JK Lakshmipat University

Laliya Ka Vas, P.O. Mahapura, Ajmer Road, Jaipur 302 026

Ph.: +91-141-7107500

INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

Course Structure, Detailed Syllabus

&

Scheme of Examination

B.Tech + M.Tech Course Structure for the Batch 2015-20

Semester	Courses							(L T P) Credits / Hrs/ Week
I	English Communication Skills	Engineering Mathematics - I	Engineering Chemistry	Electrical & Electronics Engineering	Workshop Practice	Engineering Drawing		(13 3 10) 21
	LA101 (2 1 0) 3	MA101 (3 1 0) 4	CH101 (3 1 2) 5	EE101 (3 0 2) 4	ME141 (0 0 4) 2	CE102 (2 0 2) 3		26
II	Professional Communication Skills	Engineering Mathematics - II	Engineering Physics	Environmental Studies	Engineering Mechanics	Object Oriented Programming		(15 4 6) 22
	LA201 (1 1 2) 3	MA201 (3 1 0) 4	PH101 (3 1 2) 5	ID201 (2 0 0) 2	ME201 (3 1 0) 4	CSE202 (3 0 2) 4		25
III	Data Structures	Digital Electronics	Electronic Device & Circuits	Principles of Programming Languages	Engineering Mathematics – III	Principles of Management for Engineers	**Software Systems Lab-I**	(17 3 8) (0 0 4) 24 +2
	CSE301 (3 0 4) 5	ECE303 (3 1 2) 5	ECE301 (3 1 2) 5	CSE303 (3 0 0) 3	MA301 (3 1 0) 4	HS302 (2 0 0) 2	**MTCS152 (0 0 4)2**	28 + 4
IV	Discrete Structures	Design and Analysis of Algorithms	Database Management Systems	Numerical & Statistical Analysis	Computer Architecture & Organization	Principles of Economics	**Advanced Professional Communication Skills**	(18 4 6) 25+4
	CSE402 (3 1 0) 4	CSE405 (3 0 2) 5	CSE401 (3 1 2) 5	MA402 (3 0 2) 4	CSE403 (3 1 0) 4	HS701 (3 0 0) 3	**MTLA201 (1 1 2)4**	28
V	**Practice School - I (PS501) – (4 to 6 Weeks Duration) - 4 Credits**							
	Operating System	Computer Networks	Theory of Computation	Web Technologies	System Analysis & Design	Graph Theory	**Seminar & Presentation**	**Internet technology (M.Tech Elective 1)**	Effective Public Speaking and Employability Skills	(20 3 6) 26+4+5
	CSE501 (3 1 2) 5	CSE503 (3 0 2) 4	CSE504 (3 1 0) 4	CSE505 (3 0 2) 4	CSE506 (3 1 0) 4	CSE524 (3 0 0) 3	**MTSEM101 (0 0 4)2**	**MTCS122 (3 0 0)3**	LA501 2	36
VI	Distributed Systems	Foundations of computer graphics	Compiler Design	Software Engineering	Information security	Technology Management	Minor Project	**Object Oriented Analysis and Design (M.Tech Elective 2)**		(17 1 12) 24 + 3
	CSE601 (3 1 2) 5	CSE610 (3 1 2) 4	CSE603 (3 0 2) 4	CSE604 (3 0 2) 4	CSE621 (3 0 0) 3	HS603 (2 0 0)2	CSE611 (0 0 4) 2	**MTCS224 (3 0 0)3**		30
VII	Intelligent Machines (AI, Robotics, IoT)	Artificial Intelligence (Elective I	Mobile Computing	Advanced Java	Workplace and Interpersonal Communication		**Introduction to Machine Learning (M.tech Elective III)**			(15 0 10) 14 + 2
	ID303 (2 0 0) 2	CSE703 (2 0 2) 3	CSE702 (3 0 0) 3	CSE777 (1 0 4) 3	CCT708 (2 1 0) 3		**MTCS103 (3 1 2)2**			24
VIII	Practice School - II – (16 Weeks)				**Advanced Probability and Statistics (M.Tech)**		**Advanced Algorithms and Complexity (M.Tech)**			16+8
	PS801 **16**				**CSE889 3**		**CSE888 5**			
IX	**Big Data Analytics and Applications**	**Business Intelligence & Applications**	**Industrial Automation and Internet of Things -I**	**Internship**	**Data Science using 'R' Programming**		**Dissertation - I**			29
	CS2105 4	**CS2106 4**	**EE2101 4**	**PS2101 4**	**CS2403 3**		**PR2103 10**			
X	**Dissertation -II/Industrial Project - II**									
	MTDS401/PR2107 16									16

Total Credits (246): B.Tech(176) , M.Tech (69)

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-ONE

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
LA101	English Communication Skills	2	1	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	-	-	-	-

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

Syllabus (Theory)

- Definition and Characteristic Features of Effective Communication
- Barriers to Communication: Types, Ways to Overcome
- Vocabulary Extension: Roots, Prefixes and Suffixes
- Vocabulary Extension: Synonyms, Antonyms, Homophones, One Word Substitution
- Vocabulary Extension: Learning words through Situations
- Basics of English Grammar
- Applied English Grammar and Standard English Usage
- Standard English Usage, Listening Skills
- Phonetics and Spoken English: Sounds of English, Word Accent and Weak Forms in English, Intonation
- Introducing students to the rules of Word Accent and Weak Forms in English
- Reading Comprehension: Problems, Types of Reading Skills, Strategies
- Paragraph Writing: Definition, Structure of a Paragraph, Construction of a Paragraph, Unity and Coherence
- Art of Condensation: Steps Required, Strategies

Text Book(s)

1. Sanjay Kumar and Pushp Lata, *Communication Skills,* New Delhi: OUP, 2011

Reference Book(s)

1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, Second Edition, New Delhi: OUP, 2011.
2. Krishna Mohan and Meenakshi Raman, *Effective English Communication*, New Delhi: Tata-McGraw Hill, 2000.
3. Krishna Mohan and N.P.Singh, *Speaking English Effectively,* New Delhi: Macmillan,1994.
4. V. Sasikumar and P.V. Dhamija, *Spoken English: A Self-Learning Guide to Conversation Practice*, Tata-McGraw Hill, 2007.
5. Norman Lewis, Word Power Made Easy, Delhi: GoyalSaab Publishers and Distributors, 1994.
6. A.J.Thomson and A.V.Martinet, A Practical English Grammar, 4th Edition, New Delhi: OUP, 1999.
7. Asha Kaul, Business Communication, Second Edition, New Delhi: PHI, 2010.
8. Edgar Thorpe and Showick Thorpe, Objective English, 2nd Edition, New Delhi: Pearson Education, 2008.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA101	Engineering Mathematics – I	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)

Unit 1: Calculus of several variables

Functions of two or more variables, Partial Derivatives, Total derivative, chain Rule, Euler's Theorem, Jacobian and transformation, Applications to errors, Optimization using derivatives - Maxima-Minima of functions of two variables, Lagrange's method.

Unit 2: Curve Sketching

Asymptotes, Double and Triple Points, Cartesian, parametric and polar curve sketching

Unit 3: Vector function and its derivatives

Vector functions, their derivatives and integration, Arc length and unit tangent vector, Curvature and unit normal vector, Torsion and unit Bi-normal vector, Directional derivative and gradient vectors, Tangent plane, Divergence and curl of a vector field

Unit 4: Integral Calculus

Definite Integral - Integral calculus, Line integral, Arc length, Solids of revolution: Surface and volume, Multiple Integrals - Double integral: Area, change of order of integration, changing to polar coordinates, Triple integral, Volume integral,

Unit 5: Vector Integration

Line integral, flux, work done, circulation, Path independence, potential function and conservative fields, Green's theorem in the plane, Stoke's theorem, Divergence theorem,

Text books and Reference books

1. Babu Ram, *Engineering Mathematics* Part – I, Pearson.
2. B. S. Grewal, *Higher Engineering Mathematics*, 41st Ed., Khanna Publishers, Delhi, 2011.
3. G.B. Thomas, Jr., *Thomas' calculus*, 11th edition (Indian), Pearson education, Delhi, 2008
4. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011
5. Rober Wrede, Spiegel M. R., *Schaum's outline of advanced calculus*, 3rd edition, Tata Mc-GrawHill, NewYork, 2011
6. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
7. Kreyszig, E., *Advanced Engineering Mathematics*, John Willey, Delhi (2011).
8. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CH101	Engineering Chemistry	3	1	2	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)

UNIT-I Water Chemistry

Introduction, common Impurities in water, Hardness of water, Determination of hardness by Clark's test and complexometric (EDTA) method. Removal of hardness by Lime Soda, Zeolite and Ion exchange process.

Boiler feed water: troubles their causes, disadvantages and prevention, Scale & Sludge Carry over (Priming and Foaming), Boiler Corrosion and Caustic embrittlement.

UNIT-II Polymers

Introduction to Polymer, Classification of polymers. Methods of Polymerization, Plastics: Thermosets and Thermoplastic. Preparation, properties and uses of Vinyl resins, Bakelite, Polyesters and Nylons. Rubbers: Natural rubber, vulcanization, synthetic rubbers e.g. Buna-S, Buna-N, Butyl, Thiokol and Neoprene rubbers.

UNIT-III Corrosion &Lubricants

Definition and its significance, Theories of corrosion: Dry corrosion theory, Wet (Electrochemical) theory, Passivity, Types of electrochemical corrosion. Factors influencing rate of corrosion.

Introduction, classification and uses of lubricants. Types of lubrication. Viscosity & viscosity index, Flash point Fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number.

UNIT-IV Solid State Chemistry

Solid State, Types of solids, Space Lattice and Unit cell, Types of unit cell, Cubic System – Number of atoms per unit cell, Atomic Radius, Density Calculation of unit cell. Bragg's Law X-ray studies of Crystals.

Graphite – Structure, Properties and applications.

Liquid Crystal: Liquid Crystalline state, Classification of liquid crystal and their applications.

UNIT-V Engineering Materials

Cement: Definition, Composition basic constituents and their significance, manufacturing of Portland cement by Rotary Klin technology. Setting and hardening of cement and role of gypsum.

Nanotechnology and Nano materials: Fullerenes and Carbon Nano tubes - Introduction, Structural properties, preparation and their applications.

Syllabus (Practical)

1. To determine the hardness of water by complex metric method using EDTA.
2. To determine the strength of NaOH and Na2CO3 in given alkali mixture.
3. To determine the strength of copper sulphate with the help of Hypo solution.

4. Measurement of conductivity of given sample by conductivity meter.
5. Measurement of pH of given sample by pH meter.
6. Determination of Barium as barium sulphate gravimetrically.
7. Measurement of Fluoride in water sample.
8. Determination of Na/K/Ca by Flame photometer in a given sample.
9. To determine the amount of free chlorine in given sample.
10. To determine the viscosity of a given sample of lubricant oil at various temperature.
11. To determine flash and fire point of a given lubricant using Pensky-Martin's apparatus.
12. Measurement of Nitrate and Oxygen in water sample.
13. To determine cloud and pour point of a given sample of lubricating oil using Cloud and Pour point apparatus.

Text Book

1. Engineering Chemistry by Jain & Jain (Dhanpat Rai publication)

Reference Book(s)

1. Engineering Chemistry by B Sivasankar, (Mc-Graw Hill publication).
2. Engineering Chemistry by O.G. Palanna, (Mc-Graw Hill publication).
3. Engineering Chemistry (Wiely India publication).
4. Introduction to Nanotechnology by Poole Owens (Wiley)
5. Nanotechnology by Shah&Shah (Wiley)
6. *Chemistry*in *Engineering*& Technology by J. C. Kuriacose and J. *Rajaram*,, Vol. 1&2
7. The Physics and Chemistry of Solids by Elliott (Wiley)
8. Engineering Chemistry (Wiely India publication).
9. Polymer Chemistry by Stevens (Oxford)
10. Polymer Science and Technology by Ghosh (Tata Mc-Graw Hill publication)
11. Polymer Science and Technology by Fried (PHI publication)
12. Text book of Polymer Science by Billmeyer (Wiely)

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
EE101	Electrical & Electronics Engineering	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

UNIT I

INTRODUCTION: basic physical laws, circuit elements, Source Transformation, KVL, KCL, Wye (Y) – Delta (Δ) and Delta (Δ) – Wye (Y) transformations.

UNIT II

THEOREM: Norton, Thevenin, Superposition, Max power transfer Theorem

UNIT III

AC NETWORKS: Fundamental aspects of single phase ac supply, Sinusoidal Steady State, Real/Reactive Power, Phasor, Three phase circuits, Start-delta, Two watt-meter Method, simple circuits, RMS Average value, Transients in R-L, R-C, R-L-C.

UNIT IV

TRANSFORMER & MACHINE: Basics of transformer Faraday and Lenz law, Mutual Inductance, construction, working Principles of Transformers, AC/DC machines.

UNIT IV

INTRODUCTION TO SEMICONDUCTORS: Defining Insulator, Semiconductor, Conductors. Band gap energy and band formation, elementary idea about semiconductor behavior, conductivity, types of semiconductor, p-type and n-type, working principle, characteristics and applications of Diode and Transistor, Transistor CE, CB, CC configuration.

Syllabus (Practical)

ELECTRICAL LAB

1. Single line diagram of a power system and a distribution sub-station and basic functional study of main components used in power systems.
2. Make house wiring including earthling for 1-phase energy meter, MCB, ceiling fan, tube light, three pin socket and a lamp operated from two different positions. Basic functional study of components used in house wiring
3. Study the construction and basic working of ceiling fan, single phase induction motor and three phase squirrel cage induction motor. Connect ceiling fan along with regulator and single phase induction motor through auto-transformer to run and vary speed.
4. (a) Basic functional study and connection of moving coil & moving iron ammeters and Voltmeters, dynamometer, wattmeter and energy meter.

   (b) Run a 3-phase squirrel cage induction motor at no load and measure its voltage, current, power and

power factor. Reverse the direction of rotation.

5. Study the construction, circuit, working and application of the following lamps:
   (i) Fluorescent lamp, (ii) Sodium vapour lamp, (iii) Mercury vapour lamp, (iv) Halogen lamp and (v) Neon lamp
6. (a) Study the construction and connection of single phase transformer and auto-transformer. Measure input and output voltage and fin turn ratio.
   (b) Study the construction of a core type three phase transformer. Perform star and delta Connection on a 3-phase transformer and find relation between line and phase voltage.

ELECTRONICS LAB

7. Identification, testing and applications of resistors, inductors, capacitors, PN-diode, Zener diode,LED, LCD, BJT, FET, UJT, SCR, Photo diode and Photo transistor.
8. (a) Functional study of CRO, analog & digital multi-meters and function / signal generator.
   (b) Study the single phase half wave and bridge rectifier and effects of filters on waveform.
9. Study the BJT amplifier in common emitter configuration. Measure voltage gain, plot gain frequency response and calculate its bandwidth.
10. (a) Study the construction and basic working of SCR.
    (b) Study the single phase half wave and bridge controlled rectifier and observe the effect of firing angle on waveform.

Text Book(s)

1. S.N.Singh “Basic Electrical Engineering”, Prentice-Hall of India Pvt. Ltd, 2011.
2. J. Millman and C. Halkias, Integrated Electronics, McGraw Hill,2th Edition, 6th Indian Reprint, 2011.
3. B. L. Theraja, “Electrical Technology”, Vol.1, S. Chand Publication, New Delhi
4. V. K. Mehta, “Basic Electrical Engineering”, S. Chand and Company Ltd., New Delhi

Reference Book(s)

1. T.K.Nagsarkar,M.S. Sukhija,”Basic Electrical Engineering”, Oxford University press, 2nd edition, 2011.
2. A.S. Sedra and K.C. Smith, Microelectronic Circuits, Saunder's College Publishing, 1991.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ME141	Workshop Practice	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	50	30	100

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

Syllabus (Practical)

- Basics of manufacturing, types of production systems, ethics, safety in workshop.
- Metrology, quality, Least Count of a measuring Instrument, measurement with Vernier Caliper or Micrometer.
- Machining – Demonstration of Turning, Step Turning, Facing, etc.
- Casting – Demonstration of sand casting process
- Forging – Demonstration of forging operations
- Sheet metal working applications.
- Hands on practice of Sheet metal working operations using hand tools- Preparation of Funnel.
- Gas Welding, Demonstration of Gas Welding
- Hands on practice of Joining of metal parts by Arc Welding- Preparation of a Lap Joint model.
- Mechanical joining processes, Arc Welding
- Hands on practice of Joining of metal parts by Arc Welding- Preparation of a Butt Joint model.
- Introduction to wood working, Wood working Tools, Types of wood, Types of joints.
- Hands on practice of Wood working operations using hand tools- preparation of Lap Tee Joint, Mechanical joining processes, Soldering, Brazing.
- Machining – Demonstration of Shaping operations
- Hands on practice of Fitting operations using hand tools- Prepare a job in fitting shop.

Text Books:

1. H S Bawa, “Workshop Practice”, TMH, New Delhi, 2nd Edition, 2011
2. B S Nagendra Parashar and R K Mittal, “Elements of Manufacturing Process”, Prentice Hall of India, New Delhi, 2010 print
3. B S Raghuwanshi, “A Course in Workshop Technology”, Dhanpat Rai & Co., New Delhi, Volume I & II, 2011 reprint,
4. Serope Kalpakjian and Steven R. Schmid, “Manufactuirng Engineering and Technology,” Pearson Education (Low Cost Indian Edition), New Delhi, 4th Edition, 2005

Reference Books:

1. K. Venkata Reddy, “Workshop Practice Manual”, BS Publications, Hyderabad,6th Edition, 2011 print
2. P. kannaiah and K. L. Narayana, “Engineering Practices Laboratory”, SciTech Publications, Chennai, 2006

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CE102	Engineering Drawing	2	0	2	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)

Unit I

Lines, Lettering & Dimension (Sketch Book)

Scales: Representative factor, plain scales, diagonal scales, scale of chords.

Conic sections: Construction of ellipse, parabola, & hyperbola by different methods; Engineering Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean and logarithmic spirals.

Unit II

Projection: Types of projection, orthographic projection, first and third angle projection, (Sketch Book)

Projection of points and straight lines: Line inclined to one plane, inclined with both the plane, methods for determining True Length, true Inclinations, and Traces of straight lines.

Unit III

Projection of planes and solids: Projection of Planes like circle and polygons in different positions; Projection of right and regular polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions.

Unit IV

Section of Solids: Section of right solids (like Prism, Pyramid, Cylinder and Cone) by normal and inclined planes in different positions; Intersection of cylinders.

Development of Surfaces: Parallel line and radial-line method for right, regular solids.

Unit V

Isometric Projections: Isometric scale, Isometric axes, Isometric Projection of solids from orthographic drawing.

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; Draw Toolbar, Object & Modify toolbar; solution of projection problems on CAD.

Syllabus (Practical)

Sketching and drawing of geometries and projections on Sketch Book & on AutoCAD based on above syllabus

Text Books:

1. Kulkarni D M, Rastogi A P, Sarkar A K, Engineering Graphics with AutoCAD, PHI Learning Pvt. Ltd., New Delhi, India, Fourth Printing (Revised Edition), 2012.
2. Bhatt N D, Engineering Drawing, Charotar Book Stall, Anand, India.

Reference Books:

1. Jolhe D A, Engineering Drawing with an introduction to AutoCAD, TMH, New Delhi, India.
2. Gill P S, Engineering Drawing (Geometrical Drawing), S K Kataria & Sons, Delhi, India
3. Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas publishers.
4. Engineering Drawing, Basant Agarwal & CM Agarwal, Tata McGraw Hill.
5. Shah MB and Rana BC; Engg.drawing; Pearson Education
6. Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI
7. Dhananjay A Jolhe; Engg. Drawing an Introduction; Tata McGraw Hill.
8. Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum
9. Venugopal K.; Engineering Graphics; New Age

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-TWO

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
LA201	Professional Communication Skills	1	1	2	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)

- Professional Communication: Definition, Types, Process, Features
- Importance of Non-Verbal Communication: Eye contact, Facial Expressions, Gestures, Posture, Proxemics, etc.
- Importance of Paralinguistic Features: Voice, Volume, Pitch, Intonation, Pauses, Rate, Vocalized Pauses and Vocal Cues.
- Group Discussion: Purpose, Difference between GD and Debate, Personality Traits to be Evaluated, dynamics of Group Behaviour, Opening and Ending a GD
- Job Interviews: Process, Stages, Desirable Qualities, Steps to Preparation, Body Language, Confidence, Frequently Asked Questions
- Presentation Skills: Combating Nervousness and Stage Fright, Beginning and Ending of a Presentation, Dynamics of Team Presentations, Using Slides and Audio-Visual Aids
- Business Letters and Resume: Structure, Style, Types
- Professional Reports: Types, Features, Structure, Style (The Assignment on Report Writing will include technical input from other faculty members from the Institute of Engineering and Technology and will be oriented towards developing in students the competencies required for writing PS-I Reports)
- E-mail Writing, Other Business Writings

Syllabus (Practical)

- Sounds of English: Vowel and Consonant Sounds, Word Stress, Intonation - Listening and Practice
- Reading Comprehension: Reading Passages and Answering Questions
- Vocabulary Extension: :Learning Words through Situations and Modules
- Presentation Skills: Learning through Video Presentations
- Group Discussion: Learning through Recorded Group Discussions
- Job Interviews: Learning through Recorded Job Interviews

Text Book(s)

1. Sanjay Kumar and Pushp Lata, *Communication Skills,* New Delhi: OUP, 2011

Reference Book(s)

1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, Second Edition, New Delhi: OUP, 2011.
2. Krishna Mohan and Meenakshi Raman, *Effective English Communication*, New Delhi: Tata-McGraw Hill, 2000.
3. Krishna Mohan and N.P.Singh, *Speaking English Effectively,* New Delhi: Macmillan,1994.
4. V. Sasikumar and P.V. Dhamija, *Spoken English: A Self-Learning Guide to Conversation Practice*, Tata-McGraw Hill, 2007.
5. Norman Lewis, *Word Power Made Easy,* Delhi: GoyalSaab Publishers and Distributors, 1994.
6. A.J.Thomson and A.V.Martinet, *A Practical English Grammar,* 4th Edition, New Delhi: OUP, 1999.
7. Asha Kaul, *Business Communication,* Second Edition, New Delhi: PHI, 2010.
8. Edgar Thorpe and Showick Thorpe, *Objective English*, 2nd Edition, New Delhi: Pearson Education, 2008.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA201	Engineering Mathematics – II	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)

Unit 1: Ordinary Differential equation

Differential equation of first order, Differential equation of higher order with constant coefficients, Differential equation of second order with variable coefficients, Solution in series

Unit 2: Partial differential equation

Partial Differential Equations of First Order, Variable separable technique for solving PDE, Boundary value problems: Heat equation, wave equation, Laplace equation

Unit 3: Matrix Algebra

Matrices, Rank of a Matrix, System of Linear Algebraic Equations, Linear Independence and Dependence, Eigen Values and Eigen Vectors, Diagonalization, Cayley Hamilton Theorem

Unit 4: Linear Algebra

Unit Vector Space, Subspaces, Bases and Dimensions, Coordinates, Row Equivalence and Computations concerning Subspaces, Linear Transformations, The Algebra of Linear Transformations, Representation by matrices

Unit 5: Linear Programming Problems

Introduction to LP Problems, LP formulations, Graphical Methods, Convex Sets, Simplex Methods

Text books and Reference books

1. Babu Ram, *Engineering Mathematics Part II,* Pearson.
2. B. S. Grewal, *Higher Engineering Mathematics*, 41st Ed., Khanna Publishers, Delhi, 2011.
3. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011.
4. B.V.Ramana, *Higher Engineering Mathematics*, Tata Mc-graw Hill.
5. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
6. Kreyszig, E., *Advanced Engineering Mathematics*, John Willey, Delhi (2011).
7. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005.
8. G.B. Thomas, *Jr., Thomas' Calculus*, 11th edition (Indian), Pearson education, Delhi, 2008.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
PH101	Engineering Physics	3	1	2	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%

Course Syllabi (Theory):

Coherence, Interference and Optical Technology

Introduction to optics, Spatial Coherence, Temporal coherence, Coherence length, Coherence time and 'Q' factor for light

Formation of Newton's rings, Measurement of wavelength of light, Diameter of Newton's rings.

Elementary idea of anti-reflection coating and interference filters.

Diffraction

Single slit diffraction, position of maxima / minima and width of central maximum, intensity variation.;2

Construction and theory, Formation of spectra by plane transmission grating, Determination of wavelength of light using plane transmission grating

Polarization

Plane, circular and elliptically polarized light on the basis of electric (light) vector, Malus law

Quarter and half wave plates, construction, working and use of these in production and detection of plane, circular and elliptically polarized light.

