

# **NATIONAL ENGINEERING COLLEGE**

*(An Autonomous Institution, Affiliated to Anna University, Chennai)*

**K.R.NAGAR, KOVILPATTI – 628 503**

[www.nec.edu.in](http://www.nec.edu.in)

## **REGULATIONS – 2013**



**DEPARTMENT OF  
INFORMATION TECHNOLOGY**

**CURRICULUM AND SYLLABUS OF**

**B.Tech. – INFORMATION TECHNOLOGY**

## DEPARTMENT OF INFORMATION TECHNOLOGY

### VISION

- To produce highly competent and value based IT professionals

### MISSION

- Updating curriculum with innovative components in Teaching - Learning process.
- Conducting student centric programme to enhance communication, team spirit, leadership skills and self learning.
- Motivating the students to realize the need of ethics and human values.
- Developing a conducive environment for collaborative research.

### Program Educational Objectives (PEO)

Programme educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

1. Incorporate the basic principles and practices of computing to shine in IT field and/or in higher education
2. Maintain professionalism, effective communication skills, team spirit, learning attitude and adapt to emerging technologies

## Program Outcomes (PO)

At the time of graduation graduates of our IT programme are expected to have

1. An ability to apply knowledge of mathematics, science and computing fundamentals to information technology.
2. An ability to analyze a problem, identify and define the computing and technology requirements appropriate to its solution.
3. An ability to design, develop and evaluate a computer-based system, process, component, or program to meet desired needs.
4. An ability to use research based knowledge to analyze and interpret data to provide valid conclusions.
5. An ability to use the techniques, skills and modern software engineering tools necessary for IT practice.
6. An understanding of professional, ethical, legal, security, social issues and responsibilities
7. An ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.
8. An ability to apply ethical principles and commit to professional ethics and responsibilities.
9. An ability to work independently and cooperatively to deliver reports, programs, projects, and other deliverables.
10. An ability to communicate effectively with a range of audiences using various modalities including written, oral and graphical.
11. An ability to apply the engineering and management principles to manage projects as a member and a leader in a team.
12. An ability to acquire new knowledge in the computing discipline and to engage in life-long learning

**REGULATIONS 2013 – CURRICULUM AND SYLLABUS****B.Tech. – INFORMATION TECHNOLOGY****SEMESTER - I** (Common to all B.E. / B.Tech., Degree Programmes)

S. NO.	COURSE CODE	COURSE TITLE	L	T	P	C
<i>THEORY</i>						
1.	SH100	Technical English – I	3	1	0	4
2.	SH101	Matrices and Differential Calculus	3	1	0	4
3.	SH102	Applied Physics	3	0	0	3
4.	SH103	Engineering Chemistry	3	0	0	3
5.	SH104	Fundamentals of Computing and Programming in C	3	0	0	3
6.	SH105	Engineering Graphics	2	3	0	4
<i>PRACTICAL</i>						
7.	SH106	C Programming Laboratory	0	0	3	2
8.	SH107	Physics and Chemistry Laboratory – I Part A – Physics Laboratory – I Part B – Chemistry Laboratory – I	0	0	3	2
9.	SH108	Engineering Practices Laboratory Part A – Mechanical and Civil Engineering Practices Part B – Electrical and Electronics Engineering Practices	0	0	3	2
<b>Total Number of Credits :</b>						<b>27</b>

## SEMESTER – II

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1.	13G20	Technical English – II ( <b>Common to all</b> )	3	0	0	3
2.	13G21	Integral Calculus and Transforms ( <b>Common to all</b> )	3	1	0	4
3.	13G22	Solid State Physics ( <b>Common to ECE, CSE, EEE, EIE, and IT</b> )	3	0	0	3
4.	13G23	Chemistry of Electrical and Electronic Materials ( <b>Common to ECE, CSE, EEE, EIE and IT</b> )	3	0	0	3
5.	13G24	Electric Circuits and Electron Devices ( <b>Common to CSE and IT</b> )	3	1	0	4
6.	13G25	Basic Civil and Mechanical Engineering ( <b>Common to ECE, CSE, EEE, EIE and IT</b> )	4	0	0	4
<b>PRACTICAL</b>						
7.	13G26	Computer Programming Laboratory ( <b>Common to all</b> )	0	1	2	2
8.	13G27	Physics and Chemistry Laboratory – II ( <b>Common to all</b> ) Part A – Physics Laboratory – II Part B – Chemistry Laboratory – II	0	0	3	2
9.	13G28	Electronic Devices and Circuits Laboratory ( <b>Common to CSE and IT</b> )	0	0	3	2
10.	13G29	English Language Skill Laboratory ( <b>Common to all</b> )	0	0	3	2
<b>Total Number of Credits :</b>						<b>29</b>

**SEMESTER – III**

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
<b>Theory</b>						
1	13IT31	Fourier Transforms and Complex Analysis	3	1	0	4
2	13IT32	Environmental Science and Engineering	3	0	0	3
3	13IT33	Data Structures	3	1	0	4
4	13IT34	Object Oriented Programming using C++	3	1	0	4
5	13IT35	Digital System Design	3	1	0	4
6	13IT36	Analog and Digital Communication	3	0	0	3
<b>Practical</b>						
7	13IT37	Data Structures Laboratory	0	0	3	2
8	13IT38	Object Oriented Programming using C++ Laboratory	0	0	3	2
			<b>18</b>	<b>4</b>	<b>6</b>	<b>26</b>
<b>Total Number of Credits : 26</b>						

**SEMESTER – IV**

S. NO	COURSE CODE	COURSE TITLE	L	T	P	C
<b>Theory</b>						
1	13IT41	Probability and Queueing Theory	3	1	0	4
2	13IT42	Algorithm Analysis and Design	3	0	2	4
3	13IT43	Computer Architecture	3	0	0	3
4	13IT44	C# and .NET Framework	3	0	2	4
5	13IT45	Relational Database Management Systems	3	1	0	4
6	13IT46	Microprocessors and Interfacing	3	0	0	3
<b>Practical</b>						
7	13IT47	Relational Database Management Systems Laboratory	0	0	3	2
8	13IT48	Microprocessors Laboratory	0	0	3	2
9	13IT49	Communication Skills and Technical Seminar	0	0	3	2
			<b>18</b>	<b>2</b>	<b>13</b>	<b>28</b>
<b>Total Number of Credits : 28</b>						

**SEMESTER - V**

S. No.	COURSE CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1.	13IT51	System Programming and Operating Systems	3	1	0	4
2.	13IT52	Computer Networks	3	1	0	4
3.	13IT53	Software Engineering	3	0	0	3
4.	13IT54	Java Programming	3	1	0	4
5.	13IT55	Professional Ethics and Human Values (Common to All)	3	0	0	3
6.	E1	Elective - I	3	0	0	3
<b>PRACTICAL</b>						
7.	13IT57	Networking Laboratory	0	0	3	2
8.	13IT58	Java Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>6</b>	<b>25</b>

**SEMESTER - VI**

S. No.	COURSE CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1.	13IT61	Fundamentals of Wireless Communication	3	0	0	3
2.	13IT62	Internet and Web Technology (Common to CSE, ECE and IT)	3	0	0	3
3.	13IT63	Principles of Digital Signal Processing	3	1	0	4
4.	13IT64	Compiler Design	3	1	0	4
5.	E2	Elective - II	3	0	0	3
<b>PRACTICAL</b>						
6.	13IT67	Internet and Web Technology Laboratory (Common to CSE and IT)	0	0	3	2
7.	13IT68	CASE Tools Laboratory	0	0	3	2
8.	E3	Elective Laboratory	0	0	3	2
9.	13IT69	Comprehension	0	0	3	1
<b>TOTAL</b>			<b>15</b>	<b>2</b>	<b>12</b>	<b>24</b>

**SEMESTER – VII**

S No.	COURSE CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1.	13IT71	Cryptography and Network Security	3	1	0	4
2.	13IT72	Open Source Systems	3	1	0	4
3.	13IT73	Multimedia Systems	3	1	0	4
4.	13IT74	Software Project Management	3	0	0	3
5.	E4	Elective-IV	3	0	0	3
6.	E5	Elective-V	3	0	0	3
<b>PRACTICAL</b>						
7.	13IT77	Multimedia Laboratory	0	0	3	2
8.	13IT78	Open Source Laboratory	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>6</b>	<b>25</b>

**SEMESTER VIII**

S. No.	COURSE CODE	COURSE TITLE	L	T	P	C
<b>THEORY</b>						
1.	13IT81	Principles of Management (Common to all Branches)	3	0	0	3
2.	13IT82	Mobile Computing (Common to IT, ECE and EEE)	3	0	0	3
3.	E6	Elective VI	3	0	0	3
4.	E7	Elective VII	3	0	0	3
<b>PRACTICAL</b>						
5.	13IT87	Project Work	0	0	12	6
<b>TOTAL</b>			<b>12</b>	<b>0</b>	<b>12</b>	<b>18</b>



**CORE ELECTIVES**

<b>S. No.</b>	<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>NETWORKING AND COMMUNICATIONS</b>						
1.	13ITAA	TCP/IP Design and Implementation	3	0	0	3
2.	13ITAB	Network programming and Management	3	0	0	3
3.	13ITAC	Distributed Systems	3	0	0	3
4.	13ITAD	Next Generation Networks	3	0	0	3
5.	13ITAE	High Speed Networks (Common to ECE, CSE and IT)	3	0	0	3
6.	13ITAF	Cyber Forensics	3	0	0	3
7.	13ITAG	Game Programming	3	0	0	3
<b>SOFTWARE DEVELOPMENT AND TESTING</b>						
1.	13ITBA	Advanced Java	3	0	0	3
2.	13ITBB	Service Oriented Architecture (Common to IT and CSE)	3	0	0	3
3.	13ITBC	Mobility Engineering	3	0	0	3
4.	13ITBD	Software Testing	3	0	0	3
5.	13ITBE	Software Quality Assurance	3	0	0	3
<b>COMPUTING TECHNOLOGIES</b>						
1.	13ITCA	Cloud Computing (Common to IT, ECE, CSE and EEE)	3	0	0	3
2.	13ITCB	Green Computing	3	0	0	3
3.	13ITCC	Analytic Computing (Common to IT, ECE and CSE)	3	0	0	3
4.	13ITCD	Social Computing (Common to IT, ECE and CSE)	3	0	0	3
5.	13ITCE	Parallel Computing	3	0	0	3
<b>DATA MANAGEMENT AND ANALYTICS</b>						
1.	13ITDA	Advanced Database Technology (Common to CSE and IT)	3	0	0	3
2.	13ITDB	Data Warehousing and Data Mining	3	0	0	3
3.	13ITDC	Information Storage and Management	3	0	0	3
4.	13ITDD	Information Theory and Coding	3	0	0	3
<b>ELECTIVE LAB</b>						
1.	13ITEB	Mobility with Android Laboratory	0	0	3	2
2.	13ITEC	Software Testing Laboratory	0	0	3	2

