is to determine what will be released from the stack. All potentially harmful emissions must be listed. The second part is to estimate how much of each material will be released. Without this information, we cannot begin to design a control program.
Step 2: Define target groups.	All susceptible targets should be identified. This includes people, animals, plants and materials. In each case, the most susceptible member of each group must be identified. For example, asthmatics near a plant that emits isocyanates.
Step 3: Determine acceptable exposure levels.	An acceptable level of exposure for the most sensitive target group must be established. If the pollutant is a material that has cumulative effects, such as a carcinogen, then long-term exposure levels (annual) must be set. If the pollutant has short-term effects, such as an irritant or a sensitizer, a short-term or perhaps peak exposure level must be set.
Step 4: Select controls.	Step 1 identifies the emissions, and Step 3 determines the acceptable level. In this step, each pollutant is checked to ensure that it does not exceed the acceptable level. If it exceeds the acceptable level, additional controls must be added, and the exposure levels checked again. This process continues until all exposures are at or below the acceptable level. Dispersion modelling can be used to estimate exposures for new plants or to test alternative solutions for existing facilities.

Control measures for industrial facilities include adequate, well-designed, well-installed, efficiently operated and maintained air cleaning devices, also called separators or collectors. A separator or collector can be defined as an "apparatus for separating any one or more of the following from a gaseous medium in which they are suspended or mixed: solid particles (filter and dust separators), liquid particles (filter and droplet separator) and gases (gas purifier)". The basic types of air pollution control equipment are the following:

- For particulate matter: inertial separators (e.g., cyclones); fabric filters (baghouses); electrostatic precipitators; wet collectors (scrubbers)
- For gaseous pollutants: wet collectors (scrubbers); adsorption units (e.g., adsorption beds); afterburners, which can be direct-fired (thermal incineration) or catalytic (catalytic combustion).

Wet collectors (scrubbers) can be used to collect, at the same time, gaseous pollutants and particulate matter. Also, certain types of combustion devices can burn combustible gases and vapors as well as certain combustible aerosols. Depending on the type of effluent, one or a combination of more than one collector can be used.

The control of odors that are chemically identifiable relies on the control of the chemical agent(s) from which they emanate (e.g., by absorption, by incineration). However, when an odour is not defined chemically or the producing agent is found at extremely low levels, other techniques may be used, such as masking (by a stronger, more agreeable and harmless agent) or counteraction (by an additive which counteracts or partially neutralizes the offensive odour).

The fundamental control measures in industrial facilities are the following:

Substitution of materials: Examples: substitution of less toxic solvents for highly toxic ones used in certain industrial processes; use of fuels with lower sulphur content (e.g., washed coal), therefore giving rise to less sulphur compounds and so on.

Modification or change of the industrial process or equipment: Examples: in the steel industry, a change from raw ore to pelleted sintered ore (to reduce the dust released during ore handling); use of closed systems instead of open ones; change of fuel heating systems to steam, hot water or electrical systems; use of catalysers at the exhaust air outlets (combustion processes) and so on.

Modifications in processes, as well as in plant layout, may also facilitate and/or improve the conditions for dispersion and collection of pollutants. For example, a different plant layout may facilitate the installation of a local exhaust system; the performance of a process at a lower rate may allow the use of a certain collector (with volume limitations but otherwise adequate). Process modifications that concentrate different effluent sources are closely related to the volume of effluent handled, and the efficiency of some air-cleaning equipment increases with the concentration of pollutants in the effluent. Both the substitution of materials and the modification of processes may have technical and/or economic limitations, and these should be considered.

Adequate housekeeping and storage: Examples: strict sanitation in food and animal product processing; avoidance of open storage of chemicals (e.g., sulphur piles) or dusty materials (e.g., sand), or, failing this, spraying of the piles of loose particulate with water (if possible) or application of surface coatings (e.g., wetting agents, plastic) to piles of materials likely to give off pollutants.

Adequate disposal of wastes: Examples: avoidance of simply piling up chemical wastes (such as scraps from polymerization reactors), as well as of dumping pollutant materials (solid or liquid) in water streams. The latter practice not only causes water pollution but can also create a secondary source of air pollution, as in the case of liquid wastes from sulphite process pulp mills, which release offensive odorous gaseous pollutants.

Maintenance: Example: well maintained and well-tuned internal combustion engines produce less carbon monoxide and hydrocarbons.

Work practices: Example: taking into account meteorological conditions, particularly winds, when spraying pesticides.

By analogy with adequate practices at the workplace, good practices at the community level can contribute to air pollution control - for example, changes in the use of motor vehicles (more collective transportation, small cars and so on) and control of heating facilities (better insulation of buildings in order to require less heating, better fuels and so on).

Control measures in vehicle emissions are adequate and efficient mandatory inspection and maintenance programmes which are enforced for the existing car fleet, programmes of enforcement of the use of catalytic converters in new cars, aggressive substitution of solar/battery-powered cars for fuel-powered ones, regulation of road traffic, and transportation and land use planning concepts.

Another important management tool for reducing vehicle evaporative and refuelling emissions is the control of gasoline volatility. Control of fuel volatility can greatly lower vehicle evaporative HC emissions. Use of oxygenated additives in gasoline lowers HC and CO exhaust as long as fuel volatility is not increased.

All these technological and political solutions to the motor vehicle problem except substitution of electrical cars are increasingly offset by growth in the vehicle population. The vehicle problem can be solved only if the growth problem is addressed in an appropriate way.

Table: 3: Gas cleaning methods for removing harmful gases, vapours and particulates from industrial process emissions

Control method	Examples	Description	Efficiency
Gases/Vapours			
Condensation	Contact condensers Surface condensers	The vapour is cooled and condensed to a liquid. This is inefficient and is used as a preconditioner to other methods	80+% when concentration >2,000 ppm
Absorption	Wet scrubbers (packed or plate absorbers)	The gas or vapour is collected in a liquid.	82–95% when concentration <100 ppm 95–99% when concentration >100 ppm
Adsorption	Carbon Alumina Silica gel Molecular sieve	The gas or vapour is collected on a solid.	90+% when concentration <1,000 ppm 95+% when concentration >1,000 ppm
Incineration	Flares Incinerator Catalytic incinerator	An organic gas or vapour is oxidized by heating it to a high temperature and holding it at that temperature for a sufficient time period.	Not recommended when concentration <2,000 ppm 80+% when concentration >2,000 ppm
Particulates			
Inertialseparators	Cyclones	Particle-laden gases are forced to change direction. The inertia of the particle causes them to separate from the gas stream. This is inefficient and is used as a preconditioner to other methods.	70–90%
Wet scrubbers	Venturi Wetted filter Tray or sieve scrubber	Liquid droplets (water) collect the particles by impaction, interception and diffusion. The droplets and their particles are then separated from the gas stream.	For 5 µm particles, 98.5% at 6.8 w.g.; 99.99+% at 50 w.g. For 1 µm particles, 45% at 6.8 w.g.; 99.95 at 50 w.g.
Electrostatic precipitators	Plate-wire Flat-plate Tubular Wet	Electrical forces are used to move the particles out of the gas stream onto collection plates	95–99.5% for 0.2 µm particles 99.25–99.9+% for 10 µm particles
Filters	Baghouse	A porous fabric removes particulates from the gas stream. The porous dust cake that forms on the fabric then actually does the filtration.	99.9% for 0.2 µm particles 99.5% for 10 µm particles

References:

- Ministry of Environment and Forest
- https://www.epa.gov
  Environmental Protection Agency
- http://www.ilocis.org/documents/chpt55e.htm
- Central Pollution Control Board

Course Title and Code: Risk Analysis and Solid Waste Management (MTHSE 202)	
Hours per Week	**L-T-P: 3-0-0**
Credits	**3**
Students who can take	**M.Tech Semester-II (Batch: 2018-2020)**

Course Objective:

The objective of this course is study risk identification, assessment and management of hazard materials. And how various methods and software's helpful for risk analysis. This course also gives the student an overview of solid and hazard waste management including collection, transfer, transport, and disposal. Methods of processing, basic disposal facilities, disposal options, and the environmental issues of solid waste management will be covered in this course.

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

1) Distinguish the type and source of (hazard) risk in workplace or plant.
2) Apply hazard analysis methods (HAZOP, FETI, and HAZAN & FMEA) and software's tools.
3) Identify sources and classification of various solids wastes.
4) Describe composition of solid waste and select the appropriate method for solid waste collection, transportation, redistribution and disposal.
5) Use the physical, chemical, thermal and biological methods of treating hazardous waste and adopt waste minimization and pollution prevention techniques.
6) Apply the legal legislation related to solid waste management.