Introduction and law of optical rotation, specific rotation and its measurement using the half-shade and bi-quartz device

Laser and Fibre Optics

Theory of Laser Action, Einstein's Coefficients, Threshold Conditions for Laser Action

Theory, Design, and Applications of He-Ne Laser

Theory of Semiconductor Lasers

Optical Fibre, Numerical Aperture, and Maximum Angle of Acceptance

Quantum Mechanics

Heisenberg's Uncertainty Principle, Wave and Particle Duality of Radiation, De-Broglie's Concept of Matter waves, Quantum Nature of Light

Concept of Compton Effect

Concept of Wave Function, Physical interpretation of wave function and its properties

Schrödinger's Wave Equation: Time dependent and time independent cases

Particle in one-dimensional box

Particle in three-dimensional boxes, Degeneracy

Course Syllabi (Practical):

1. To determine the wave length of sodium light by Newton's Ring
2. To determine the specific rotation of Glucose (Sugar) solution using a Polarimeter
3. To measure the Numerical Aperture of an Optical Fibre.
4. To determine coherent length and coherent time of laser using He-Ne Laser
5. To determine the height of object with the help of a Sextant.

6. To determine the dispersive power of material of a Prism for Violet Red and Yellow colours of Mercury light with the help of a spectrometer.
7. To study the Charge & Discharge of a condenser and hence determine time constant (Both current and voltage graphs are to be plotted).
8. To study characteristics of G.M. Counting System.
9. To convert a Galvanometer in to an ammeter of range 1.5/3 amp and calibrate it.
10. To convert a Galvanometer in to a Volt of range 1.5/3 volt and calibrate it.

Text Books:

1. Mahesh C. Jain, "Textbook of Engineering Physics", Part I , PHI
2. Mahesh C. Jain, "Textbook of Engineering Physics", Part II, PHI
3. Lab Manuals for Physics

Reference Books:

1. Arther Beiser, "Concept of Modern Physics" Tata McGrawHill, New Delhi, 5th edn. 1997.
2. Ajoy Ghatak, "Optics", Tata McGraw Hill, 4th edn
3. Eyvind H Wichman, "Quantum Physics" Tata McGraw Hill, Volume 4
4. Neeraj Mehta, "Applied Physics for Engineers", PHI, I edn. 2011
5. Dattu R Joshi, "Engineering Physics", Tata McGraw Hill Education Pvt. Ltd. New Delhi, I edn. 2010.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ID201	Environmental Studies	2	0	0	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	-	-	-	-	-

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

Course Syllabi (Theory):

- Understanding environment, The global crisis, Basic Concepts
- Forest and Grassland ecosystems, Desert Ecosystems, Aquatic Ecosystems
- Introduction to Biodiversity, Biodiversity Conservation
- Water Resources, Energy Resources, Forest Resources
- Land, Food, and Mineral Resources
- Air and Noise Pollution, Water, Soil, and Marine Pollution
- Solid Waste Management and Disaster Management
- Population Growth, Environment and Human Health, Sustainable Development
- Global Warming, Acid Rain, and Ozone Depletion
- Different types of laws and regulations

Text Books:

1. Rajagopalan, R., “Environmental Studies: From Crisis to Cure”, Oxford University Press, New Delhi, 2e, 2011

Reference Books:

1. Ranjit Daniels & J. Krishnaswamy “Environmental Studies”, Wiley India
2. Davis & Cornwell “Environmental Engineering”, Mc Graw Hill

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ME201	Engineering Mechanics	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)

- Fundamentals of engineering mechanics, Laws of Motion, Equilibrium, Conditions for equilibrium, Equations of equilibrium.
- **Statics of Particles and Rigid Bodies:** System of forces, Resultant force, Resolution of force, Moment and Couples.
- **Trusses:** Truss analysis, analysis of frames and machines.
- **Friction:** Types of Friction, Laws of friction, Angle of friction, Angle of repose, Applications of Friction.
- **Lifting Machines:** Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting machines; System of Pulleys, Simple wheel and axle, Wheel and differential axle, Weston's differential pulley block, Worm and worm wheel.
- **Properties of Plane Surfaces:** Centroids & Centre of Mass, area of moments, principle moments of inertia, Second moment of mass.
- **Virtual work:** Principle of Virtual Work, Active forces and active force diagram.
- **Kinematics of Particles and Rigid Bodies:** Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular acceleration, Radial and transverse velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion.
- **Kinetics of Particles and Rigid Bodies**: Equation of motion in rectangular coordinate, radial and transverse components, Equation of motion in plane for a rigid body.
- **Work, Energy and Power:** Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Non-conservative Force, Conservation of energy.
- **Impulse and Momentum:** Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular momentum, Angular momentum of rigid body.

Text Books:

1. Meriam and Kraige, **"Engineering Mechanics-STATICS"**, John Wiley & Sons, Fifth Edition, 2010
2. Meriam and Kraige, **"Engineering Mechanics-DYNAMICS"**, John Wiley & Sons, Fifth Edition, 2010

Reference Books:

1. Engineering Mechanics, Basudeb Bhattacharyya, Oxford University Press
2. Vector Mechanics for Engineers, Beer and Johnston, Tata McGraw-Hill., Ninth Edition, 2009.
3. Engineering Mechanics, Hibbeler, Pearson Education, Sixth Edition, 2010
4. Engineering Mechanics, Andrew Pytel & Kiusalas, Cengage Learning, Third Edition, 2010.
5. Engineering Mechanics, Timoshenko and Young, Tata McGraw-Hill, Fourth Edition, 2006.
6. Engineering Mechanics-Statics and Dynamics, Shames, Pearson Education.
7. Engineering Mechanics, Boresi and Schmidt, CL-Engineering, First Edition, 2008.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE202	Object Oriented Programming	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

- Identifiers and constants (Literals), Keywords, Data Types, The Operators, New Casting Operators, Typeid and throw, The Conditional structures and Looping Constructs
- Difference between Struct and class in C++, The difference between Union and Class, Static Data members of a class, Pointer to objects and pointer to members of class, The local classes,
- Assigning Objects
- Introduction to Functions, The Inline function, Default Arguments to the function, Functions with object as parameters, Call by reference and return by reference, Prototyping and Overloading, Friend functions, Const and Volatile functions, Static functions, Private and Public functions
- Introduction to constructors, The explicit constructors, Parameterized constructors, Multiple constructors, Constructors with default arguments, Dynamic Initialization, Constructor with dynamic allocation, copy constructors, The member initialization list, destructors
- Overloading Operators, The need, Defining derived class using single base class, Derivation using public, private and protected access modifiers
- The implementation of Inheritance in the C++ object model, multiple-inheritance, Abstract classes, Composite objects (container objects), Compile Time and Runtime Polymorphism
- Introduction, Need for Exception handling, Components of exception handling mechanism

Course Syllabi (Practical):

Programs using C++/Java which covers following concepts:

- Declaration and Usage of Classes and Objects
- Constructors and Destructors.
- Overloaded Functions and Overloaded Operators.
- Inheritance
- Exception handling mechanism.

Text Books:

1. Object Oriented Programming using C++ and Java, E. Balagurusamy, Tata McGraw Hill.

Reference Books:

1. Programming with ANSI C++ by Bhushan Trivedi, Oxford University Press
2. An Introduction to Object Oriented Programming with Java, C Thomas WU, Fourth Edition, Tata McGraw Hill.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-THIRD

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE301	Data Structures	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%

Course Syllabi (Theory):

- Arrays as storage elements for representing polynomial of one or more degrees or addition & multiplication, sparse matrices for transposing & multiplication, stack, queue, dequeue, circular queue for insertion and deletion with condition for over and underflow, transposition of sparse matrices with algorithms of varying complexity (Includes algorithms for operations as mentioned). Evaluation of Expression: Concept of precedence and associativity in expressions, difficulties in dealing with infix expressions, Resolving precedence of operators and association of operands, postfix & prefix expressions, conversion of expression from one form to other form using stack (with & without parenthesis), Evaluation of expression in infix, postfix & prefix forms using stack, Recursion.
- Linear linked lists: singly, doubly and circularly connected linear linked lists insertion, deletion at/ from beginning and any point in ordered or unordered lists, Comparison of arrays and linked lists as data structures. Linked implementation of stack, queue and dequeue, Algorithms for/of insertion, deletion of stack, queue, and dequeue implemented using linked structures. Polynomial representation using linked lists for addition, Concepts of Head Node in linked lists. Searching, sequential and binary search.
- Non-Linear Structures: Trees definition, characteristics concept of child, sibling, parent child relationship etc., binary tree: different types of binary trees based on distribution of nodes, binary tree (threaded and unthreaded) as data structure, insertion, deletion and traversal of binary trees, constructing binary tree from traversal results, Threaded binary Tree, Time complexity of insertion, deletion and traversal in threaded and ordinary binary trees. AVL tree: Concept of balanced trees, balance factor in AVL trees, insertion into and deletion from AVL tree, balancing AVL tree after insertion and deletion, Application of trees for representation of sets.
- Graphs: Definition, Relation between tree & graph, directed and undirected graph, representation of graphs using adjacency matrix and list, Depth first and breadth first traversal of graphs, finding connected components and spanning tree, Single source single destination shortest path algorithms. Sorting: Insertion, quick, Merge, heap, topological and bubble sorting algorithms for different characteristics of input data. Comparison of sorting algorithms in term of time complexity.

Course Syllabi (Practical):

1. Write a simple C program on a 32 bit compiler to understand the concept of array storage, size of a word. The program shall be written illustrating the concept of row major and column major storage. Find the address of element and verify it with the theoretical value. Program may be written for arrays Upto 4-dimensions.
2. Simulate a stack, queue, circular queue and dequeue using a one dimensional array as storage element. The program should implement the basic addition, deletion and traversal operations.
3. Represent a 2-variable polynomial using array. Use this representation to implement addition of polynomials.
4. Represent a sparse matrix using array. Implement addition and transposition operations using the representation.

5. Implement singly, doubly and circularly connected linked lists illustrating operations like addition at different locations, deletion from specified locations and traversal.
6. Repeat exercises 2, 3 & 4 with linked structures.
7. Implementation of binary tree with operations like addition, deletion, traversal.
8. Depth first and breadth first traversal of graphs represented using adjacency matrix and list.
9. Implementation of binary search in arrays and on linked Binary Search Tree.
10. Implementation of insertion, quick, heap, topological and bubble sorting algorithms.

Text Books

1. Reema Thareja, Data Structure using C, Oxford Education, Third Edition, 2012
2. Data Structures through C, Yashwant Kanetkar, BPB Publications Sixth Edition, 2012

Reference Books

1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hop croft, Data Structures and Algorithms. Pearson Education, 2012

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ECE303	Digital Electronics	3	1	2	5

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%

Course Syllabi (Theory):

- Digital system and binary numbers: Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes.
- Gate-level minimization: The K-map method up to five variable, don't care conditions, POS simplification, NAND and NOR implementation, Quine Mc-Clusky method (Tabular method)
- Combinational Logic: Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers ,demultiplexers
- Synchronous Sequential logic: Sequential circuits, storage elements: latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure.
- Registers and counters: Shift registers, ripple counter, synchronous counter, other counters.
- Memory and programmable logic: RAM, ROM, PLA, PAL. Design at the register transfer level: ASMs, design example, design with multiplexers. Asynchronous sequential logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race Free State assignment, hazards.

Course Syllabi (Practical):

1. Study of logic gates.
2. Design and implementation of adders and subtractors using logic gates.
3. Design and implementation of code converters using logic gates.
4. Design and implementation of 4-bit binary adder/subtractor and BCD adder using IC 7483.
5. Design and implementation of 2-bit magnitude comparator using logic gates, 8-bit magnitude comparator using IC 7485.
6. Design and implementation of 16-bit odd/even parity checker/generator using IC 74180.
7. Design and implementation of multiplexer and demultiplexer using logic gates and study of IC 74150 and IC 74154.
8. Design and implementation of encoder and decoder using logic gates and study of IC 7445 and IC 74147.
9. Construction and verification of 4-bit ripple counter and Mod-10/Mod-12 ripple counter.
10. Design and implementation of 3bit synchronous up/down counter.
11. Implementation of SISO, SIPO, PISO and PIPO shift registers using flip-flops

Text Books:

1. M. Morris Mano and M. D. Ciletti, “Digital Design”, 4th Edition, Pearson Education
2. Pedroni - Digital Electronics & Design, Elsevier

Reference Books:

1. F. Vahid: Digital Design: Wiley Student Edition, 2006
2. J. F. Wakerly, Digital Design Principles and Practices, Fourth Edition, Prentice-Hall, 2005.
3. R. L. Tokheim, Digital electronics, Principles and applications, 6th Edition, Tata McGraw Hill Edition.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE303	Principles of Programming Languages	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	-	-	-	-	-

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

Course Syllabi (Theory):

Preliminary Concepts: Reasons for studying, concepts of programming languages, Definition, History, Features. Programming domains, Language Evaluation Criteria, influences on Language design, Language categories, Programming Paradigms – Imperative, Object Oriented, functional Programming, and Logic Programming. Programming Language Implementation – Compilation and Virtual Machines, programming environments.

Issues in Language Translation, Syntax and Semantics, Stages analysis and synthesis, Parse Tree, CFG and BNF grammar.

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions and Statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, and Unconditional Statements.

Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators.

Abstract Data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java.

Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads.

Exception handling: Exceptions, exception Propagation, Exception handler in C++ and Java.

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, application of Functional Programming Languages and comparison of functional and imperative Languages. Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation.

Text Books:

1. Concepts of Programming Languages Robert .W. Sebesta 8/e, Pearson Education,2008.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech,rp-2007.

Reference Books:

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. Programming Languages, K. C.Louden, 2nd Edition, Thomson,2003.
3. LISP, Patric Henry Winston and Paul Horn, Pearson Education.
4. Programming in Prolog, W.F. Clocksin,& C.S.Mellish, 5th Edition, Springer.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ECE301	Electronic Devices & Circuits	3	1	2	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)

- **Semiconductor Physics:** Mobility and conductivity, charge densities in a semiconductor, Fermi Dirac distribution, carrier concentrations and Fermi levels in semiconductor, Generation and recombination of charges, diffusion and continuity equation, Mass action Law, Hall effect.
- **Junction Diode:** PNJunction diodes, Diode as a circuit element, load line concept, clipping and clamping circuits, Voltage multipliers. Zener diode, characteristics and its applications.
- **Bipolar Junction Transistor:** Transistor characteristics, Current components, Current gains: alpha and beta. Operating point. Hybrid model, h-parameter equivalent circuits. CE, CB and CC configuration. DC and AC analysis of CE, CC and CB amplifiers. Ebers-Moll model. Biasing & stabilization techniques. Thermal runaway, Thermal stability.
- **Field Effect Transistor** JFET, MOSFET, Equivalent circuits and biasing of JFET's & MOSFET's. Low frequency CS and CD JFET amplifiers. FET as a voltage variable resistor. Biasing, Small signal model analysis.
- **Small Signal Amplifiers at Low Frequency:** Analysis of BJT and FET, DC and RC coupled amplifiers. Frequency response, mid-band gain, gains at low and high frequency. Analysis of DC and differential amplifiers. Miller's Theorem. Cascading Transistor amplifiers, Darlington pair. Emitter follower, source follower.

Syllabus (Practical)

1. Plot V-I characteristic of P-N junction diode & calculate cut-in voltage, reverse saturation current and static & dynamic resistances.
2. Plot V-I characteristic of Zener diode and study of Zener diode as voltage regulator. Observe the effect of load changes and determine load limits of the voltage regulator.
3. Study of application of diode as clipper & clamper circuit.
4. Plot input and output characteristics of BJT in CB, CC and CE configurations.
5. Plot frequency response curve for single stage amplifier and to determine gain bandwidth product.
6. Plot drain current-drain voltage and drain current-gate bias characteristics of field effect transistor and measure of I_{DSS}& V_P.
7. Plot gain-frequency characteristic of two stages RC coupled amplifier & calculate its bandwidth and compare it with theoretical value.

Text Books:

1. Microelectronics Circuits (Theory and Applications), Adel S. Sedra and Kenneth C. Smith, Adapted by Arun N. Chandorkar, 5th Ed. Oxford International Student Edition.
2. Electronic Device and Circuits, J.B. Gupta, Katson Educational Series.
3. Electronic Devices and Circuits, S. Salivahanan, N. Suresh Kumar and A Vallavaraj, Tata Mc-Graw Hill 2rd Edition

Reference Books:

1. Millman's Electronic Devices and Circuits, Jocob Millman, Christos C Halkias & Satyabrata Jit, Tata Mc-Graw Hill 3rd Edition.
2. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, Pearson 10th Edition.
3. Electronic Devices and Circuits, David A. Bell, Oxford 5th Edition.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA301	Engineering Mathematics – III	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)

Unit 1: Laplace Transform
Laplace transform and its properties and applications
Unit 2: Sequences and Series
Sequences, Series, Orthogonal function, Fourier Series
Unit 3: Fourier Transform
Fourier transform and its properties and applications
Unit 4: Special Functions
Gamma and Beta functions, Bessel functions, series representations and recurrence relations
Unit 5: Complex Analysis
Functions of complex variables and its derivatives, Integration in complex planes, Series, Singularities and Residues, Evaluation of Real Integrals, Conformal mappings

Text books and Reference books

1. Babu Ram, *Engineering Mathematics Part II,* Pearson
2. Dennis G. Zill and Warren S. Wright, *Advanced Engineering Mathematics*, Fourth Edition (Student Edition), Jones & Barlett, Viba, New Delhi, 2011
3. Peter V. O'Neil, *Advanced Engineering Mathematics*, Seventh Indian Reprint, Cengage Learning, New Delhi, 2011.
4. Erwin Kreyszig, *Advanced Engineering Mathematics*, Wiley 9th Edition.
5. B. S. Grewal, *Higher Engineering Mathematics*, 41st Ed., Khanna Publishers, Delhi, 2011.
6. H. K. Dass, *Advanced Engineering Mathematics*, 12th editions with corrections, S. Chand and Company, Meerut, 2004
7. B. V. Ramana, *Higher Engineering Mathematics*, Tata Mcgraw Hill.
8. Potter M.C., Goldberg J.L., Edward F.A., *Advanced Engineering Mathematics*, 3rd Edition, Oxford University Press, 2005

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS302	Principles of Management for Engineers	2	0	0	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	-	-	-	-

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

Course Syllabi (Theory):

- **Concepts of management:** Functions and Responsibilities of managers, Principles of management and visiting various, Schools of management Thoughts in developing, Excellent managers
- **Planning:** Nature and purpose of planning, Planning process and principles, Types of planning, Advantages and disadvantages of planning, Concept of objectives and types of objectives, Case analysis
- **Organizing:** Nature and purpose of organizing, Process of organizing, Span of management and determination of span of management, Principles of organizing, Departmentalization, delegation and, Decentralization. Case analysis
- **Directing and leading:** Requirements of Effective directions, Giving orders, motivation, Nature of leadership, leadership and management, Recapitulation and case discussion
- **Controlling:** concept and process, Need for controlling and types of control methods, Essentials of effective control, Benefits and problems in control systems. Case analysis
- Social responsibilities of business: Meaning, Social responsibility of business towards different groups, Social performance of business in India, Social audit, Business ethics and corporate governance

Text Books:

1. Tripathy, P.C. and Reddy, P. N. “Principles of Management”. . McGraw Hill, New Delhi.4th ed. 2008.

Reference Books:

1. Koontz, Herold and Weihrich, Heinz. “Management”. McGraw Hill, New York. 9th ed. 1988.
2. Stoner, James A. F. and Freeman, R Edward. “Management”. Prentice Hall of India, New Delhi. 6th e, 1989.
3. Bateman, T. S. and Snell, S. A. “Management: Leading and Collaborating in a Competitive World”, McGraw Hill Irwin. 8th edition,2009.
4. Draft, R. L. “Principles of Management”. Cengage learning.2009
5. Schermerhron, J. R. “Introduction to Management”, 10th edition, Wiley India. 2009

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS152	Software Systems Lab-I	0	0	4	0	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	50	30	100

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

Syllabus (Theory)

UNIT I:

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories.

UNIT II:

Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp & comm, View files, disk related commands, checking disk free spaces. Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process, init and run levels.

UNIT III:

Shell programming- Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks.

UNIT IV:

Simple filter commands – pr, head, tail, cut, paste, sort, tr. Flter using regular expressions – grep, egrep, and sed. awk programming – report printing with awk

UNIT V:

LATEX course outline:-Introductory notions. Handling errors, Formatting text and mathematics, Formatting text and mathematics, Mathematical formulae, Producing and including graphics in a LATEX file.

Text Books:

1. T1. Sumitabha Das , *UNIX – Concepts & Applications* (Third Ed.), Tata McGraw Hill Publications.

2. T2. Graham Glass & King Ables, *Unix for programmers and users* (Third Ed.), Pearson Education India. (Low Prices Edition)

Reference Books:

1. R1. Cristopher Negus, *Red Hat Linux 9 Bible*, IDG Books India Ltd.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-FOURTH

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE402	Discrete Structures	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	40	10	10	100	-	-	-	-	-

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

Course Syllabi (Theory):

- Language of Logic: Proposition, Compound Proposition, Conjunction, Disjunction, Implication, Converse, Inverse & Contrapositive, Bi-conditional Statements, tautology, Contradiction & Contingency, Logical Equivalences, Quantifiers, Arguments.
- Proof Methods: Vacuous, Trivial, Direct, Indirect by Contrapositive and Contradiction, Constructive & Non-constructive proof, Counterexample. The Division Algorithm, Divisibility Properties (Prime Numbers & Composite Numbers), Principle of Mathematical Induction, The Second Principle of Mathematical Induction, Fundamental Theorem of Arithmetic. Algorithm Correctness: Partial Correctness, Loop Invariant. Testing the partial correctness of linear & binary search, bubble & selection sorting.
- Graph Theory: Graphs – Directed, Undirected, Simple,. Adjacency & Incidence, Degree of Vertex, Sub graph, Complete graph, Cycle & Wheel Graph, Bipartite & Complete Bipartite Graph, Weighed Graph, Union of Simple Graphs. Complete Graphs. Isomorphic Graphs, Path, Cycles & Circuits Euclerian & Hamiltonian Graphs. Planar Graph: Kuratowski's Two Graphs, Euler's Formula, Kuratowski's Theorem. Trees: Spanning trees- Kruskal's Algo, Finding Spanning Tree using Depth First Search, Breadth First Search, Complexity of Graph, and Minimal Spanning Tree.
- Sets: Definition and types, Set operations, Partition of set, Cardinality (Inclusion- Exclusion & Addition Principles), Recursive definition of set. Functions: Concept, Some Special Functions (Polynomial, Exponential & Logarithmic, Absolute Value, Floor & Ceiling, Mod & Div. Functions), Properties of Functions, Cardinality of Infinite Set, Countable & Uncountable Sets, the Pigeonhole & Generalized Pigeonhole Principles, Composition of Functions.
- Relations: Boolean Matrices, Binary Relation, Adjacency Matrix of Relation, Properties of Relations, Operations on Relations, The Connectivity Relations, Transitive Closure-Warshall's Algorithm, Equivalence relations- Congruence Relations, Equivalence Class, Number of Partitions of a Finite Set, Partial & Total Orderings.

Text Books:

1. Kenneth Rosen, Discrete Mathematics and its applications, 5th edition, Tata-McGraw Hill, 2002.
2. C.L. Liu, Elements of Discrete mathematics, McGraw-Hill, 1985

Reference Books:

1. D. B. West, Introduction to Graph Theory, Prentice Hall of India.
2. M. Artin, Algebra, Prentice-Hall India, 1991

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE405	Design & Analysis of Algorithms	3	1	2	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%

Course Syllabi (Theory):

- Introduction: Algorithms, Analyzing algorithms, Complexity of algorithms, Growth of functions, Performance measurements, Sorting and order Statistics - Shell sort, Quick sort, Merge sort, Heap sort, Comparison of sorting algorithms, Sorting in linear time.
- Advanced Data Structures: Red-Black trees, B – trees, Binomial Heaps, Fibonacci Heaps.
- Divide and Conquer with examples such as Sorting, Matrix Multiplication, Convex hull and Searching.
- Greedy methods with examples such as Optimal Reliability Allocation, Knapsack, Minimum Spanning trees – Prim's and Kruskal's algorithms, Single source shortest paths - Dijkstra's and Bellman Ford algorithms.
- Dynamic programming with examples such as Kanpsack, All pair shortest paths – Warshal's and Floyd's algorithms, Resource allocation problem. Backtracking, Branch and Bound with examples such as Travelling Salesman Problem, Graph Coloring, n-Queen Problem, Hamiltonian Cycles and Sum of subsets.
- Selected Topics: Algebraic Computation, Fast Fourier Transform, String Matching, Theory of NP-completeness, Approximation algorithms and Randomized algorithms.

Course Syllabi (Practical):

Write programs for following Techniques using language of your choice.