**INTERDISCIPLINARY SUBJECTS**

S. No.	Course Code	Course Title	L	T	P	C
<b>(Maximum of 2 Electives to be opted)</b>						
1.	13ITFA	Total Quality Management	3	0	0	3
2.	13ITFB	Intellectual Property Rights	3	0	0	3
3.	13ITFC	Business Intelligence and its Applications (Common to CSE, ECE,IT)	3	0	0	3
4.	13ITFD	Knowledge Management	3	0	0	3
5.	13ITFE	M-Commerce (Common to CSE and IT)	3	0	0	3
6.	13ITFF	Natural Language Processing	3	0	0	3
7.	13ITFG	Embedded Systems	3	0	0	3

**TRANS DISCIPLINARY ELECTIVES**

S. No.	Course Code	Course Title	L	T	P	C
<b>Any one of the following course is compulsory</b>						
1.	13TD01	Indian Business Laws	0	0	0	3
2.	13TD02	Leadership and Personality Development	0	0	0	3
3.	13TD03	International Business Management	0	0	0	3
4.	13TD04	Basics of Marketing	0	0	0	3
5.	13TD05	Retailing and Distribution management	0	0	0	3
6.	13TD06	International Economics	0	0	0	3
7.	13TD07	Indian Economy	0	0	0	3
8.	13TD08	Rural Economics	0	0	0	3
9.	13TD09	International Trade	0	0	0	3
10.	13TD10	Global Challenges and issues	0	0	0	3
11.	13TD11	Indian Culture and Heritage	0	0	0	3
12.	13TD12	Indian History	0	0	0	3
13.	13TD13	Sustainable Development and Practices	0	0	0	3
14.	13TD14	Women in Indian Society	0	0	0	3
15.	13TD15	Indian Constitution	0	0	0	3
16.	13TD16	Bio Mechanics in Sports	0	0	0	3

SH100

**TECHNICAL ENGLISH – I**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**3 1 0 4**

**COURSE OUTCOMES**

The Student will

- apply basic grammar in Writing and Speaking.
- prepare formal Letter Writings.
- come out with proper pronunciation.
- speak confidently in interactions.
- develop interest to read any article.

**UNIT I**

12

**Language Focus:** Technical Vocabulary, Word Formation, Concord, Tense (Present).**Writing:** Leave Application Letter, Paragraph writing.**Listening:** Listening to correct pronunciation of words.**Speaking:** Self - Introduction, Greetings.**UNIT II**

12

**Language Focus:** Words often misspelled, Articles, Tense (Past)**Writing:** Permission letters (In-plant training/Seminar/Workshop), Chart description.**Listening:** Listening to the Sentences with correct stress and Intonation.**Speaking:** Situational Conversations.**UNIT III**

12

**Language Focus:** Compound nouns, Tense (Future), Preposition, Comparative Adjectives.**Writing:** Invitation Letter, Acceptance Letter, Declining Letter.**Listening:** Listening to the conversations.**Speaking:** One minute speech.**UNIT IV**

12

**Language Focus:** Modal verbs, Gerund, Infinitives, Voice.**Writing:** Writing Instructions, Letters to Editor.**Listening:** Listening to the different Tonal Expressions.**Speaking:** Giving Opinions.**UNIT V**

12

**Language Focus:** 'If' Conditionals, 'Wh' questions, Question Tags.**Writing:** Reading and Note - taking**Speaking:** Group Discussion.**Reading:** ERC, one word questions from the suggested book.**SUGGESTED ACTIVITIES**

1. Matching words and meanings – Using words in context – Making sentences.
2. Exercises on gap filling and correction of errors on Concord (Subject – Verb Agreement).
3. Gap filling exercises using the appropriate Tense forms.
4. Exercises on transferring information from Graph to Text – Bar charts, Flow charts.
5. Making sentences using Modal verbs to express probability, compulsion, etc.
6. Exercises on Writing Instructions.
7. Exercises on framing Questions.
8. Other relevant classroom activities.

**L: 45 T: 15 TOTAL: 60 PERIODS**

**BOOK SUGGESTED FOR READING**

1. R.K.Narayanan, “Malgudi Days”, Indian Thought Publications, 1943.

**REFERENCES**

1. Rizvi. M. Ashraf, “Effective Technical Communication”, McGraw Hill Companies, 2005.
2. P.K.Dutt, G.Rajeevan and C.L.N. Prakash, “A Course in Communication Skills”, Cambridge University Press India, 2007.
3. Andrea.J.Rutherford, “Basic Communication Skills for Technology”, Pearson Education, 2<sup>nd</sup> Edition, 2007.

**SH101****MATRICES AND DIFFERENTIAL CALCULUS  
(Common to all B.E. / B.Tech., Degree Programmes)****L T P C  
3 1 0 4****COURSE OUTCOMES**

- Ability to find inverse and integral powers of matrices and to perform transformations of matrices.
- Ability to find the evolutes of various curves.
- Ability to solve ordinary and partial differential equations.
- Ability to obtain constrained maxima and minima.

**UNIT I MATRICES****12**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties (excluding proofs); Cayley – Hamilton theorem (excluding proof) – Inverse and integral powers of a matrix using Cayley – Hamilton theorem; Diagonalisation of a matrix by orthogonal transformation; Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

**UNIT II DIFFERENTIAL CALCULUS****12**

Curvature in cartesian, parametric and polar forms; Centre, radius and circle of curvature; Evolutes.

**UNIT III FUNCTIONS OF SEVERAL VARIABLES****12**

Partial derivatives; Total derivatives; Differentiation of implicit functions; Jacobians; Maxima and Minima - Method of Lagrangian multipliers.

**UNIT IV ORDINARY DIFFERENTIAL EQUATIONS****12**

Higher order linear differential equations with constant coefficients; Method of variation of parameters; Cauchy's and Legendre's linear equations; Simultaneous first order linear equations with constant coefficients.

**UNIT V PARTIAL DIFFERENTIAL EQUATIONS****12**

Formation of partial differential equations; Lagrange's linear equations; Solutions of standard types of first order partial differential equations; Linear partial differential equations of second and higher order with constant coefficients.

**L: 45 T: 15 TOTAL: 60 PERIODS****TEXT BOOKS**

1. Grewal. B.S, "Higher Engineering Mathematics", Khanna Publications, Delhi, 40<sup>th</sup> Edition, 2007.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley India, 8<sup>th</sup> Edition, Reprint 2011.

**REFERENCES**

1. Bali N. P. and Manish Goyal, "Text book of Engineering Mathematics", Laxmi Publications Private Limited, 7<sup>th</sup> Edition, Reprint, 2010.
2. Ramana.B.V., "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2007.
3. Jain.R.K. and Iyengar.S.R.K., "Advanced Engineering Mathematics", Narosa Publishing House Private Limited, 3<sup>rd</sup> Edition, 2007.
4. Veerarajan.T., "Engineering Mathematics for semester I and II", Tata McGraw Hill Education Private Limited, New Delhi, 3<sup>rd</sup> Edition, 2012.
5. Veerarajan.T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Private Limited, New Delhi, 2012.

SH102

**APPLIED PHYSICS**  
(Common to all B.E. / B.Tech., Degree Programmes)**L T P C**  
**3 0 0 3****COURSE OUTCOMES**

The students will be able to

- gain knowledge on the properties of matter and hydrodynamics.
- study and apply the ultrasonic methods for industrial and medical field.
- understand Lasers and to identify the appropriate Laser technique for industrial and medical field.
- understand the different types, fabrication, losses of optical fibers and the applications of fiber optics in communication and instrumentation.
- understand the physical properties of photons and electrons and to study the different Electron Microscopes.

**UNIT I PROPERTIES OF MATTER AND HYDRODYNAMICS 9****Properties of Matter**

Stress, Strain, Hooke's law; Types of moduli of elasticity; Torsional pendulum – Determination of Rigidity modulus of a wire; Bending of beams – Expression for bending moment – Measurement of Young's modulus by uniform and Non- uniform bending – I Shaped girders.

**Hydrodynamics**

Stream line flow, Turbulent flow, Poiseuille's formula for flow of liquid through a capillary tube, Determination of coefficient of viscosity of a liquid.

**UNIT II ULTRASONICS 9**

Production – magnetostriction effect – magnetostriction generator – piezoelectric effect – piezoelectric generator; Detection of ultrasonic waves; Properties – Cavitations – Velocity measurement – acoustic grating; Industrial applications – drilling, welding, soldering and cleaning – SONAR - Non Destructive Testing – pulse echo system through transmission and reflection modes – A,B and C scan displays; Medical applications – Sonograms.

**UNIT III LASERS 9**

Principle of spontaneous emission and stimulated emission, Population inversion, Pumping, Einstein's A and B coefficients – derivation; Types of Lasers - CO<sub>2</sub> Laser, Nd-YAG Laser, Semiconductor Laser (Homojunction); Determination of wavelength of Laser using grating and Particle size; Applications of Lasers: Industrial applications – Welding, Cutting and Heat treatment; Medical applications; Holography (construction and reconstruction).

**UNIT IV FIBER OPTICS AND ITS APPLICATIONS 9**

Principle and propagation of light in optical fibers; Numerical aperture and Acceptance angle; Types of optical fibers – material, refractive index and mode; Double crucible technique of fiber drawing; Splicing – fusion splicing; Loss in optical fiber – attenuation, dispersion and bending; Fiber optical communication system (Block diagram); Advantages and Applications of optical fiber; Fiber optic sensors – temperature and displacement; Endoscope.

**UNIT V QUANTUM PHYSICS AND MICROSCOPY 9**

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh Jean's Law from Planck's theory; Photoelectric effect – Law of Photoelectric effect – Photoelectric equation; Matter Waves – De Broglie wavelength - Schrodinger's wave equation – time independent and time dependent equations – Particle in one dimensional box; Heisenberg's Uncertainty principle; Linear Harmonic oscillator; Electron microscope – scanning electron microscope – transmission electron microscope.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. R.K.Gaur and S.C.Gupta, "Engineering Physics", Dhanpat Rai Publications, New Delhi, 2009.
2. M.Arumugam, "Engineering Physics", Anuradha Publishers, 2010.

**REFERENCES**

1. David Halliday, Robert Resnick, Jearl Walker, "Fundamentals of Physics", John Wiley and Sons, Inc., USA, 9<sup>th</sup> Edition, 2013.
2. Arthur Beiser, "Concepts of Modern Physics", McGraw Hill Publications Private Limited, 5<sup>th</sup> Edition, 2008.
3. Richard P.Feynmann, Robert B.Leighton and Mathew Sands, "Feynmann's Lectures on Physics", Addison Wesley Publication, USA, 2010.
4. Yoav Peleg, Reuven Pnini, Elvahu Zaarur, Eugene Hecht, "Schaum's Outline of Quantum Mechanics", McGraw Hill Companies Limited, USA, 2<sup>nd</sup> Edition, 2010.

SH103

**ENGINEERING CHEMISTRY**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

The students will be able to

- select suitable water treatment techniques for industrial and domestic purpose.
- acquire knowledge of electrochemistry.
- apply the contextual knowledge of adsorption techniques for industrial applications.
- synthesize polymers for domestic and industrial applications.
- understand the knowledge of nano materials for their applications in Science and Engineering.