Prerequisites		
Sr. No.	**Evaluation Component**	**Marks**
1	Attendance	NIL
2	Assignment	10
3	Class Participation	5
4	Quiz	5
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	40
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	NIL
15	Lab Evaluation-II	NIL
16	Course Portfolio	NIL
	Total (100)	100

Course Syllabi (Theory):

Unit -1- Risk and Hazard Assessment: Introduction, hazard monitoring-risk issue - Hazard assessment, procedure, methodology; safety audit, checklist analysis, what-if analysis, safety review, preliminary hazard analysis (PHA), hazard operability studies (HAZOP).

Unit-2- Risk Analysis Quantification and Software's: Fault Tree Analysis & Event Tree Analysis, Logic Symbols, Methodology, minimal cut set ranking - fire explosion and toxicity index(FETI), various indices - Hazard analysis(HAZAN)- Failure Mode and Effect Analysis(FMEA)- Basic concepts of Software on Risk analysis, CISCON, FETI, ALOHA.

****Case Studies:** 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,

Unit-3- Sources, Classification & Regulatory Framework: Types and Sources of solid and hazardous wastes - Need for solid and hazardous waste management – Elements of integrated waste management and roles of stakeholders - Salient features of Indian legislations on management and handling of municipal solid wastes, hazardous wastes, biomedical wastes, lead acid batteries, electronic wastes, plastics and fly ash.

Unit-4- Storage, Collection And Transport of Wastes: 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 Optimizing waste allocation– compatibility, storage, labeling and handling of hazardous wastes – hazardous waste manifests and transport.

Unit-5- Waste Disposal & Waste Processing Technologies: Waste disposal options – Disposal in landfills - Landfill Classification, types and methods – site selection - design and operation of sanitary landfills, secure landfills and landfill bioreactors – leachate and landfill gas management – landfill closure and environmental monitoring, Objectives of waste processing – material separation and processing technologies – biological and chemical conversion technologies – methods and controls of Composting - thermal conversion technologies and energy recovery – incineration

Text books &Reference(s)

1. Loss Prevention in Process Industries-Frank P. Less Butterworth-Hein UK 1990 (Vol.I, II & III)
2. Methodologies for Risk and Safety Assessment in Chemical Process Industries, Commonwealth Science Council, UK
3. Hazop and Hazon, by Trevor A Klett, Institute of Chemical Engineering.
4. "Guidelines for Chemical Process Quantitative Risk Analysis", second edition, Centre for Chemical Process safety, AICHE, 2000

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Activity for Skill Development and Employability

QUIZ

Q.1 Give a critical note on the need of hazardous waste management in India.

Q.2 Discuss the legislation and rules for solid waste management in India. How much these legislations are effective for waste management of India at present situation?

Q.3 Analyze the waste management of your town. And submit your suggestion /methods for improvement of waste management system of your town.

ASSIGNMENT:

Q1- Develop a hazardous solid waste management system in JKLU campus.

Q2 – Write a critical analytical note on Jaipur municipal solid waste management.

Course Title and Code: Project Studio-II (MTHSE 203)	
Hours per Week	**L-T-P: 0-0-4**
Credits	**2**
Students who can take	**M.Tech Semester-II (Batch: 2018-2020)**

Course Objective:
The objective of this course is to study analyze and assess the pollution in air, water and soil and subsequently predict the mitigation measures.

On successful completion of this course students will be able to:
1. Distinguish the typical sources of air, water and soil pollution.
2. Assess the severity of the consequences of pollution by measuring it either in field or in labs.
3. Predict the impacts of industrial pollution.
4. Suggest the impact mitigation measures of industrial pollution.
5. Explain the legal framework of pollution controlling boards/authority.

Prerequisites

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

Syllabus (Theory)

In this exercise students will work in small groups and undertake studies on environment engineering or Industrial safety and management. The aim of this project is to make students able to understand safety needs of organizations in a variety of occupational environments.

Activity for Skill Development and Employability

PROJECT REPORT ON
WATER QUALITY ANALYSIS OF BAGRU

Prepared By

Mr. Jay B. Patel [2018MTHSE001]

Mr. Tejaskumar N. Patel [2018MTHSE002]

Mr. Saransh Gupta [2018MTHSE003]

Submitted To

Mr. Vinod K. Vishwakarma

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Institute of Engineering and Technology

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1. Introduction:

Over two thirds of Earth's surface is covered by water; less than a third is taken up by land. As Earth's population continues to grow, people are putting ever-increasing pressure on the planet's water resources. In a sense, our oceans, rivers, and other inland waters are being "squeezed" by human activities—not so they take up less room, but so their quality is reduced. Poorer water quality means water pollution.

We know that pollution is a human problem because it is a relatively recent development in the planet's history: before the 19th century Industrial Revolution, people lived more in harmony with their immediate environment. As industrialization has spread around the globe, so the problem of pollution has spread with it. When Earth's population was much smaller, no one believed pollution would ever present a serious problem. It was once popularly believed that the oceans were far too big to pollute. Today, with around 7 billion people on the planet, it has become apparent that there are limits. Pollution is one of the signs that humans have exceeded those limits.

1.1 What is water pollution?

Water pollution can be defined in many ways. Usually, it means one or more substances have built up in water to such an extent that they cause problems for animals or people. Oceans, lakes, rivers, and other inland waters can naturally clean up a certain amount of pollution by dispersing it harmlessly. If you poured a cup of black ink into a river, the ink would quickly disappear into the river's much larger volume of clean water. The ink would still be there in the river, but in such a low concentration that you would not be able to see it. At such low levels, the chemicals in the ink probably would not present any real problem. However, if you poured gallons of ink into a river every few seconds through a pipe, the river would quickly turn black. The chemicals in the ink could very quickly have an effect on the quality of the water. This, in turn, could affect the health of all the plants, animals, and humans whose lives depend on the river.

Water pollution is any chemical, physical or biological change in the quality of water that has a harmful effect on any living thing that drinks or uses or lives (in) it. When humans drink polluted water it often has serious effects on their health. Water pollution can also make water unsuited for the desired use.

Water pollution is defined as the presence in groundwater of toxic chemicals and biological agents that exceed what is naturally found in the water and may pose a threat to human health and/or the environment. Additionally, water pollution may consist of chemicals introduced into the water bodies as a result of various human activities. Any amount of those chemicals pollutes the water, regardless of the harm they may pose to human health and the environment.

1.2 Types of Water Pollution:

There are various **types of water pollution** based on the various causes of water pollution. Various classifications can be made, based on various water pollution causes:

I) Chemical – when various chemicals are the water pollution causes. The following chemicals are the most **common water pollutants**:

- **Crude oil and various petroleum products** (including gasoline, diesel fuel, kerosene, motor and lubricating oils, jet fuel). These compounds are lighter than water and thus always sit on top of water forming sheens of "free product". However, part of these compounds dissolve in water and, even in small amounts may be harmful and at the same time may remain unnoticeable by the eye.
- **Fertilizers** (including nitrates and phosphates) **–** while small amounts are useful to life, higher amounts of nitrates and phosphates in water are only beneficial to algae and harmful microorganisms and are poisonous to human and aquatic life. These contaminants cannot be seen themselves in water (as they do not form sheens or color the water), but their effects can. The typical effect of water pollution by fertilizers (usually through agricultural runoff) is the fast and abundant water growth.
- **Chlorinated solvents** (including TCE, PCE, 1,1,1-TCA, carbon tetrachloride, Freons) which sink in water (are denser than water) and are quite persistent and toxic. These compounds thus, cannot be seen by the eye, in contrast with petroleum products that are easily seen as sheens on top of water surface.
- **Petroleum solvents** (including benzene, toluene, xylenes, ethylbenzene)
- **Other organic solvents and chemicals** (such as acetone, methyl ethyl ketone, alcohols such as ethanol, isopropanol; or oxygenate compounds such as MTBE)
- **Antibiotics and other pharmaceutical products**;
- **Perchlorate –** perchlorate salts are used in rocket fuels, as well as many other applications such as fireworks, explosives, road flares, inflation bags, etc. This contaminant is usually associated with military bases, construction sites (when explosives are used). However, natural formation in arid areas may account for perchlorate in water, too (e.g., in Chile, Texas or California where natural formation of perchlorate has been observed)
- **Trihalomethanes –** these are usually byproducts of water chlorination and may pollute groundwater and surface water via leaking sewer lines and discharges. Examples of such compounds are: chloroform, bromoform, dichlorobromomethane;
- **Metals and their compounds –** of higher health risk are the organo-metal compounds which may form when metals from water react with organic compounds from water. Common examples include Hg, As, and Cr poisoning of water. Thus, if water is polluted with both metals and organic compounds the health risk is higher. And so is the effect of water pollution on aquatic life.
- **Pesticides/Insecticides/herbicides –** comprise a large number of individual chemicals that get into water due to agricultural activities directly (by spraying over large areas) or indirectly with agriculture runoff. The insecticide DDT is a typical example of such type of water pollutant.
- **PCBs –** in spite of their recent ban, their ubiquitous environmental presence makes these contaminants usually associated with urban runoffk.