1 Selection Sort

2 Bubble sort

3 Insertion sort

4 Counting sort

5 Radix sort

6 Quick Sort

7 Merge Sort

8 Linear search (Array & Linked list)

9 Binary Search (with & without recursion)

10 Binary Search Tree

11 Maximum Subarray Problem

12 Breadth First Search

13 Depth First Search

14 Minimal Spanning Trees(Prism algorithm)

15 Minimal Spanning Trees(Kruskal's Algorithm)

16 Median Finding

Text and References:

1. Thomas H. Coreman, Charles E. Leiserson and Ronald L. Rivest, “Introduction to Algorithms”, Prentice Hall of India.
2. RCT Lee, SS Tseng, RC Chang and YT Tsai, “Introduction to the Design and Analysis of Algorithms”, Mc Graw Hill, 2005.
3. E. Horowitz & S Sahni, "Fundamentals of Computer Algorithms",
4. Berman, Paul,” Algorithms”, Cengage Learning.
5. Aho, Hopcraft, Ullman, “The Design and Analysis of Computer Algorithms” Pearson Education, 2008.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE401	Database Management Systems	3	1	2	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%

Course Syllabi (Theory):

- Basic Concepts : data, database, database systems, database management systems, instance, schema, Database Applications, Purpose and Advantages of Database Management System (over file systems), View of Data (Data Abstraction, Data Models), Database Languages (DML, DDL), Relational Databases (Tables, DML, DDL), Data Storage and Querying (Components, Storage Manager, Query Processor), Database Architecture, Database User and Administrators
- Design Phases, Design Alternatives (Major Pitfalls), Entity Relational Model (Entity Sets, Relationship Sets, Attributes), Constraints (Mapping Cardinalities, Keys, Participation Constraints), Entity Relationship Diagram, Weak Entity Set, Extended E-R features (Generalization, Specialization and Aggregation), E-R Notations, Examples of ERD
- Features of Good Relational Design, Atomic Domain and First Normal Form, Decomposition Using Functional Dependency (Key and Functional Dependency, BCNF, 2NF, 3NF), Functional Decomposition Theory (Closure Set of Functional Dependency with Armstrong Rules, Canonical Cover and Loseless Decomposition), Dependency Preservation, Comparison of 3NF and BCNF, Decomposition Using Multi-Valued Dependencies (Multi-Valued Dependency and 4 NF)
- Structure of Relational Databases (Basic Structure, Database Schema, Types of Keys), Fundamental Relational Algebra Operations (Select, Project, Union, Set Difference, Cartesian Product and Rename Operator), Additional Relational Algebra Operators (Set Intersection, Natural Join, Division Operator, Assignment Operator), Examples
- Transaction Concept (Transaction State, Basic Definitions, ACID Property), Implementation of Atomicity and Durability (Shadow Paging Concept), Concurrent Execution (Reasons of Concurrent Execution, Serial and Concurrent Schedule), Serializability (Conflict and View Serializability), Recoverability of Schedules (Recoverable Schedule and Cascade-less Schedule), Lock-based Protocol (Types of Lock and Deadlock Concept), Two-Phase Locking Protocol, Deadlock Handling (Deadlock Prevention Techniques like Wait-Die, Wound-Wait), Recovery of Deadlock (Selection of

  Victim, Rollback, and Starvation), Insert and Delete Operations (Delete, Insertion, Phantom Phenomenon), Transaction Failure, Storage Structure and Transaction Log and Log-Based Recovery (Deffered Database Modification, Immediate Database Modification, Checkpoints)

Course Syllabi (Practical):

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

Text Books:

1. Silberschatz, Korth, Sudarshan, “Database System Concepts”, 5th Edition, McGraw Hill Publication

Reference Books:

1. C J Date, A Kannan, S Swaminathan, "An Introduction to Database Systems", 8th Edition, Pearson Education (2006)
2. S K Singh, "Database Systems: Concepts, Design and Applications", Pearson Education
3. Elmsari, Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education (2008)
4. Peter Rob, Carlos Coronel, "Database Systems: Design, Implementation and Management", 7th Edition, Cengage Learning (2007)

Textbook for Practical

1. "Oracle 9i PL/SQL", Oracle Press.

Reference Book for Practical

1. Ivan Bayross, "SQL, PL/SQL The Programming Language Oracle".

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE403	Computer Architecture & Organization	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

Course Syllabi (Theory):

BASIC STRUCTURE OF COMPUTERS : Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface –Instruction set architecture – Addressing modes – RISC – CISC. ALU design – Fixed point and floating point operations.

BASIC PROCESSING UNIT : Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming.

PIPELINING : Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets –Data path and control considerations – Performance considerations – Exception

handling.

MEMORY SYSTEM :Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

I/O ORGANIZATION : Accessing I/O devices – Programmed Input/Output -Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and processors.

Text Books:

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.

Reference Books:

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Third Edition, Elsevier, 2005.
2. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
3. V.P. Heuring, H.F. Jordan, “Computer Systems Design and Architecture”, Second Edition, Pearson Education, 2004.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA402	Numerical and Statistical Analysis	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

- **Modeling, Computers, and Error Analysis**: Mathematical Modeling and solution using Programming and Software, Computer Arithmetic and Errors: Approximations and Round-Off Errors, Truncation Errors and the Taylor Series
- **Transcendental and polynomial equation**: Solution of non-linear Equations: Bisection Method, *Regula-falsi* Method, Secant Method, Newton Raphson Method
- **Linear Algebraic Equations**: LU Decomposition Method, Gauss Elimination Method, Gauss Jordan Elimination Method, Iterative methods for solving system of linear equations.
- **Interpolation and approximation**: Netwon Formula for forward and backward interpolation, Sterling Central difference interpolation, Lagrangian Interpolation
- **Numerical Differentiation and Integration**: Numerical Differentiation and Integration, Newton-Cotes Integration Formulae.
- **Ordinary Differential Equations**: Picard Method, Euler Method, Modified Euler Method, Runge-Kutta 4^{th} order Method, Milne Predictor-Corrector Method
- **Random Variables and probability distributions**: Introduction to probability, Discrete and continuous random variables, Probability Distributions: Binomial, Possion, Exponential, Normal distributions, Mathematical expectation, Chebyshev's inequality, Discrete and continuous probability distributions
- **Sampling distributions**: Sampling, Types of sampling, sampling errors, sampling distribution of means, variance and proportions for normal population, The Central Limit Theorem, Chi-Square, t and F distributions
- **Estimation**: Estimators, Point and interval estimation, confidence intervals for parameters in one sample and two sample problems of normal populations, confidence intervals for proportions
- **Testing of Hypotheses**: Null and alternative hypotheses, the critical and acceptance regions, two types of error, Parametric Tests, Chi-square goodness of fit test, Contingency tables.
- **Correlation and regression**: Types of Relationships, Scatter Diagrams, Regression Line, Coefficients of Determination and Correlation

Syllabus (Practical)

Numerical Methods using MATLAB and Statistical Analysis using SPSS in Computer Labs that includes:

- Numerical solution of algebraic and transcendental equations.
- Numerical solution of system of linear equations.
- Interpolation.

- Numerical differentiation.
- Numerical integration.
- Numerical solution of differential equations.
- Data Analysis using Correlation and Regression
- Test of Hypothesis

Text books and Reference books

1. K. E. Atkinson, *Introduction to Numerical Analysis*, John Wiley and Sons.
2. M.K. Jain, S. R. K. Iyengar, R. K. Jain, *Numerical Methods For Scientific And Engineering Computation*, New age International publishers, New Delhi.
3. Steven C Chapra, Raymond P Canale, *Applied Numerical Methods with MATLAB for Engineers and Scientists*, 3rd Editions, Tata Mc Graw Hill, New Delhi, 2012.
4. Srimanta Pal, *Numerical Methods: Principles, Analyses and Algorithms*, Oxford University Press, New Delhi.
5. Cheney and Kincaid, *Numerical Methods and Applications*, Cengage Publications, New Delhi.
6. Cleve B. Moler, *Numerical Computing with MATLAB*, Prentice Hall of India, New Delhi .
7. Rishard A. Johnson, *Miller and Freund's probability and Statistics for Engineers*, PHI, 8th Ed.
8. Ravichandran J., *Probaility and statistics for Engineers*, Wiley India, New Delhi.
9. Douglas C. Montgomery and George C. Runger, *Applied Statistics and Probability for Engineers*, John Wiley & Sons, Inc., 3rd Edition (2004).
10. Prem S. Mann, *Introductory Statistics*, Wiley publication, 7th edition.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS701	Principles of Economics	3	0	0	3

Evaluation Scheme (Theory)								
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 /Mock Interviews/others

Course Syllabi (Theory):

- Definition of Economics and role of economics in Engineering and Technology; Basic economic terms; The economy, working of an economy, kinds of an economy and its basic problems; Laws of Demand and Supply and market Equilibrium; Elasticity of demand its measurements and application, Production function and law of Variable Proportion and Law of Returns to Scale; Concepts of cost and revenue, short run and long run cost function; Profit maximization hypothesis, Price and output determination under Perfect Competition, Monopolistic competition and Monopoly.
- Measurement of macroeconomic aggregates, National Income, Consumption, saving and investment function; Macroeconomic issues: Inflation, Unemployment and Economic growth International aspects of macroeconomics; Foreign Exchange rate and Balance of payments.

Text Books:

1. T.R. Jain and M.L. Grover, “Economics for Engineers”, V. K. (India) Enterprises

Reference Books:

1. D N Dwivedi “Principles of Economics”, Vikas Publishing House Pvt Ltd.
2. G. Mankiew. Economics Principles and Applications. Cengage Learning

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTLA201	Advance Professional Communication Skills	1	1	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

UNIT I:
Introduction to the course, characteristic Features of Effective Communication and Ways to overcome barriers to Communication.

UNIT II:
Importance of Non-Verbal Communication, Importance of Paralinguistic Features and Vocal Cues

UNIT III:
Group Discussion, Job Interviews, Public Speaking.

UNIT IV:
Business Letters and Resume, Business Reports, Technical Proposals.

UNIT V:
E-mail Writing, Other Business Writings

Syllabus (Practical)

1. Decided by teacher in to the lab according to topics in theory.

Text Book(s)

1. T1. Sanjay Kumar and Pushp Lata, *Communication Skills,* New Delhi: OUP, 2011.

Reference Books:

1. R1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, Second Edition, New Delhi: OUP, 2011.
2. R2. Krishna Mohan and Meenakshi Raman, *Effective English Communication,* New Delhi: Tata-McGraw Hill, 2000.
3. R3. Krishna Mohan and N.P.Singh, *Speaking English Effectively*, New Delhi: Macmillan,1994.
4. R4. V. Sasikumar and P.V. Dhamija, *Spoken English: A Self-Learning Guide to ConversationPractic*e, Tata-McGraw Hill, 2007.
5. R5. Norman Lewis, *Word Power Made Easy*, Delhi: GoyalSaab Publishers and Distributors, 1994.
6. R6. A.J.Thomson and A.V.Martinet, *A Practical English Grammar,* 4th Edition, New Delhi: OUP, 1999.
7. R7. Asha Kaul, *Business Communication*, Second Edition, New Delhi: PHI, 2010.
8. R8. Edgar Thorpe and Showick Thorpe, *Objective English*, 2nd Edition, New Delhi: Pearson Education, 2008.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-FIFTH

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE501	Operating System	3	1	2	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%

Course Syllabi (Theory):

- Basic Elements of Computer System, Processor Registers, Instruction Execution, Interrupts, The Memory Hierarchy, Cache Memory, Operating System Objectives and Functions, The Evolution of OS, Major Achievements, Characteristics of Modern OS ,Process States, Process Description, Process Control, UNIX Process Management, Processes and Threads, Principles of Concurrency, Mutual Exclusion, Software Approaches, Mutual Exclusion: Hardware Support, Semaphores, Monitors, Message Passing, Reader/Writer Problem, Principles of Deadlock, Deadlock Prevention.
- Deadlock Avoidance, Deadlock Detection, An Integrated Deadlock Strategy, Dining Philosophers Problem, Memory Management Requirements, Memory Partitioning, Paging, Segmentation, Hardware and Control Structures, OS Software, UNIX Memory Management
- Uni-processor Scheduling: Types of Scheduling, Scheduling, Algorithms, Traditional UNIX Scheduling, Multiprocessor and Real-time Management: Multiprocessor Scheduling, Thread Scheduling, Real- Time Scheduling
- I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, OS Design
- Issues, I/O Buffering, Disk Scheduling, RAID, Disk cache, File Management: Overview, File Organization, File Directories, File Sharing, Record Blocking, Secondary Storage Management.
- Distributed Processing, Client/Server and Clusters: Client/Server Computing, Distributed Message, Passing, Remote Procedure Calls, Clusters.

Course Syllabi (Practical)

- Linux Basics, File System, Commands in Linux, Pipes and Filters, Communication commands, Shell Scripting in Linux

Text Books:

1. Stalling W, “Operating Systems”, 6th edition, Prentice Hall India.
2. C.L. Liu, Elements of Discrete mathematics, McGraw-Hill, 1985

Reference Books:

1. Silberschatz, A., Peter B. Galvin and Greg Gagne, “Operating System Principles, Wiley India, 8th Edition
2. Tanenbaum A.S., “Modern Operating Systems”, 4th Edition, PHI, 2001
3. Flynn I.M, “Understanding Operating Systems”, Cengage India Publication

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE503	Computer Networks	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

- Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.
- Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.
- Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6.
- Transport Layer: Transport Layer - Design issues, connection management, session Layer- Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.
- Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

Course Syllabi (Practical):

1. Packet transmission – packetization of data, simple point-to-point communication.

2. MAC Layer – Observe and measure the performance of various MAC Layer protocols by changing the network load, distance between the nodes wherever applicable and compare them:

- BUS Topology:
  - ALOHA: Exposure to multiple access to a shared medium, throughput vs offered load
  - CSMA: Throughput vs offered load for various node distances in the form of bit delays

- CSMA/CD: Throughput vs offered load, packet delay vs throughput at various loads
- Token-Passing BUS: Demand assignment when compared to random access protocols, packet delay vs throughput – comparison with CSMA/CD
- CSMA/CA: DCF mode operation – Throughput vs offered load – comparison with CSMA/CD performance

- RING Topology:
  - Token Ring: Throuhgput vs average packet delay at various loads and timeout values, performance comparison with CSMA/CD

3. DLL: Observe and measure the performance of various DLL protocols by changing the network load, various timeout period, introducing bit errors and compare them

- Stop-and-Wait: Throughput vs BER for different packet lengths and timeout values
- Sliding Window – Go-Back-N: Pipelining concept – throughput vs BER for different packet lengths and timeout values – comparison with Stop-and-Wait
- Sliding Window – Selective-Repeat: Pipelining with selective re-transmissions concept – throughput vs BER for different packet lengths and timeout values – comparison with Go-Back-N

4. Network Layer: Study of Routing Protocols

- Distance Vector routing: Hop-by-hop routing, routing table updation, count-to-infinity problem exposure
- Link State routing: Routing table updation, effect of shortest path algorithm, comparison with DV routing

5. Application Layer:

- File transfer using sockets: TCP connection establishment, session management

6. Serial/Parallel port networking: Simple network connectivity using serial and parallel ports in a PC, setup TCP/IP communication through PPP.

7. Data security in computer networks:

- Data protection: RC4 symmetric stream cipher-key generation, encryption-decryption steps
- Network threat: Sniffing of raw data and encrypted data in a LAN

8. STAR Topology (Optional):

- ALOHA, CSMA, CSMA/CD, Stop & Wait and Sliding Window GBN protocols performance in STAR topology
- Switching in LAN: Switching at Layer 2, self-learning using Baran's backward learning algorithm

Text Books:

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education
3. W. Stallings, Data and Computer Communication, Macmillan Press
4. Anuranjan Misra, “Computer Networks”, Acme Learning
5. G. Shanmugarathinam, ”Essential of TCP/ IP”, Firewall Media

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE504	Theory of Computation	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

Course Syllabi (Theory):

- Introduction; Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transit ion, Language of NFA, Equi valence of NFA and DFA, Minimization of Finite Automata, Distinguis hing one string from other, Myhill-Nerode Theorem
- Regular expression (RE) , Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA toRegular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages . Application of Pumping Lemma, Closure properties of Regu lar Languages, Decision properti es of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.
- Context free grammar (CFG) and Contex t Freee Languages (CFL): Definition, Examples, Derivation , Derivation trees, Am biguity in Grammer, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless sym bols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs,
- Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA
- Turing machines (TM): Basic model, definit ion and representatio n, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Chur ch's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory

Text & reference Books

1. Hopcroft, Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education

2. K.L.P. Mishra and N.Chandrasekaran, "Theory of Computer Science : Automata, Languages and Computation", PHI

3. Martin J. C., "Introduction to Languages and Theory of Computations", TMH

4. Papadimitrou, C. and Lewis, C.L., "Elements of the Theory of Computation", PHI

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE505	Web Technologies	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

Internet Principles and Components: History of the Internet and World Wide Web- – HTML - protocols – HTTP, SMTP, POP3, MIME, IMAP. Domain Name Server, Web Browsers and Web Servers, Dynamic HTML

Client Side and Server Side Programming: Introduction to JAVA Scripts and VB Scripts– Object Based Scripting for the web. Programming Java Script and VB Script - Structures – Functions – Arrays – Objects, Regular Expression in java script. Java Server Pages - Session and Application management - Session tracking and cookies – Access a database from JSP – Developing N-tier web application.

XML and ActiveX: Anatomy of xml document - XML markup-working with elements and attributes - creating valid documents-xml objects and DOM. ActiveX controls: OLE and ActiveX -ActiveX Documents, Server side Active-X Components, ActiveX DLL and ActiveX Exe.

Multimedia and Web Application: Multimedia in web design, Audio and video speech synthesis and recognition - Electronic Commerce – E-Business Model – E-Marketing – Online Payments and Security – N-tier Architecture. Search and Design: Working of search engines -optimization-Search interface.

Web Services: Introduction to Web Services, UDDI, SOAP, WSDL, Web Service Architecture, Developing and deploying web services. Ajax – Improving web page performance using Ajax, Programming in Ajax.

Course Syllabi (Practical):

1. Creation of HTML Files
2. Working with Client Side Scripting
    - 2.1 VBScript
    - 2.2 JavaScript
3. Configuration of web servers
    - 3.1 Apache Web Server
    - 3.2 Internet Information Server (IIS)
4. Working with ActiveX Controls in web documents.
5. Experiments in Java Server Pages
    - 5.1 Implementing MVC Architecture using Servlets
    - 5.2 Data Access Programming (using ADO)
    - 5.3 Session and Application objects
    - 5.4 File System Management
6. Working with other Server Side Scripting
    - 6.1 Active Server Pages

6.2 Java Servlets

6.3 PHP

7. Experiments in Ajax Programming
8. Developing Web Services
9. Developing any E-commerce application (Mini Project)

Text Books & References

1. Xavier, C, “Web Technology and Design” , New Age International
2. Deitel, “Java for programmers”, Pearson Education
3. Ivan Bayross,” HTML, DHTML, Java Script, Perl & CGI”, BPB Publication.
4. Ramesh Bangia, “Internet and Web Design” , New Age International
5. Jackson, “Web Technologies” Pearson Education
6. Patel and Barik, ”Introduction to Web Technology & Internet”, Acme Learning

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE506	System Analysis & Design	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

Course Syllabi (Theory):

Unit 1: SYSTEMS ANALYSIS FUNDAMENTALS

Systems, Roles, and Development Methodologies, Understanding and Modeling Organizational Systems, Project Management

Unit II. INFORMATION REQUIREMENTS ANALYSIS

Information Gathering: Interactive Methods, Information Gathering: Unobtrusive Methods, Agile Modeling and Prototyping

Unit III. THE ANALYSIS PROCESS

Using Data Flow Diagrams, Analyzing Systems Using Data Dictionaries, Process Specifications and Structured Decisions, Object-Oriented Systems Analysis and Design Using UML

Unit IV. THE ESSENTIALS OF DESIGN

Designing Effective Output, Designing Effective Input, Designing Databases, Human-Computer Interaction

Unit V. QUALITY ASSURANCE AND IMPLEMENTATION

Designing Accurate Data Entry Procedures, Quality Assurance and Implementation

Textbook:

Systems Analysis and Design, 9/E, Kenneth E. Kendall, Julie E. Kendall

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE521 (Elective-I)	Management Information System	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					

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

Course Syllabi (Theory):

- Organization & Types, Decision Making, Data & information, Characteristics & Classification of information, Cost & value of information, Various channels of information & MIS. Foundation of Information System: Introduction to Information System in Business Fundamentals of Information System, Solving Business Problems with Information System, Concept of Balanced MIS, Effectiveness & Efficiency Criteria. Tool and Techniques of MIS- dataflow diagram, flow chart etc.
- Business application of information technology, electronic commerce, Internet, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information system for managerial Decision Support, Information System for Strategic Advantage. Managing Information Technology, Enterprise & Global Management, Security & Ethical Challenges, Planning & Implementing Change.
- Reports: Various types of MIS reports, GUI & Other Presentation tools.
- Advanced concepts in information system: Enterprise Resource Planning: introduction, various modules like Human Resources, Finance, Accounting, Production & Logistics. Supply Chain Management, CRM, Procurement Management System Object Oriented modeling case studies.

Text & Reference Books

1. O.Brian, “Introduction to Information System”, Mc-Graw Hill.
2. O.Brian, “Management Information System”, TMH.
3. Alter, “Information Systems : A Management Perspective”, Addison Wesley.
4. Arora & Bhatia, “Information Systems for Managers”, Excel
5. Bansal, “Information System Analysis & Design”, TMH.
6. Jawadegar, “Management Information System”, TMH.
7. Murdick, “Information System for Modern Management”, PHI.
8. Alexis Leon, “Enterprise Resource Planning”, TMH.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE 522 (Elective-I)	Information Technology & Project Management	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					

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

Course Syllabi (Theory):

- Overview of Software Project Planning Software Project, Categorization of software Project, Introduction to Stepwise Project Planning, Project Scope, Infrastructure, Resource Allocation etc, Project Plan Execution.
- Project Evaluation Strategy assessment, Technical Assessment, Cost Benefit Analysis, Cash flow forecasting, Risk Evaluation, Selection of Technologies, Rapid application Development, Prototyping Example.
- Software Effort Estimation & Activity Play Over & under estimation problem, basis for software estimation, Estimation by analogy, COCOMO, Parameter Model function, point analysis, Project schedule, Planning Model, Project Tim management, Activity duration estimation.
- Risk management, Identification, Analysis and abatement of risk, Nature of resources, critical, county cost, schedule, Monetary & control, Cost Monitoring, Priority by monetary, Managing Control , Contract Management, Human Resource Management.
- Software quality Assurance, Software quality in project planning, Software quality definition, ISO 9126 standards, Product quality management,SEICMM model

Text & References:

- Shtub, Bard, and Globerson,"Project Management: Engineering, Technology, & Implementation", Prentice Hall
- Neal Whitten , "Managing Software Development Projects, Formula for Success", 2nd Edition, John Wiley & Sons
- Bob Hughes, Mike Cotterell, "Software Project Management", 3rd Edition, McGrawHill

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE 523 (Elective-I)	Data Compression & Encryption	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	-	-	-	-	-

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

Course Syllabi (Theory):

Introduction: Compression Techniques, Modeling and Coding,

Mathematical Preliminaries for Lossless Compression: Overview

Introduction to Information Theory: Models, Coding

Huffman Coding: Overview, The Huffman Coding Algorithm, Minimum Variance Huffman Codes, Adaptive Huffman Coding, Application of Huffman Coding,

Arithmetic Coding: Overview, Introduction, Coding a Sequence, Generating a Binary Code, Comparison of Huffman and Arithmetic Coding, Applications

Dictionary Techniques: Overview, Introduction, Static Dictionary, Adaptive Dictionary, Applications

Mathematical Preliminaries for Lossy Coding: Overview, Introduction, Distortion Criteria, Models

Scalar Quantization: Overview, Introduction, The Quantization Problem, Uniform Quantizer, Adaptive Quantization, Nonuniform Quantization

Vector Quantization: Overview, Introduction, Advantages of Vector Quantization over Scalar Quantization

Transform Coding: Overview, Introduction, The Transform, Transforms of Interest, Discrete Cosine Transform, Quantization and Coding of Transform Coefficients, Application to Image Compression – JPEG, Application to Audio Compression,

Wavelet-Based Compression: Image Compression, Embedded Zerotree Coder, Set Partitioning in Hierarchical Trees, JPEG 2000

Encryption: Introduction: Security Services, Mechanisms, Attacks

Conventional Cryptography: Model for conventional cryptography, various ciphering techniques

Modern encryption techniques: DES, IDEA, RSA, Diffie Hellman Key exchange, Digital Signatures, Hash Functions, Message Authentication Codes

Text & References:

1. Introduction to Data Compression – Second Editon By Khalid Sayood Morgan Kaufmann, Harcourt India Publication
2. Cryptography and Network Security – William Stallings

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE524 (Elective-I)	Graph Theory	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	-	-	-	-	-

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

Course Syllabi (Theory):

Unit -I

Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

Unit- II

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

Unit -III

Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability, network flows Planer graphs, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

Unit -IV

Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix. Coloring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem Discussion of Graph theoretic algorithm wherever required.