**UNIT I WATER TREATMENT 9**

Hardness: types of hardness, estimation of hardness of water – EDTA method – problems; disadvantages of hard water: scales and sludges – disadvantages of scales and sludges – boiler corrosion – priming and foaming – caustic embrittlement; domestic water treatment: screening, sedimentation, coagulation, filtration, disinfection – chlorine – UV method; water softening: demineralization process; desalination: definition, reverse osmosis.

**UNIT II ELECTRO ANALYTICAL TECHNIQUES 9**

Electrode potential: definition, measurement of electrode potential, Nernst equation – problems; EMF: definition, measurement of EMF – Poggendorff's method; reference electrode: standard hydrogen electrode, calomel electrode, glass electrode – measurement of pH using glass electrode; CO<sub>2</sub> sensing electrode; conductometric titrations: acid-base titration (HCl vs NaOH); potentiometric titrations: redox titration (Fe<sup>2+</sup> vs K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>), precipitation titration (Ag<sup>+</sup> vs NaCl).

**UNIT III CATALYSIS AND SURFACE PHENOMENA 9**

Types of catalysis – homogeneous catalysis – heterogeneous catalysis, mechanism of catalytic action - contact theory, catalytic promoters, catalytic poison; enzyme catalysis: Michaelis-Menton equation; adsorption: definition, types – physical adsorption – chemical adsorption – differences between physical and chemical adsorption; adsorption isotherms: definition, Freundlich and Langmuir adsorption isotherms, applications of adsorption.

**UNIT IV ENGINEERING POLYMERS 9**

Polymerization – types of polymerization – addition – free radical addition polymerization mechanism – copolymerization – condensation polymerization; plastics: classification – thermoplastics and thermosetting plastics, preparation, properties and uses of commercial plastics – PVC, teflon, perlon – U, bakelite; rubber: vulcanization of rubber, synthetic rubber – butyl rubber, SBR; composites: definition, types of composites – polymer matrix composites – FRP.

**UNIT V NANO MATERIALS 9**

Nanoparticles: definition, carbon nanotubes (CNT), types of carbon nano tubes – single walled and multi walled carbon nanotubes – fullerene; synthesis of carbon nanotubes: chemical vapour deposition – laser ablation – arc-discharge method; properties of CNT: mechanical, electrical, thermal and optical properties; applications of carbon nanotubes in chemical field, medicinal field, mechanical field and current applications.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 15<sup>th</sup> Edition, 2005.
2. S.S.Dara, "A text book of Engineering Chemistry", S. Chand and Company Limited, New Delhi, 12<sup>th</sup> Edition, 2006.



**REFERENCES**

1. J.Hammer Mark, “Water and Waste water Technology”, Prentice Hall, New Arrivals, 2012.
2. G.Whitmore, “Electrochemistry and its Applications”, Sarup book publishers, New Delhi, 2009.
3. G.Whitmore, “Adsorption and Catalysis”, Sarup Book Publishers, New Delhi, 2008.
4. Fred.Bilmayer, “Text book of Polymer Science”, Wiley, 1<sup>st</sup> Edition, 2007.
5. T.Pradeep, “Nano – The Essential”, Tata McGraw Hill Education Private Limited, New Delhi, 2012.
6. S.C.Bhatia, “Engineering Chemistry”, CBS Publishers and Distributors, 1<sup>st</sup> Edition, 2011.

**SH104 FUNDAMENTALS OF COMPUTING AND PROGRAMMING IN C**  
**(Common to all B.E. / B.Tech., Degree Programmes)**

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

- Learn the major components of a computer system.
- Formulate the algorithms and analyze their complexity.
- Identify the correct and efficient ways of solving problems.
- Acquire knowledge about dynamic memory allocation, modular programming and data organization.
- Develop real time applications using the power of C language features.

**UNIT I COMPUTER FUNDAMENTALS 10**

Introduction – Characteristics of Computers – Evolution of Computers – Computer Generations – Classification of Computers – Basic Computer organization – Number Systems – Problem Analysis – Algorithms – Flow charts – Computer Software – Types of Software.

**UNIT II BASIC C PROGRAMMING 9**

Structure of C Program – Keywords, Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making – Branching and Looping.

**UNIT III FUNCTIONS, ARRAYS AND POINTERS 9**

Functions: User-defined functions – Definitions – Declarations - Call by reference – Call by value. Arrays: Declaration – Definition – Multidimensional Arrays – Functions with array as arguments. Pointers: Initialization – Pointers as Arguments – Pointers to Pointers – Dynamic Memory Management Functions.

**UNIT IV STRUCTURES AND UNIONS 9**

Derived types – Structures: Declaration – Definition – Initialization of structures – Accessing structures – Nested structures – Arrays of structures – Structures and functions – Pointers to structures – Self-referential structures – Unions.

**UNIT V FILE HANDLING 8**

File structure – binary and text files – File handling functions – File I/O – File Manipulations.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Pradip Dey, Manas Ghosh, “Fundamentals of Computing and Programming in C”, Oxford University Press, 1<sup>st</sup> Edition, 2009.
2. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India), 2011.

**REFERENCES**

1. Ashok.N.Kamthane, “Computer Programming”, Pearson Education (India), 2008.
2. Stephen G.Kochan, “Programming in C”, Pearson Education (India), 3<sup>rd</sup> Edition, 2005.
3. Brian W.Kernighan and Dennis M.Ritchie, “The C Programming Language”, Pearson Education Inc., 2005.

**SH105**

**ENGINEERING GRAPHICS**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**2 3 0 4**

**COURSE OUTCOMES**

- Students will be able to use the drawing instruments effectively.
- An ability to draw the basic engineering curves and problems related to projections of points, straight lines, planes and solids.
- Able to apply the knowledge acquired on practical applications of sectioning and development of solids.
- Able to draw simple solids and its sections in isometric view and projections and also to draw its perspective views.

Drawing Instruments – IS specifications on lines – drawing sheets – Printing letters and dimensioning – scales (not for examination) – First angle projection should be followed.

**UNIT I PLANE CURVES** **12**  
Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloids – Epi and Hypo cycloids - construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

**UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES** **12**  
Projection of points and straight lines located in the first quadrant – Traces – Determination of true lengths and true inclinations.  
Projection of regular polygonal surfaces and circular lamina inclined to any one reference plane.

**UNIT III PROJECTION OF SOLIDS** **12**  
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

**UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES** **12**  
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – obtaining true shape of section.  
Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinder and cone – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

**UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS** **12**  
Principles of isometric projection – isometric scale – isometric projections of simple solids – cube – prisms, pyramids, cylinder and cone in simple position only, truncated prisms, pyramids, cylinders and cones.  
Perspective projection of prisms, pyramids and cylinders by visual ray method and vanishing point method.

**TOTAL: 60 PERIODS**

Note: In end semester examination from each unit one question with either or pattern may be asked. No short questions.

**TEXT BOOK**

1. N.D. Bhatt, “Engineering Drawing”, Charotar Publishing House, 46<sup>th</sup> Edition, 2003.

**REFERENCES**

1. K.V.Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2006.
2. M.S.Kumar, "Engineering Graphics", D.D. Publications, 2007.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005.
5. K.R.Gopalakrishnan, "Engineering Drawing" (Vol. I & II), Subhas Publications, 1998.
6. Dhananjay A.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw Hill Publishing Company Limited, 2008.
7. Basant Agarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

SH106

**C PROGRAMMING LABORATORY**  
(Common to all B.E. / B.Tech., Degree Programmes)**L T P C**  
**0 0 3 2****COURSE OUTCOMES**

- Acquire logical thinking and problem solving skills.
- Implement the algorithms and analyze their complexity.
- Identify the correct and efficient ways of solving problems.
- Acquire hands on practice in dynamic memory allocation, modular programming and data organization.
- Implement real time applications using the power of C language features.

**LIST OF EXPERIMENTS**

1. Solve problems such as temperature conversion, student grading, interest calculation.
2. Finding the 2's complement of a binary number.
3. Generation of the first 'n' terms of the Fibonacci sequence and prime sequence.
4. Computing Sine series and Cosine series.
5. Given distance traveled by a vehicle as  $d = ut + \frac{1}{2}at^2$ , where 'u' and 'a' are the initial velocity and acceleration. Calculate the distance traveled for different time intervals.
6. Solving the roots of a quadratic equation.
7. Designing a simple arithmetic calculator. (Use switch statement)
8. Performing the following operations: (Use loop statement)
  - i. Generate Pascal's triangle.
  - ii. Construct a Pyramid of numbers.
9. Performing the following operations to a string:
  - i. To insert a sub-string into main string at a given position.
  - ii. To delete 'n' characters from a given position in a string.
  - iii. To replace a character of string either from beginning or ending or at a specified location.
10. Performing the following operations: (Use arrays)
  - i. Matrix addition.
  - ii. Transpose of a matrix.
  - iii. Matrix multiplication by checking compatibility.
11. Performing the following operations: (Use recursive functions)
  - i. To find the factorial of a given integer.
  - ii. To find the GCD (Greatest Common Divisor) of two given integers.
  - iii. To solve Towers of Hanoi problem.
12. Performing the Student Information Processing using File Handling concepts.

**TOTAL: 45 PERIODS****SOFTWARE REQUIREMENTS**

- Turbo C/ ANSI C Compiler
- Gcc compiler

**SH107                      PHYSICS AND CHEMISTRY LABORATORY – I**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**0 0 3 2**

**PART A – PHYSICS LABORATORY – I**

**COURSE OUTCOMES**

At the end of the Laboratory classes, the students are able to

- develop collaborative learning skills and to add some of their own ideas to the experiments and their explanations.
- understand the optical properties, mechanical properties and electrical properties.

**LIST OF EXPERIMENTS**

1. (a) Particle size determination using Diode Laser.  
(b) Determination of Laser parameters – Wavelength, and angle of divergence.  
(c) Determination of Numerical aperture and acceptance angle of an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of the liquid – Ultrasonic Interferometer.
4. Determination of Dispersive power of a prism using Spectrometer.
5. Determination of Young's modulus – Non-uniform bending method.
6. Determination of coefficient of viscosity of liquid – Poiseuille's method.
7. Determination of specific resistance of a given coil of wire – Carey Foster's Bridge.  
• *A minimum of FIVE experiments shall be offered.*

**PART B - CHEMISTRY LABORATORY – I**

**COURSE OUTCOMES**

The student

- can estimate the amount of hardness and acidity present in the water sample.
- gain knowledge about the estimation of nickel in an alloy.
- quantify the electrolyte by measuring the conductance and pH.

**LIST OF EXPERIMENTS**

1. Estimation of hardness of Water sample by EDTA method.
2. Estimation of acidity of Water sample.
3. Estimation of Nickel by EDTA method.
4. Conductometric titration (HCl Vs NaOH).
5. Conductometric titration (BaCl<sub>2</sub> Vs Na<sub>2</sub>SO<sub>4</sub>).
6. pH metric titration (HCl Vs NaOH).
7. Determination of molecular weight and degree of polymerization using Viscometry.