II) Radiological – when radioactive materials are the water pollutant causes.

III) Biological – when various microorganisms (e.g., bacterial species and viruses), worms, and/or algae occurring in a large number are the water pollution causes. This type of pollution is caused by decaying organic material in water, animal wastes, as well as improper disposal of human wastes.

1.3 Sources of water pollution:

There are many cause for water pollution, but two general categories exist: direct and indirect contaminant sources.

Direct sources include effluent outfalls from factories, refineries, waste treatment plants etc.. that emit fluids of varying quality directly into urban water supplies. In the united state and other countries, these practices are regulated, although this doesn't mean that pollutants can't be found in these water.

Indirect sources include contaminents that enter the water supply from soils/groundwater systems and from the atmosphere via rain water. Soil and ground waters contain the residue of human agricultural practices (fertilizers, pesticides, etc.) and improperly disposed of industrial wastes. Atmospheric contaminents are also derived from human practices (such as gaseous emission from automobiles, factories and even bakeries). Containments can be broadly classified into organic, Inorganic, radioactive and acid/base.

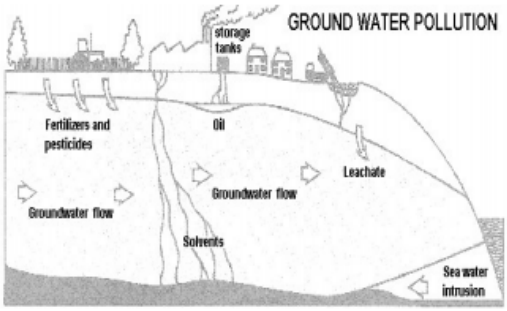

Figure 1: Sources of Water pollution

1.4 Effect of Water Pollution:

Effects of Water Pollution on Human Health:

- Domestic and hospital sewage contain many undesirable pathogenic microorganisms, and its disposal into a water without proper treatment may cause outbreak of serious diseases, such as, amoebiasis dysentery, typhoid, jaundice, cholera, etc.
- Metals like **lead, zinc, arsenic, copper, mercury** and **cadmium** in industrial waste waters adversely affect humans and other animals.
- **Arsenic pollution** of ground water has been reported from West Bengal, Orissa, Bihar, Western U.P. Consumption of such arsenic polluted water leads to accumulation of arsenic in the body parts like blood, nails and hairs causing skin lesions, rough skin, dry and thickening of skin and ultimately **skin cancer**.
- Mercury compounds in waste water are converted by bacterial action into extremely toxic **methyl mercury**, which can cause numbness of limbs, lips and tongue, deafness, blurring of vision and mental derangement.
- Pollution of water bodies by mercury causes **Minamata** (neurological syndrome) disease in humans and **dropsy** in fishes.
- Lead causes **lead poisoning** (Lead interferes with a variety of body processes and is toxic to many organs and tissues). The compounds of lead cause anemia, headache, loss of muscle power and bluish line around the gum.
- Cadmium poisoning causes cancer of lungs and liver and **Itai – Itai** disease (a painful disease of bones and joints, causes softening of the bones and kidney failure) etc.
- Water contaminated with cadmium can cause itai itai disease also called ouch-ouch disease (a painful disease of bones and joints) and cancer of lungs and liver.

Effects of Water Pollution on Environment:

- Micro-organisms involved in biodegradation of organic matter in sewage waste consume lot of oxygen, and make water oxygen deficient killing fish and other aquatic creatures.
- Presence of large amounts of nutrients in water results in **algal bloom** [excessive growth of planktonic (free-floating) **algae** [Harmful Algal Blooms and **Eutrophication** are explained in the previous post]. This leads to **ageing of lakes**.
- A few toxic substances, often present in industrial waste waters, can undergo biological magnification (Biomagnification) in the aquatic food chain. This phenomenon is well-known for **mercury** and **DDT**.
- High concentrations of DDT disturb calcium metabolism in birds, which causes thinning of eggshell and their premature breaking, eventually causing decline in bird populations.
- Thermal wastewater eliminates or reduces the number of organisms sensitive to high temperature, and may enhance the growth of plants and fish in extremely cold areas but, only after causing damage to the indigenous flora and fauna.
- Aquatic organisms take up pesticides from water which get into the food chain and move up the food chain. At higher trophic level they get concentrated and may reach the upper end of the food chain [**Biomagnification**explained in 'Trophic Levels'].

Effects of Water Pollution on Aquatic Ecosystem:

- Polluted water reduces Dissolved Oxygen (DO) content, thereby, eliminates sensitive organisms like plankton, molluscs and fish etc.
- However a few tolerant species like **Tubifex (annelid worm)** and some insect larvae may survive in highly polluted water with low DO content. Such species are recognized **as indicator species** for polluted water.
- **Biocides, polychlorinated biphenyls (PCBs)** and **heavy metals** directly eliminate sensitive aquatic organisms.
- Hot waters discharged from industries, when added to water bodies, lowers its DO content.

1.5 Why Water Quality Analysis is require?

Water quality analysis is required mainly for monitoring purpose. Some importance of such assessment includes:

1) To check whether the water quality is in compliance with the standards, and hence, suitable or not for the designated use.
2) To monitoring the efficiency of a system, working for water quality maintenance

5. Result:

The different type of water parameter at a different location is shown in the table and graph. Which are given below.

Table 2: Concentration of Water parameter

Location	pH	Conductivity (S/m)	Total Dissolved Solid (mg/l)	Dissolved Oxygen (mg/l)	Total Hardness (mg/l)
Location 1	6.26	6.6	4224	0.08	320
Location 2	9.24	8.24	5273.6	4.87	350
Location 3	6.55	0.41	263.68	6.85	196
Location 4	8.01	4.43	2835.2	7.11	396
Location 5	7.98	0.91	582.4	7.06	120
Location 6	7.73	1.08	695.68	6.88	196
Location 7	7.96	1.56	998.4	6.94	226
Location 8	7.97	2.9	1856	7.2	226
Location 9	6.99	10.5	6720	5.54	2260
Location 10	8.2	0.42	268.8	7.12	203

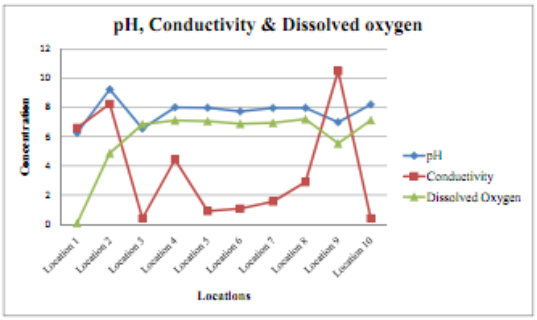

Figure 5: pH, Conductivity and Dissolved oxygen at different location

The maximum pH concentration found at location 2 is 9.24 and minimum pH concentration found at location 1 is 6.26 . Conductivity found at location 9 is 10.5 S/m which is higher than other location. Conductivity found at location 1 is 0.412 S/m which is lower than other location. The maximum dissolved oxygen found at location 8 and minimum dissolved oxygen found at location 1. The pH, Conductivity and dissolved oxygen found at every location is around the standard limit.

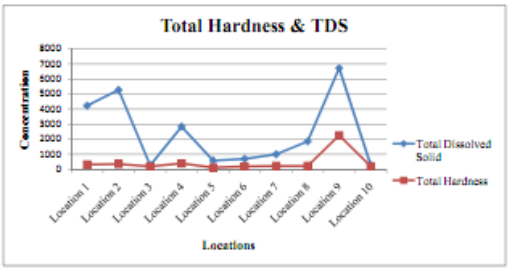

Figure 6: Total Hardness and TDS at different location

The total dissolved solids and total hardness are found at every location much higher than the standard limit. The maximum total hardness found is 2260 mg/l at location 9. The minimum total hardness found is 120 mg/l at location 5. The total hardness varied from 196 mg/l to 2260 mg/l which shows the variation in the presence of calcium, magnesium and variety of other metals. Total dissolved solids found at location 9 is 6720 mg/l which is higher than other location. Total dissolved solids found at location 3 is 263.68 mg/l which is lower than other location. The level of total dissolved solids in drinking water affects the taste of the water.

6. Conclusion:

From the above study it should be concluded that water pollution is the contamination of water bodies, usually as a result of human activities. The main problem caused by water pollution is that it kills organisms that depend on these water bodies. Dead fish, crabs, birds and seagulls, dolphins, and many other animals often wind up on beaches, killed by pollutants in their habitat (living environment). Pollution disrupts the natural food chain as well. All the samples have variation in the result as given below.