References

1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH
3. Robin J. Wilson, Introduction to Graph Theory, Pearson Education
4. Harary, F, Graph Theory, Narosa
5. Bondy and Murthy: Graph theory and application. Addison Wesley.
6. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH
7. Geir Agnarsson, Graph Theory: Modeling, Applications and Algorithms, Pearson Education

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
LA501	Effective Public speaking and Employability Skills	2	0	0	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	-	-	-	-	-

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

Course Syllabi (Theory):

- Planning, Preparing and Organizing a Presentation: Collecting the Material, Making an Outline, Drafting, Editing
- Structuring the Presentation: Choosing and Pattern such as Chronological, Causal, Spatial, Directional, Psychological, etc.
- Audience Analysis: Recognizing Needs, Expectations and Attitudes
- Combating Nervousness: Signs and Symptoms; Hidden Causes of Stage Fright; Remedies
- Designing a Presentation: Planning Innovative Beginnings; Developing and Substantiating the Main Body; Casting Effective Endings
- Using Body and Voice to Communicate Effectively: Nuances of Body Language such as Gestures, Posture, Eye Contact, Hand Movements, Facial Expressions; and Elements of Voice such as Volume, Pitch, Articulation, Inflections, Pauses, Vocalized Pauses, etc.
- Choosing Appropriate Language for the Right Effect: Vocabulary, Wit and Humour
- Preparing Speeches for Special Occasions: Welcome Speech, Welcome Speech, Introduction Speech, Felicitation Speech, Farewell Speech, Vote of Thanks, etc
- Preparing Resume and Curriculum Vitae
- Group Discussion: Understanding the Purpose and Relevance; Learning Tips for Effective Participation; Various Traits to be Evaluated such as Reasoning Ability, Group Dynamics, Leadership Skills, Openness, Assertiveness, Motivation, Non-verbal Communication, Originality, Composure, Expression; Learning through Mock Group Discussions, etc
- Job Interviews: Discussing with students the different steps and strategies required in job interviews; highlighting the importance of preparation, alertness, confidence and knowledge; preparing for commonly asked questions during interviews, marshalling techniques for answering effectively, reviewing different job interviews; displaying effective body language; sailing through dicey questions; Learning through Mock Interviews.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
PS501	Practice School – I				4

S. No.	Evaluation Component	Marks (100) (Weightage %)
1	Quiz-I	4
2	Quiz-II	4
3	Group Discussion-I	4
4	Group Discussion-II	4
5	Seminar-I	4
6	Seminar-II	4
7	Diary-I	4
8	Diary-II	4
9	Observation-I	4
10	Observation- II	4
11	Mid Term Evaluation (Project Report and Presentation/Viva)	20
12	Final Evaluation (Project Report and Presentation/Viva)	40

Course Syllabi:

This course is for 6 weeks at the end of 4th semester during summer term of 4 year full time B. Tech. and 5 year Integrated Dual degree (B.Tech + M.Tech, B.Tech + MBA) programs 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 PS-1 assignments is of study and orientation.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTSEM101	Seminar & Presentation	0	0	4	0	2

S. No.	Evaluation Component	Duration (Hours)	Marks (100)	Nature of Component
1.	Presentation	Weekly	20	Open Book
2.	Report(Soft Copy)	Weekly	20	Open Book
3.	Assignment	Continuous	10	Open Book
4.	Final Presentation		25	Open Book
5.	Final Report(Hard Copy)		25	Open Book

Syllabus (Practical)

OPERATION PROCEDURE

1. Student has to devote full semester for **MTSEM101** course.
2. Student has to report to the Supervisor regularly.
3. Seminars' evaluation has to be carried out in the presence of a two member Committee comprising.
4. Experts in the relevant area constituted by the Supervisor.

Final Thesis to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

Reference Books:

1. Based on literature survey to be done with peer reviewed journals.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS122 (Elective-I)	Internet Technology	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: WEB 2.0

search, content networks, user-generated content, blogging, social networking, social media, tagging, social bookmarking, rich Internet applications, web services, location-based services, Web 2.0 monetization and business models, future of the Web.

UNIT II: EXTENSIBLE HYPERTEXT MARKUP LANGUAGE (XHTML)

XHTML syntax, headings, linking, images, special characters and horizontal rules, lists, tables, forms, internal linking, meta elements.

UNIT III: CASCADING STYLE SHEETS (CSS)

separation of content and presentation, inline styles, embedded style sheets, conflicting styles, kinking external style sheets, positioning elements, backgrounds, element dimensions, box model and text flow, media types, building a CSS drop-down menu, user style sheets.

UNIT IV: JAVASCRIPT

Client side scripting, control statements, functions, arrays, objects, events.

UNIT V: DOCUMENT OBJECT MODEL

Objects and collections Extensible Markup Language (XML) RSS: Advantages and applications, structuring data, XML namespaces, Document Type Definitions (DTDs), XML vocabularies, RSS.

Text Book(s):

1. Deitel H.M. and P. J. Deitel, Internet & World Wide Web. How to Program, 4/e, Prentice Hall, ISBN 0131752421, 2008

References Book(s)

1. Web Design The complete Reference, Thomas Powell, Tata McGrawHill
2. HTML and XHTML The complete Reference, Thomas Powell, Tata McGrawHill
3. JavaScript 2.0 : The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider 4. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-SIXTH

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE601	Distributed Systems	3	0	2	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%

Course Syllabi (Theory):

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges.

System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system,

absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection.

Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection,

distributed dead lock detection, path pushing algorithms, edge chasing algorithms.

Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem,

Atomic Commit in Distributed Database system.

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study.

Security: Overview of security techniques, Cryptographic algorithms, Digital signatures

Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent.

Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.

Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks,

Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm. CORBA Case Study: CORBA RMI, CORBA services.

Course Syllabi (Practical):

Programs related to CORBA, EJB, RMI

Text/Reference Books:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill

2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design",

Pearson Ed.

3. Gerald Tel, "Distributed Algorithms", Cambridge University Press

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE610	Foundations of Computer Graphics	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

- Introduction: Introduction to Raster scan displays, Storage tube displays, and refreshing, flicking, interlacing, color monitors, display processors, resolution, Introduction to Interactive. Computer Graphics: Picture analysis, Overview of programmer's model of interactive graphics, Fundamental problems in geometry. Scan Conversion: point, line, circle, ellipse polygon, Aliasing, and introduction to Anti-Aliasing (No antialiasing algorithm).
- 2D & 3D Co-ordinate system: Homogeneous Co-ordinates, Translation, Rotation, Scaling, Reflection, Inverse transformation, Composite transformation. Polygon Representation, Flood Filling, Boundary filling. Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Polygon Clipping algorithms. Searching, sequential and binary search.
- Hidden Lines & Surfaces: Image and Object space, Depth Buffer Methods, Hidden Facets removal, Scan line algorithm, Area based algorithms. Curves and Splines: Parametric and Non parametric Representations, Bezier curve, B-Spline Curves.
- Rendering: Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV
- Multimedia: Multimedia components, Multimedia Input/output Technologies: Storage and retrieval technologies, Architectural considerations, file formats. Animation: Introduction, Rules, problems and Animation techniques.

Course Syllabi (Practical):

- Study of basics of openGL
- WAP to draw a Line using DDA line drawing algorithm
- WAP to draw a line using breshanham's algorithm
- Write a program to draw circle using midpoint circle algorithm
- To draw an ellipse using mid point ellipse algorithm
- Write a program to translate, rotate and scale the2D object
- Write a program to fill polygon using boundary and flood fill algorithm
- Implementation of clipping algorithm.
- Write a program to translate, rotate and scale the 3D object.
- Write a program to draw 3D effects. sphere with illumination

Text Books:

1. J. Foley, A. Van Dam, S. Feiner, J. Hughes: Computer Graphics- Principles and Practice,Pearson
2. Hearn and Baker: Computer Graphics, PHI

Reference Books:

1. Multimedia Systems Design, Prabhat Andleigh and Thakkar, PHI.
2. Multimedia Information Networking, N.K.Sharda, PHI.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE603	Compiler Design	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Course Syllabi (Theory):

- Introduction, lexical analysis:Language processors; The structure of a Compilers; The evolution of programming languages; The science of building a compiler; Applications of Compiler technology; Programming language basics; Lexical analysis: The Role of Lexical Analyzer; Input Buffering; Specifications of Tokens; Recognition of Tokens.
- Syntax Analysis 1: Introduction; Context-free Grammars; Writing a Grammar; Top-down Parsing, Syntax Analysis 2: Bottom-up Parsing; Introduction to LR Parsing: Simple LR.
- Syntax-Directed definitions: Evaluation order for SDDs; Applications of Syntax-directed translation; Syntax-directed translation schemes. **,** Intermediate code generation**:** Variants of syntax trees; Three-address code; Types and declarations; Translation of expressions; Type checking; Control flow; Back patching; Switch statements; Intermediate code for procedures.
- Run-Time environments: Storage Organization; Stack allocation of space; Access to non-local data on the stack; Heap management; Introduction to garbage collection,
- Code generation: Issues in the design of Code Generator; The Target language; Addresses in the target code; Basic blocks and Flow graphs; Optimization of basic blocks; A Simple Code Generator.

Course Syllabi (Practical):

Practice of Lex/Yacc for Compiler Writing, Program to check whether a string belongs to grammar or not, program to parse a tree, Program to find leading terminals, Program to find trailing terminals, Program to check whether a grammar is left recursive and remove left recursion, Program to remove left factoring, Program to show all operations of a stack

Text Books:

1. K. Muneeswaran, Compiler Design, Oxford University Press, 2012

Reference Books:

1. Compilers- Principles, Techniques and Tools, Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D Ullman – 2nd Edition, Addison-Wesley, 2007.
2. Allen I. Holub “Compiler Design in C”, Prentice Hall of India, 2003.
3. C. N. Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE604	Software Engineering	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

- Software Components, Software Characteristics, Software Crisis, Software Engineering Processes, Similarity and Differences from Conventional Engineering Processes, Software Quality Attributes, Software Development Life Cycle (SDLC) Models: Water Fall Model, Linear Sequential Model, Prototype Model, Spiral Model, RAD Model, Evolutionary Development Models, Incremental Model, Component Assembly Model, Iterative Enhancement Models.
- Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS. Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Software Quality Frameworks, ISO 9000 Models, SEI-CMM Model
- Basic Concept of Software Design, Architectural Design, Low Level Design, Modularization, Design Structure Charts, Pseudo Codes, Flow Charts, Coupling and Cohesion Measures, Design Strategies: Function Oriented Design, Object Oriented Design, Top-Down and Bottom-Up Design. Software Measurement and Metrics: Various Size Oriented Measures: Hallstead's Software Science, Function Point (FP) Based Measures, Cyclomatic Complexity Measures, Control Flow Graphs
- Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up. Testing Strategies: Test Drivers and Test Stubs, Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Test Data Suit Preparation, Alpha and Beta Testing of Products. Static Testing Strategies: Formal Technical Reviews (Peer Reviews), Walk Through, Code Inspection, Compliance with Design and Coding Standards
- Software as an Evolutionary Entity, Need for Maintenance, Categories of Maintenance: Preventive, Corrective and Perfective Maintenance, Cost of Maintenance, Software Re-Engineering, Reverse Engineering. Software Configuration Management Activities, Change Control Process, Software Version Control, An Overview of CASE Tools. Estimation of Various Parameters such as Cost, Efforts, Schedule/Duration, Constructive Cost Models (COCOMO), Resource Allocation Models, Software Risk Analysis and Management

Course Syllabi (Practical):

Experiments are to practice software engineering techniques. Use any open source CASE tool. You can choose any other CASE tool, as per choice.

Design Approach: Object Oriented

These designing can be done on any automation system e.g. library management system, billing system, payroll system, bus reservation system, students result management system.

1. Do a feasibility study

2. Document all the requirements as specified by customer in Software Requirement Specification

3. Design sequence diagrams for project

4. Design Collaboration diagram

5. Design Data Flow Diagram for the project

6. Design Entity Relation Diagram for the project

7. Design Class diagram

8. Code and test the project, which you have designed in last 8 labs.

Text Books:

1. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, 7th Edition, McGraw Hill Publications

Reference Books:

1. Sommerville, “Software Engineering”, 8th Edition, Pearson Education
2. Waman S. Jawadekar, “Software Engineering – Principles and Practices”, TMGH
3. Publication
4. Pankaj Jalote, “Software Engineering – A Precise Approach”, Wiley India ", Tata McGraw-Hill, 2003.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE621(Elective-II)	Information Security	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	-	-	-	-	-

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

Course Syllabi (Theory):

- Introduction to security attacks, services and mechanism, Classical encryption techniques substitution
- Ciphers and transposition ciphers, cryptanalysis, steganography, Stream and block ciphers.
- Modern Block Ciphers: Block ciphers principles, Shannon's theory of confusion and diffusion, Fiestal structure, Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of operations, Triple DES
- Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers, Extended Euclidean Algorithm,
- Advanced Encryption Standard (AES) encryption and decryption Fermat's and Euler's theorem, Primality testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public key crypto systems, RSA algorithm, security of RSA
- Message Authentication Codes: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA)
- Digital Signatures: Digital Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature algorithm,
- Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key distribution, X.509 Certificates, Public key Infrastructure.
- Authentication Applications: Kerberos, Electronic mail security: pretty good privacy (PGP), S/MIME.
- IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Introduction to Secure Socket Layer, Secure electronic, Transaction (SET).
- System Security: Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, Firewalls

Text Books & References:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", Pearson Education.
2. Behrouz A. Frouzan: Cryptography and Network Security, TMH
3. Bruce Schiener, "Applied Cryptography". John Wiley & Sons
4. Bernard Menezes," Network Security and Cryptography", Cengage Learning.
5. Atul Kahate, "Cryptography and Network Security", TMH

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE 625 (Elective II)	Soft Computing	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)

- ANN- Introduction – Biological neuron – Artificial neuron – Neuron modeling – Learning rules Single layer – Multi layer feed forward network – Back propagation – Learning factors.
- ANN - ARCHITECTURE AND APPLICATIONS Feedback networks – Discrete time Hopfield networks – Transient response of continuous time networks – Process modeling using ANN- Neuro controller for inverted pendulum.
- FUZZY SYSTEMS Classical sets – Fuzzy sets – Fuzzy relations – Fuzzification - Membership functions – Defuzzification – Methods of defuzzification – Fuzzy rules.
- FUZZY LOGIC CONTROL Membership function – Knowledge base – Decision-making logic – Optimisation of membership function using neural networks – Adaptive fuzzy system.- FLC for inverted pendulum- Home heating system- Introduction to Neuro-fuzzy systems.
- OPTIMIZATION TECHNIQUES

  Gradient Search – Non-gradient search – Genetic Algorithms: Operators, search algorithm, penalty – Evolutionary Programming: Operators, Search Algorithms.

Course Syllabi (Practical):

Write programs to implement following Techniques.

Hill Climbing

Best first Search

A* algorithm

AO* Algorithms

Control strategies.

Text Books:

1. Laurance Fausett, 'Fundamentals of Neural Networks', Pearson Education, 2004.
2. Timothy J. Ross, 'Fuzzy Logic with Engineering Applications', McGraw Hill, 1997.

3. David Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning’, Pearson Education, 2007.

Reference Books:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, ‘ Neuro- Fuzzy and Soft Computing’ Pearson Education, New Delhi, 2004.
2. Jacek M. Zurada, ‘Introduction to Artificial Neural Systems’, Jaico Publishing home, 2002.
3. John Yen and Reza Langari, ‘Fuzzy Logic – Intelligence, Control and Information’ Pearson Education, New Delhi, 2003.
4. Robert J.Schalkoff, ‘ Artifical Neural Networks’, McGraw Hill, 1997.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MA621 (Elective-II)	Engineering Optimization	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	-	-	-	-	-

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

Syllabus (Theory)

- **Introduction:** Introduction to Optimization and its scope, Formulating a Mathematical Model, Deriving Solutions from the Model
- **Linear Programming Problems:**Revised Simplex Method, Duality Theory and Sensitivity Analysis, Dual Simplex Method, Transportation Problem, Assignment Problem
- **Non-linear Programming**: Introduction, Single variable and multi variable optimization, Constrained and unconstrained problems, Kuhn-Tucker conditions
- **Network Optimization Models:** The Terminology of Networks, Shortest-Path Problem, Minimum Spanning Tree Problem
- **Other Optimization Models:** Dynamic Programming, Integer Programming, Game Theory
- **Multi-objective optimization**: Introduction to various multi-objective optimization techniques and its scope, Linear Goal Programming and Its Solution

Text books and Reference books

1. Hillier F.S. and Lieberman G.J., *Introduction to Operations Research: Concepts and Cases*, Tata Mc Graw Hill, 8th Ed., (Indian Adapted Edition), 2005.
2. Taha. H. A, *Operations Research: An Introduction*, Pearson Education, 7th ed., 2003.
3. Ronald L. Rardin, *Optimization in Operations Research*. Pearson Education, First Indian Reprint 2002.
4. Pant.J.C*., Introduction to Optimization: Operations Research*, Jain Brothers, 5th Ed., 2000.
5. Sharma. S. D., *Operations Research*, Kedarnath Ramnath & Co., 15th Edition, 2006.
6. Kalyanmoy Deb, Optimization for Engineering Design: Algorithms and Examples, PHI.
7. Kasana H.S. and Kumar K.D., Introductory Operations Research: Theory and Applications, Springer.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE611	Minor Project	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**
-	-	-	-	-	-	-	-	-

Syllabus (Practical)

The objective of the project is to enable the students to work in a project of latest topic / research area / industrial applications. Each project student shall have a guide who is a faculty member. During the semester the students are expected to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem. The students are expected to complete the project and submit a full-fledged report comprising of the complete system developed along with implementation and test results. The departmental committee shall examine the students and award credits.

Evaluation

Sr. No.	Evaluation Component	Nature of Exam	Marks
1.	Presentation & Report	Mid Semester	40
2.	Continuous Evaluation	Continuous	10
3.	Final Presentation & Report	End Sem	50

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS 601(HS-Elective)	Organizational Behaviour	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	-	-	-	-	-

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

Unit I - Introduction to Organizational Behavior

Introduction, evolution of OB, fundamental concepts, models of OB & challenges in OB

Unit II - Understanding Self

Perception, personality, emotions, values, attitudes, learning

Unit III - Understanding Groups

Group dynamics, teams and groups, interpersonal skills, communication, conflict and negotiation, motivation, leadership

Unit IV - Understanding Organisations

Organisational culture, power, politics, decision making, change and its management

Text Book

1. Organizational behavior by Stephen P. Robbins, Pearson Education Asia.

Reference Books

1. Organisational Behaviour by Fred Luthans
2. Behavior in Organisations by Jerald Greenberg & Robert A.Baron, Pearson Education
3. Organizational behavior by Mirza S Saiyadain
4. Organisational Behaviour by Dr. K. Ashwathappa

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS 602(HS-Elective)	Professional Ethics	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	-	-	-	-	-

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

Unit I – Concept of Ethics

Importance, human values, moral reasoning, stakeholder theory

Unit II – Ethical issues in organizations

Engineering ethics, Ethics in different areas of organizations

Unit III – Unethical business practices

Corruption, bribe, smuggling, hawala, money laundering, tax heavens, unethical marketing communications, counterfeiting, piracy, dumping, etc.

Unit IV – Developing corporate citizenship

Responsibility and rights, whistle blowing, developing ethical culture, ethical leadership

Text Book

1. Professional Ethics and Human Values, Govindarajan, M., Natarajn, S. and Senthilkumar, V.S., PHI

Reference Books

1. Professional Ethics by R. Subramaniam, Oxford University Press
2. Human Values and Professional Ethics by S. Kannan, Taxmann

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS603(HS-Elective)	Technology Management	2	0	0	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	-	-	-	-	-

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

Unit I - Introduction to Technology Management

Sources and types of technological change, incremental and disruptive change, product life cycles and dominant designs

Unit II – Technology strategy

Corporate and technology strategy, technology assessment, technological forecasting - exploratory and normative

Unit III – Technology Diffusion

Diffusion of technology, technology indicators, technology transfer, technology management scenario in India

Unit IV – Organizational implications of technology

Technical structure and organizational infrastructure, flexible manufacturing management systems (FMMS), financial aspects, social issues, environmental impact assessment, human aspects in technology management

Text Book

1. Management of Technology: The Key to Competitiveness and Wealth Creation by Tarek Khalil and Ravi Shankar, McGraw Hill Education India

Reference Books

1. Technology Management by SBS Publishers
2. Technology, Management and Society By Peter F Drucker, HBS Press

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
HS 604(HS-Elective)	Critical Interpretation of Literature and Cinema	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	-	-	-	-	-

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

- Significance of Literature and Cinema
- Interpreting Literature through Devices such as Narrative Technique, Theme, Plot, Action, Characterization, Structure, Unity, Stylistic Features, Figures of Speech such as Simile, Metaphor, Alliteration, Personification, Paradox, Antithesis, Oxymoron, Onomatopoeia, Litotes, Epithets, Hyperbole, etc.
- Interpreting Cinema through Devices such as Light, Sound, Structure, Continuities, Shots, Close-ups, Flashbacks, Memory, Scopophilia, Soundtrack, Counterpoints, Acting, Make-up, Costume, Camera Angles, Editing, Cuts, Ambiguity etc.
- Complexities and Compromises in Cinematic Adaptions
- Analyzing Selected Poems, Short Stories, Plays and Works of Fiction
- List of Selected Works: Poems by Robert Frost, Alexander Pope, Short Stories by Chekhov, Katherine Mansfield, and Somerset Maugham; John Osborne's Look Back in Anger, Jhumpa Lahiri'sThe Namesake
- Analyzing Selected Films through Cinematic Devices, Adaptation Techniques, etc.
- List of Selected Works: The Namesake, French Lieutenant's Woman, Pride and Prejudice, Guide

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS224 (Elective II)	Object Oriented Analysis and Design	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: FUNDAMENTAL

An overview of object oriented systems development Object basics Object oriented systems development life cycle.

UNIT II: OBJECT ORIENTED METHODOLOGIES

Rumbaugh methodology, Booch methodology − Jacobson methodology, Patterns, Frameworks, Unified approach, Unified modeling language, Use case diagram, Class diagram, Interaction diagram, Package diagram, State diagram, Activity diagram and Implementation diagram.

UNIT III: OBJECT ORIENTED ANALYSIS

Identifying use cases Object analysis Classification, Identifying object relationships, Attributes and methods.

UNIT IV: OBJECT ORIENTED DESIGN

Design axioms, Designing classes, Access layer, Object storage, Object interoperability.

UNIT V: SOFTWARE QUALITY AND USABILITY

Designing interface objects, Software quality assurance, System usability, Measuring user satisfaction, SYSTEM DESIGN: - Estimating Performance, Making a reuse plan, breaking system into subsystems ,identifying concurrency, allocation of subsystems, management of data storage, Handling Global resources, choosing a software control strategy, Handling boundary condition, common Architectural style.

Text Book(s):

1. T1. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education.

Reference Books:

1. R1.Oriented Modeling and Design with UML michael Blaha and James Rambaugh - second edition
2. R2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides,"Design patterns:Elements of Reusable object-oriented software", Addison-Wesley.
3. R3. Object-Oriented Methods: A Foundation, James Martin, et. al, Prentice-Hall.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-SEVENTH

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE701	Data Warehousing & Data Mining	3	0	2	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

- Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. **Data Reduction**:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.

- **Concept Description**:- Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisions, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases.

- **Classification and Predictions**:

  What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods Knearest neighbor classifiers, Genetic Algorithm.

- **Cluster Analysis**:

  Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering-CURE and Chameleon, Density Based Methods-DBSCAN, OPTICS, Grid Based Methods- STING, CLIQUE, Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis

- **Data Warehousing**: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

- Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

Syllabus (Practical)

1. Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.

2. Using IBM OLAP Miner - Understand the use of data mining for evaluating the content of multidimensional cubes.

3. Using Teradata Warehouse Miner - Create mining models that are executed in SQL.

4. Publish and analyze a business intelligence portal. Metadata & ETL Lab: The objective of this lab exercises is to implement metadata import agents to pull metadata from leading business intelligence tools and populate a metadata repository. To understand ETL processes.

5. Publish metadata stored in the repository.

6. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.

7. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.