- *A minimum of FIVE experiments shall be offered.*
- *Laboratory classes on alternate weeks for Physics and Chemistry.*

**TOTAL: 45 PERIODS**

SH108

**ENGINEERING PRACTICES LABORATORY**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**0 0 3 2**

**COURSE OUTCOMES**

- Students will be able to prepare the pipe connections and identify the various components used in plumbing.
- An ability to prepare simple wooden joints using wood working tools.
- An ability to prepare simple lap, butt and tee joints using arc welding equipments.
- An ability to prepare simple components using lathe and drilling machine.

**PART A – MECHANICAL AND CIVIL ENGINEERING PRACTICES**

<b>I</b>	<b>PLUMBING WORKS:</b> Study of components related to plumbing. Hands-on-exercise: Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.	<b>5</b>
<b>II</b>	<b>CARPENTRY PRACTICES:</b> Study of the joints in roofs, doors, windows and furniture. Hands-on-exercise: Wood work, joints by sawing, planning and cutting.	<b>6</b>
<b>III</b>	<b>WELDING:</b> Study of the tools used in welding Gas welding practice. Preparation of butt joints, lap joints and tee joints using arc welding.	<b>5</b>
<b>IV</b>	<b>BASIC MACHINING:</b> (a) Simple Turning and Taper turning. (b) Drilling Practice.	<b>7</b>

**REFERENCES**

1. Ramesh Babu.V., “Engineering Practices Laboratory Manual”, VRB Publishers Private Limited, Chennai, Revised Edition, 2013 – 2014.
2. Jeyachandran.K., Natarajan.S. and Balasubramanian.S., “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.
3. Bawa.H.S., “Workshop Practice”, Tata McGraw Hill Publishing Company Limited, 2007.
4. Rajendra Prasad.A. and Sarma.P.M.M.S., “Workshop Practice”, Sree Sai Publication, 2002.
5. Kannaiah.P. and Narayana.K.L., “Manual on Workshop Practice”, Scitech Publications, 1999.

## **PART B – ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICES**

### **COURSE OUTCOMES**

- An ability to develop familiarity with rudimentary measurement equipment – signal generators, oscilloscopes, multimeters and power supplies.
- Ability to demonstrate and evaluate the parameters of basic electronic components (wires, resistors, capacitors, diodes etc.) based on their physical parameters and dimensions.
- Define, describe, and analyze fundamentals of Boolean algebra and digital logic gates.
- An ability to predict qualitatively and quantitatively compute the steady state AC responses of basic circuits using the phasor method.
- Gain experience in the documentation of measurements and procedures as well as the preparation of formal reports.

### **I ELECTRICAL ENGINEERING PRACTICE 10**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair-case wiring.
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of an electrical equipment.

### **II ELECTRONICS ENGINEERING PRACTICE 12**

1. Study of Electronic components and equipments – Resistor, colour coding, measurement of AC signal parameters (peak-peak, rms period, frequency) using CRO
2. Study of logic gates AND, OR, XOR and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components, Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

**TOTAL: 45 PERIODS**

### **REFERENCES**

1. K.Jeyachandran, S.Natarajan and S.Balasubramanian, “A Primer on Engineering Practices Laboratory”, Anuradha Publications, 2007.
2. T.Jeyapoovan, M.Saravanapandian and S.Pranitha, “Engineering Practices Lab Manual”, Vikas Publishing House Private Limited, 2006.
3. H.S.Bawa, “Workshop Practice”, Tata McGraw Hill Publishing Company Limited, 2007.
4. A.Rajendra Prasad and P.M.M.S.Sarma, “Workshop Practice”, Sree Sai Publication, 2002.
5. P.Kannaiah and K.L.Narayana, “Manual on Workshop Practice”, Scitech Publications, 1999.



13G20

**TECHNICAL ENGLISH – II**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

The student will be able to

- apply correct form of language while Speaking and Writing.
- prepare his own Professional letter writings.
- interpret any passage after listening.
- interact at different situations fluently.

**UNIT I****10**

**Language Focus:** Homonyms, Different grammatical forms of the same word, correct usage of words / phrases.

**Writing:** Recommendation writing.

**Listening:** Interpreting Poetic lines.

**Speaking:** Telephone English.

**UNIT II****9**

**Language Focus:** Cause and Effect, Phrasal Verbs.

**Writing:** Quotation letter, Clarification Letter, Placing orders, Complaint Letter.

**Listening:** Conversations.

**Speaking:** Asking questions.

**UNIT III****9**

**Language Focus:** Idioms and Phrases with animal names.

**Writing:** Checklist, Process Description.

**Speaking:** Presentations.

**UNIT IV****9**

**Language Focus:** Technical Definitions, Transformation of Sentences.

**Writing:** Job Application Letter, Curriculum Vitae, Bio-data, Resume.

**Speaking:** Mock Interview.

**UNIT V****8**

**Language Focus:** British and American Vocabulary, Numerical Expressions.

**Writing:** E-mail Writing, Report Writing.

**Speaking:** Group Discussion.

**SUGGESTED ACTIVITIES**

1. Making sentences using different grammatical forms of the same word.
2. Exercises on combining sentences using Cause and Effect expressions.
3. Writing Formal Letters.
4. Writing exercises on Recommendations.
5. Exercises on Idioms and Phrases.
6. Exercises on preparing letter of Job Application with annexure.
7. Exercises on British and American English words with meanings.

**TOTAL: 45 PERIODS**

**BOOK SUGGESTED FOR READING**

1. A.P.J.Abdul Kalam, Arun Tiwari, "Wings of Fire", an Autobiography, University Press Private Limited India, 1999, 30<sup>th</sup> Impression, 2007.

**REFERENCES**

1. T.M.Farhathullah, "Communication Skills for Technical Students", Orient Longman Private Limited, 2002.
2. K.R.Lakshmi Narayanan, "English for Technical Communication", SciTech Publications, 1999.
3. Jack.C.Richards, Jonathan Hull and Susan Protor, "English for International Communication", Cambridge University Press, 3<sup>rd</sup> Edition, 2004.

**13G21 INTEGRAL CALCULUS AND TRANSFORMS**  
(Common to all B.E. / B.Tech., Degree Programmes)

**L T P C**  
**3 1 0 4**

**COURSE OUTCOMES**

- Ability to find area and volume of objects using double and triple integrals.
- Ability to analyze the concepts related to vector calculus and to apply them in engineering field.
- Ability to perform the ideas of Laplace transform and Z-transform in their respective engineering subjects.

**UNIT I MULTIPLE INTEGRALS 12**

Double integration – Cartesian and polar coordinates; Change of order of integration; Change of variables between cartesian and polar coordinates; Triple integration in cartesian coordinates; Area as double integral; Volume as triple integral.

**UNIT II VECTOR CALCULUS 12**

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields; Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stoke’s theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelepipeds.

**UNIT III LAPLACE TRANSFORM 12**

Definition of Laplace transform – Conditions for existence – Transform of elementary functions – Basic properties – Derivatives and Integrals of Transform – Transform of derivatives and integrals – Transform of unit step function and impulse function – Transform of periodic function – Initial and final value theorems.

**UNIT IV INVERSE LAPLACE TRANSFORM 12**

Definition of Inverse Laplace transform – Convolution theorem – Solution of linear ordinary differential equations of second order with constant coefficients using Laplace transformation techniques and solution of simultaneous differential equations of first order with constant coefficients using Laplace transformation techniques.

**UNIT V Z – TRANSFORM 12**

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of difference equations – Solution of difference equations using Z-transform.

**L: 45 T: 15 TOTAL: 60 PERIODS**

**TEXT BOOKS**

1. Grewal.B.S., “Higher Engineering Mathematics”, Khanna Publications, New Delhi, 40<sup>th</sup> Edition, 2007.
2. Erwin Kreyszig, “Advanced Engineering Mathematics”, Wiley India, 8<sup>th</sup> Edition, 2011.

**REFERENCES**

1. Bali.N.P. and Manish Goyal, “Text book of Engineering Mathematics”, Laxmi Publications Private Limited, 7<sup>th</sup> Edition, 2008.
2. Ramana.B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Publishing Company, New Delhi, 2007.
3. Jain.R.K. and Iyengar.S.R.K., “Advanced Engineering Mathematics”, Narosa Publishing House Private Limited, 3<sup>rd</sup> Edition, 2007.
4. Veerarajan.T., “Engineering Mathematics for semester I & II”, Tata McGraw Hill Education Private Limited, 3<sup>rd</sup> Edition, New Delhi, 2012.
5. Veerarajan.T., “Transforms and Partial Differential Equations”, Tata McGraw Hill Education Private Limited, New Delhi, 2012.

13G22

**SOLID STATE PHYSICS**  
(Common to ECE, CSE, EEE, EIE and IT)

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

The Student will be able to

- identify the crystal lattices, their structures and how the structure influences its major properties at different levels.
- choose the major functional and structural properties required for specific applications.
- check the parameter that satisfies superconducting behaviour.
- relate technology to the physics of semiconductor devices.
- classify the magnetic materials and their storage applications.
- design optical materials that are able to be manufactured and measured using the state of art optical fabrication technologies.

**UNIT I CRYSTAL PHYSICS****9**

Lattice, Unit cell, Bravais lattice, Lattice planes; Miller indices – d-spacing in cubic lattice; Calculation of number of atoms per unit cell, Atomic radius, Coordination number and Packing factor for SC, BCC, FCC and HCP structures; Crystal defects – point, line and surface defects; Burger vector.

**UNIT II CONDUCTING MATERIALS AND SUPERCONDUCTORS****9****Conductors**

Band theory of solids - Distinguish between conductors, semiconductors and insulators on the basis of band theory of solids; Classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann Franz law – Lorentz number – Draw backs of classical theory; Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

**Superconductors**

Superconductivity: Properties – Meissner effect – Isotopic effect; Types of superconductors – Type I and Type II superconductors; Applications of superconductors – Magnetic levitation.

**UNIT III SEMICONDUCTORS****9**

Intrinsic semiconductor – carrier concentration derivation – Fermi level – variation of Fermi level with temperature – electrical conductivity – bandgap determination; Extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level – with temperature and impurity concentration; Hall effect – Determination of Hall coefficient – Applications.

**UNIT IV MAGNETIC MATERIALS AND STORAGE DEVICES****9**

Origin of magnetic moment, Bohr magneton, Dia and Para magnetism, Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials; Anti-ferromagnetic materials; Ferrites – structure and applications; magnetic recording and readout – storage of magnetic data – tapes, floppy, Hard disk and CD ROM.

**UNIT V OPTICAL MATERIALS****9**

Optical properties of metals, insulators and semiconductors; Phosphorescence and fluorescence; Excitons traps and color centre and their importance; Different phosphors used in CRO screens, liquid crystal display, LED – working of LED; Thermography and its applications; Solar cell – PN junction solar cell – Conversion efficiency and solar concentration – Hetero junction solar cell.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Charles Kittel, "Introduction to Solid State Physics", John Wiley and Sons, Singapore, 7<sup>th</sup> Edition, 2007.
2. Dr.N.Sankar, S.O.Pillai, "A Text book of Engineering Physics", New Age International Publications, New Delhi, 2009.