The TDS fluctuates from 582.4 mg/l to 6720mg/l but more dissolved solids present in to the water. Well, the level of total dissolved solids in drinking water affects the taste of the water. The total hardness varied from 196 mg/l to 2260 mg/l which shows the variation in the presence of calcium, magnesium and a variety of other metals

The lower concentration of dissolved oxygen is increasing the stress to the aquatic life. Here the drop down to 0.08 mg/l and if Oxygen levels that remain below 1-2 mg/l for a few hours can result in large fish kills.

Conductivity is directly proportional to the presence of conductive ions come from dissolved salts and inorganic materials such as alkalis, chlorides, sulfides, carbonate compounds and environmental factors also. So here the conductivity fluctuates due to variation in TDS.

Water is a natural resource that is vital to human health. It is also a resource that is undergoing a major crisis; its capacity to support plant and animal life is rapidly being destroyed by human activities. So the more treatment plant should be strictly implemented in industries which polluting water adversely and implement new technologies to minimize the use of water and should focus on sustainable development.

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- Central Pollution Control Board

PROJECT REPORT ON

PM_{10} CONCENTRATION IN JKLU CAMPUS

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1. Introduction:

PM_{10} - Particulate Matter:

Particulate matter (PM) is a complex mixture of extremely small particles and liquid droplets. PM is made up of a number of components, including acids such as nitrates and sulfates, organic chemicals, metals, soil, and dust. Sources of particulate matter include construction sites, gravel/dirt roads, smokestacks, and fires. Many particles form in the atmosphere via chemical reactions of other pollutants like sulfur dioxide and nitrogen oxides, which are emitted from combustion sources like power plants and automobiles.

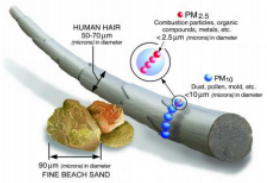


Figure 1: Size comparisons of PM particles

PM stands for particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye.

Particulate matter less than 10 micron (µm) size are designed as respirable particulate matter (RPM) also known as PM_{10} causing the health damage. The PM10 particles are capable of reaching lungs and large enough to be deposited by sedimentation. Sedimentation is most effective for particles between 2 and 4 µm. Larger particles i.e.> 10 µm that enters the respiratory system, can be trapped by the hairs and linings of the nose. Once captured, they can driven out by a cough or sneeze. So, particles greater than 10 µm size, are quite effectively removed by upper respiratory system.

The upper limit of the size of RPM, whether 10 µm or 15 µm, is still a matter of discussion. The choice of 15 µm cut-off size is based on the worst case situation of mouth breathers, because in nose breather particle larger than 10 µm are either ejected by noise or restricted to the nasopharyngeal region (Harrison and Perry,1986).

About 40% of the particles between 1 and 2 µm size are retained in bronchioles and alveoli (Fig.2). Particle between 0.25 to 1 µm shown a decrease in retention because many particles in this range are breathed in and out again. However, Particle below 0.25 µm shows another increase in relation because of Brownian motion, which results in impingement (Peavy et al, 1985).

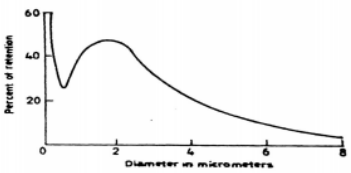


Figure 2: Retention of particulates in lungs

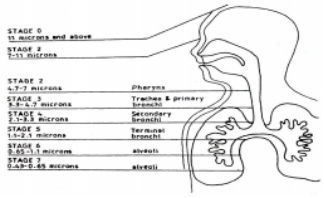


Figure 3: Deposition of RPM in human respiratory system.

The Respirable is defined as a percentage according to the size of particles as given below (table.1). The deposition of RPM in human respiratory system is shown in fig.3.

- **Greenhouse Gasses –** Our atmosphere's molecular make up has changed dramatically since the industrial revolution. The increase in global industries has led to a build-up of so called greenhouse gasses in the atmosphere, which prevent heat from escaping the planet leading to global warming.
- **Global dimming –** Reductions in the earth's direct irradiance have led researchers to believe that the increase in particulates in the atmosphere has impacted this, global dimming also creates a cooling effect, counteracting the heating of the greenhouse gasses.
- **Ocean acidification –** Due to the higher levels of carbon dioxide released by human activity. An estimated 30-40% of carbon dioxide dissolves into the oceans, causing harmful effects to ocean life such as coral bleaching.

Health Effects:

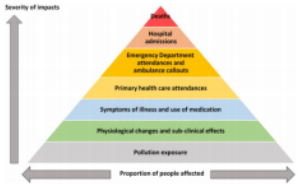


Figure 4: hierarchy of effect of particulate matter

- **Asthma –** A rising rate of diagnoses have been linked to the increased levels of fine pollutants in countries worldwide, particularly in areas with higher pollution.
- **Lung cancer –** Fine particles that penetrate deep into the human respiratory system and attack the bronchi, affecting the health of the lungs and leading to cancerous growths.
- **Cardiovascular disease –** Numerous different particulates have drastic effects on the heart and its functions, again caused by the fine particulates that easily pass into the human system unfiltered.
- **Premature delivery –** Exposure to high levels of air pollutants has led to an increase in the amount of failed pregnancies, especially in towns and cities with higher levels of pollution.

2. Materials and Methods:

Study area:

JK Lakshmipat University was selected as a study area. JKLU is situated at Near Mahindra SEZ, P.O. Mahapura, Ajmer road, Jaipur, Rajasthan. JKLU is 17km away from Jaipur city. JKLU is situated at 26.8361° N, 75.6502° E. It has a total 30 acre (121406 m^2) area. The satellite image of JKLU is shown in below.

Figure 5: Satellite image of JKLU campus.

Monitoring and Analysis:

Particulate matter (PM_{10}) was monitored continuously for 24-hours in a day at ten different locations at JKLU for ten days. Name of the ten different sites as follows

- IT Building
- IM Building
- Admin Building
- LRC Stairs
- Boys Hostel – 2
- Mess Building
- Boys Hostel – 1
- Girls Hostel
- Main Gate of University
- New Block Building

Particulate matter (PM_{10}) concentrations are expressed in microgram per cubic meter (µg/m^3). The particulate matter was measured by Respirable dust sampler which determines particulate mass concentrations in ambient air. Working principle and procedure taken for measurement PM_{10} is Beta Ray Attenuation which is given as below.

Table 1: Aerodynamic size fraction of Respirable particles.

Aerodynamic diameter (µm)	Respirable (%)
2 and below	90-100
2.5	75
3.5	50
5.0	25
10 and above	0

A Respirable dust monitor should, therefore, reject all the particles larger than 10µm. The particles larger than 10 µm were accepted by many industrial hygienists as non-Respirable.

Exposure to particulate matter can damage lung and heart function by irritating the airways and causing irregular heartbeats. PM settling on the ground or water contributes to acid rain damage and soil nutrient depletion. PM also reduces visibility (haze), which degrades scenic areas and can obscure transportation routes (e.g. wildfire smoke passing over a road).

There is one primary and secondary standard for PM_{10}, and both standards have the same limit. The standard value of PM_{10} for 24 hours is 100µg/m^3 and annually 60µg/m^3.

Types of Particulate matter:

There are mainly two types of particulate matter as following

1. **Primary particulate matter:**
   The particulate matter directly generated from source is known as a primary particulate matter.
2. **Secondary particulate matter:**
   Secondary particulate matter generated from some primary particulate matter reacts with one another or with other chemicals to form secondary particulate matter.

Sources of Particular matter:

Natural Sources:

- **Volcanoes –** Erupting volcanoes eject large quantities of particulates including volcanic ash and gases into the atmosphere, volcanic eruptions have been directly associated with climate change since studies began.
- **Dust storms –** Strong winds can pick up vast clouds of dust which in turn are dispersed into the atmosphere and can take years to return to the surface.
- **Forest and grassland fires –** Wood and grass smoke contain a complex mixture of particulates such as carbon monoxide and hydrogen cyanide, which are lifted into the air and rest in the atmosphere.
- **Birth defects –** Particulates pass through the mother and into the child at any point of the pregnancy and can lead to a wide range of birth defects.
- **Premature death –** Typically higher in regions with high levels of air pollutants and aerosols.
- **Vascular inflammation –** Caused by a plaque build-up in the arteries, directly caused by particulates inhaled.
- **Atherosclerosis –** Hardening of the arteries that reduces elasticity, leading to heart problems, also caused by plaque build-up.
- **Radiation exposure –** A large number of particulates are formed up of radioactive material such as uranium and thorium, which is then inhaled or finds its way into crops which in turn are consumed.