Text Books & Reference:

1. M.H.Dunham,"Data Mining:Introductory and Advanced Topics" Pearson Education
2. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier
3. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World : A Practical Guide for Building Decision Support Systems, 1/e " Pearson Education
4. Mallach,"Data Warehousing System",McGraw –Hill

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE702	Mobile Computing	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)

- Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.
- (Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.
- Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).
- Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.
- Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.
- Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.
- Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.
- Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

Syllabus (Practical)

1. SimulationofapplicationusingJ2MEsimulator

a. MidletandotherbasicUIitems.

b. BluetoothAPI

c. ImplementationofWirelessMessaging

2. SimulationofInfotainment(news,weatherforecastsetc)usingWAP
3. Simulationof applicationsusingsymbianOS
4. Study of WML and J2ME simulators
5. Design of Calendar for any given month and year using WML/J2ME
6. Simulation of Authentication and encryption technique used in GSM

Text Books:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley. (Chapters 4, 7, 9, 10, 11), second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028. (Chapters 11, 15, 17, 26 and 27)

Reference Books:

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October2004,
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden, Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003.

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.

Workplace and Interpersonal Communication(CCT708)

Course Description

This course helps students craft their personal brand, face prospective employers, and prepare for the workplace.

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

Prerequisites		
Hours per Week		**L-T-P: 2-1-0**
Credits		**3**
Sr. No	**Specifications**	**Marks**
01	Attendance	10
02	Assignment	75
03	Class Participation	15
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	Nil
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation	Nil
15	Lab Evaluation	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

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.

MTCS103: Introduction to Machine Learning

Course Title and Code: Introduction to Machine Learning	
Hours per Week	**3 0 2**
Credits	**2**
Students who can take	**B.Tech+ M.Tech**

Course Objective: With the increased availability of data from varied sources there has been increasing attention paid to the various data driven discipline such as analytics and machine learning. This course introduces concepts of machine learning from a mathematically well motivated perspective. Different learning paradigms and some of the more popular algorithms and architectures used in each of these paradigms would be covered in the course.

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

1. Identify machine learning techniques suitable for a given problem.
2. Interpret fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
3. Apply dimensionality reduction techniques.
4. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
5. Apply Suitable Machine Learning Technique.
6. Build Neural Network for Prediction
7. Utilize Reinforcement Learning concepts to improvise precision of models.

Prerequisites: Linear Algebra, Basic Statistics, Programming Langauge

Evaluation Scheme

Sr. No	**Specifications**	**Marks**
1	Attendance	Nil
2	Assignment	40
3	Class Participation	Nil
4	Quiz	Nil
5	Theory Exam I	Nil
6	Theory Exam	15
7	Theory Exam (End Term)	25
8	Report-1	Nil
9	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**

Retest

1	Theory Exam	25
2	Lab Evaluation	10

Course Contents:

Probability Theory, Linear Algebra, Convex Optimization - (Recap), Introduction: Statistical Decision Theory - Regression, Classification, Bias Variance

Linear Regression, Multivariate Regression, Subset Selection, Shrinkage Methods, Principal Component, Partial Least squares

Linear Classification, Logistic Regression, Linear Discriminant Analysis, Perceptron, Support Vector Machines

Neural Networks - Introduction, Early Models, Perceptron Learning, Backpropagation, Initialization, Training & Validation, Parameter Estimation - MLE, MAP, Bayesian Estimation

Decision Trees, Regression Trees, Stopping Criterion & Pruning loss functions, Categorical Attributes, Multiway Splits, Missing Values, Decision Trees - Instability Evaluation Measures

Bootstrapping & Cross Validation, Class Evaluation Measures, ROC curve, MDL, Ensemble Methods - Bagging, Committee Machines and Stacking, Boosting

Gradient Boosting, Random Forests, Multi-class Classification, Naive Bayes, Bayesian Networks Undirected Graphical Models, HMM, Variable Elimination, Belief Propagation

Partitional Clustering, Hierarchical Clustering, Birch Algorithm, CURE Algorithm, Density-based Clustering

Gaussian Mixture Models, Expectation Maximization, Learning Theory, Introduction to Reinforcement Learning, Optional videos (RL framework, TD learning, Solution Methods, Applications)

Suggested Reading Materials:

The Elements of Statistical Learning, by Trevor Hastie, Robert Tibshirani, Jerome H. Friedman (freely available online)

Pattern Recognition and Machine Learning, by Christopher Bishop

Course Title and Code Intelligent Machines (AI, Robotics, IoT) : ID303		
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.		
Prerequisites		**Basic Programming Course**
Hours per Week		**L-T-P: 2-0-0**
Credits		**2**
Sr. No	**Specifications**	**Marks**
01	Attendance	Nil
02	Assignment	40
03	Class Participation	20
04	Quiz	40
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	Nil
12	Project -2	Nil
13	Project -3	Nil
14	Lab Evaluation1	Nil
15	Lab Evaluation2(Final)	Nil
16	Course portfolio	Nil
	Total (100)	**100**

Syllabus

IoT: Introduction to Embedded IOT System: Interfacing sensors and motor, Controlling Devices and Reading input Status from sensors using webpage, Introduction to API and web services, Designing SMS API and security OTP app, Camera Interfacing using sensors, Basic SMTP protocol and Mail server and Sending Mail (Security application) mail based, Creating applications with weather updates.

Artificial Intelligence and Machine Learning: Understanding what we mean when we say machines think, How does AI relate to the rest of predictive analytics?, How AI works and its inherent limitations., AI till date, Expectations from the field of AI, Introduction to Machine Learning, Preprocessing your data, Regression model, Classification model, Clustering Model, Case-study-Water Jug Problem, Titanic Data Set

Robotics: Elements of robots: joints, links, actuators, and sensors. Position and orientation of a rigid body, Representation of joints, different kinds of actuators – stepper, DC servo and brushless motors, model of a DC servo motor, purpose of sensors, internal and external sensors, common sensors, Kinematics of serial robots, Degrees-of-freedom of parallel mechanisms and manipulators.

Reference / Text Books

1. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)

2. "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press)
3. Russel and P. Norvig, “Artificial Intelligence – A Modern Approach”, Second Edition, Pearson Education, 2003.
4. Luger, “Artificial Intelligence: Structures and Strategies for complex problem solving”, Fourth Edition, Pearson Education, 2002.
5. David Poole, Alan Mackworth, Randy Goebel, ”Computational Intelligence : a logical approach”, Oxford University Press, 2004.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE703	Artificial Intelligence	2	0	2	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)

What is Artificial Intelligence?, The AI Problems, The Underlying Assumption, What is an AI Technique, The Level of the Model, Criteria for Success

Problems, Problem spaces and Search

Heuristic Search Techniques

Knowledge representation issues

Using Predicate knowledge
Rule based representation of knowledge

Syllabus (Practical)

Implementation of different problems using programming languages such as PROLOG & LISP.

Text Books:

1. Russell and Norvig. Artificial Intelligence: A Modern Approach, 3rd. edition.

Reference Books:

1. David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence : a logical approach", Oxford University Press, 2004.
2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education, 2002.
3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 1998.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
SEM701	Seminar	0	0	4	2

S. No.	Evaluation Component	Duration (Hours)	Marks (100)	Nature of Component
1.	Presentation	Weekly	25	Open Book
2.	Report(Soft Copy)	Weekly	25	Open Book
3.	Assignment	Continuous	10	Open Book
4.	Final Presentation		20	Open Book
5.	Final Report(Hard Copy)		20	Open Book

Syllabus (Practical)

Operation Procedure

1. Student has to devote full semester for SEM701 course.
2. Student has to report to the Supervisor regularly.
3. Seminars s evaluation has to be carried out in the presence of a two member Committee comprising.
4. Experts in the relevant area constituted by the Supervisor.

Final Seminar Report to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

Reference Books:

Based on literature survey to be done with peer reviewed journals and magazines.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ECE828 (Elective III)	Digital Image Processing	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	-	-	-	-

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

Syllabus (Theory)

- Image Processing, The origins of Digital Image Processing, Examples of Fields that use Digital Image Processing, Fundamentals Steps in Digital Image Processing, Components of an Image Processing System.

- Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationship between Pixels, An Introduction to the Mathematical Tools Used in Digital Image Processing

- Intensity Transformation and Spatial Filtering, Background, Some Basic Intensity Transformation Functions, Histogram Processing, Fundamentals of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters

- Filtering in the Frequency Domain, Concepts, Sampling and the Fourier Transform of Sampled
- Functions, The Discrete Fourier Transform (DFT) of One Variable, Extension to Functions of Two Variables,, Some Properties of the 2-D Discrete Fourier Transform, The Basics of Filtering in the Frequency Domain, Image Smoothing Using Frequency Domain Filters, Image Sharpening Using Frequency Domain Filters.

- Color Fundamentals, Color Models, Pseudocolor Image Processing, Basics of Full-Color Image Processing, Color Transformations, Smoothing and Sharpening.

Text Books:

1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education 2003.

Reference Books:

1. Chanda and D. Dutta Majumder, “Digital Image Processing and Analysis”, PHI Publication.

2. Madhuri A. Joshi, “Digital Image Processing – An Algorithmic Approach, PHI Publication.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE723 (Elective III)	Network Management	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	-	-	-	-	-

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

Syllabus (Theory)

- Problem definition and overview - What is network management, network management business drivers, network management scenarios, examples of management tools
- Basic management concepts and management architectures – agent/manager paradigm, management networks, TMN reference architecture
- Management functions and basic management algorithms – Fault, Configuration, Accounting, Performance, Security (FCAPS) reference model, OAM&P (Operations Administration Maintenance & Provisioning), management lifecycle, management processes and organization
- Management information fundamentals – management information modeling paradigms, Internet management model (SMIv2)
- Management communication fundamentals – Management protocol reference architecture, basic management patterns and their applications, advanced management patterns
- Management protocols – SNMP + management functions provided through MIBs, CLI, syslog, Netconf and YANG, Netflow and IPFIX
- Service level management: service level agreements, service level monitoring and performance measurement, service level assurance

Text Book

1. Clemm, “Network Management Fundamentals”, Cisco Press, ISBN-13 978-1-58720-137-0

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE728 (Elective III)	Wireless Networks	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	-	-	-	-	-

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

Syllabus (Theory)

UNIT I MULTIPLE RADIO ACCESS

Medium Access Alternatives: Fixed-Assignment for Voice Oriented Networks Random Access for Data Oriented Networks , Handoff and Roaming Support, Security and Privacy.

UNIT II WIRELESS WANS

First Generation Analog, Second Generation TDMA – GSM, Short Messaging Service in GSM, Second Generation CDMA – IS-95, GPRS - Third Generation Systems (WCDMA/CDMA 2000)

UNIT III WIRELESS LANS

Introduction to wireless LANs - IEEE 802.11 WLAN – Architecture and Services, physical Layer- MAC sublayer- MAC Management Sublayer, Other IEEE 802.11 standards, HIPERLAN, WiMax standard.

UNIT IV ADHOC AND SENSOR NETWORKS

Characteristics of MANETs, Table-driven and Source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT V WIRELESS MANS AND PANS

Wireless MANs – Physical and MAC layer details, Wireless PANs – Architecture of Bluetooth Systems, Physical and MAC layer details, Standards.

Text Books & Reference:

1. William Stallings, "Wireless Communications and networks" Pearson / Prentice Hall

of India, 2nd Ed., 2007.

2. Dharma Prakash Agrawal & Qing-An Zeng, “Introduction to Wireless and Mobile

Systems”, Thomson India Edition, 2nd Ed., 2007.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE725 (Elective III)	Parallel Processing	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	-	-	-	-	-

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

Syllabus (Theory)

- Introduction to Parallel Processing: Flynn's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors
- Shared Memory Multiprocessors: SMP and CC-NUMA architectures, Cache coherence protocols, Consistency protocols, Data pre-fetching, CC-NUMA memory management, SGI 4700 multiprocessor, Network Processors
- Interconnection Networks: Static and Dynamic networks, switching techniques, Routers, Internet techniques
- Message Passing Architectures: Message passing paradigms, Grid architecture, Workstation clusters, User level software
- Scheduling: Multiprocessor Programming Technique, Scheduling and mapping, Internet web servers, P2P, Content aware load balancing

Text Books:

1. Introduction to Parallel Computing 2nd Edition, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, The Addison Wesley Publishing Company, ISBN 0-201-64865

Reference Books:

1. D.L. Eager, J. Zahorjan, and E.D. Lazowski. Speedup Versus Efficiency in Parallel Systems, IEEE Transactions on Computers, Vol 38 No 3, March 1989.
2. Joseph JaJa, An Introduction to Parallel Algorithms, Addison-Wesley, 1992.
3. S. G. Akl, Design and Analysis of Parallel Algorithms, Prentice-Hall, 1989.
4. T. Leighton, Introduction to Parallel Algorithms and Architectures, Morgan Kaufmann, 1992.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE722 (Elective III)	Modeling & Simulation Technologies	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	-	-	-	-	-

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

Course Syllabi (Theory):

- **Introduction:** Systems, models, discrete event simulation and continuous simulation.
- **Discrete Event Simulation:** Time-advance mechanisms, event modeling of discrete dynamic systems, single-server single queue model, event graphs, Monte Carlo simulation.
- **GPSS:** Model structure, entities and transactions, blocks in GPSS, process oriented programming, user defined functions, SNA, logic switches, save locations, user chains, tabulation of result, programming examples.
- **Random Number Generation:** Congruence generators, long period generators, uniformity and independence testing
- **Random Variable Generation:** Location, scale and shape parameters, discrete and continuous probability distributions; Inverse transform method, composition and acceptance rejection, methods
- **Queuing Models:** Little's theorem, analytical results for M/M/1, M/M/1/N, M/M/c, M/G/1 and other queuing models.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE727 (Elective IV)	Cyber Laws and Intellectual Property Rights	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	-	-	-	-	-

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

Syllabus (Theory)

- History of Information Systems and its Importance, basics, Changing Nature of Information Systems, Need of Distributed Information Systems, Role of Internet and Web Services, Information System Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.
- Security Threats to E Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards. Physical Security- Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges
- Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues, Policies Network Security- Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunneling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN.
- Security metrics- Classification and their benefits Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data mIning Security, Building Security into Software Life Cycle Ethics- Ethical Issues, Issues in Data and Software Privacy Cyber Crime Types & overview of Cyber Crimes

Text Books & Reference:

- Godbole," Information Systems Security", Willey
- Merkov, Breithaupt," Information Security", Pearson Education
- Yadav, "Foundations of Information Technology", New Age, Delhi
- Schou, Shoemaker, " Information Assurance for the Enterprise", Tata McGraw Hill
- Sood,"Cyber Laws Simplified", Mc Graw Hill
- Furnell, "Computer Insecurity", Springer
- IT Act 2000

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE726 (Elective IV)	Object Oriented Analysis and Design	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	-	-	-	-	-

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

Syllabus (Theory)

- Introduction to UML: Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, Software Development Life Cycle.
- Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.
- Advanced Structural Modeling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
- Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.
- Basic Behavioral Modeling-I: Interactions, Interaction diagrams.
- Basic Behavioral Modeling-II: Use cases, Use case Diagrams, Activity Diagrams.
- Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
- Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.
- Case Study: The Unified Library application.

Text Book

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.

2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

Reference Books:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.
3. Atul Kahate: Object Oriented Analysis & Design, The McGraw-Hill Companies.
4. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, Cengage Learning.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE721 (Elective IV)	Real Time Systems	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	-	-	-	-	-

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

Syllabus (Theory)

Introduction: Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

Real Time Scheduling: Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

Resources Access Control: Effect of Resource Contention and Resource Access Control (RAC), Non-pre-emptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.

Multiprocessor System Environment: Multiprocessor and Distributed System Model, Multiprocessor Priority-Ceiling Protocol, Schedulability of Fixed-Priority End-to-End Periodic Tasks, Scheduling Algorithms for End-to-End Periodic Tasks, End-to-End Tasks in Heterogeneous Systems, Predictability and Validation of Dynamic Multiprocessor Systems, Scheduling of Tasks with Temporal Distance Constraints.

Real Time Communication: Model of Real Time Communication, Priority-Based Service and Weighted Round- Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols, Real Time Protocols, Communication in Multicomputer System, An Overview of Real Time Operating Systems.

Text Books & Reference:

1. Real Time Systems by Jane W. S. Liu, Pearson Education Publication.
2. Mall Rajib, “Real Time Systems”, Pearson Education
3. Albert M. K. Cheng , “Real-Time Systems: Scheduling, Analysis, and Verification”, Wiley.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
ECE829 (Elective IV)	Information Theory & Coding	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	-	-	-	-	-

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

Course Syllabi (Theory):

- Information theory – Concept of amount of information -units, Entropy -marginal, conditional and joint entropies - relation among entropies Mutual information, information rate, channel capacity, redundancy and efficiency of channels.
- Discrete channels – Symmetric channels, Binary Symmetric Channel, Binary Erasure Channel, Cascaded channels, repetition of symbols, Binary unsymmetrical channel, and Shannon theorem. Continuous channels – Capacity of band limited Gaussian channels, Shannon-Hartley theorem, Tradeoff between band width and signal to noise ratio, Capacity of a channel with infinite band width, Optimum modulation system.
- Source coding – Encoding techniques, Purpose of encoding, Instantaneous codes, Construction of instantaneous codes, Kraft's inequality, Coding efficiency and redundancy, Noiseless coding theorem. Construction of basic source codes – Shannon-Fano algorithm, Huffman coding, Arithmetic coding, ZIP coding.
- Codes for error detection and correction – Parity check coding, Linear block codes, Error detecting and correcting capabilities, Generator and Parity check matrices, Standard array and Syndrome decoding, Hamming codes, Encoding and decoding of systematic and unsystematic codes. Cyclic codes – Generator polynomial, Generator and Parity check matrices, Encoding of cyclic codes, Syndrome computation and error detection, Decoding of cyclic codes, BCH codes, RS codes, Burst error correction.
- Convolutional codes – Encoding- State, Tree and Trellis diagrams, Maximum likelihood decoding of convolutional codes -Viterbi algorithm, Sequential decoding -Stack algorithm. Interleaving techniques – Block and convolutional interleaving, Coding and interleaving applied to CD digital audio system -CIRC encoding and decoding, interpolation and muting. ARQ – Types of ARQ, Performance of ARQ, Probability of error and throughput.

Text Books:

1. Communication Systems by Simon Haykin, John Wiley & Sons. Pvt. Ltd.
2. Principles of Communication Systems by Taub & Schilling, Tata McGraw-Hill
3. Principles of Digital Communication by Das, Mullick & Chatterjee, Wiley Eastern Ltd

Reference Books:

1. Error Control Coding Fundamentals and Applications by Shu Lin & Daniel J. Costello Jr., Prentice Hall Inc.
2. Digital Communications Fundamentals and Applications by Bernard Sklar, Person Education Asia.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
CSE724 (Elective IV)	Machine Learning	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				

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

Course Syllabi (Theory):

- Basic concepts, Supervised learning., Supervised learning setup. LMS.
- Logistic regression. Perceptron. Exponential family. Generative learning algorithms. Gaussian discriminant analysis. Naive Bayes.
- Support vector machines. Model selection and feature selection, Ensemble methods: Bagging, boosting, Evaluating and debugging learning algorithms.
-
- Learning theory, Bias/variance tradeoff. Union and Chernoff/Hoeffding bounds, VC dimension. Worst case (online) learning, Usage of learning algorithms.
-
- 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.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

5 Year B. Tech + M.Tech Programme

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER-EIGHTH

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
PS801	Practice School - II	-	-	-	16

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
-	-	-	-	-	-	-	-	-	-	-

Duration for practice school is Five and a half month

Course Syllabi:

This course is for five and half months (summer and one semester) in VII or VIII Semester. The objective of this programme is to provide the students, an opportunity to work on live projects of corporate world in various fields. During this programme, they will work on real world applications of their curricula through organizational function of their choice. The students are expected to be involved directly in problem solving efforts of specific interest to the host organization. The learning of PS-I will help them in completing PS-II successfully.

Evaluation Scheme:

S. No.	Evaluation Component	Marks (100) (Weightage %)
1	Quiz-I	4
2	Quiz-II	4
3	Group Discussion-I	4
4	Group Discussion-II	4
5	Seminar-I	4
6	Seminar-II	4
7	Diary-I	4
8	Diary-II	4
9	Observation-I	4
10	Observation- II	4
11	Mid Term Evaluation (Project Report and Presentation/Viva)	20
12	Final Evaluation (Project Report and Presentation/Viva)	40

Course Name: Advanced Probability and Statistics

Course Code: CSE889

Course Offered to: Students of B.Tech + M.Tech Sem 8th as a curated MOOC

Credits: 3

Course Description

The use of statistical reasoning and methodology is indispensable in modern world. It is applicable to every discipline, be it physical sciences, engineering and technology, economics or social sciences. Much of the advanced research in electronics, electrical, computer science, industrial engineering, biology, genetics, and information science relies increasingly on use of statistical tools. It is essential for the students to get acquainted with the subject of probability and statistics at an early stage. The present course has been designed to introduce the subject to undergraduate/postgraduate students in science and engineering. The course contains a good introduction to each topic and an advance treatment of theory at a fairly understandable level to the students at this stage. Each concept has been explained through examples and application oriented problems.

Course Platform: NPTEL

Course End Date: April 19, 2019

Date of Exam: April 28, 2019 (Sunday)

Industries that will recognize this course

Today all industries use statistical methods. So for students desirous to work in any type of industry, this course will be indispensable. In particular, companies dealing with Business Analytics, Banking and finance, Insurance machine learning, data mining etc. this course will be invaluable.

INTERNSHIP/JOB OPPORTUNITIES FOR TOP 5% OF THIS COURSE AT VuNet:
VuNet Systems(www.vunetsystems.com) brings in a big data approach to manage the complex IT infrastructure of enterprises. With its powerful analytics and intuitive visualisations, it helps connect the 1000s of dots in an IT infrastructure to keep it always on and secure. VuNet has customers across verticals, from banks, manufacturing, consumer care to IT/ITES, with some leading retail payment companies as well. VuNet has also been recognised among the NASSCOM Emerge50 innovative product startups and is also part of the Cisco Launchpad program - Cisco's partnership program with top emerging startups.

Upon completion of this course, the toppers can submit their resumes and programming code samples. VuNet will interview the candidates and offer internships or job opportunities based on the interview.

Instructor: Prof. Somesh Kumar, IIT Kharagpur

CERTIFICATION: Final score will be calculated as : 25% assignment score + 75% final exam score, 25% assignment score is calculated as 25% of average of Best 8 out of 12 assignments

E-Certificate will be given to those who register and write the exam and score greater than or equal to 40% final score. Certificate will have your name, photograph and the score in the final exam with the breakup.It will have the logos of NPTEL and IIT Kharagpur. It will be e-verifiable at nptel.ac.in/noc.

Course Name: Advanced Algorithms and Complexity

Course Code: CSE888

Course Offered to: Students of B.Tech + M.Tech Sem 8th as a curated MOOC

Credits: 5

Course Description

Students after studying the basic algorithms are ready to step into the area of more complex problems and algorithms to solve them. Advanced algorithms build upon basic ones and use new ideas. The course would start with networks flows which are used in more typical applications such as optimal matchings, finding disjoint paths and flight scheduling as well as more surprising ones like image segmentation in computer vision. The course would then proceed to linear programming with applications in optimizing budget allocation, portfolio optimization, finding the cheapest diet satisfying all requirements and many others. Later, inherently hard problems for which no exact good solutions are known (and not likely to be found) and how to solve them in practice would be discussed. The course would be finished with a soft introduction to streaming algorithms that are heavily used in Big Data processing. Such algorithms are usually designed to be able to process huge datasets without being able even to store a dataset.

Course Platform: Coursera

Syllabus:

Flows in Networks

Network flows show up in many real world situations in which a good needs to be transported across a network with limited capacity which can be seen when shipping goods across highways and routing packets across the internet. In this unit, the mathematical underpinnings of network flows and some important flow algorithms will be discussed. Some surprising examples on seemingly unrelated problems that can be solved with our knowledge of network flows will also be shared.

Linear Programming

Linear programming is a very powerful algorithmic tool. Essentially, a linear programming problem asks you to optimize a linear function of real variables constrained by some system of linear inequalities. This is an extremely versatile framework that immediately generalizes flow problems, but can also be used to discuss a wide variety of other problems from optimizing production procedures to finding the cheapest way to attain a healthy diet. Surprisingly, this very general framework admits efficient algorithms. In this unit, some of the importance of linear programming problems along with some of the tools used to solve them will be discussed.

NP Complete Programs

In this module students shall study the classical NP-complete problems and the reductions between them. Students will also practice solving large instances of some of these problems despite their hardness using very efficient specialized software based on tons of research in the area of NP-complete problems.

Coping with NP-completeness

Special cases on NP-complete problems can, in fact, be solved in polynomial time will be discussed. Exact algorithms that find a solution much faster than the brute force algorithm will also be covered. The course would be concluded with approximation algorithms that work in polynomial time and find a solution that is close to being optimal.