**REFERENCES**

1. Donald A.Neamen "Semiconductor Physics and Devices", Tata McGraw Hill Publication, New Delhi, 3<sup>rd</sup> Edition, 2007.
2. M.Arumugam, "Materials Science", Anuradha publications, Kumbakonam, 2010.
3. Calister, "Material Science and Engineering: An Introduction", John Wiley and Sons, 6<sup>th</sup> Edition, 2009.

**13G23 CHEMISTRY OF ELECTRICAL AND ELECTRONIC MATERIALS**  
(Common to ECE, CSE, EEE, EIE and IT)

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

The students can

- apply the knowledge in designing new energy storing devices.
- identify the types of corrosion and to design a method to control the corrosion.
- apply the knowledge of photochemistry in designing the various electronic materials.
- choose proper analytical technique for analyzing the synthesized electronic materials.

**UNIT I ENERGY SOURCES AND STORAGE DEVICES 9**

Nuclear energy: definition – mass defect; types of nuclear reactions: nuclear fission – characteristics – nuclear chain reaction – fusion reactions – difference between nuclear fusion and fission reaction; nuclear reactor: components – light water nuclear reactor – breeder reactor; solar energy: solar cell – advantages; wind energy: wind mill – advantages; storage batteries: types – primary battery – alkaline battery – secondary battery – lead-acid, nickel-cadmium; lithium battery; fuel cell: H<sub>2</sub>-O<sub>2</sub> fuel cell.

**UNIT II CORROSION AND ITS CONTROL 9**

Chemical corrosion: oxidation corrosion – Pilling-Bedworth rule; electrochemical corrosion: mechanism – hydrogen evolution mechanism – oxygen absorption mechanism – galvanic corrosion – differential aeration corrosion; factors influencing corrosion; corrosion control: cathodic protection: sacrificial anodic protection – impressed current cathodic protection – inhibitors; electroplating: methods of cleaning the article – electroplating of gold; electroless plating: advantages over electroplating – electroless plating of nickel.

**UNIT III PHOTOCHEMICAL PROCESSES 9**

Photochemical reactions: definition, characteristics; laws of photochemistry – Grothus-Draper's law – Stark-Einstein's law – Beer-Lambert's Law; quantum yield: definition, reason for low and high yield; photochemical equilibrium: photochemical synthesis of hydrogen chloride; photophysical processes: types – non radiative transition – internal conversion – inter system crossing – radiative transition – fluorescence – phosphorescence; chemiluminescence, thermoluminescence, photosensitization: definition, halogen photosensitizer, applications.

**UNIT IV ELECTRONIC MATERIALS 9**

Organic semiconducting materials: advantages; p-type and n-type semiconducting materials – pentacene – fullerenes-C-60; organic dielectric material: definition, examples – polystyrene – PMMA; organic light emitting polymer: polythiophene; conducting polymers: types – intrinsically conducting polymer – doped conducting polymer – extrinsically conducting polymer – coordination conducting polymer, applications; polymer with piezoelectric, pyroelectric and ferroelectric properties: polyvinylidene fluoride; OLED materials: definition, polymer OLED material – polyphenylene vinylene.

**UNIT V ANALYTICAL INSTRUMENTATION 9**

UV-Visible spectroscopy: types of transitions – chromophore, auxochrome – instrumentation (block diagram only) – applications; IR spectroscopy: molecular vibrations – linear molecule – CO<sub>2</sub> – nonlinear molecule – H<sub>2</sub>O – instrumentation (block diagram only) – applications; Atomic absorption spectroscopy: principle – instrumentation (block diagram only) – estimation of nickel by AAS; flame photometry: principle – instrumentation (block diagram only) – estimation of sodium by flame photometry; thermogravimetry (TG): definition – instrumentation (block diagram only) – characteristics of thermogram – factors influencing thermogravimetry – analyzing CuSO<sub>4</sub>.5H<sub>2</sub>O thermogram – applications.

**TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi, 15<sup>th</sup> Edition, 2002.
2. S.S.Dara, "A text book of Engineering Chemistry" S.Chand and Company Limited, New Delhi, 13<sup>th</sup> Edition, 2006.
3. B.S.Chauhan, "Engineering Chemistry", University science press, New Delhi, 3<sup>rd</sup> Edition, 2009.

**REFERENCES**

1. S.C.Bhatia, "Engineering Chemistry", CBS Publishers and Distributors, 1<sup>st</sup> Edition, 2011.
2. Kuriacoarse J.C., and Rajaram.J., "Chemistry in Engineering and Technology", Vol.1 & 2, Tata McGraw Hill Publishing Company Limited, New Delhi, 1989.
3. Hagen Klauk, "Organic Electronics: Materials, manufacturing and applications", Wiley - VCH, 2006.
4. S.Rao, Dr.B.B.Parulekar, "Energy Technology", Khana Publishers, New Delhi, 21<sup>st</sup> Edition, 2004.
5. Skoog, Holler, Crouch, "Instrumental Analysis", Cengage Learning India Private Limited, New Delhi, 2011.
6. R.Chaudhary, "Basics of Photochemistry", Anmol Publications and Company, New Delhi, 2009.

**13G24 ELECTRIC CIRCUITS AND ELECTRON DEVICES  
(Common to CSE and IT)**

**L T P C  
3 1 0 4**

**COURSE OUTCOMES**

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

- Analyze the circuits using various network theorems.
- Compute the transient response of RL, RC and RLC circuits for AC and DC inputs.
- Determine the resonance condition for series and parallel circuits.
- Describe the operation and characteristics of different types of semiconductor diodes.
- Compare the operation and characteristics of various transistors like BJT, JFET and MOSFET.

**UNIT I CIRCUIT ANALYSIS TECHNIQUES 12**  
Ohm's law, Kirchhoff's laws – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis – Voltage and current division – Source transformation – Star-delta conversion. **Network Theorems:** Thevenin's theorem, Superposition theorem, Norton's theorem, Maximum power transfer theorem (only for resistive network).

**UNIT II TRANSIENT RESPONSE FOR CIRCUITS 12**  
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and AC with sinusoidal input.

**UNIT III RESONANT CIRCUITS 12**  
Voltage and current relation in pure Resistor, Inductor, Capacitor, RL, RC and RLC circuits – Series and parallel circuits – Parallel and series resonances – their frequency response – Quality factor and bandwidth.

**UNIT IV SEMICONDUCTOR DIODES 12**  
Review of intrinsic and extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitances – effect of temperature and breakdown mechanism – Zener diode and its characteristics – Tunnel diode – PIN diode – Varactor diode – Photodiode.

**UNIT V TRANSISTORS 12**  
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET - drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

**L: 45 T: 15 TOTAL: 60 PERIODS**

**TEXT BOOKS**

1. A.Sudhakar, Shyammoan S.Palli, "Circuits and Networks - Analysis and Synthesis", Tata McGraw Hill, 4<sup>th</sup> Edition, 2010.
2. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits", Shaum series, Tata McGraw Hill, 2001.
3. S.Salivahanan, N.Suresh kumar and A.Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition, 2008.

**REFERENCES**

1. William H.Hayt, J.V.Jack, E.Kemmelby and Steven M.Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 2011.



2. Robert T. Paynter, "Introductory Electronic Devices and Circuits", Pearson Education, 7<sup>th</sup> Edition, 2008.
3. J. Millman and Halkins, Satyabranta Jit, "Electronic Devices and Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition, 2008.
4. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5<sup>th</sup> Edition, 2008.

**13G25 BASIC CIVIL AND MECHANICAL ENGINEERING**  
(Common to ECE, CSE, EEE, EIE and IT)

**L T P C**  
**4 0 0 4**

**COURSE OUTCOMES**

- An ability to identify the various systems and its components of various power plants.
- An ability to state and differentiate the working principles of IC engines.
- Students will be able to identify the various systems and components of refrigeration and air conditioning systems.

**A – CIVIL ENGINEERING**

**UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 15**

**Surveying:** Objects – types – classification – principles – measurements of distances – angles – leveling – determination of areas – illustrative examples.

**Civil Engineering Materials:** Bricks – stones – sand – cement – concrete – steel sections.

**UNIT II BUILDING COMPONENTS AND STRUCTURES 15**

**Foundations:** Types, Bearing capacity – Requirement of good foundations.

**Superstructure:** Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.

**B – MECHANICAL ENGINEERING**

**UNIT III POWER PLANT ENGINEERING 10**

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro-electric and Nuclear Power plants – Merits and Demerits – Pumps and turbines – working principle of Reciprocating pumps (single acting and double acting) – Centrifugal Pump.

**UNIT IV IC ENGINES 10**

Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

**UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM 10**

Terminology of refrigeration and air conditioning – Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room air conditioner.

**TOTAL: 60 PERIODS**

**REFERENCES**

1. Shanmugam G. and Palanichamy M.S., “Basic Civil and Mechanical Engineering”, Tata McGraw Hill Publishing Company Limited, New Delhi, 1996.
2. Ramamrutham S., “Basic Civil Engineering”, Dhanpat Rai Publishing Company Private Limited, 1999.
3. Seetharaman S., “Basic Civil Engineering”, Anuradha Agencies, 2005.
4. Venugopal K. and Prahu Raja V., “Basic Mechanical Engineering”, Anuradha Publishers, Kumbakonam, 2000.
5. Shantha Kumar S.R.J., “Basic Mechanical Engineering”, Hi-tech Publications, Mayiladuthurai, 2000.

**13G26****COMPUTER PROGRAMMING LABORATORY  
(Common to all B.E. / B.Tech., Degree Programmes)****L T P C  
0 1 2 2****COURSE OUTCOMES**

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

- Demonstrate how to use the UNIX Shell commands.
- Use the Shell programming constructs.
- Learn tracing mechanisms (for debugging), user variables, Shell variables, read-only variables, positional parameters, reading input to a Shell script.
- Test on numeric values, test on file type, and test on character strings using shell scripts.
- Write moderately complex Shell scripts and make them executable.

Execute programs written in C under UNIX environment.

**LIST OF EXPERIMENTS**

1. Study of UNIX OS, vi Editor.
2. Use of Basic UNIX Shell Commands:  
ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
3. Shell Programming:
  - i. Interactive shell scripts
  - ii. Positional parameters
  - iii. Arithmetic Operators
  - iv. if-then-fi, if-then-else-fi, nested if-else
  - v. Logical operators
  - vi. if - elif, case structure
  - vii. while, until, for loops, use of break
  - viii. Metacharacters
4. Shell scripts for the following:
  - i. Showing the count of users logged in
  - ii. Printing column wise list of files in your home directory
  - iii. To count lines, words and characters in its input (do not use wc)
5. C Programming on UNIX:
  - i. Dynamic Storage Allocation
  - ii. Pointers
  - iii. Functions
  - iv. File Handling

**TOTAL: 45 PERIODS****SOFTWARE REQUIREMENTS**

- UNIX/LINUX OS
- Gcc compiler

13G27

**PHYSICS AND CHEMISTRY LABORATORY – II**  
(Common to all B.E. / B.Tech., Degree Programmes)

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**PART A - PHYSICS LABORATORY – II**

**COURSE OUTCOMES**

At the end of the Laboratory classes, the students are able to

- understand the role of direct observation in Physics and to distinguish between inferences based on theory and the outcomes of the experiments.
- experience with experimental processes, including some experience designing investigation.