Experiment: Respirable Particulate Matter (RPM) (By Respirable dust sampler (RDS))

Objective:

To find out the most polluted area in JKLU campus.

Working Principle:

Ambient air laden with suspended particulate matter passes through a cyclone. The coarse, non-Respirable dust is separated from the air stream by centrifugal forces acting on the solid particles. These particles are collected in the hopper of the cyclone. The fine dust forming the Respirable fraction passes through the cyclone and carried by the air stream to the filter paper and deposited on the filter Fig. 6 gives an exploded view of a typical RDS system.

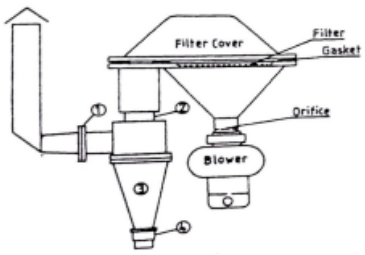


Figure 6 : Respirable dust sampler (RDS). (1) tangential gas inlet; (2) axial gas inlet; (3) conical lower section and, (4) a dust tight bin.

It consists of suitably designed cyclone separator with (1) a tangential gas inlet, (2) axial gas outlet, (3) a conical lower section and, (4) a dust tight bin in series with a HVS unit connected through a suitably designed coupling system. The height and width of the rectangular opening of the air inlet, the diameter of the air outlet and other dimensions of the cyclones are so designed that it separates and collects non-Respirable dust fraction in the dust tight bin and allows the Respirable fraction to exit the axial gas outlet to the coupling system and finally to glass fiber filter.

Procedure:

1. Manometer: Fill the manometer tube with distilled water. Allow the water column to settle down and see that lower level of meniscus is at the zero mark of the scale.

2. Preparation of filter: Check the pinholes and number the filter paper. Dry the filter paper at 100°C for 1h. Remove the filters from the oven into a desiccator. Allow the filter to cool down to room temperature inside the desiccator. Weigh the filters immediately after they are taken out of the desiccator.

3. Storage: Store the filters without folding the paper in a clean flat box as shown in fig.

Figure 7: Storage of Filter paper

4. Handling: Since the filter paper is binder-free, it is quite fragile. So, during weighing and handling, do not fold the filter paper.

Installation of filter paper on sampler

5. Loosen the four wing nuts and remove the top cover.

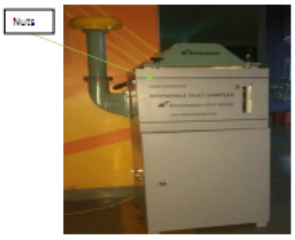


Figure 8: Respirable dust sampler

Figure 10: Setting Date and Time in instrument

2. After 24 hours of continuous sampling, before putting off the blower, record the total time of running from timer and final manometer reading.

Figure 11: Final reading of manometer

3. Remove the faceplate and take out the filter paper carefully by touching the outer edge only. Fold the filter lengthwise so that only surfaces with collected particulate are in contact, and place in a sealed polythene folder. Record the folder and filter number, location, and any other factors such as meteorological factors, (rainfall, wind velocity etc.), or raising of nearby building that might affect the results.

6. Check that the filter clamping gasket and backing screen are clean.

7. Place the filter paper on the backing screen taking care to ensure that it is centralized.

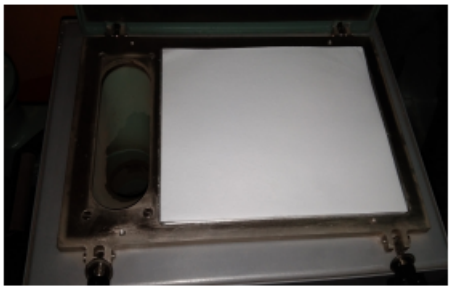


Figure 9: Filter paper in Respirable dust sampler

8. Uniformly tighten the wing nuts maintaining almost equal pressure on all sides of the cover.

Pre-use checks for the cyclone assembly: Remove the dust collection bottle at the bottom of the cyclone. Wipe the bottle inside with a clean tissue paper. Use a small paint brush to clear any dust residues at the bottom hole of the cyclone body. If the seal rings are dry, apply a little silicon grease. Replace the dust collection bottle and push it upwards until it rests firmly against the bottom seal ring. The sampler is now ready for particulate sampling.

Gaseous sampling: The RDS is also provided with a suction nozzle to facilitate installation of gaseous sampling attachment. Fill the impinger with absorbing solution for SO_2, and NOx.

Check the time from time totalize: Set the timer as desired.

Now, switch on the RDS

1. Air is sucked through the filter paper. Record the initial manometer reading for flow measurement, elapse time indicator, starting time and date.

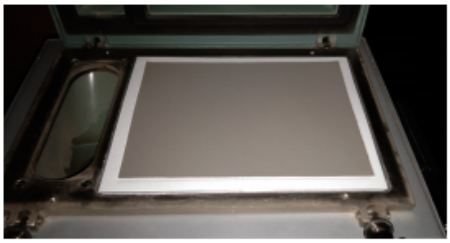


Figure 12: Filter paper after 24 hour

4. Collect the dust from the bin of cyclone and weigh.

5. Expose filter for 12 hour in the filter conditioning environment and then reweigh.

After they are weighed, the filters may be saved for details chemical analysis.

3. Observation Table:

The observation taken at different locations is shown in observation table. The initial and final flow rate of every location is taken at a time during the experiment. The initial and final weight of filter paper is taken by using weighing machine. Every taken data are shown in the table.

Table 2: Observation Data of different location

Location	Flow rate (m^3/min)		Weight of Filter Paper (gm)	
	Initial (Q_1)	Final (Q_2)	Initial (W_1)	Final (W_2)
IT Building	1.05	0.88	2.7	2.87
IM Building	1.05	0.94	2.7	2.82
Admin Building	1.05	0.87	2.712	2.884
LRC Stair	1.03	0.85	2.704	2.921
Boys Hostel - 2	1.11	0.95	2.721	2.924
Mess	1.12	0.94	2.723	2.926
Boys Hostel - 1	1.06	0.93	2.716	2.935
Girls Hostel	1.08	0.96	2.718	2.943
Main Gate	1.12	0.86	2.713	3.01
New Block	1.11	0.95	2.716	2.95

Calculation:

1) IT Building:

Calculation of volume of air sampled.

Air volume sampled (V), $(m^3) = \frac{(Q1+Q2)}{2} \times T$; Where, Q1 = initial airflow rate, m3/min.

Q2 = final air flow rate, m3/min.

T =sampling time in minutes,

$$\text{So, } V = \frac{(1.05+0.88)}{2} \times 24 \times 60$$

$$V = 1389.6\ m^3$$

Calculate the concentration of Respirable dust and total dust as described in SPM calculation.

$$PM10\ Concentration\ (\mu g/m^3) = \frac{Wt\ of\ dust\ collected(W2-W1)}{Air\ volumed\ (V)} \times 10^6$$

$$= \frac{(2.87-2.70)}{1389.6} \times 10^6$$

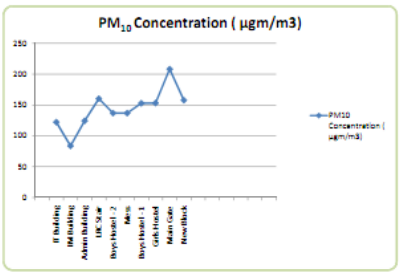
$$= 122.33 \mu g/m^3$$

4. Result:

The PM_{10} concentration in JKLU campus is shown in table and graph.

Table 3: PM_{10} Concentration JKLU campus

Location	Flow rate(m^3/min)		Weight of Fliter Paper (gm)		PM_{10} Concentration ($\mu g/m^3$)
	Initial (Q_1)	Final (Q_2)	Initial (W_1)	Final (W_2)	
IT Building	1.05	0.88	2.70	2.87	122.33
IM Building	1.05	0.94	2.70	2.82	83.75
Admin Building	1.05	0.87	2.712	2.884	124.42
LRC Stair	1.03	0.85	2.704	2.921	160.31
Boys Hostel - 2	1.11	0.95	2.721	2.924	136.86
Mess	1.12	0.94	2.723	2.926	136.86
Boys Hostel - 1	1.06	0.93	2.716	2.935	152.84
Girls Hostel	1.08	0.96	2.718	2.943	153.18
Main Gate	1.12	0.86	2.713	3.01	208.33
New Block	1.11	0.95	2.716	2.95	157.75



Graph: 1 PM_{10} Concentration in JKLU Campus

2) IM Building:

Calculation of volume of air sampled.

Air volume sampled (V), $(m^3) = \frac{(Q1+Q2)}{2} \times T$; Where, Q1 = initial air-flow rate, m3/min.

Q2 = final air flow rate, m3/min.