Course Provider: University of California

Course Instructors:

Alexander S. Kulikov, Visiting Professor, Department of Computer Science and Engineering

Michael Levin, Lecturer, Computer Science

Daniel M Kane, Assistant Professor, Department of Computer Science and Engineering / Department of Mathematics

Neil Rhodes, Adjunct Faculty, Computer Science and Engineering

JK Lakshmipat University

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

2 Year M. Tech Program

(Branch: Computer Science & Engineering)

Batch 2016-18

Course Structure, Detailed Syllabus
&
Scheme of Examination

Institute of Engineering and Technology
Department of Computer Science and Engineering
Course Structure for the M.Tech Computer Science Engineering Batch 2016- 20

Semester	Courses							(L T P) Credits Hrs/Week
I	Analysis and Design of Algorithms	Advanced Computer Networks	Advanced DBMS	Software Systems Lab I	Elective I	Seminar & Presentation		(12 2 12) 20
	MTCS101 (3 1 0) 4	MTCS102 (3 0 2) 4	MTCS103 (3 1 2) 5	MTCS152 (0 0 4) 2	(3 0 0) 3	MTSEM 101 (0 0 4) 2		26
II	Advanced Compilers	Computers and Network Security	Distributed Computing	Advanced Professional Communication skills	Software Systems Lab II	Elective-II	Seminar & Presentation	(13 2 12) 21
	MTCS201 (3 0 2) 4	MTCS202 (3 1 0) 4	MTCS203 (3 0 0) 3	MTLA201 (1 1 2) 3	MTCS251 (0 0 4) 2	(3 0 0) 3	MTSEM 201 (0 0 4) 2	27
III	Professional Practice	Dissertation Stage-I	Elective- III	Elective - IV				(9 0 4) 11+8
	MTTP301 (3 0 4) 5	MTDS301 ( ) 8	(3 0 0)3	(3 0 0) 3				
IV	Dissertation Stage- II							( ) 20
	MTDS401 ( ) 20							

List of Elective Courses

Elective I	ICT for Socio Economic Development (MTCS121)	Internet Technology (MTCS122)	Digital System Design (MTCS123)					
Elective II	Advanced Computer Architecture (MTCS221)	Information Security & Cyber Laws (MTCS222)	Graph Theory (MTCS223)	Object Oriented Analysis & Design (MTCS224)				
Elective III	Speech & Language Processing (MTCS321)	Genetic Algorithms (MTCS322)	New Trends in IT (MTCS323)	Computational Complexity (MTCS324)	Software Engineering (MTCS325)	Artificial Intelligence Techniques (MTCS326)	Machine Learning MTCS327	
Elective IV/V/VI/VII	Mobile Computing (MTCS321)	Pattern Recognition (MTCS322)	Parallel Processing (MTCS323)	Distributed Systems (MTCS324)	Real Time Systems (MTCS325)	Quantum Computing (MTCS326)	Dataware housing & Mining (MTCS327)	Embedded Systems (MTCS328)
	Spatial Databases (MTCS329)	Human Computer Interaction (MTCS330)	Organization of Web Information (MTCS331)	Computer Vision (MTCS332)	Advanced Computer Graphics (MTCS333)	Ubiquitous Computing (MTCS334)	Database Administration (MTCS335)	Information Retrieval MTCS336

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

2 Year M. Tech Program

(Branch: Computer Science & Engineering)

Batch 2016-18

SEMESTER-ONE

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS101	Analysis & Design of Algorithm	3	1	0	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)

UNIT I:
Introduction to Algorithm, The role of algorithms in computing, Asymptotic notation, asymptotic analysis of recurrence relations, probabilistic analysis and randomized algorithm, the hiring problem, indicator random variables, Divide and conquer paradigm – Merge sort, Inversion counting, Dynamic Programming – Matrix Chain multiplication, Longest Common subsequence, optimal binary search trees.

UNIT II:
Greedy Algorithm –Activity Selection problem, Theoretical foundation of greedy algorithm, Task Scheduling problem, Comparison of dynamic programming and Greedy algorithm with Knapsack as case study, Graphs: Review of Graphs (Representation, Depth First Search, Breath First search, Kruskal and Prim Algorithm, Dijkstra's Algorithm.

UNIT III:
Flow networks: Ford-Fulkerson method, comparison Networks, Zero-one Principle, Bitonic Sorting Network, Merging Network, Sorting Network, Matrix Operation (Properties, Strassen's Algorithm, Solution of linear equation, Matrix inversion), Polynomial and FFT, Representation of polynomials, The DFT and FFT, efficient FFT implementation.

UNIT IV:
Number–Theoretic Algorithm, Elementary number-theoretic notion, Greatest common divisor, modular arithmetic, solving modular linear equation, the Chinese remainder theorem

UNIT V:
NP-Completeness, Polynomial time, Polynomial time verification, NP-completeness and reducibility, NP-Completeness proofs, Approximation Algorithms- the vertex-cover problem, The Traveling-Salesman Problem, The set covering problem

Text Books:

1. T1. T. H. Cormen, C. E. Leiserson, R.L. Rivest, C. Stein, Introduction to Algorithms, 2nd Edition, PHI.
2. T2. A.V. Aho, J. E. Hopcroft, J.D. Ulman, The Design & Analysis of Computer Algorithms, Addison Wesley.

Reference Books:

1. R1. V. Manber, "Introduction to Algorithms – A Creative Approach", Addison Wesley.
2. R2. Ellis Harwitz and Sartaz Sahani, "Fundamentals of Computer Algorithms", Galgotia.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 102	*Advanced Computer Networks*	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

UNIT I:

Introduction, overview of network building blocks, Network architecture with layers and protocols, Overview of data link concepts, IP addressing, forwarding, and routing, BGP and adaptive routing, Multi-Protocol Label Switching (MPLS), MPLS Architecture and related protocols, Traffic Engineering (TE) and TE with MPLS

UNIT II:

Transport protocols and congestion control, Quality of Service (QoS) with MPLS technology, Network recovery and restoration with MPLS technology

UNIT III:

Virtual Private Networks (L2, L3, and Hybrid), Metro Networks, Metro technologies, Ethernet over SONET, Resilient Packet Rings, Ethernet transport, Metro Ethernet services, L2 switching, L3/L2VPNs for Metro, Pseudowire (PW) concept (multisegment/redundant PW's), Ethernet over MPLS, VPLS

UNIT IV:

Optical Networks, WDM, Wavelength routing, LightPaths/Lighttrails, Wavelength conversion and rerouting, Network Survivability and Provisioning, IP over DWDM, Next generation Optical Networks, Optical Circuit Switching, Optical Burst Switching, Optical Packet Switching

UNIT V:

GMPLS (Generalized MPLS), MPL (lambda) S, GMPLS architecture, Other Topics : Sensor Networks, Mobile Internet, Home networking, TriplePlay/IPTV

Syllabus (Practical)

1. **Kernel** configuration, compilation and installation : Download / access the latest kernel source code from kernel.org,compile the kernel and install it in the local system.Try to view the source code of the kernel
2. **Virtualisation** environment (e.g., xen, kqemu or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to other alternate OSs like *BSD
3. **Compiling from source:** learn about the various build systems used like the auto* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automake etc.,
4. Introduction to **packet management system**: Given a set of RPM or DEB, how to build and maintain, serve packages over http or ftp and also how do you configure client systems to access the package repository.
5. **Installing various software packages** either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need internet access. Install samba and share files to windows Install Common Unix Printing System(CUPS)
6. **Write userspace drivers using fuse** – easier to debug and less dangerous to the system (Writing full-fledged drivers is difficult at student level)
7. **GUI programming**: a sample programme – using Gambas since the student
8. have VB knowledge. However, one should try using GTK or QT
9. **Version Control System** setup and usage using RCS, CVS, SVN
10. **Text processing with Perl**: simple programs, connecting with database e.g., MYSQL
11. **Running PHP** : simple applications like login forms after setting up a LAMP stack
12. **Running Python** : some simple exercise – e.g. Connecting with MySql database
13. **Set up the complete network** interface using ifconfig command like setting gateway, DNS, IP tables, etc.

Test Book(s)

1. T1. Forouzan, *Data Communications and Networking*, 4e, Mc Graw Hill.

Reference Book(s):

1. R1. Youlu Zheng, Shakil Akhtar, *Networks for Computer Scientists and Engineers*, Oxford University Press.
2. R2. Andrew S. Tanenbaum, *Computer Networks*, Fourth Edition", Prentice Hall.
3. R3. William Stallings, *Computer Networking with Internet Protocols and Technology*, Pearson Education, 2004.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS103	Advanced DBMS	3	1	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 **
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)

UNIT I:

OODBMBS & ORDBMS: Overview of Object-Oriented concepts & characteristics, Objects, OIDs and reference types, Database design for ORDBMS, Comparing RDBMS, OODBMS & ORDBMS

UNIT II:

Advance Database Management System –Concepts & Architecture, Spatial data management, Web based systems: Overview of client server architecture,Databases and web architecture, N-tier, Architecture, Business logic – SOAP, Multimedia databases, Mobile database.

UNIT III:

Parallel databases: Introduction, Parallel database architecture, I/O parallelism, Inter-query and Intra-query parallelism, Interoperational and Intra-operational parallelism, Design of parallel systems.

UNIT IV:

Distributed Databases:Introduction, DDBMS architectures,Homogeneous and Heterogeneous Databases,Distributed data storage,Distributed transactions, Commit protocols, Availability, Concurrency control & recovery in distributed databases, Directory systems,Knowledge base Systems: Integration of expert in database, application & object database overview, Data Warehousing: Introduction to Data warehousing, Architecture, Dimensional data modeling- star, snowflake schemas, fact constellation, OLAP and data cubes Operations on cubes, Data preprocessing -need for preprocessing,data cleaning, data integration and transformation, data reduction.

UNIT V:

Data Mining: Introduction to data mining, Introduction to machine learning, Descriptive and predictive data mining, outlier analysis, clustering, k means algorithm, Classification - decision tree, association rules - apriori algorithm, Information Retrieval & XML data: Introduction to information retrival, Indexing for Text search, Web search engines, Managing text in DBMS, Data model for XML, XML DTD's,Domain specific DTD's, Querying XML data

Syllabus (Practical)

PL/SQL:

Introduction , Declaring Variables , Writing Executable Statements , Interacting with Oracle Server , Writing Control Structures , Working with Composite Data Types , Writing Explicit Cursors , Writing Implicit Cursors , Handling Exceptions , Creating Procedures , Creating Functions , Managing Subprograms , Creating Packages , More Package concepts , Oracle supplied Packages , Manipulating Large Objects , Creating Database Triggers , More Trigger concepts

Text Books:

1. R1. Ramez Elmsari, Shamkant Navathe , *Fundamentals of Database Systems*, , Fifth edition, Pearson Education
2. R2. Ivan Bayross , *SQL, PL/SQL the Programming Language of Oracle*, 3rd edition

Reference Books:

1. T1. Date C. J., *An Introduction to Database Systems*, Addison-Wesley Longman (8th Ed)
2. T2. Database system concepts, 5th Edition –by Abraham Silberschatz, Henry Korth, S,Sudarshan, (McGraw Hill International)
3. T3. Data Mining: Concepts and systems, by Jiawei nan, Micheline Kamber, (Morgan Kaufmann publishers)
4. T4. Database systems: Design implementation and management, by Rob Coronel, 4th Edition, (Thomson Learning Press)
5. T5. Database Management Systems by Raghu Ramkrishnan, Johannes Gehrke Second Edition, (McGraw Hill International)
6. T6. Database Management System by Alexis Leaon, Mathews Leon, (leon press)

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS152	Software Systems Lab-I	0	0	4	0	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	50	30	100

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

Syllabus (Theory)

UNIT I:

Linux introduction and file system - Basic Features, Advantages, Installing requirement, Basic Architecture of Unix/Linux system, Kernel, Shell. Linux File system-Boot block, super block, Inode table, data blocks, How Linux access files, storage files, Linux standard directories.

UNIT II:

Commands for files and directories cd, ls, cp, md, rm, mkdir, rmdir, pwd, file, more, less, creating and viewing files using cat, file comparisons – cmp & comm, View files, disk related commands, checking disk free spaces. Partitioning the Hard drive for Linux, Installing the Linux system, System startup and shut-down process, init and run levels.

UNIT III:

Shell programming- Basic of shell programming, Various types of shell available in Linux, comparisons between various shells, shell programming in bash, read command, conditional and looping statements, case statements, parameter passing and arguments, Shell variables, system shell variables, shell keywords, Creating Shell programs for automate system tasks.

UNIT IV:

Simple filter commands – pr, head, tail, cut, paste, sort, tr. Flter using regular expressions – grep, egrep, and sed. awk programming – report printing with awk

UNIT V:

LATEX course outline:-Introductory notions. Handling errors, Formatting text and mathematics, Formatting text and mathematics, Mathematical formulae, Producing and including graphics in a LATEX file.

Text Books:

3. T1. Sumitabha Das , *UNIX – Concepts & Applications* (Third Ed.), Tata McGraw Hill Publications.
4. T2. Graham Glass & King Ables, *Unix for programmers and users* (Third Ed.), Pearson Education India. (Low Prices Edition)

Reference Books:

2. R1. Cristopher Negus, *Red Hat Linux 9 Bible*, IDG Books India Ltd.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS123 (Elective-I)	Digital System Design	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: BOOLEAN ALGEBRA AND LOGIC GATES

Review of binary number systems - Binary arithmetic - Binary codes - Boolean algebra and theorems - Boolean functions - Simplifications of Boolean functions using Karnaugh map and tabulation methods - Logic gates

UNIT II: COMBINATIONAL LOGIC

Combinational circuits - Analysis and design procedures - Circuits for arithmetic operations - Code conversion - Introduction to Hardware Description Language (HDL)

UNIT III: DESIGN WITH MSI DEVICES

Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits

UNIT IV: SYNCHRONOUS SEQUENTIAL LOGIC

Sequential circuits - Flip flops - Analysis and design procedures - State reduction and state assignment - Shift registers - Counters - HDL for sequential logic circuits, Shift registers and counters.

UNIT V: ASYNCHRONOUS SEQUENTIAL LOGIC

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables - Race-free state assignment - Hazards.

Text Books:

1. T1. M.Morris Mano, "Digital Design", 3rd edition, Pearson Education, 2002.

Reference Books:

1. R1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, 2000
2. R2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2003.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS121 (Elective-I)	ICT for Socio-Economic Development	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 **
20	20	50	10	100	20	50	30	100

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

Syllabus (Theory)

UNIT I:
Development and Knowledge-Based Societies

UNIT II:
Infrastructure and Policy

UNIT III:
Poverty and ICTs

UNIT IV:
Growth and ICTs

UNIT V:
Education and ICTs, Health and ICTs, Gender Equality and ICTs ,Trade/Market Access and ICTs

Reference Book(s)

1. Avgerou, C. & Walsham, G. (eds) (2000) *Information Technology In Context: Studies From The Perspective Of Developing Countries,* Ashgate, Aldershot, UK
2. Castells, M. (2006*) Mobile Communications and Society: A global Perspective*, Cambridge, Mass.: MIT Press.
3. Heeks, R. (2002) 'i-Development not e-development', *Journal of International Development*, 14(1), 1-12
4. Heeks, R. (2008) ICT4D2.0: the next phase of applying ICT for international development, *IEEE Computer*, 41(6), 26-33
5. Heeks, R. (2010) Do information and communication technologies (ICTs) contribute to development?, *Journal of International Development*, 22(5), 625-640
6. Krishna, S. & Madon, S. (eds) (2003) *The Digital Challenge: Information Technology in the Development Context,* Ashgate, Aldershot, UK
7. Prahalad, C. (2004) *Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*, Pearson Education.
8. Unwin, T. (ed.) (2009) *ICT4D*, Cambridge University Press, Cambridge, UK
9. World Bank (1998) *World Development Report: Knowledge for Development*, World Bank, Washington, DC
10. Warschauer, M. (2003) *Technology and Social Inclusion: Re-thinking the Digital Divide*, Cambridge, Mass.: MIT Press.
11. Online:
12. Electronic Journal of IS in Developing Countries, journal www.ejisdc.org
13. ICT for Development www.ict4d.org
14. Information Technology for Development, journal

15. Information Technologies and International Development, journalwww.itidjournal.org/
16. Development Informatics Working Paper Series, IDPM, University of Manchester, UK http://bit.ly/DevInWP
17. Zunia/Development Gateway: ICTs for Development, World Bank, Washington, DC http://zunia.org/cat/ict/
18. Various (2002) Information Society, 18(2), special issue on ICTs in Developing Countries

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS122 (Elective-I)	Internet Technology	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: WEB 2.0

search, content networks, user-generated content, blogging, social networking, social media, tagging, social bookmarking, rich Internet applications, web services, location-based services, Web 2.0 monetization and business models, future of the Web.

UNIT II: EXTENSIBLE HYPERTEXT MARKUP LANGUAGE (XHTML)

XHTML syntax, headings, linking, images, special characters and horizontal rules, lists, tables, forms, internal linking, meta elements.

UNIT III: CASCADING STYLE SHEETS (CSS)

separation of content and presentation, inline styles, embedded style sheets, conflicting styles, kinking external style sheets, positioning elements, backgrounds, element dimensions, box model and text flow, media types, building a CSS drop-down menu, user style sheets.

UNIT IV: JAVASCRIPT

Client side scripting, control statements, functions, arrays, objects, events.

UNIT V: DOCUMENT OBJECT MODEL

Objects and collections Extensible Markup Language (XML) RSS: Advantages and applications, structuring data, XML namespaces, Document Type Definitions (DTDs), XML vocabularies, RSS.

Text Book(s):

2. Deitel H.M. and P. J. Deitel, Internet & World Wide Web. How to Program, 4/e, Prentice Hall, ISBN 0131752421, 2008

References Book(s)

4. Web Design The complete Reference, Thomas Powell, Tata McGrawHill
5. HTML and XHTML The complete Reference, Thomas Powell, Tata McGrawHill
6. JavaScript 2.0 : The Complete Reference, Second Edition by Thomas Powell and Fritz Schneider 4. PHP : The Complete Reference By Steven Holzner, Tata McGrawHill

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTSEM101	Seminar & Presentation	0	0	4	0	2

S. No.	Evaluation Component	Duration (Hours)	Marks (100)	Nature of Component
6.	Presentation	Weekly	20	Open Book
7.	Report(Soft Copy)	Weekly	20	Open Book
8.	Assignment	Continuous	10	Open Book
9.	Final Presentation		25	Open Book
10.	Final Report(Hard Copy)		25	Open Book

Syllabus (Practical)

OPERATION PROCEDURE

5. Student has to devote full semester for **MTSEM101** course.
6. Student has to report to the Supervisor regularly.
7. Seminars' evaluation has to be carried out in the presence of a two member Committee comprising.
8. Experts in the relevant area constituted by the Supervisor.

Final Thesis to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

Reference Books:

2. Based on literature survey to be done with peer reviewed journals.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

2 Year M. Tech Program

(Branch: Computer Science & Engineering)

Batch 2016-18

SEMESTER-SECOND

Detailed Syllabus
&
Scheme of Examination

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 201	Advance Compiler	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/others

**The ratio of weightage between Theory and Practical content will be 60%: 40%

Syllabus (Theory)

UNIT I: BASICS OF COMPILER DESIGN
Planning a compiler, approaches to compiler design, compiler development tools – Lex and Yaac.

UNIT II: CODE GENERATION
Efficient code generation for expressions, code generator generators, code generation for pipelined machines, register allocation techniques.

UNIT III: CODE OPTIMIZATION
Classical theory of data flow analysis, bi-directional data flows, unified algorithm for data flow analysis, theory of data flow analysis, program representation for optimization – SSA form.

UNIT IV: PARALLEL COMPILERS
Motivation and overview, Structure of a Parallelizing compiler. Parallelism detection: data dependence, direction vectors, loop carried and loop independent dependences.

UNIT V: COMPILATION FOR DISTRIBUTED MACHINES
Data partitioning, instruction scheduling, register allocation, machine optimization. Dynamic compilation.

Advanced Topics: Just in time (JIT) compilers, Auto scheduling compilers.

Syllabus (Practical)

Practice of Lex/Yacc of Compiler Writing, program to check whether a string belongs to grammar or not, program to parse a tree, program to find leading terminals, program to find trailing terminals, program to check whether a grammar is left recursive and remove left recursion, program to remove left factoring, program to show all operations of a stack

Text Books:

1. T1. Aho, Ulman, Sethi, "Compiler Principles and Techniques", Addison Wesley
2. T2. Muchnik, "Advanced Compiler Design and Implementation", Kauffman(1998)

Reference Books:

1. R1. Wolf M., “Optimizing Super Compiler for Super Computers”, Pitman(1989)
2. R2. Banerjee U., kluwer, “Loop Optimization”, PHI (1997)

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 202	Computer and Network Security	3	1	0	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)

UNIT I:
Introduction to security attacks, services and mechanism, introduction to cryptography. Conventional Encryption: Conventional encryption model, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution, random number generation.

UNIT II:
Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat's and Euler's theorem, primality testing, Euclid's Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffle-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, Elganel encryption.

UNIT III:
Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS, MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS), proof of digital signature algorithm.

UNIT IV:
Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.

UNIT V:
IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations, key management. Web Security: Secure socket layer and transport layer security, secure

electronic transaction (SET). System Security: Intruders, Viruses and related threads, firewall design principals, trusted systems.

Reference Books:

1. R1. William Stallings, "Cryptography and Network Security: Principals and Practice", Prentice Hall, New Jersy.
2. R2. Johannes A. Buchmann, "Introduction to Cryptography", Springer-Verlag.
3. R3. Bruce Schiener, "Applied Cryptography".

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 203	Distributed Computing	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges. System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection. Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms,performance metric for distributed mutual exclusion algorithms.

UNIT II:
Distributed Deadlock Detection: system model, resource vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system.

UNIT III:
Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent. Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances.

UNIT IV:
Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control. Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault - tolerant services, highly available services, Transactions with replicated data.

UNIT V:
Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol, Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm. CORBA Case Study: CORBA RMI, CORBA services.

Reference Books:

1. R1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. R2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design",Pearson Ed.
3. R3. Gerald Tel, "Distributed Algorithms", Cambridge University Press

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTLA 201	Advance Professional Communication	1	1	2	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)

UNIT I:
Introduction to the course, characteristic Features of Effective Communication and Ways to overcome barriers to Communication.

UNIT II:
Importance of Non-Verbal Communication, Importance of Paralinguistic Features and Vocal Cues

UNIT III:
Group Discussion, Job Interviews, Public Speaking.

UNIT IV:
Business Letters and Resume, Business Reports, Technical Proposals.

UNIT V:
E-mail Writing, Other Business Writings

Syllabus (Practical)

2. Decided by teacher in to the lab according to topics in theory.

Text Book(s)

2. T1. Sanjay Kumar and Pushp Lata, *Communication Skills,* New Delhi: OUP, 2011.

Reference Books:

9. R1. Meenakshi Raman and Sangeeta Sharma, *Technical Communication: Principles and Practice*, Second Edition, New Delhi: OUP, 2011.
10. R2. Krishna Mohan and Meenakshi Raman, *Effective English Communication,* New Delhi: Tata-McGraw Hill, 2000.
11. R3. Krishna Mohan and N.P.Singh, *Speaking English Effectively*, New Delhi: Macmillan,1994.
12. R4. V. Sasikumar and P.V. Dhamija, *Spoken English: A Self-Learning Guide to ConversationPractic*e, Tata-McGraw Hill, 2007.
13. R5. Norman Lewis, *Word Power Made Easy*, Delhi: GoyalSaab Publishers and Distributors, 1994.
14. R6. A.J.Thomson and A.V.Martinet, *A Practical English Grammar,* 4th Edition, New Delhi: OUP, 1999.
15. R7. Asha Kaul, *Business Communication*, Second Edition, New Delhi: PHI, 2010.
16. R8. Edgar Thorpe and Showick Thorpe, *Objective English*, 2nd Edition, New Delhi: Pearson Education, 2008.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 251	Software System lab II	0	0	4	0	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	50	30	100

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

Syllabus (Practical)

1. Development of programs using Software Architectural Styles
2. Development of library information system by adopting RM-ODP standard
3. Development of programs using Design Patterns
4. Development of internet based online shopping system
5. Two way communication using TCP and UDP
6. Development of Simple Web Server
7. File Transfer using TCP
8. Implementation of page replacement algorithm
9. Implementation of Scheduling algorithms
10. Development of simple Web Services
11. Implementation of Chat Server Application
12. Implementation of SDES and RSA algorithm
13. Implementation of Query Optimization techniques

LATEX course outline:-Introductory notions. Handling errors, Formatting text and mathematics, Formatting text and mathematics, Mathematical formulae, Producing and including graphics in a LATEX file

Text Book(s)

1. T1. UNIX – Concepts & Applications (Third Ed.) – Sumitabha Das, Tata McGraw Hill Publications.
2. T2. Unix for programmers and users (Third Ed.) – Graham Glass & King Ables, Pearson Education India. (Low Prices Edition)

Reference Books(s)

1. R1. Red Hat Linux 9 Bible – Cristopher Negus, IDG Books India Ltd.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 221 (Elective II)	Advance Computer Architecture	3	0	0	3	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				

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

Syllabus (Theory)

UNIT I:
Fundamentals of Computer design- Technology trends- cost- measuring and reporting performance quantitative principles of computer design.