**LIST OF EXPERIMENTS**

1. Determination of Young's modulus – Uniform bending method.
2. Determination of Band Gap of a semiconductor material.
3. Determination of Hall Co-efficient.
4. Determination of Radius of curvature of a Plano convex lens using Newton's rings Method.
5. Determination of wavelength of mercury spectrum using spectrometer & grating.
6. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
7. Torsional pendulum – Determination of Moment of Inertia of the disc and Rigidity modulus of the material of the wire.

- *A minimum of FIVE experiments shall be offered.*

**PART B - CHEMISTRY LABORATORY – II**

**COURSE OUTCOMES**

The student

- can estimate the amount of alkalinity and Dissolved Oxygen (DO) present in the water sample.
- gain the knowledge in the estimation of copper in an alloy and iron in rust.
- quantify electrolyte and ion by measuring the conductance and emf.

**LIST OF EXPERIMENTS**

1. Estimation of copper in brass by EDTA method.
2. Determination of Dissolved Oxygen (DO) in water (Winkler's method)
3. Estimation of alkalinity of Water sample
4. Estimation of  $Fe^{2+}$  ion in rust by Dichrometry
5. Conductometric titration (Mixture of acids vs NaOH)
6. Potentiometric Titration ( $Fe^{2+}$  vs  $K_2Cr_2O_7$ )
7. Estimation of  $Fe^{2+}$  ion by spectrophotometry.

**TOTAL: 45 PERIODS**

- *A minimum of FIVE experiments shall be offered.*
- *Laboratory classes on alternate weeks for Physics and Chemistry.*

**13G28 ELECTRONIC DEVICES AND CIRCUITS LABORATORY  
(Common to CSE and IT)****L T P C  
0 0 3 2****COURSE OUTCOMES**

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

- Analyze the circuits using various network theorems and laws.
- Determine the parameters from the characteristics of diodes and transistors.

**LIST OF EXPERIMENTS**

1. Verification of Ohm's laws
2. Verification of Mesh and Nodal analysis
3. Verification of KVL and KCL
4. Verification of Thevenin's Theorem
5. Verification of Norton's Theorem
6. Verification of superposition Theorem
7. Verification of Maximum power transfer Theorem
11. Characteristics of CE configuration
12. Characteristics of CB configuration
8. Characteristics of PN diode
9. Characteristics of Zener diode
10. Characteristics of Photodiode

**TOTAL: 45 PERIODS**

**13G29                      ENGLISH LANGUAGE SKILL LABORATORY**  
**(Common to all B.E. / B.Tech., Degree Programmes)**

**L T P C**  
**0 0 3 2**

**COURSE OUTCOMES**

The Student will

- improve their pronunciation skill.
- gather information from any speech.
- imbibe the stress and intonation of the native speakers' accent.

**1. Micro Skills**

- Spotting the Homonyms / Silent letter words / mispronounced words
- Identifying the missing words in native speech
- Finding the cluster words
- Marking correct punctuation
- Marking word chunks
- Identification of sentences

**2. Content Comprehension and making inferences**

- Listening to audio files of Speech, Poetry, Recent Issues, News clippings, etc
  - a. True / False
  - b. Multiple Choice Questions
  - c. Filling the blanks
  - d. Filling the charts

**3. Listen and Act**

- Drawing the map using audio
- Picture completing task
- Transferring data to Graph

**4. Interpreting the video clippings**

**5. Listening to Conversations**

**TOTAL: 30 PERIODS**

<b>13IT31</b>	<b>FOURIER TRANSFORMS AND COMPLEX ANALYSIS</b>	<b>L T P C</b>
		<b>3 1 0 4</b>

**COURSE OUTCOMES**

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

- Perform Fourier series analysis of the functions.
- Implement the properties of Fourier transforms and Compute the Fourier transforms of various functions.
- Calculate the Fourier series solution of Wave and Heat equations.
- Grasp analytic functions and their properties and be introduced to the host of conformal mappings with suitable examples that have direct application.
- Understand the basics of complex integration and the concept of contour integration encountered in practice.

**UNIT I      FOURIER SERIES      12**

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range Sine series – Half range Cosine series – Complex form of Fourier series – Parseval's identity – Harmonic analysis.

**UNIT II      FOURIER TRANSFORMS      12**

Fourier Integral theorem (without proof) – Fourier transform pair – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

**UNIT III      APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS      12**

Solutions of one dimensional wave equation – One dimensional equation of heat conduction– Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

**UNIT IV      ANALYTIC FUNCTIONS      12**

Functions of a complex variable – Analytic functions – Necessary and Sufficient conditions excluding proofs) – Harmonic and orthogonal properties of analytic functions – Harmonic conjugate – Construction of analytic functions – Conformal mapping:  $w = z+c$ ,  $cz$ ,  $1/z$  and bilinear transformation.

**UNIT V      COMPLEX INTEGRATION      12**

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula (excluding proofs) – Taylor's and Laurent's expansions – Singular points – Residues – Residue theorem (excluding proof) – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

**L: 45 T:15, TOTAL: 60 PERIODS**

**TEXT BOOKS**

1. Grewal, B.S, "Higher Engineering Mathematics", Khanna Publishers, Delhi, 40<sup>th</sup> Edition, (2007).
2. Bali N. P and Manish Goyal, "Text book of Engineering Mathematics", Laxmi Publications Private Limited, 7<sup>th</sup> Edition, (Reprint 2010).

**REFERENCES**

1. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2007).
2. Jain R.K and Iyengar S.R.K, "Advanced Engineering Mathematics", Narosa Publishing House Private Limited, 3<sup>rd</sup> Edition, (2007).
3. T.Veerarajan "Transforms and Partial Differential Equations", Tata McGraw-Hill Education Private Limited, updated Edition, (2012).

**13IT32 ENVIRONMENTAL SCIENCE AND ENGINEERING**  
(Common to all B.E./B.Tech. Degree Programmes)

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

Upon successful completion of course the student will be able to

- Understand the various ecosystem and biodiversity
- Classify the different types of natural resources and identify the role of individual in conservation of resources
- Identify and analyse the causes, effects and control measures of environmental pollution
- Identify the different types of environmental hazards and their management
- Analyse the social issues related to the environment and how human population affect the environment

**UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 9**

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers– energy flow in the ecosystem – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) aquatic (pond) ecosystems. Field study of simple ecosystems –pond and forest. Introduction to biodiversity: definition - genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values –India as a mega-diversity nation – hot spots of biodiversity –threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation. Field study of common plants, insects, birds.

**UNIT II NATURAL RESOURCES 9**

Forest resources: Use and over-exploitation, deforestation, case studies- dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide Problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, case studies – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

**UNIT III ENVIRONMENTAL POLLUTION 9**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Noise pollution (e) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – e-Waste: Definition-dimension of the problem - source-toxic Substances in e-waste - risks related to toxic substances–environmental problems-role of an individual in prevention of pollution.

**UNIT IV ENVIRONMENTAL HAZARDS 9**

Environmental hazards: Definition – Hazard- Types-Natural and man-made hazards – Natural hazards: Causes, effect and management of Earthquake, Flood, Landslide, Cyclones and Tsunami; Man-made Hazards: Hazards due to dams and reservoirs, hazards due to nuclear power plant, Industrial hazards. Case study: Chernobyl disaster, Bhopal gas tragedy.

**UNIT V SOCIAL ISSUES, HUMAN POPULATION AND THE ENVIRONMENT 9**

Water conservation: rain water harvesting-climate change: global warming, acid rain, ozone layer depletion-Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – role of information technology in environment and human health – Case studies.

**TOTAL: 45 PERIODS**



**TEXT BOOKS**

1. Ravikrishnan. A., “Environmental Science and Engineering, Sri Krishna Hitech Publishing Company Private Limited, 2010.
2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, 2006.

**REFERENCES**

1. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 2<sup>nd</sup> Edition, Pearson Education, 2004.
2. Rajagopalan. R, “Environmental Studies - From Crisis to Cure”, Oxford University Press, 2005.
3. Natural Hazards – Local, National, Global: G. F. White (ed), Oxford University Press.

**13IT33****DATA STRUCTURES**

L	T	P	C
3	1	0	4

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Understand the basic concepts of different linear data structures and apply appropriate data structure for solving computing problems.
- Understand the design concepts of Non-Linear data structure and apply appropriate method for solving the problems.
- Design simple algorithms for solving computing problems and recognize the associated algorithm's operations and complexity.

**UNIT I FUNDAMENTALS OF ALGORITHMS 12**

Introduction to Data Structure and Algorithm – Analysis of algorithm – Best case and worst case complexities – Analysis of algorithm using data structures – Performance analysis – Time complexity – Space complexity – Amortized time complexity – Asymptotic notation.

**UNIT II LINEAR STRUCTURES 12**

Abstract Data Types (ADT) – Array implementation – linked list implementation – singly linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – Applications of stacks and queues.

**UNIT III SORTING AND SEARCHING 12**

Sorting Algorithms: Insertion sorts: Straight insertion sort, Binary insertion of sort, Shell sort; Exchange Sorts: Bubble sort, Quick sort, selection sorts: Straight Selection Sort, Heap Sort; Merge sort; Distribution Sorts: Bucket Sort, Radix Sort.

Searching: Sequential Search, Ordered Sequential Search, depth first search and breadth first search techniques, Binary Search, Hashing.

**UNIT IV TREE STRUCTURES 12**

Tree ADT – Definition and mathematical properties - Binary Tree ADT – Binary Tree traversals - Expression trees – Representations - applications of trees – binary search tree – AVL trees – binary heaps.

**UNIT V GRAPHS 12**

Definitions – Representations - Topological sort – Graph Traversal - shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – biconnectivity – Euler circuits – applications of graphs.

**L: 45 T: 15 TOTAL: 60 PERIODS****TEXT BOOKS**

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2012.
2. Horowitz and Sahani, "Fundamentals of data Structures", Galgotia Publication Private Limited, New Delhi, 2001

**REFERENCES**

1. D K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House Private Limited, 2000.
2. D. Samanta, "Classic Data Structures" PHI Learning Private Limited, 2004
3. R. Kruse etal, "Data Structures and Program Design in C", Pearson Education Asia, Delhi- 2002.
4. Ashok N.Kamthane, "An Introduction to Data Structures in C", Pearson Education, 2009.
5. R. F. Gilberg, B. A. Forouzan, "Data Structures", Second Edition, Thomson India Edition, 2005.