T =sampling time in minutes,

$$\text{So, } V = \frac{(1.05+0.94)}{2} \times 24 \times 60$$

$$V = 1432.8\ m^3$$

Calculate the concentration of Respirable dust and total dust as described in SPM calculation.

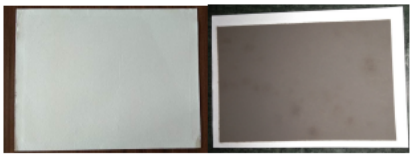
$$PM10\ Concentration\ (\mu g/m^3) = \frac{Wt\ of\ dust\ collected(W2-W1)}{Air\ volumed\ (V)} \times 10^6$$

$$= \frac{(2.82-2.70)}{1432.8} \times 10^6$$

$$= 83.75 \mu g/m^3$$

Calculation of PM_{10} Concentration for other site as same method as given above.

The maximum particulate matter concentration found in JKLU campus at Main gate site and the minimum particulate matter concentration found in JKLU campus at IM Building site. The condition of filter paper is shown in fig.



Before **After**

Figure 13: Filter Paper

5. Conclusion:

From the study it can be concluded that at JKLU campus the particulate matter concentration found in all the site is above the standard level. So it is affected to the human health and it should be controlled by the following measures

- Identify measures for improving operating and management practices.
- Select optimal particulate removal devices such as ESPs and baghouses.
- Installed air pollution controlling equipment.
- Ban on burning of leaves, biomass and municipal solid waste.
- Mulch or compost leaves and yard waste.
- Tree Plantation along roads and intersection.
- Promotion of cleaner production processes.

6. References:

- https://www.epa.gov/pm-pollution/particulate-matter
  Environmental Protection Agency
- https://www.conserve-energy-future.com/causes-and-effects-of-particulate-matter
- Ministry of Environment and Forest
- World Health Organization
- Central Pollution Control Board

Course Title and Code: Safety in Chemical Industry (MTHSE 214)	
Hours per Week	**L-T-P: 3-0-0**
Credits	**3**
Students who can take	**M.Tech Semester-II (Batch: 2018-2020)**

Course Objective:
The objective of this course is to study risk identification and management in process plant integrity management. Process integrity management or process safety management is important because accidents in process plants can cause significant casualties and serious financial losses with the potential impact on the community over a wide radius from the plant itself. This course focuses on high consequence and low probability events.

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

1) Distinguish the typical sources of risk in a process plant by;
2) Assess the severity of the consequences of incidents;
3) Undertake a Hazard and Operability Study (HAZOP);
4) Explain the legal framework controlling process plant safety in India;
5) Analyze the root cause of accidents in chemical industry.

Prerequisites		Occupational Health and Safety
Sr. No.	**Evaluation Component**	**Marks**
1	Attendance	
2	Assignment	10
3	Class Participation	5
4	Quiz	5
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	40
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

Syllabus (Theory)

SAFETY IN PROCESS DESIGN AND PRESSURE SYSTEM DESIGN: Design process, conceptual design and detail design, assessment, inherently safer design chemical reactor, types, batch reactors, reaction hazard evaluation, assessment, reactor safety, operating conditions, unit operations and equipments, utilities. Pressure system, pressure vessel design, standards and codes- pipe works and valves- heat exchangers- process machinery- over pressure protection, pressure relief devices and design, fire relief, vacuum and thermal relief, special situations, disposal- flare and vent systems failures in pressure system.

PLANT COMMISSIONING AND INSPECTION Commissioning phases and organization, pre-commissioning documents, process commissioning, commissioning problems, post commissioning documentation Plant inspection, pressure vessel, pressure piping system, non-destructive testing,

pressure testing, leak testing and monitoring- plant monitoring, performance monitoring, condition, vibration, corrosion, acoustic emission-pipe line inspection.

PLANT MAINTENANCE, MODIFICATION AND EMERGENCY PLANNING Management of maintenance, hazards- preparation for maintenance, isolation, purging, cleaning, confined spaces, permit system- maintenance equipment- hot works- tank cleaning, repair and demolition- online repairs- maintenance of protective devices- modification of plant, problems- controls of modifications. Emergency planning, disaster planning, onsite emergency- offsite emergency, APELL

STORAGES AND TRASPORTATION General consideration, petroleum product storages, storage tanks and vessel- storages layout segregation, separating distance, secondary containment- venting and relief, atmospheric vent, pressure, vacuum valves, flame arrestors, fire relief- fire prevention and protection LPG storages, pressure storages, layout, instrumentation, vapourizer, refrigerated storages LNG storages, hydrogen storages, toxic storages, chlorine storages, ammonia storages, other chemical storages- underground storages- loading and unloading facilities- drum and cylinder storage- ware house, storage hazard assessment of LPG and LNG Hazards during transportation – pipeline transport

PLANT OPERATIONS Operating discipline, operating procedure and inspection, format, emergency procedures hand over and permit system- start up and shut down operation, refinery units- operation of fired heaters, driers, storage- operating activities and hazards- trip systems- exposure of personnel. Specific safety consideration for Cement, paper, pharmaceutical, petroleum, petro-chemical, rubber, fertilizer and distilleries.

Text Book 1. Lees, F.P. “Loss Prevention in Process Industries” Butterworths and Company, 1996.

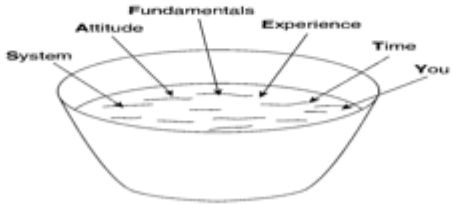
References

1. “Quantitative Risk Assessment in Chemical Process Industries” American Institute of Chemical Industries, Centre for Chemical Process safety.
2. Fawcett, H.h. and Wood, “Safety and Accident Prevention in Chemical Operations” Wiley inters, Second Edition.
3. “Accident Prevention Manual for Industrial Operations” NSC, Chicago, 1982.
4. GREEN, A.E., “High Risk Safety Technology”, John Wiley and Sons,. 1984.
5. Petroleum Act and Rules, Government of India. 6. Carbide of Calcium Rules, Government of India.

Activity for Skill and Employability

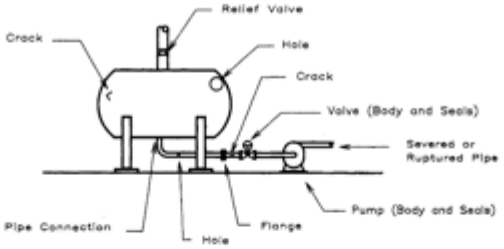
QUIZZES

1. Form a work accident or from an exposure involving a single incident in the work environment such as a cut, fracture, a sprain is known as……
2. Number of occupational injuries and/or illnesses or lost workdays per 100 full-time employees are …… as per OSHA.
3. The FAR reports the number of fatalities based on 1000 employees working their entire lifetime. The employees are assumed to work a total of 50 years. Calculate the FAR is based on 10^8 working hours……..
4. The OSHA incidence rate provides information on all types of work-related
5. The airline industry claims commercial airline transport has fewer deaths per mile than any other means of transportation. Do the accident statistics support this claim? In 1984 the airline industry posted 4 deaths per 10,000,000 passenger miles. What additional information is required to compute a FAR? A fatality rate?
6. A university has 1200 full-time employees. In a particular year, this university had 38 reportable lost-time injuries with a resulting 274 lost workdays. Compute the OSHA incidence rate based on injuries and lost workdays.
7. A certain volatile substance evaporates from an open container into a room of volume 1000 ft^3. The evaporation rate is determined to be 100 mg/min. If the air in the room is assumed to be well mixed, how many ft^3/min of fresh air must be supplied to ensure that the concentration of the volatile is maintained below its TLV of 100 ppm? The temperature is 77°F and the pressure is 1 atm. Assume a volatile species molecular weight of 100. Under most circumstances, the air in a room cannot be assumed to be well mixed. How would poor mixing affect the quantity of air required? How volatile substance enter and effects the biological organisms.
8. A contractor accidentally cut into a 10-in propane line operating at 800 psi at a natural gas liquids terminal. The large vapor cloud estimated to cover an area of 44 acres was ignited about 4-5 min later by an unknown source. Liquid products from 5 of 26 salt dome caverns fed the fire with an estimated 18,000-30,000 gal of LPG for almost 6 hr. before being blocked in and the fires extinguished. Both engine-driven fire pumps failed, one because intense radiated heat damaged its ignition wires and the other because the explosion broke a sight glass fuel gauge, spilling diesel fuel, which ignited, destroying the fire pump engine. Identify the initiation, propagation, and termination steps in accident reports. How to prevent these accidents.
9. Explain the importance of each ingredients for a successful safety programs



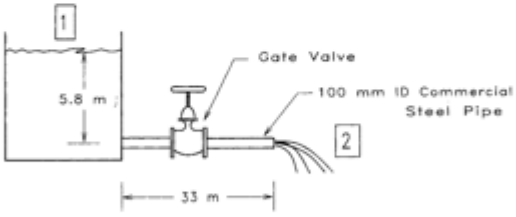
ASSIGNMENTS

1. Estimate the release mechanism in the figure.



2. At 1 P.M. The plant operator notices a drop in pressure in a pipeline transporting benzene. The pressure is immediately restored to 100 psig. At 2:30 P.M. A 1¼-in-diameter leak is found in the pipeline and immediately repaired. Estimate the total amount of benzene spilled. The specific gravity of benzene is 0.8794.