UNIT II:
Instruction set principles and examples- classifying instruction set- memory addressing- type and size of operands- addressing modes for signal processing-operations in the instruction set- instructions for control flow- encoding an instruction set.-the role of compiler

UNIT III:
Instruction level parallelism (ILP)- over coming data hazards- reducing branch costs –high performance instruction delivery- hardware based speculation- limitation of ILP

UNIT IV:
ILP software approach- compiler techniques- static branch protection- VLIW approach- H.W support for more ILP at compile time- H.W verses S.W solutions

UNIT V
Memory hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM, Multiprocessors and thread level parallelism- symmetric shared memory architectures- distributed shared memory- Synchronization- multi threading, Storage systems- Types – Buses - RAID- errors and failures- bench marking a storage device- designing a I/O system, Inter connection networks and clusters- interconnection network media – practical issues in interconnecting networks- examples – clusters- designing a cluster

Text Books:

1. T1. Computer Architecture A quantitative approach 3rd edition John L. Hennessy & David A. Patterson Morgan Kufmann (An Imprint of Elsevier)

Reference Books:

1. R1. Computer Architecture and parallel Processing, Kai Hwang and A., Briggs International Edition,McGraw-Hill.
2. R2. Advanced Computer Architectures, Dezso Sima, Terence Fountain, Peter Kacsuk, Pearson.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 222 (Elective II)	Information Security and Cyber Laws	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: FUNDAMENTALS OF CYBER LAW

1. Jurisprudence of Cyber Law
2. Overview of Computer and Web Technology
3. Introduction to Indian Cyber Law
4. Overview of General Laws and Procedures in India

UNIT II: E-COMMERCE- LEGAL ISSUES

1. Electronic Commerce
2. Digital Signatures - technical issues
3. Digital Signatures - legal issues
4. Electronic Contracts

UNIT III: INTELLECTUAL PROPERTY ISSUES AND CYBERSPACE - THE INDIANPERSPECTIVE

1. Overview of Intellectual Property related Legislation
2. Copyright law & Cyberspace
3. Trademark law & Cyberspace
4. Law relating to Semiconductor Layout & Design

UNIT IV: CYBERCRIME AND DIGITAL EVIDENCE - INDIAN PERSPECTIVE

1. Penalties & Offences under the IT Act, 2000
2. Offences under the Indian Penal Code, 1860
3. Investigation and adjudication of cyber crimes
4. Digital evidence

UNIT V: INTELLECTUAL PROPERTY RIGHTS

1. Nature and Enforcement, International Character of IPRs, Role of IPRs in Economic Development.
2. Patents: Introduction To Patents, Object of Patent Law, Inventions not Patentable, Obtaining Patents, Rights and Obligations of a Patentee.
3. Copyrights: Introduction to Copyrights, Subject-Matters of Copyright, Rights Conferred by Copyright, Infringement, Assignment and Licensing Of Copyrights, Copyright Societies, International Copyright, Performers' Rights.

4. Trademarks: Functions, Significance and Types of Trademarks, Distinctiveness and Deceptive Similarity, Registration Procedure, Trademark Registry, Grounds for Refusal of Registration of Trademarks, Concurrent Use, Character Merchandising.

Text Book(s)

1. T1. Pavan Duggal , Cyberlaw - The Indian Perspective,2009 Edition, Saakshar Law Publications, Delhi.

Reference Book(s)

1. R1. Narayanan,P.,IntellectualPropertyLaw,EasternLawHouse(2007)3rded

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 223 (Elective II)	Graph Theory	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Graph, Sub Graph, Connected component , spanning trees , Shortest path algorithm, Cut- sets and Cut Vertices: Cut Sets, Properties of Cut-sets, All Cut-Sets in a Graph, Fundamental Circuits and Cut-Sets, Connectivity and Separability, Network flows, 1 isomorphism, 2 isomorphism. Combinatorial Vs. Geometric Graphs, Planar Graphs, Kuratowski's Two Graphs, Different Representations of a Planar Graph, Detection of planarity, Geometric Dual, Combinatorial Dual, Matrix Representation of Graphs.

UNIT II:

Chromatic Number, Chromatic Partitioning, Chromatic, Polynomial, Vertex Cover, Matching's, Path cover, Connectivity, Hamilton city, Vertex Coloring, Edge Coloring, Four Color Problem and Other Coloring Problems.

UNIT III:

Basic combinatorial numbers, recurrences, generating functions,Latin squares, partitions, partially orders sets,

UNIT IV:

Types of Enumeration, Counting Labeled Trees, Counting Unlabeled Trees, Polya's Counting Theorem, Graph Enumeration with Polya's Theorem

Test Book(s):

1. T1. Graph Theory with Applications to Engineering and Computer Science, Narasingh Deo, PHI.

Reference Books:

1. R1.Graph Theory and Combinatorics, Dr. D.S. Chandrasekharaiah, Prism.
2. R2. Introduction to Graph Theory, Chartrand Zhang, TMH.
3. R3.Graph Theory Modeling, Applications, and Algorithms, Geir Agnarsson & Raymond Geenlaw,Pearson Prentice Hall.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 224 (Elective II)	Object Oriented Analysis and Design	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: FUNDAMENTAL

An overview of object oriented systems development Object basics Object oriented systems development life cycle.

UNIT II: OBJECT ORIENTED METHODOLOGIES

Rumbaugh methodology, Booch methodology − Jacobson methodology, Patterns, Frameworks, Unified approach, Unified modeling language, Use case diagram, Class diagram, Interaction diagram, Package diagram, State diagram, Activity diagram and Implementation diagram.

UNIT III: OBJECT ORIENTED ANALYSIS

Identifying use cases Object analysis Classification, Identifying object relationships, Attributes and methods.

UNIT IV: OBJECT ORIENTED DESIGN

Design axioms, Designing classes, Access layer, Object storage, Object interoperability.

UNIT V: SOFTWARE QUALITY AND USABILITY

Designing interface objects, Software quality assurance, System usability, Measuring user satisfaction, SYSTEM DESIGN: - Estimating Performance, Making a reuse plan, breaking system into subsystems ,identifying concurrency, allocation of subsystems, management of data storage, Handling Global resources, choosing a software control strategy, Handling boundary condition, common Architectural style.

Text Book(s):

2. T1. Craig Larman,"Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development", Third Edition, Pearson Education.

Reference Books:

4. R1.Oriented Modeling and Design with UML michael Blaha and James Rambaugh - second edition
5. R2. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides,"Design patterns:Elements of Reusable object-oriented software", Addison-Wesley.
6. R3. Object-Oriented Methods: A Foundation, James Martin, et. al, Prentice-Hall.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTSEM201	**Seminar & Presentation**	**0**	**0**	**4**	**2**

Evaluation Component	Duration (Hours)	Marks (100)	
Presentation	Mid Sem 1	20	
Report(Soft Copy)	Mid Sem 1	20	
Assignment	Continuous	10	
Final Presentation	End Sem	25	
Final Report(Hard Copy)	End Sem	25	

Syllabus (Practical)

Operation Procedure

1. Student has to devote full semester for **MTSEM201** course.
2. Student has to report to the Supervisor regularly.
3. Seminars' evaluation has to be carried out in the presence of a two member Committee comprising.
4. Experts in the relevant area constituted by the Supervisor.

Final Thesis to be submitted has to be in formal hard bound cover bearing of the Institute emblem.

Reference Books:

1. Based on literature survey to be done with peer reviewed journals.

JK Lakshmipat University

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

2 Year M. Tech Program

(Branch: Computer Science & Engineering)

Batch 2016-18

SEMESTER-THIRD

Detailed Syllabus
&
Scheme of Examination

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

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

Learning Outcomes (Provided by IBM):

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

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

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

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

Syllabus (Theory)

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

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

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

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

IBM Watson Studio, Analyzing data with Watson Studio

Reference Books:

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

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

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

Learning Outcome:

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

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

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

Syllabus (Theory)

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

IBM Cognos Analytics: Author Reports Fundamentals – Introduction, Create list reports, Focus reports using filters, Create crosstab reports, Present data graphically, Focus reports using prompts,

Extend reports using calculations, Use additional report building techniques, Customize reports with conditional formatting, Drill-through definitions, Enhance report layout

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

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

Reference Books:

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

Course Title and Course Code	**Industrial Automation and IoT - I (EE2101)**
Hours per Week	**L T P: 3 0 2**
Credits	**4**
Students who can take	**B. Tech Semester-VII, M. Tech Semester-I**

Course Objectives

Industrial automation is the application of technology to control the production and delivery of industrial products and services. On the other hand, the Internet of Things (IoT) is transforming the way we work and live, extending the power of Internet to a whole range of objects different from computers or smartphones. This course aims to provide an introduction to industrial automation and IoT technologies and standards.

Learning Outcomes:

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

1. Analyze the link between Information Technology and Operational Technology.
2. Specify the key components to design an Industrial automation & IoT system.
3. Choose technologies for communication and real time data collection.
4. Design, deploy and test a basic Industrial automation & IoT system.
5. Apply recommended engineering practices to meet desired requirements for applications, considering sustainability, security and safety as design constraints.

Sr. No	Specifications	Marks
1	Attendance	NIL
2	Assignment	10
3	Class Participation	05
4	Quiz	05
5	Theory Exam-I	10
6	Theory Exam-II	10
7	Theory Exam-III	20
8	Report-I	NIL
9	Report-II	NIL
10	Report-III	NIL
11	Project-I	10
12	Project-II	NIL
13	Project-III	NIL
14	Lab Evaluation-I (Continuous)	10
15	Lab Evaluation-II (Exam)	10
16	Course Portfolio (MOOC Course)	10
Total (100)		**100**

Evaluation Scheme for Retest:

S. No.	Specifications	Marks
1	Theory Exam-III (End Term)	20
2	Lab Evaluation-II (Exam)	10
3	**Total**	**30**

Syllabus

Theory

UNIT1: Introduction. Classical hierarchical industrial automation model. Essential functions of each level. Elements of industrial control (sensors, actuators, transmitters, controllers, etc.). ISA 95 / ISA S88 – Enterprise integration. Emergent architectures.

UNIT2: Instrumentation. Characteristics of instruments: accuracy, precision, sensitivity, etc. Units and standards. Voltage, current and electrical power measurements. Measurement of temperature, position, speed, force, pressure, light, level, humidity and other variables. Signal conditioning and transmission. Indicators, recorders. Actuators. Valves and motors. Instrumentation symbols. Functional identification. Standards: ISA 5.1 – Instrument symbols and identification. IEC 61511 Safety Instrumented Systems.

UNIT3: IoT fundamentals, Architecture and protocols,

UNIT4: Industrial IoT fundamentals. Convergence of IT and OT. Industrial communication: principles, protocols and technologies. Design methodology. Design of IoT systems for industrial safety processes.

UNIT5: CASE STUDIES

Design and test a basic IIoT system involving prototyping, programming and data analysis. Application to sustainability problems: health, energy, water, smart cities, etc.

Practical

1. Characteristics of sensors. Calibration. Temperature, moisture, displacement, voltage, current, etc. Signal conditioning and processing.
2. Interfacing LEDs. Serial port. DC-motor.
3. IoT communication. Standards: MODBUS, OPC, MQTT, etc.
4. PLC programming.
5. Mini-project

Text Book(s)

- Krishna Kant. "*Computer-based Industrial Control*". PHI Learning Private Limited, 2010.
- Hanes, Salgueiro, Grossetete, Barton and Henry (2017). "*IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things*". Cisco Press
- Curtis Johnson. "*Process Control Instrumentation Technology*". PHI Learning Private Limited, 2013.

Reference Book(s)

- Gilchrist (2016). "*Industry 4.0: The Industrial Internet of Things*". Apress.
- John P. Bentley. Principles of Measurement Systems. 4th Edition, Addison Wesley Longman Ltd.,UK, 2004

Web Resources

https://nptel.ac.in/courses/108/105/108105062/
https://nptel.ac.in/courses/106/105/106105195/

Online Courses:

Developing Industrial Internet of Things
https://www.coursera.org/programs/j-k-lakshmipat-university-on-coursera-kzogk/browse?index=prod_enterprise_products&productId=84QbLYtsEeicuBLWaYsl_g&productType=s12n&query=industrial+iot&showMiniModal=true

Design of Internet of Things
https://nptel.ac.in/courses/108/108/108108098/

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTTP 301	Professional Practice	3	0	4	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)

UNIT I:

Each Student will be assigned by Director, IET to a faculty member who will act as the instructor. Students and faculty members covering a broad area will be grouped in a panel. Panel will normally consists of 4 to 8 students and 2 to 4 faculty members.

UNIT II:

Within one week of registration, the student should plan the details of topics of lectures, laboratory experiments and developmental activities and broad topic of research etc. in consultation with his assigned instructor. Two copies of written outline of the total work should be submitted to the instructor within a week.

UNIT III:

In a particular discipline group, instructors belonging to broad areas will from the panel and will nominate one of them as the panel coordinator. The coordinator together with other instructors will draw a complete plan of lectures to be delivered by all the students in the semester. Each student will present 3 to 4 lectures, which will be attended by all students and instructors. There lectures will be evenly distributed over the entire semester the coordinator will announce the schedule for the entire semester and will fix suitable meeting time in the week.

UNIT IV:

Each student will also make one presentation about his finding on the broad topic of research. The final report has to be submitted on the form of a complete research proposal. The reference and bibliography should be cited in a standard format. The research proposal should contain (i) topic of research (II) background and current status of research work in the area as evidence from the literature review (III) scope of the proposed work (IV) Methodology (V) Reference and bibliography.

UNIT V:

A report covering laboratory experiments, developmental activities and code for professional conduct and ethics in the discipline, The panel will jointly evaluate all components of the course throughout the semester and the mid semester grade will be announced by the respective instructor to his student.

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
PR2103	Dissertation - I				10

OPERATION DETAILS:

- Each Student will be assigned by Director, IET to a faculty member who will act as the instructor. Students and faculty members covering a broad area will be grouped in a panel.
- Within 2 weeks of registration, the student should submit the work plan with time line and developmental activities in consultation with his assigned supervisor. Two copies of written outline of the total work should be submitted to the supervisor within 2 weeks.
- Mid semester grading will be done by the supervisor based on the performance of the student in research and development activities. The student should submit the Mid semester report to the supervisor in the 9th week of the semester, which shows the progress of the student till the mid semester.
- The student is also required to submit End-semester report which provides the details of work done by the student in research and development area. End semester report should be submitted to the supervisor in the 15th week of the semester. The end semester report should also contain a research proposal.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 321 (Elective III)	Speech & Language Processing	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction to Language and Speech, Estimation Techniques, and Language Modeling, Parsing and Syntax

UNIT II:
The EM Algorithm in NLP, Stochastic Tagging, and Log-Linear Models, Probabilistic Similarity Measures and Clustering ,Machine Translation ,Discourse Processing: Segmentation, Anaphora Resolution

UNIT III:
Dialogue Systems

UNIT IV:
Natural Language Generation/Summarization

UNIT V:

Unsupervised Methods in NLP

Text Book:

1. Jurafsky, David, and James H. Martin. *Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition*. Upper Saddle River, NJ: Prentice-Hall, 2000. ISBN: 0130950696.
2. Manning, Christopher D., and Hinrich Schütze. *Foundations of Statistical Natural Language Processing*. Cambridge, MA: 1999. ISBN: 0262133601.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 322 (Elective III)	Genetic Algorithms	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Evolutionary Computation as a Process Modeling tool and its historical perspective, Simple Genetic Algorithm and its major operators: Reproduction, Crossover, Mutation etc.

UNIT II:

Mathematical Construction of Genetic Operators, Schema Theorem of John Holland. Variants of Binary Encoded Genetic Algorithms: Micro Genetic Algorithm, Messy

UNIT III:

Genetic Algorithm, Greedy Genetic Algorithm etc. and their usage in Engineering Problems, Hamming Cliffs. Real Coded Genetic Algorithms, Differential Evolution and their recent usage in Engineering Process

UNIT IV:

Modeling. Uni-modal vs. Multi-modal problems in Genetic Algorithms and their significance in the context of Process Simulation, Handling of Constraints. The role Pareto-optimal problems in engineering design and their solution strategies based upon Genetic Algorithms.

UNIT V:

Genetic Algorithms as classifier. Usage in process control. Examples of applications in major engineering and scientific disciplines.

Text Book:

1. Evolutionary Computation: A Unified Approach by Kenneth A. DeJong, MIT Press, 2006, ISBN: 0262041944

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 323 (Elective III)	New Trends in IT	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 **
20	20	50	10	100				

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

Scope&Objective:

The basic aim of this course is to prepare the students for the M.Tech. Thesis / Dissertation by making them aware of the new and latest ongoing research in the field of CSE / IT.

Methodology:

Eachstudenthastogothrough different resources available with LRC likeIEEExploreandhastostudy3-4papersperweekanddiscusswiththecourseinstructor.Attheendofeachweekstudenthastogivethepresentationonono neofthechosenpaperinconsentwiththecourseinstructor.

EvaluationScheme:

Acontinuousevaluationbasedonstudent'spresentationwilltakeplace.

Each presentation is for 10 marks evaluation and a minimum of 10 presentations are to be given by each student in whole semester. In case of more than 10 presentations, best of 10 presentations in terms of marks obtained by that student will be taken into consideration.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 324 (Elective III)	Computational complexity	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Serial and Parallel Models of Computatio, Languages, Grammars, Machines , Time, Space and Other

UNIT II:

Resource Limitations , Properties of Models , Complexity Classifications , Reductions and their Applications.

UNIT III:

Languages Complete for a Class , Approximation Algorithms , Interactive Proofs

UNIT IV:

Problem Definitions ,Models of Computation ,FSM Language Recognition ,TM Language Recognition , The Classes P and NP, NP-complete Languages, The classes **P** and **NP**, **NP**-complete languages, Proof that CIRCUIT SAT is **NP**-complete, Complexity Classes, Proper Resource Bounds, Hierarchy Theorems.

UNIT V:

Savitch's Theorem, Review of Space Complexity, Complements of Complexity Classes, co**NP** ,Polynomial Time Hierarchy

Reference Books:

1. M.R. Garey and D.S. Johnson, Computers and Intractability, A Guide to the Theory of NP-Completeness, Freeman 1986.
2. V.J. Rayward-Smith: A first Course in Computability, Blackwell Scientific Publications, 1986.
3. H. Lewis and C. Papadimitriou: Elements of the Theory of Computation, Prentice Hall, 1998.
4. J Hopcroft and J Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 1979.
5. Michael Sipser: Introduction to the Theory of Computation

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 325 (Elective III)	Software Engineering	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction to Software Engineering; Prescriptive Process Models; Agile Process; Extreme Programming (XP); Brief Overview of Other Agile Process Models: Adaptive Software Development, Scrum

UNIT II:
Introduction; Core Principles of Process and Practice; Principles Guiding Each Framework Activity; Requirements Engineering; Groundwork for Understanding of Software Requirements; Overview of Eliciting Requirements, Developing Use Cases, Building the Requirements Model; Negotiating Requirements; Validating Requirements; Requirement Modeling Strategies; Overview of Flow-Oriented Modeling, Behavioral Modeling; Requirements Modeling for WebApps

UNIT III:
Design Concepts; Design Model; Architectural Styles, Architectural Design; Assessing lternative Architectural Designs; Architectural mapping Using Data Flow, Three Views of Component; Designing Class-Based Components; Conducting Component-Level Design; Component-Level Design for WebApps; Designing Traditional Components, Component-Based Development;

UNIT IV:
Overview of Review Techniques, A Strategic Approach to Software Testing; Strategic Issues; Test Strategies for Conventional Software; Test Strategies for Object Oriented Software; Test Strategies for WebApps; System Testing; Debugging; Software Testing Fundamentals; White-Box Testing; Basis Path Testing; Control Structure Testing; Black-Box Testing; Testing for Specialized Environments; Patterns and Software Testing; Overview of Testing O-O Applications; Testing OOA and OOD Models; O-O Testing Strategies; O-O Testing Methods; Testing Methods Applicable at Class Levels; Inter-Class Test Case Design; Testing Concepts for WebApps; An Overview of Testing Process for WebApps; Content Testing; User Interface Testing; Component-Level Testing; Navigation Testing; Configuration Testing; Security Testing; Performance Testing

UNIT V:
Framework for Product Metrics; Metrics for Requirements Model; Metrics for Design Model; Design Metrics for WebApps; Metrics for Source Code; Metrics for Testing; Metrics for Maintenance; Software Project Estimation; Decomposition Techniques; Empirical Estimation Models; Estimation for Object Oriented Projects Overview of Project Scheduling

Text Books:

1. **T1.** Roger S. Pressman, "Software Engineering – A Practitioner's Approach", 7th Edition, McGraw Hill Publications

Reference Books:

1. **R1**. Sommerville, "Software Engineering", 8th Edition, Pearson Education
2. **R2.** Waman S. Jawadekar, "Software Engineering – Principles and Practices", TMGHPublication
3. **R3.** Pankaj Jalote, "Software Engineering – A Precise Approach", Wiley India

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 326 (Elective III)	Artificial Intelligence Techniques	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: INTELLIGENT AGENTS

Agents and environments - Good behavior – The nature of environments –structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial nformation.

UNIT II: SEARCHING TECHNIQUES

Informed search and exploration – Informed search strategies – heuristic function – local search, algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

UNIT III: KNOWLEDGE REPRESENTATION

First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution - Knowledge representation - Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects.

UNIT IV: LEARNING

Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods - Learning with complete data - Learning with hidden variable - EM algorithm - Instance based learning - Neural networks - Reinforcement learning – Passive reinforcement learning - Active reinforcement learning - Generalization in reinforcement learning.

UNIT V: APPLICATIONS COMMUNICATION

Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar

induction - Probabilistic language processing - Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

Text Book:

1. T1. Elaine Rich and Kevin Knight, *Artificial Intelligence*, 2nd Edition, Tata McGraw-Hill, 2009.

Reference Book:

1. R1. George Lugar, *Artificial Intelligence,* Pearson Publication, Fifth edition.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS327 (Elective III)	Machine Learning	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 **
20	20	50	10	100				

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

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.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 421 (Elective IV)	Mobile Computing	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT II:
(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT III:
Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP, Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.

UNIT IV:
Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques. Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

UNIT V:
Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

Text Books:

1. T1. Jochen Schiller, "Mobile Communications", Addison-Wesley. (Chapters 4, 7, 9, 10, 11), second edition, 2004.
2. T2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", Wiley, 2002, ISBN 0471419028. (Chapters 11, 15, 17, 26 and 27)

Reference Books:

1. R1. . Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October2004,
2. R2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden, Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. R3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer, second edition, 2003.
4. R4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley DreamTech, 2003

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 422 (Elective IV)	Pattern Recognition	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Basics of pattern recognition, Bayesian decision theory : Classifiers, Discriminant functions, Decision surfaces, Normal density and discriminant functions, Discrete features

UNIT II:
Parameter estimation methods: Maximum-Likelihood estimation, Gaussian mixture models, Expectation-maximization method, Bayesian estimation, Hidden Markov models for sequential pattern classification: Discrete hidden Markov models, continuous density hidden Markov models

UNIT III:
Dimension reduction methods: Fisher discriminant analysis, Principal component analysis, Non-parametric techniques for density estimation : Parzen-window method, K-Nearest Neighbour method

UNIT IV:
Linear discriminant function based classifiers: Perceptron, Support vector machines, Non-metric methods for pattern classification: Non-numeric data or nominal data, Decision trees.