<b>13IT34</b>	<b>OBJECT ORIENTED PROGRAMMING USING C++</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Discuss the basic concepts of Object Oriented Programming.
- Illustrate class, objects, constructors and destructor.
- Employ templates and exception handling.
- Apply the concept of inheritance and polymorphism.
- Explain the concept of file handling, namespaces, ANSI string objects and STL.

<b>UNIT I</b>	<b>INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING PARADIGM AND CONCEPTS</b>	<b>12</b>
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Evolution of programming paradigm – Structured versus object-oriented development – Elements of Object Oriented Programming – Data Encapsulation and Abstraction – classes – Inheritance – derived classes – Polymorphism – operator overloading, virtual function – friend function – Generic classes – templates – Exception Handling – Stream computation.

<b>UNIT II</b>	<b>CLASSES, OBJECTS AND MEMBER FUNCTIONS IN C++</b>	<b>12</b>
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Class Specification – Class objects – Accessing class members – Defining member functions – Outside member functions – Accessing member function – Pointers within a class – passing objects as arguments – Returning objects from functions – friend functions and classes – static data and member functions – nested classes – object initialization and clean up.

<b>UNIT III</b>	<b>TEMPLATES AND EXCEPTION HANDLING</b>	<b>12</b>
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Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and Unexpected functions – Uncaught exception.

<b>UNIT IV</b>	<b>INHERITANCE AND POLYMORPHISM</b>	<b>12</b>
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Inheritance – public, private, and protected derivations – multiple inheritance – virtual base class – abstract class - overloading – overloading through friend functions – overloading the assignment operator – type conversion – composite objects Runtime polymorphism – virtual functions – pure virtual functions – RTTI – typeid – dynamic casting – RTTI and templates – cross casting – down casting.

<b>UNIT V</b>	<b>FILE HANDLING, STRINGS NAMESPACE AND STL</b>	<b>12</b>
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Streams and formatted I/O – I/O manipulators - file handling – random access – object serialization – namespaces - std namespace – ANSI String Objects – standard template library.

**L: 45 T: 15 TOTAL: 60 PERIODS**

**TEXT BOOKS**

1. K.R. Venugopal, Rajkumar Buyya, “Mastering C++”, second Edition, Tata McGraw-Hill, 2013.
2. Bhushan Trivedi, “Programming with ANSI C++”, Oxford University Press, 2009.

**REFERENCES**

1. Ira Pohl, “Object Oriented Programming using C++”, Pearson Education, Second Edition, Reprint 2004.
2. S. B. Lippman, Josee Lajoie, Barbara E. Moo, “C++ Primer”, Fourth Edition, Pearson Education, 2005.
3. B. Stroustrup, “The C++ Programming language”, Third Edition, Pearson Education, 2004.

**13IT35****DIGITAL SYSTEM DESIGN**

L	T	P	C
3	1	0	4

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Represent numerical values in various number systems and perform number conversions between different number systems.
- Analyze and design digital combinational circuits including arithmetic circuits (half adder, full adder, multiplier).
- Analyze Sequential and Logic Circuits.

**UNIT I NUMBER SYSTEM AND LOGIC GATES 12**

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems- Boolean functions – Simplifications of Boolean functions using Karnaugh map- AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR, Implementations of Logic Functions using gates.

**UNIT II COMBINATIONAL CIRCUITS 12**

Design procedure, Half adder, Full Adder, Half subtractor, Full subtractor Parallel binary adder, parallel binary Subtractor, Fast Adder, Carry Look Ahead adder, Serial Adder/Subtractor, BCD adder, Binary Multiplier, Binary Divider, Introduction to Hardware Description Language (HDL).

**UNIT III SEQUENTIAL CIRCUITS 12**

Latches, Flip-flops - SR, JK, D, T, and Master-Slave, Characteristic table and equation, Application table, Edge triggering, Level Triggering, Realization of one flip flop using other flip flops, serialadder/subtractor, Asynchronous Ripple or serial counter, Asynchronous Up/Down counter, Synchronous counters, Synchronous Up/Down counters, Programmable counters, Design of Synchronous counters: state diagram, State table, State minimization, State assignment, Excitation table and maps.

**UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 12**

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment – Shift registers – Counters – HDL for Sequential Circuits.

**UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC 12**

Design of fundamental mode and pulse mode circuits, incompletely specified State Machines, Problems in Asynchronous Circuits, Design of Hazard Free Switching circuits. Design of Combinational and Sequential circuits using VERILOG.

**L: 45 T: 15 TOTAL: 60 PERIODS****TEXT BOOKS**

1. M.Morris Mano, “Digital Design”, Third Edition, Pearson Education, 2007.
2. S. Salivahanan and S. Arivazhagan, “Digital Circuits and Design”, Third Edition, Vikas Publishing House Private Limited, New Delhi, 2006.

**REFERENCES**

1. Thomas L. Floyd , “Digital Fundamentals”, Prentice Hall, Tenth Edition, 2008
2. John F. Wakerly, “Outlines & Highlights for Digital Design: Principles and Practices”, Pearson / PHI, 2010.
3. Jr. Charles H. Roth and Larry L Kinney, “Fundamentals of Logic Design” (with Companion CD-ROM), Thomson Learning, Sixth Edition, 2009.
4. Raj Kamal, “Digital Systems: Principles and Design”, Prentice Hall, First Edition, 2009.

<b>13IT36</b>	<b>ANALOG AND DIGITAL COMMUNICATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Understand basic communications systems, particularly with application to noise-free Analog and digital communications.
- Develop the ability to compare and contrast the strengths and weaknesses of various Communication systems.
- Describe how information is put into electronic devices for storage and delivery.

**UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9**

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

**UNIT II DIGITAL COMMUNICATION 9**

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying - binary phase shift keying - QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery - squaring loop, Costas loop, DPSK.

**UNIT III DIGITAL TRANSMISSION 9**

Introduction, Pulse modulation, PCM - PCM sampling, sampling rate, signal to quantization noise rate, companding - analog and digital - percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission - Intersymbol interference, eye patterns.

**UNIT IV SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9**

Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

**UNIT V DATA AND OPTICAL COMMUNICATION 9**

Introduction – History of Data communications, Standards Organizations for data communication – data communication circuits – data communication codes – Error control – Error Detection – Error correction-- Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

**TOTAL: 45PERIODS**

**TEXT BOOKS**

1. Wayne Tomasi, "Advanced Electronic Communication Systems", Sixth Edition Pearson Education, 2007.
2. Simon Haykin, "Communication Systems", Fourth Edition, John Wiley & Sons, 2001.

**REFERENCES**

1. H.Taub, D L Schilling ,G Saha ,"Principles of Communication", Third Edition,2007.
2. B.P.Lathi, "Modern Analog And Digital Communication systems", Third Edition, Oxford University Press, 2007
3. B.Sklar, "Digital Communication Fundamentals and Applications", Second Edition, Pearson Education, 2007.
4. Blake, "Electronic Communication Systems", Thomson Delmar Publications, 2002.
5. Martin S.Roden, "Analog and Digital Communication System", Third Edition, PHI, 2002.

**13IT37****DATA STRUCTURES LABORATORY**

L	T	P	C
0	0	3	2

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Apply and implement learned algorithm design techniques and data structures to solve problems.
- Analyze and compare the efficiency of algorithm for a given problem.
- Design and analyze the time and space efficiency of the data structure

**LIST OF EXPERIMENTS**

1. Array Implementation of List ADT
2. Implementation of Singly Linked List
3. Implementation of Doubly Linked List
4. Represent a polynomial as a linked list and write functions for polynomial addition.
5. Write programs to implement the following using an array.
  - a) Stack ADT
  - b) Queue ADT
6. Write programs to implement the following using a singly linked list.
  - a) Stack ADT
  - b) Queue ADT
7. Implement Stack and use it to convert a given infix expression into postfix form.
8. Implement a double-ended queue (dequeue) when insertion and deletion operations are possible at both the ends.
9. Write programs that traverse the given binary tree in
  - a) Preorder
  - b) inorder
  - c) postorder.
10. Write programs for implementing the following sorting methods with complexity analysis
  - a) Merge sort
  - b) Quick sort
  - c) Heap sort
11. Write a program to perform the following operations:
  - a) Insert an element into a binary search tree.
  - b) Delete an element from a binary search tree.
  - c) Search for a key element in a binary search tree..
12. Write a program to perform the following operations
  - a) Insertion into an AVL-tree
  - b) Deletion from an AVL-tree
13. Implement priority queue using binary heaps.
14. Implementation of hash table and collision handling using open addressing.
15. Write programs for the implementation of BFS and DFS for a given graph.
16. Write a program for generating Minimum cost spanning tree using Prim's algorithm.

**TOTAL: 45 PERIODS****List of Equipments and components for A Batch of 30 students (1 per batch)**

1. Software Required – **TURBOC version 3 or GCC version 3.3.4.**
2. Operating System – **WINDOWS 2000 / XP / NT OR LINUX**
3. Computers Required – **30 Nos.** (Min. Requirement: Pentium III or Pentium IV with 256 RAM and 40 GB harddisk)

<b>13IT38</b>	<b>OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### **COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Impart their knowledge related to classes and objects
- Manipulate objects using friend functions
- Implement various features of object oriented programming
- Develop applications using file handling concepts

### **LIST OF EXPERIMENTS**

1. Define a STUDENT class with Reg. No., Name and Marks in 3 tests of subject. Declare an array of 10 STUDENT objects. Using appropriate functions, find the average of two better marks for each student. Print the Reg. No., Name and average marks of all the students.
2. Create two classes DM and DB which stores the value of distances. DM stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add object of DM with another object of DB. Use friend function to carry out the addition operation. The object that stores the result may be a DM object depending on the units in which the results are required. The display should be in the format of feet and inches or meters and centimeters depending on the object of display.
3. Declare friend function in two classes. Calculate the sum of integers of both the classes using friend sum () function.
4. Create a class called MATRIX using a two- dimensional array of integers. Implement the following operations by overloading the operator == which checks the compatibility of two matrices to be added and subtracted. Perform the addition and subtraction by overloading the operators + and -. Display the result by overloading the operator <<.
5. Implement complex number class with necessary operator overloading and type Conversions such as integer to complex, double to complex, complex to double etc.
6. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
7. Overload the new and delete operators to provide custom dynamic allocation of memory.
8. Develop a template of linked-list class and its methods.
9. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.
10. Create a class called STUD with data members Reg. No., Name and Age. Using inheritance, create the classes UGSTUD and PGSTUD having fields a semester, fees and stipend. Enter the data for at least 5 students. Find the average age for all

UG and PG students separately.

11. Design stack and queue classes with necessary exception handling.
12. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
13. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
14. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, \*, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read and write the result to another file (one per line).