3. Water contaminated with small amounts of hazardous waste is gravity-drained out of a large storage tank through a straight commercial steel pipe, 100 mm ID is shown in below figure. Compute the flow rate of material escaping from the pipe.

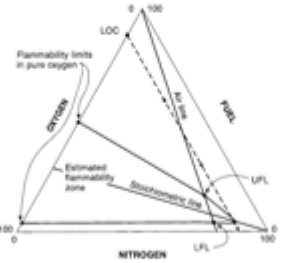


4. Xylene is used as a solvent in paint. A certain painting operation evaporates an estimated 3 gal of xylene in an 8-hr shift. The ventilation quality is rated as average. Determine the quantity of dilution ventilation air required to maintain the xylene concentration below 100 ppm, the TLV-TWA. Also, compute the air required if the operation is carried out in an enclosed hood with an opening of 50 ft^2 and a face velocity of 100 ft/min. The temperature is 77°F and the pressure is 1 atm. The specific gravity of the xylene is 0.864, and its molecular weight is 106.

5. A cylindrical tank 20 ft. high and 8 ft. in diameter is used to store benzene. The tank is padded with nitrogen to a constant regulated pressure of 1 atm gauge to prevent explosion. The liquid level within the tank is presently at 17 ft. A 1-in puncture occurs in the tank 5 ft off the ground because of the careless driving of a forklift truck. Estimate (a) the gallons of benzene spilled, (b) the time required for the benzene to leak out, and (c) the maximum mass flow rate of benzene through the leak. The specific gravity of benzene at these conditions is 0.8794.

6. You have just begun work at a chemical plant. After several weeks on the job you determine that the plant manager runs the plant with an iron fist. He is a few years away from retirement after working his way up from the very bottom. Also, a number of unsafe practices are performed at the plant, including some that could lead to catastrophic results. You bring up these problems to your immediate supervisor, but he decides to do nothing for fear that the plant manager will be upset. After all, he says, "We've operated this plant for 40 years without an accident." What would you do in this situation?

7. Estimate the Method for the flammability limits in air, the LOC, and flammability limit in pure oxygen.



8. An open toluene container in an enclosure is weighed as a function of time, and it is determined that the average evaporation rate is $2.20X10^{-4}$ lb_m/min. The ventilation rate is 100 ft^3/min. The temperature is 540°R and the pressure is 1 atm. Estimate the concentration of toluene vapor in the enclosure, and compare your answer to the TLV for toluene of 50 ppm. R_g = 0.7302 ft^3 atm /lb-mol °R

CASE STUDY: The accident at Flixborough, England, occurred on a Saturday in June 1974. Although it was not reported to any great extent in the United States, it had a major impact on chemical engineering in the United Kingdom. As a result of the accident, safety achieved a much higher priority in that country.

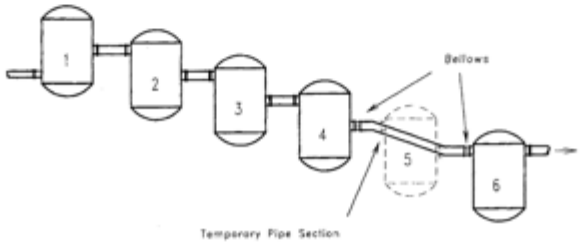
The Flixborough Works of Nypro Limited was designed to produce 70,000 tons per year of caprolactam, a basic raw material for the production of nylon. The process uses cyclohexane, which has properties similar to gasoline. Under the process conditions in use at Flixborough (155°C and 7.9 atm), the cyclohexane volatilizes immediately when depressurized to atmospheric conditions.

The process where the accident occurred consisted of six reactors in series. In these reactors cyclohexane was oxidized to cyclohexanone and then to cyclohexanol using injected air in the presence of a catalyst. The liquid reaction mass was gravity-fed through the series of reactors. Each reactor normally contained about 20 tons of cyclohexane.

Several months before the accident occurred, reactor 5 in the series was found to be leaking. Inspection showed a vertical crack in its stainless steel structure. The decision was made to remove the reactor for repairs. An additional decision was made to continue operating by connecting reactor 4 directly to reactor 6 in the series. The loss of the reactor would reduce the yield but would enable continued production because unreacted cyclohexane is separated and recycled at a later stage.

The feed pipes connecting the reactors were 28 inches in diameter. Because only 20-inch pipe stock was available at the plant, the connections to reactor 4 and reactor 6 were made using flexible bellows-type piping, as shown in Figure. It is hypothesized that the bypass pipe section ruptured because of inadequate support and over flexing of the pipe section as a result of internal reactor pressures. Upon rupture of the bypass, an estimated 30 tons of cyclohexane volatilized and formed a large vapor cloud. The cloud was ignited by an unknown source an estimated 45 seconds after the release.

The resulting explosion leveled the entire plant facility, including the administrative offices. Twenty-eight people died, and 36 others were injured. Eighteen of these fatalities occurred in the main control room when the ceiling collapsed. Loss of life would have been substantially greater had the accident occurred on a weekday when the administrative offices were filled with employees. Damage extended to 1821 nearby houses and 167 shops and factories. Fifty-three civilians were reported injured. The resulting fire in the plant burned for over 10 days. Estimate the safety procedure to prevent this accidents. Identifying the causes of initiation propagation in this case.



INDUSTRIAL VISIT:

Tanwar Industries Ltd. Kaladera, Jaipur, (An AUTHORISED OEM OF M/S MAHINDRA & MAHINDRA LTD) February 04, 2019

Course code	Course Title	Teaching Scheme	
		Total Duration	Credits
PS2101	Internship	4—6 Weeks	4

Evaluation Scheme:		
Expert Evaluation	**Evaluation Component**	**Final Term**
External Supervisor (50)	Based on Feedback	50
Faculty Supervisor (50)	**Reporting Activity Fortnightly (10)**	10
	Report (20)	20
	Presentation &Viva (20)	20
Total		**100**

Course Syllabi:

This course is for 6 weeks at the end of 2nd semester during summer term of 2 year full time M.Tech. Program in all the engineering disciplines.
The objective of this programme is to provide the students an understanding of working of corporate world in various functions associated with an Industry/Organization. During this programme, they will observe and learn various real world applications of their curricula and develop an understanding of vast engineering operations and its various facets such as inventory, productivity, management, information systems, human resource development, data analysis etc. The general nature of internship assignments is of study and orientation.

Activity for Skill Development and Employability
Industry project and Reports

Study on Analytical Procedures of Environmental Pollutants

Submitted by:
Jay B. Patel
(2018MTHSE001)

Submitted To:
Dr. Jitendra Kumar Singh
HSE Coordinator

Department of Health, Safety & Environmental Engineering
Institute Engineering and Technology (IET)
JK Lakshmipat University Jaipur

July 2019

1

Study on Analytical Procedures of Environmental Pollutants

INTERNSHIP (PS2101)
Submitted in partial fulfilment of the requirements for the degree of
Master of Technology in Health, Safety & Environmental Engineering

Submitted by:
Jay B. Patel
(2018MTHSE001)

Submitted To:
Dr. Jitendra Kumar Singh
HSE Coordinator

Department of Health, Safety & Environmental Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

July 2019

2

STUDY ON ENVIRONMEATAL POLLUTION ANALYTICAL METHODS

Submitted by:

Tejas N Patel

(2018MTHSE002)

Submitted To:

Dr. Jitendra Kumar Singh

HSE Coordinator

Health, Safety & Environmental Engineering

Institute Department of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

July 2019

STUDY ON ENVIRONMEATAL POLLUTION ANALYTICAL METHODS

INTERNSHIP (PS2101)

Submitted in partial fulfilment of the requirements for the degree of

Master of Technology in Health, Safety & Environmental Engineering

Submitted by:

Tejas N Patel

(2018MTHSE002)

Submitted To:

Dr. Jitendra Kumar Singh

HSE Coordinator

Department of Health, Safety & Environmental Engineering

Institute of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

July 2019

Study of Health & Environment Safety in LG Electronics India Pvt. Ltd.