UNIT V:
Unsupervised learning and clustering : Criterion functions for clustering, Algorithms for clustering: K-means, Hierarchical and other methods Cluster validation

Text Books:

1. T1. R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2001
2. T2. S.Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009
3. T3. C.M.Bishop, Pattern Recognition and Machine Learning, Springer, 2006

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 423 (Elective IV)	Parallel Processing	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction to Parallel Processing: Flynn's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors

UNIT II:
Shared Memory Multiprocessors: SMP and CC-NUMA architectures, Cache coherence protocols, Consistency protocols, Data pre-fetching, CC-NUMA memory management, SGI 4700 multiprocessor, Network Processors

UNIT III:
Interconnection Networks: Static and Dynamic networks, switching techniques, Routers, Internet techniques

UNIT IV:
Message Passing Architectures: Message passing paradigms, Grid architecture, Workstation clusters, User level software

UNIT V:
Scheduling: Multiprocessor Programming Technique, Scheduling and mapping, Internet web servers, P2P, Content aware load balancing

Text Books:

1. T1: Introduction to Parallel Computing 2nd Edition, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, The Addison Wesley Publishing Company, ISBN 0-201-64865

Reference Books:

1. R1: D.L. Eager, J. Zahorjan, and E.D. Lazowski. Speedup Versus Efficiency in Parallel Systems, IEEE Transactions on Computers, Vol 38 No 3, March 1989.
2. R2: Joseph JaJa, An Introduction to Parallel Algorithms, Addison-Wesley, 1992.
3. R3: S. G. Akl, Design and Analysis of Parallel Algorithms, Prentice-Hall, 1989.
4. R4: T. Leighton, Introduction to Parallel Algorithms and Architectures, Morgan Kaufmann, 1992.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 424 (Elective IV)	Distributed Systems	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Characterization of Distributed Systems: Introduction, Examples of distributed Systems, Resource sharing and the Web Challenges, System Models: Architectural models, Fundamental Models Theoretical Foundation for Distributed System: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection.

UNIT II:
Distributed Mutual Exclusion: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

UNIT III:
Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, Distributed dead lock detection, path pushing algorithms, edge chasing algorithms. Agreement Protocols: Introduction, System models, classification of Agreement

UNIT IV:
Problem, Byzantine agreement problem, Consensus problem, Interactive consistency Problem, Solution to Byzantine Agreement problem, Application of Agreement problem, Atomic Commit in Distributed Database system, Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study, Security: Overview of security techniques, Cryptographic algorithms, Digital signatures Cryptography pragmatics, Case studies: Needham Schroeder, Kerberos, SSL & Millicent, Distributed File Systems: File service architecture, Sun Network File System, The Andrew File System, Recent advances, Transactions and Concurrency Control: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control.

UNIT V:
Distributed Transactions: Flat and nested distributed transactions, Atomic Commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. Replication: System model and group communication, Fault -tolerant services, highly available services, Transactions with replicated data, Distributed Algorithms: Introduction to communication protocols, Balanced sliding window protocol,

Routing algorithms, Destination based routing, APP problem, Deadlock free Packet switching, Introduction to Wave & traversal algorithms, Election algorithm, CORBA Case Study CORBA RMI, CORBA services.

Text/Reference Books:

1. Singhal & Shivaratri, "Advanced Concept in Operating Systems", McGraw Hill
2. Coulouris, Dollimore, Kindberg, "Distributed System: Concepts and Design", Pearson Ed.
3. Gerald Tel, "Distributed Algorithms", Cambridge University Press

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 425 (Elective IV)	Real Time System	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction: Real-time systems, Properties, Misconceptions, Real-Time tasks, Scheduling results.

UNIT II:
Uniprocessor Real-Time System: Task Scheduling, Resource access control protocols, Overload handling, Energy-aware scheduling, Feedback control scheduling.

UNIT III:
Multiprocessor Real-Time System: Task Scheduling, Fault-tolerance, Resource reclaiming.

UNIT IV:
Distributed Real-Time System: Global scheduling - transfer, information, and location policies, Real-time Networks: Real-time channel, Packet scheduling, Real-Time MAC protocols, Real-time OS: RT-Linux, Case studies of RTOS, Real-time middleware.

UNIT V:
Other Issues: Architecture and software engineering issues, Case studies

Text Book:

1. T1. Jane W. S. Liu, *Real-time Systems,* Prentice Hall, 2000, An in-depth introduction to real-time systems

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 426 (Elective IV)	Quantum Computing	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I: FOUNDATION
Overview of traditional computing – Church-Turing thesis – circuit model of computation – reversible computation – quantum physics – quantum physics and computation – Diracnotation and Hilbert Spaces – dual vectors – operators – the spectral theorem –functions of operators – tensor products – Schmidt decomposition theorem

UNIT II: QUBITS AND QUANTUM MODEL OF COMPUTATION
State of a quantum system – time evolution of a closed system – composite systems –measurement – mixed states and general quantum operations – quantum circuit model –quantum gates – universal sets of quantum gates – unitary transformations – quantum circuits

UNIT III: QUANTUM ALGORITHMS
Superdense coding – quantum teleportation – applications of teleportation – probabilistic versus quantum algorithms – phase kick-back – the Deutsch algorithm – the Deutsch-Jozsa algorithm – Simon's algorithm – Quantum phase estimation and quantum Fourier Transform – eigenvalue estimation

UNIT IV: QUANTUM ALGORITHMS – II
Order-finding problem – eigenvalue estimation approach to order finding – Shor's algorithm for order finding – finding discrete logarithms – hidden subgroups – Grover's quantum search algorithm – amplitude amplification – quantum amplitude estimation – quantum counting – searching without knowing the success probability

UNIT V: QUANTUM COMPUTATIONAL COMPLEXITY AND ERROR CORRECTION
Computational complexity – black-box model – lower bounds for searching – general black-box lower bounds – polynomial method – block sensitivity – adversary methods – classical error correction – classical three-bit code – fault tolerance – quantum error correction – three- and nine-qubit quantum codes – fault-tolerant quantum computation.

Text Book:

1. T1. P. Kaye, R. Laflamme, and M. Mosca, "An introduction to Quantum Computing",
2. Oxford University Press, 1999.
3.

Reference Book:

1. R1. V. Sahni, "Quantum Computing", Tata McGraw-Hill Publishing Company, 2007.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 427 (Elective IV)	Data Warehousing and Mining	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining,

UNIT II:

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Online Data Storage, Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems

UNIT III:

Concepts Description: Characterization and Comparison: Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases. Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT IV:

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from

Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

UNIT V:

Mining Complex Types of Data: Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

Text Books:

1. T1. Data Mining – Concepts and Techniques Han & Kumber
2. T2. Data Mining Techniques – Arun Pujari, University Press
3. T3. Building the DataWarehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd.

Reference Books:

1. R1. Data warehousing in the real world – Sam Anahory , Dennis Murray. Pearson edn asia.
2. R2. Data warehousing fundamentals – Paulraj ponnaiah wiley student, edition
3. R3. The data warehouse life cycle tool kit – Ralph kimball wiley student, edition
4. R4. Data mining introductory and advanced topics –Margaret h dunham, pearson education

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 428 (Elective IV)	Embedded Systems	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Embedded Computing: Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design, Design Examples, The 8051 Architecture : Introduction, 8051 Micro controller Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts.

UNIT II:
Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051, Data Transfer and Logical Instructions, Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts,

UNIT III:
Applications: Interfacing with Keyboards, Displays, D/A and A/D Conversions, Multiple Interrupts, Serial Data Communication, Introduction to Real – Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment

UNIT IV:
Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real- Time Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); Embedded Software Development Tools: Host and Target machines

UNIT V:
Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System, Introduction to advanced architectures: ARM and SHARC, Processor and memory organization and Instruction level parallelism; Networked embedded systems: Bus protocols, I2C bus and CAN bus; Internet-Enabled Systems, Design Example-Elevator Controller.

Text Book(s)

1. T1. Computers and Components, Wayne Wolf, Elseveir.
2. T2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
3. T3. An Embedded Software Primer, David E. Simon, Pearson Education.

Reference Book(s)

1. R1. Embedding system building blocks, Labrosse, via CMP publishers.
2. R2. Embedded Systems, Raj Kamal, TMH.
3. R3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. R4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. R5 Microcontrollers, Raj kamal, Pearson Education.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 429 (Elective IV)	Spatial Database	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Introduction: Current Status Spatial Information Tech., Spatial Data & Spatial Database Systems, Application Domains of Geographical Information Systems (GIS), Common GIS data types and analysis.Conceptual Data Models for spatial databases (e.g. pictogram enhanced ERDs).

UNIT II:

Logical data models for spatial databases: raster model (map algebra), vector model (OGIS/ SQL1999). Compression methods for raster and vector data. Process and retrieve geographic data from spatial databases using OGIS/SQL1999 interface and other specific interface (SDK) from database vendors,

UNIT III:

Physical data models for spatial databases: Clustering methods (space filling curves), Storage methods (R-tree, Grid files), Concurrency control (R-link trees), Design conceptual data models for spatial databases using a ER diagram approach.

UNIT IV:

Query Optimization: strategies for range query, nearest neighbor query, spatial joins (e.g. tree matching), cost models for new strategies, impact on rule based optimization.

UNIT V:

Spatial networks: Conceptual, logical, and physical data models, query languages, graph algorithms, access methods.Optimize spatial database by applying spatial indexing technologies, pyramid structure, data compressing, etc Basic operations of the Oracle Spatial databases and PostGIS/PostgreSQL open-source spatial database, Mining spatial database: auto-correlation, co-location, spatial outliers, classification (SAR, MRF). Rastor databases: Raster image operations, content-based retrieval, spatial data warehouses., Introduction to modern commercial and open-source (free) spatial databases products, e.g. Oracle 10g Spatial, ArcSDE 9.x, PostGIS 1.3/PostgreSQL 8.2, etc. Advances and trends in spatial databases: network data model, spatio-temporal data model, spatial data mining, etc. Application Trends: Spatio-temporal Databases, Location based services, Social media, Crowd Sourcing, Global climate change etc.

Text Book(s)/ Reference Book(s)

1. PostGIS in Action by Regina O. Obe and Leo S. Hsu (ISBN: 1935182269)

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 430 (Elective IV)	Human Computer Interaction	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Introduction: HCI foundation and history Interactive system design (theory and practice) Concept of usability - definition and elaboration, HCI and software engineering, GUI design and aesthetics, Prototyping techniques

UNIT II:

Model-based Design and evaluation: Basic idea, introduction to different types of models, GOMS family of models (KLM and CMN-GOMS), Fitts' law and Hick-Hyman's law, Model-based design case studies, Guidelines in HCI: Shneiderman's eight golden rules, Norman's seven principles, Norman's model of interaction, Nielsen's ten heuristics with example of its use, Heuristic evaluation, Contextual inquiry, Cognitive walkthrough.

UNIT III:

Empirical research methods in HCI: Introduction (motivation, issues, research question formulation techniques), Experiment design and data analysis (with explanation of one-way ANOVA), Hierarchical task analysis (HTA), Engineering task models and Concur Task Tree (CTT).

UNIT V:

Dialog Design: Introduction to formalism in dialog design, design using FSM (finite state machines), State charts and (classical) Petri Nets in dialog design, Cognitive architecture: Introduction to CA, CA types, relevance of CA in IS design, Model Human Processor (MHP), Object Oriented Programming: OOP-Introduction, OOM- Object Oriented Modeling of User Interface Design, Design -Case Studies.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 431 (Elective IV)	Organization of Web Information	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction: Modeling Web Data, Database Technology and Web Applications, Semistructured data, Web Data Management with XML, XML and syntax, XML Data Model, XLink, and XPointer

UNIT II:
XPath and XQuery: Regular Path Expressions, XPath Basics, XPath steps and expressions, Path evaluations, axes, node tests, predicates, XQuery Syntax, FLWOR expression, advanced features, XUpdate

UNIT III:
Typing: Automata on ranked trees, unranked trees, XML Schema, other schema languages, Graph semistructured data, graph bisimulation, data guides, XML query evaluation, XML identifiers, XML evaluation techniques

UNIT IV:
Ontologies, Querying and Data Integration: RDF, RDF Schema, OWL, Description Logic, Querying data through ontologies, Querying RDF data, querying through RDFS 8, Answering queries though DL, Global-as-view (GAV) and Local-as-view (LAV) mediation, Ontology based mediation, Peer-to-peer data management systems

UNIT V:
Building Web scale applications:Web search, web crawlers, web information retrieval, Web graph mining and hot topics in web search, Distributed systems, failure management, Required properties of a distributed system, P2P networks, Hash-based structures, distributed indexing, Distributed computing with MapReduce

Text Books

1. S. Abiteboul, I. Manolescu, P. Rigaux, M. Rousset and P. Senellart, Web Data Management, Cambridge University Press, 2012
2. S. Abiteboul, P. Buneman and D. Suciu, Data on the Web: From Relational to Semistructured Data to XML, Morgan Kaufman Publisher

Reference Books:

1. R. Szeliski ***Computer Vision: Algorithms and Applications***, Springer, 2011.
2. D.A. Forsyth and J. Ponce, ***Computer Vision: A Modern Approach***, Prentice Hall, 2002.
3. V.S. Nalwa, ***A Guided Tour of Computer Vision***, Addison-Wesley, 1993.
4. R. Klette, K.Schluns, and A. Koschan, ***Computer Vision: Three-Dimensional Data from Images***, Springer Singapore, 1998.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 432 (Elective IV)	Computer Vision	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction: What is computer vision, A brief history, Image formation: Geometric primitives and transformations, Photometric image formation, The digital camera

UNIT II:
Image processing: Point operators, Linear filtering, More neighborhood operators, Fourier transforms, Pyramids and wavelets, Geometric transformations, Global optimization, Feature detection and matching: Points and patches, Edges, Lines, Segmentation: Active contours, Split and merge, Mean shift and mode finding, Normalized cuts, Graph cuts and energy-based methods, Feature-based alignment: 2D and 3D feature-based alignment, Pose estimation, Geometric intrinsic calibration

UNIT III:
Structure from motion: Triangulation, Two-frame structure from motion, Factorization, Bundle adjustment, constrained structure and motion, Dense motion estimation: Translational alignment, Parametric motion, Spline-based motion, Optical flow, Layered motion

UNIT IV:
Image stitching: Motion models, Global alignment, Compositing, Computational photography: Photometric calibration, High dynamic range imaging, Super-resolution and blur removal, Image matting and compositing, Texture analysis and synthesis
Stereo correspondence: Epipolar geometry, Sparse correspondence, Dense correspondence, Local methods, Global optimization, Multi-view stereo, 3D reconstruction: Shape from X, Active rangefinding, Surface representations, Point-based representations, Volumetric representations, Model-based reconstruction, Recovering texture maps and albedos,

UNIT V:
Image-based rendering: View interpolation, Layered depth images, Light fields and Lumigraphs, Environment mattes, Video-based rendering, Recognition: Object detection, Face recognition, Instance recognition, Category recognition, Context and scene understanding, Recognition databases and test sets

Text Book(s)/ Reference Book(s)

1. R. Szeliski ***Computer Vision: Algorithms and Applications***, Springer, 2011.
2. D.A. Forsyth and J. Ponce, ***Computer Vision: A Modern Approach***, Prentice Hall, 2002.
3. V.S. Nalwa, ***A Guided Tour of Computer Vision***, Addison-Wesley, 1993.

4. R. Klette, K.Schluns, and A. Koschan, ***Computer Vision: Three-Dimensional Data from Images***, Springer Singapore, 1998.

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 433 (Elective IV)	Advanced Computer Graphics	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Advanced Rendering Techniques: Photorealistic rendering Global Illumination Participating media rendering Ray tracing Monte Carlo algorithm Photon mapping

UNIT II:
Texture Synthesis and Image Processing: Environmental mapping; Texture synthesis; Anisotropic image smoothing;

UNIT IV:
Volume Rendering: Volume graphics overview; Marching cubes; Direct volume rendering;

UNIT V:
Surfaces and Meshes: Subdivision; Distance fields and level sets; Physically-based Modeling: Stable fluid solver; Lattice Boltzmann method;

Text and Reference Books:

1. Tomas Moller and Eric Haines Real-Time Rendering A K Peters Ltd, 2nd edition, 2002
2. Alan H. Watt and Mark Watt, Advanced Animation and Rendering Techniques : Theory and Practice, Addison-Wesley, 1992
3. Matt Pharr and Greg Humphreys, Physically based rendering, Morgan Kaufmann, 2004
4. James D. Foley, Andries van Dam, Steven K. Feiner andJohn F. Hughes, Computer Graphics : Principles & Practices, Addison Wesley, 2nd edition in C, 1995

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 434 (Elective IV)	Ubiquitous Computing	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:

Introduction to Ubiquitous Computing: Past, present, future; the ubiquitous computing market, m-Business, Challenges and future of Ubiquitous Computing Device Technology for Ubiquitous Computing: Hardware, Human-machine interfaces, Biometrics, Operating Systems, Java for ubiquitous devices, Outlook.

UNIT II:

Device Connectivity: Protocols, Security, Device Management. Web application concepts for ubiquitous computing: History, WWW architecture, Protocols, Trans-coding, Client Authentication via the Internet for ubiquitous computing. WAP and beyond: Introduction, Components of the WAP architecture, WAP infrastructure, WAP security issues, Wireless Markup Language, WAP push, Products, i-Mode.

UNIT III:

Voice Technology: Basics of Speech Recognition, Voice standards, Speech Applications, Speech and Ubiquitous Computing, Security.

UNIT IV:

Ubiquitous Web application architecture: Background, Scalability & Availability, Development of ubiquitous computing Web Applications, Ubiquitous Application Architecture

UNIT V:

Access from PCs: Smart-card authentication via the Internet, Ordering goods Access via WAP: WAP functionality, Implementation. Access from Personal Digital Assistants: Extending the example application to personal digital assistants, Implementation for synchronized devices, Implementation for intermittently connected devices, Implementation for connected devices. Access via Voice: Extending the example application to voice access, Implementation

Test Book(s)

1. T1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaec & Klaus Rindtorff: Ubiquitous Computing: Technology and Architecture of Mobile Internet Applications, Pearson Education, New Delhi,

2006.

Reference Books:

1. R1.Guruduth S. Banavar, Norman H. Cohen, Chandra Narayanaswami: Ubiquitous Computing: An Application-Based Approach, Wiley Interscience, 2012.
2. R2. A. Genco, S. Sorce: Ubiquitous Systems and Ubiquitous Computing, WIT Press, 2012.
3. R3.Stefen Poslad: Ubiquitous Computing: Smart Devices, Environments and Interactions, Wiley, Student Edition

Course code	Course Title	Teaching Scheme				
		L	T	P	S	Credits
MTCS 435 (Elective IV)	Database Administration	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 **
20	20	50	10	100				

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

Syllabus (Theory)

UNIT I:
Introduction, Installation and configuration a database, administering servers and server groups, managing and optimizing schemas,

UNIT II:
SQL programs, SQL *PLUS Overview, Modifying Data,, Managing Constraints, Managing Views,

UNIT III:
User Access and Security, Oracle Overview and Architecture, Managing Oracle, Control and Redo Log Files, Managing Tables, indexes and Constraints, Managing Users and Security

UNIT IV:
Introduction to Network Administration, Backup and Recovery Overview, Introduction to performance tuning

UNIT V:
Database Backup and recovery, Data Modeling and Design, System Development Projects, Information SystemsTechnology.

Text Books

1. C.J. Date, Database Systems, Addison Wesley, 2000
2. Chip Dawes, Biju Thomas, Introduction to Oracle 9i SQL, BPB, 2002

Reference Books

1. Bob Bryla, Biju Thomas, Oracle 9i DBA Fundamental I, BPB, 2002
2. Doug Stums, Matthew Weshan, Oracle 9i DBA Fundamental I, BPB, 2002
3. Joseph C. Johnson, Oracle 9i Performance Tuning., BPB, 2002

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

2 Year M. Tech Program

(Branch: Computer Science & Engineering)

Batch 2015-20

SEMESTER TENTH

Detailed Syllabus
&
Scheme of Examination

PERATION OF THE COURSE

Course code	Course Title	Teaching Scheme			
		L	T	P	Credits
MTDS401	**Dissertation Stage - II**				**20**

-	-	-	-	-	-	-	-	-	-	-

a) The student should immediately chalk out a plan of work in Consultation with his supervisor. Current literature (journals, books, etc.) must be methodically reviewed and the status of the work in the field must be considered. The detailed outline of work must reflect a survey of the current literature in the same area and must include topic of research, objective, background of previous work in the area, methodology and a work plan with a time schedule clearly indicating the intermediate milestones and the estimated time to achieve the same along with references and bibliography.

b) Within two weeks of registration, the student should give his Dissertation particulars to the Director-IET office through supervisor in TS-1 Proforma.

c) The student should regularly interact with his supervisor and present seminars and submit reports on the scheduled dates. Proposed examiners and other faculty in relevant area may be requested to attend the presentations.

d) Supervisor will announce the Mid-semester grade to his student and send the MID-SEM Evaluation Form to the Director-IET office.

e) TWO typed copies of Final Dissertation Report and Abstract are to be submitted to the supervisor on or before the last day of class work in each semester. Supervisor will retain his copy and send the remaining ONE copy after the viva voce examination along with the Final Evaluation Form and Dissertation Abstract to the Director-IET Office.

f) The following format for Dissertation Abstract should be used:

Format for submission of Dissertation Abstract

Dissertation Title :

Supervisor :

Semester : First/Second Session:

Name of Student : ID No. :

Abstract

Abstract in the above format should also be included in the bound report.

g) Every student has to sign his attendance regularly with the supervisor or as per the alternative arrangement made by the supervisor. An attendance sheet is being provided for this purpose to the supervisor.
h) The candidate should apply and seek prior permission of his supervisor for going on leave for any genuine needs. If the leave of absence exceeds seven days in the entire semester, the recommended final grade may be revised by the Director-IET in consultation with the supervisor.
i) A separate Dissertation topic has to be assigned to individual students. Wherever the broad area is same, the aspects to be researched by an individual candidate should be clearly focused and spelt out.
j) Utmost care should be taken in the preparation of the FINAL REPORT. A check-list of various items is provided and students should carefully go through these. Supervisors are also requested to examine the draft of the FINAL REPORT keeping in view the items in the check-list.

2. EVALUATION

Evaluation in this course is essentially individual oriented. The various instruments of evaluation along with the weightage of components are given below:

Component	Weightage	Week in which due
Viva –I	15	5th week
Mid. sem. written report	15	10th week
Mid. sem. presentation	15	10th week
Viva –II	15	15th week
Final Dissertation*	25	Last day of class work
Final Viva-voce*	15	Actual date announced by Director-IET

*Final Viva-voce examination and evaluation of the Dissertation is to be jointly done by the Supervisor and the examiner appointed by the Director-IET. The other components are to be evaluated by the supervisor and the details are to be made available to the examiner at the time of final viva. Supervisor will send the copy of Dissertation report to the examiner well in advance. Before sending he should check the contents as per checklist and sign the 'Certificate' page.

The evaluation will recognize the day-to-day work involvement and punctuality of the student in his work. Evaluation in various components shall take into account work progress and achievements, technical/professional competence, documentation and expression, initiative and originality, punctuality and reliability, self-reliance, and acquisition of special skills. The student should extend full cooperation to his supervisor and interact with him in advance about the time, venue and mode of each evaluation. He should be in constant touch with his supervisor. Supervisor may require his student to sign the attendance sheet before a particular time on each working day.

Grading will be done mainly on the basis of the progress made towards attaining the overall objectives of the Dissertation. The supervisor shall evaluate various prescribed components of evaluation before the submission of final Dissertation. The supervisor shall evaluate the various prescribed components of evaluation before the submission of final report. He/she should seek utmost participation of examiner by inviting him to the various seminars. A full time student is normally registered for 20 credits when registered. Supervisor can reduce/increase the prescribed credits subject to a minimum of 15 and maximum of 25 credits depending on the time and effort devoted by the individual student. Supervisor should maintain all pertinent records of his student. Departures in the number of credits to be registered may be decided by the Director-IET. The final report and performance in the final viva are to be jointly evaluated by the Supervisor and examiner appointed by the Director-IET. Evaluation in various components can be done on the basis of marks or grades. However, the recommendations for the final award shall invariably be made in terms of one of the prescribed letter grade. The student will have to defend the work appearing in his/her Dissertation before the panel of examiners. Immediately after the final viva, ONE copy each of the Dissertation Report and Dissertation Abstract along with the completed Final Evaluation Form are to be submitted to the Director-IET office by the supervisor. The student should also ensure with his supervisor so that these reach the Division well before the last date of comprehensive examination. Supervisor should check that he has signed the 'Certificate Page'.

3. COURSE NOTICES

Notices pertaining to this course will be displayed on Notice Boards by the supervisor.

4. GENERAL

a) It is the responsibility of the student to ensure continuous interaction with his Supervisor.

b) Prescribed formats of the Cover/Title page and certificate from the supervisor should be adhered to in the preparation of final Dissertation Report. Check-list of items for the preparation of the FINAL REPORT should also be consulted. The following sequence may be followed in the preparation of the Dissertation Report:

- Title page (inner cover)

- Acknowledgement
- Certificate from the Supervisor
- List of Symbols & Abbreviations used
- Dissertation Abstract
- Table of contents
- Chapters 1, 2, 3, etc.
- Conclusion
- Appendices
- Bibliography/References
- List of Publications/Conference Presentations, if any.

c) The registration in Dissertation course is normally after the completion of coursework. 15-20 credits of Dissertation will be assigned at the time of registration. Credits put upto a maximum of 25 may be permitted depending upon the total time and effort put in by an individual student.