Submitted by:

Saransh Gupta

(2018MTHSE003)

Submitted To:

Dr. Jitendra Kumar Singh

HSE Coordinator

Health, Safety & Environmental Engineering

Institute Department of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

July 2019

Study of Health & Environment Safety in LG Electronics India Pvt. Ltd.

INTERNSHIP (PS2101)

Submitted in partial fulfillment of the requirements for the degree of

Master of Technology in Health, Safety & Environmental Engineering

Submitted by:

Saransh Gupta

(2018MTHSE003)

Submitted To:

Dr. Jitendra Kumar Singh

HSE Coordinator

Department of Health, Safety & Environmental Engineering

Institute of Engineering and Technology (IET)

JK Lakshmipat University Jaipur

CERTIFICATE

This is to certify that the Internship (PS2101) project work entitled " **Study on Analytical Procedures of Environmental Pollutants"** submitted by Jay B. Patel **(2018MTHSE001)** towards the partial fulfillment of the requirements for the degree of **Master of Technology in Health, Safety & Environmental 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 Practice School-I examination.

Dr. Jitendra Kumar Singh
Assistant Professor
Coordinator of Health, Safety & Environmental Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

Date of Submission:

ACKNOWLEDGEMENT

I have pleasure and privilege in expressing our heartiest gratitude to my venerable advisor Dr. Jitendra Kumar Singh, HSE Coordinator, Department of Health, Safety & Environmental Engineering, Institute of Engineering and Technology (IET), JK Lakshmipat University, Jaipur for his valuable guidance, constructive criticism, constant encouragement and keep interest in completing this project work.

I am also grateful to Mr. Amit Badlani, Managing Director of Go Green Mechanism Pvt. Ltd. and his staff for providing every possible help and Information regarding this project.

Last but far from the least, we have no words to express the sense of gratitude for the supports and understanding shown by our parents for their continuous inspiration and blessing and our family member whose encouragement, moral support, love and affection that made me to the present position.

Sincerely yours,
Jay B. Patel
(2018MTHSE001)

CERTIFICATE

This is to certify that the Internship (PS 2101) project work entitled " **Study on Analytical Procedures of Environmental Pollutants"** submitted by **Tejas N Patel (2018MTHSE002)** towards the partial fulfillment of the requirements for the degree of **Master of Technology in Health, Safety & Environmental 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 Internship (PS2101) examination.

Dr. Jitendra Kumar Singh
Assistant Professor
Coordinator of Health, Safety & Environmental Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

Date of Submission:

ACKNOWLEDGEMENT

I have pleasure and privilege in expressing our heartiest gratitude to my venerable advisor Dr. Jitendra Kumar Singh, HSE Coordinator, Department of Health, Safety & Environmental Engineering, Institute of Engineering and Technology (IET), JK Lakshmipat University, Jaipur for his valuable guidance, constructive criticism, constant encouragement and keep interest in completing this project work.

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Sincerely yours,
Tejas N Patel
(2018MTHSE002)

July 2019

CERTIFICATE

This is to certify that the Internship (PS2101) project work entitled " **Study of Industrial Safety in LG Electronics India Pvt. Ltd., Greater Noida,"** submitted by Saransh Gupta **(2018MTHSE003)** towards the partial fulfillment of the requirements for the degree of **Master of Technology in Health, Safety & Environmental 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 Internship - examination.

Dr. Jitendra Kumar Singh
Assistant Professor
Coordinator of Health, Safety & Environmental Engineering
Institute of Engineering and Technology (IET)
JK Lakshmipat University Jaipur

Date of Submission:

...../...../.....

ACKNOWLEDGEMENT

I have pleasure and privilege in expressing our heartiest gratitude to my venerable adviser Dr. Jitendra Kumar Singh, HSE Coordinator, Department of Health, Safety & Environmental Engineering, Institute of Engineering and Technology (IET), JK Lakshmipat University, Jaipur for his valuable guidance, constructive criticism, constant encouragement and keep interest in completing this project work.

I express my deep gratitude to Mr. Pankaj Khurana (HOD ESH & FET Team), my training officer and mentor for this project. A Big thank to Mr. Sandeep Panwar (Fire Officer) and Mr. Deepak kumar (Safety Officer). This training could be impossible for me without their kind help and guidance. Thorough the support provided by them, I have imparted knowledge on the avenues which this project have opened and explored. Their directions in making me think about unique conceptual and practical aspects of Health, Safety & Environment which has lifted this project at this stage of successful completion.

I extend my gratitude to LG Electronics Private Limited and my mentor, trainers and all the team member of ESH and FET for their encouragement, support, guidance and assistance for undergoing industrial training and for preparing the project report.

Sincerely yours,
Saransh Gupta
(2018MTHSE003)

ABSTRACT

Environment pollution is one of the most serious global challenges. Environmental pollution is the unfavorable alteration of our surroundings, wholly or largely as a byproduct of man's actions, through direct or indirect effects of the changes in the energy pattern, radiation levels, and chemical and physical constitution and abundance of organisms. Pollution is viewed from different angles by different people but is commonly agreed to be the outcome of urban-industrial and technological revolution and rapacious and speedy exploitation of natural resources, increased rate of exchange of matter and energy, and ever-increasing industrial wastes, urban effluents, and consumer goods.

Characterization of the environment, water, wastewater, air, and soil is the first stage of any treatment process. Based on the levels of pollution/impurity in the environment, and its discharge rate and location the treatment technologies must be designed for effective environmental pollution management. Analytical techniques using various methods to monitor the levels of pollutants in the relevant environment and basic precautions to be followed when carrying out these tests. Recent developments in the analysis of the quality of the water, wastewater, and industrial effluents, air sampling techniques and soil assessments are elaborated. This chapter will be a ready reckon for laboratory practices in analysis of environmental parameters.

TABLE OF CONTENTS

Abstract

Environmental pollution is the unfavorable alteration of our surroundings, wholly or largely as a byproduct of man's actions, through direct or indirect effects of the changes in the energy pattern, radiation levels, and chemical and physical constitution and abundance of organisms. Environmental pollution is a global problem and is common to both developed as well as developing countries, which attracts the attention of human beings for its severe long-term consequences. The decline in environmental quality as a consequence of pollution is evidenced by loss of vegetation, biological diversity, excessive amounts of harmful chemicals in the ambient atmosphere and in food grains, and growing risks of environmental accidents and threats to life support systems. Pollution is viewed from different angles by different people but is commonly agreed to be the outcome of urban-industrial and technological revolution and rapacious and speedy exploitation of natural resources, increased rate of exchange of matter and energy, and ever-increasing industrial wastes, urban effluents, and consumer goods. Holdgate (1979) defined environmental pollution as the introduction by man, into the environment, of substances or energy liable to cause interference with legitimate uses of environment. Singh (1991) has defined pollution in a very simple manner, i.e., "Disequilibrium condition from equilibrium condition in any system." This definition may be applied to all types of pollution ranging from physical to economic, political, social, and religious. Over the past couple of decades, various sources of pollution were identified that altered the composition of water, air, and soil of the environment. The substances that cause pollution are known as pollutants. A pollutant can be any chemical (toxic metal, radionuclides, organophosphorus compounds, gases) or geochemical substance (dust, sediment), biological organism or product, or physical substance (heat, radiation, sound wave) that is released intentionally or inadvertently by man into the environment with actual or potential adverse, harmful, unpleasant, or inconvenient effects. Such undesirable effects may be direct (affecting man) or indirect, being mediated via resource organisms or climate change. Depending on the nature of pollutants and also subsequent pollution of environmental components, the pollution may be categorized as Air pollution, Water pollution, Soil/Land pollution, Radiation pollution, Thermal pollution. Among these types of pollution, air pollution is the main type threatening the environment, humans, plants, animals, and all living organisms.

Table of Contents

Abstract

Environment pollution is one of the most serious global challenges. Environmental pollution is the unfavorable alteration of our surroundings, wholly or largely as a byproduct of man's actions, through direct or indirect effects of the changes in the energy pattern, radiation levels, and chemical and physical constitution and abundance of organisms. Pollution is viewed from different angles by different people but is commonly agreed to be the outcome of urban-industrial and technological revolution and rapacious and speedy exploitation of natural resources, increased rate of exchange of matter and energy, and ever-increasing industrial wastes, urban effluents, and consumer goods.

Characterization of the environment, water, waste water, air, and soil is the first stage of any treatment process. Based on the levels of pollution/impurity in the environment, and its discharge rate and location the treatment technologies must be designed for effective environmental pollution management. Analytical techniques using various methods to monitor the levels of pollutants in the relevant environment and basic precautions to be followed when carrying out these tests. Recent developments in the analysis of the quality of the water, waste water, and industrial effluents, air sampling techniques and soil assessments are elaborated. This chapter will be a ready reckon for laboratory practices in analysis of environmental parameters.

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