**MINI Projects:**

Employee payroll calculation, Hospital Management, Bank Management, Library Management, Attendance Calculation, Grade sheet Calculation, Railway Reservation System, Electricity Bill generation, Time table generation System, Inventory Control System

**TOTAL: 45 PERIODS**

**LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 35 STUDENTS****HARDWARE:**

- 35 Personal Computers
- Processor – 2.0 GHz or higher
- RAM – 256 MB or higher
- Hard disk – 20 GB or higher

**SOFTWARE:**

- Microsoft Visual C++ 6.0 – to be installed in all PC's.
- OS - Windows 2000/ Windows XP/ NT





<b>13IT42</b>	<b>ALGORITHM ANALYSIS AND DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Demonstrate a familiarity with algorithm, asymptotic performance of algorithms and data structures.
- Master different algorithm design techniques (brute-force, decrease and conquer, divide and conquer)
- Master different algorithm design techniques (transform and conquer, dynamic programming)
- Master different algorithm design techniques (greedy, Iterative methods)
- Acquire basic knowledge of computational complexity algorithms.

**UNIT I BASIC CONCEPTS AND MATHEMATICAL ASPECTS OF ALGORITHMS 12**

Introduction – What is Algorithm - Fundamentals of Algorithmic Problem Solving - Important Problem Types - Fundamental Data Structures- Fundamentals of the Analysis of Algorithm Efficiency : Analysis Framework - Mathematical Analysis of Non recursive Algorithms - Mathematical Analysis of Recursive Algorithms - Example: Fibonacci Numbers.

**UNIT II SORTING AND SEARCHING ALGORITHMS 12**

Brute Force and Exhaustive search: Selection Sort and Bubble Sort - Sequential Search and Brute-force string matching – Exhaustive search - Depth first Search and Breadth First Search - Decrease and Conquer: Insertion Sort – Topological sorting – Divide and conquer: Merge sort - Quick Sort - Binary tree Traversal and Related Properties – Multiplication of large integers and strassen’s matrix multiplication.

**UNIT III ALGORITHMIC SEARCH TECHNIQUES 12**

Transform and Conquer: Balanced Search Trees - Heaps and Heap sort - Space and Time Trade offs: Hashing - B-Trees - Dynamic Programming: The Knapsack Problem and Memory Functions - Optimal Binary Search Trees - Warshall's and Floyd's Algorithms.

**UNIT IV GREEDY AND ITERATIVE ALGORITHMS 12**

Greedy Technique: Prim's Algorithm - Kruskal's Algorithm - Dijkstra's Algorithm - Huffman Trees and codes - Iterative Improvement: The Simplex Method - The Maximum-Flow Problem.

**UNIT V ALGORITHM DESIGN METHODS 12**

Limitations of Algorithm Power: Lower-Bound Arguments - Decision Trees - P, NP, and NP-complete Problems - Coping with the Limitations of Algorithm Power: Backtracking - Branch-and-Bound - Approximation Algorithms for NP-hard Problems -Algorithms for Solving Nonlinear Equations.

**L: 45 P: 15 TOTAL: 60 PERIODS**

**TEXT BOOK**

1. Anany Levitin, “Introduction to the Design and Analysis of Algorithm”, Third Edition, Pearson Education, Asia, 2012.

**REFERENCES**

1. T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, “Introduction to Algorithms”, Second Edition, Prentice Hall of India Private Limited, 2003.
2. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, “Fundamentals of computer Algorithms”, Second Edition, Universities Press, 2008.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, “The Design and Analysis Of Computer Algorithms”, Pearson Education Asia, 2003.

**13IT43****COMPUTER ARCHITECTURE**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Discuss the basic structure and operation of a digital computer.
- Illustrate the sequence of micro-operations required to complete the execution of an instruction level machine language.
- Employ some of the techniques used to improve the performance of computer at the architectural point of view.
- Discuss several types of memory used in a computer their hierarchy and functions as part of the system.
- Explain the communication process with input and output devices and different mechanisms for interfacing with the peripheral units.

**UNIT I BASIC STRUCTURE OF COMPUTERS 9**

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.

**UNIT II BASIC PROCESSING AND ARITHMETIC UNIT 9**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming-Addition and subtraction of signed numbers – design of fast adders – Multiplication of positive numbers – signed operand multiplication – Integer division - Fixed point and floating point operations.

**UNIT III PIPELINING 9**

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

**UNIT IV MEMORY SYSTEM 9**

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

**UNIT V I/O ORGANIZATION 9**

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.

**TOTAL: 45 PERIODS****TEXT BOOK**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2002.

**REFERENCES**

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, Third Edition, Elsevier, 2005.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, 2003.
3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw- Hill, 1998.
4. V.P. Heuring, H.F. Jordan, “Computer Systems Design and Architecture”, Second Edition, Pearson Education, 2004.

<b>13IT44</b>	<b>C# AND .NET FRAMEWORK</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Gain programming skills in C# both in basic and various elements of OOPs.
- Build Web based Applications and Accessing Data with ADO.NET.
- Design in the concepts of the web Application development by using various web based GUI tools like web forms.
- Develop Web Applications with Web Services
- Build sample applications and large-scale projects.

**UNIT I INTRODUCTION TO C# 12**

C# and the .NET framework - Basics programming with C#, - Arrays, Strings, Structures, Enumerations, Classes, Objects.

**UNIT II OBJECT ORIENTED ASPECTS OF C# 12**

Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions, Assemblies, Appdomains, Reflection, .NET Remoting - .NET Remoting Architecture - .NET Remoting Features.

**UNIT III WEB BASED APPLICATION DEVELOPMENT ON .NET 12**

ASP.NET Introduction -Programming Web applications with Web Forms- Validation controls- ASP.NET Development - Custom Controls – Master Pages- ASP.NET AJAX.

**UNIT IV ADO.NET 12**

ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding– Data Grid View Class.

**UNIT V WEB SERVICE AND .NET COMPACT FRAMEWORK 12**

Web Services with ASP.NET – SOAP, WSDL, Web Services, .NET Compact Framework – Compact Edition Data Stores – Errors, Testing and Debugging.

**L: 45 P: 15 TOTAL: 60 PERIODS**

**TEXT BOOKS**

1. E.Balagurusamy, Programming in C#, Second Edition, Tata McGraw-Hill Education, 2008.
2. Jesse Liberty, Donald Xie, “Programming in C# 3.0”, Fifth Edition, O’Reilly, 2007.

**REFERENCES**

1. Christian Nagel et al, “Professional C# 2005 with .NET 3.0”, Wiley India, 2007.
2. Andy Wigley, Daniel Moth, Peter Foot, “Mobile Development Handbook”, Microsoft Press, 2007.
3. S. Thamarai Selvi and R. Murugesan, “A Textbook on C#”, Pearson Education, 2003.
4. Andrew Troelsen, “Pro C# 2010 and the .NET 4 Platform”, Fifth Edition, A Press, 2010.

<b>13IT45</b>	<b>RELATIONAL DATABASE MANAGEMENT SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Develop an appreciation of the role of data, files and databases in information systems.
- Understand the data modeling concepts (E-R and Class diagrams) used in database development.
- Create databases and pose complex SQL queries of relational databases.
- Familiar with a broad range of data management issues including data integrity and security.
- Gain a working knowledge of developing and maintaining a small-scale database project.
- Formulate a working definition of database development and administration.

**UNIT I INTRODUCTION 12**

Purpose of Database System - Views of data - Data Models - Database Languages - Database Architecture - Database users and Administrator – Entity Relationship model (E-R model) - E-R Diagrams - Introduction to relational databases.

**UNIT II RELATIONAL MODEL 12**

Structure of Relational Databases-The relational Model - Keys - Relational Query Languages -Relational Algebra - Domain Relational Calculus - Tuple Relational Calculus - Fundamental operations - Additional Operations- SQL fundamentals - Integrity - Triggers - Security - Views – Introduction to Distributed Databases and Client/Server Databases.

**UNIT III RELATIONAL DATABASE DESIGN 12**

Features of Good Relational Designs - Functional Dependencies - First, Second, Third Normal Forms, Dependency Preservation - Boyce/Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form

**UNIT IV TRANSACTION MANAGEMENT 12**

Transaction Concepts - ACID Properties - A Simple Transaction Model – Serializability - Transaction Recovery - System Recovery-Media Recovery - Two Phase Commit - Save Points - Concurrency - Need for Concurrency - Locking Protocols - Two Phase Locking - Deadlock- - Recovery Isolation Levels - SQL Facilities for Concurrency.

**UNIT V DATA STORAGE AND QUERYING 12**

Overview of Physical Storage Media - Magnetic Disks - RAID - Tertiary storage - File Organization - Organization of Records in Files - Indexing and Hashing -Ordered Indices - B+ tree Index Files - B tree Index Files - Static Hashing - Dynamic Hashing - Query Processing Overview - Catalog Information for Cost Estimation - Selection Operation - Sorting - Join Operation-Query Optimization –Transformation of Relational expressions.

**L: 45 T: 15 TOTAL: 60PERIODS**

**TEXT BOOKS**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Sixth Edition, Tata McGraw Hill, 2010.
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

**REFERENCES**

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson / Addison wesley, 2011.
2. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, McGraw Hill, 2006.
3. S.K.Singh, "Database Systems Concepts, Design and Application", Second Edition, Pearson Education, 2011.



<b>13IT47</b>	<b>RELATIONAL DATABASE MANAGEMENT SYSTEMS LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Create databases and pose complex SQL queries of relational databases.
- Gain experience developing a set of queries to handle a specified set of typical user inquiries for information extraction from the database.
- Familiar with a broad range of data management issues including data integrity and security.
- Demonstrate principles of design, development, and administration relevant to Oracle database technology.
- Gain a working knowledge of developing and maintaining a small-scale database project.

**LIST OF EXPERIMENTS**

1. Creation and Modification of relations
2. Integrity constraint enforcement
3. Nested Queries & Join Queries
4. Creation and Updation of Views
5. Exercises using PL/SQL
6. High level programming language extensions (Control structures, Procedures and Functions).
7. Creation of Triggers
8. Cursor management
9. Menu Design
10. Database Design and implementation (Mini Project).

**TOTAL: 45 PERIODS**

**REFERENCE**

1. Ivan Bayross, "Commercial Application Development Using ORACLE Developer 2000", BPB Publications, 2000.

**LAB EQUIPMENTS** Hardware and Software required for a batch of 30 students:

**Hardware:**

- 30 Personal Computers

**Software:**

- Front end: VB/VC ++/JAVA
  - Back end: Oracle 11g, my SQL, DB2
  - Platform: Windows 2000 Professional/XP
- Oracle server could be loaded and can be connected from individual PCs.

**13IT48****MICROPROCESSORS LABORATORY**

L	T	P	C
0	0	3	2

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Work with 8085 and 8086 microprocessors.
- Work with standard microprocessor interfaces.

**LIST OF EXPERIMENTS**

1. Programming with 8085
2. Programming with 8086-experiments including BIOS/DOS calls:
3. Keyboard control, Display, File Manipulation.
4. Interfacing with 8085/8086-8255,8253
5. Interfacing with 8085/8086-8279,8251

**TOTAL: 45 PERIODS****List of equipments/components for 30 students (two per batch)**

1. 8085 Trainer Kit with onboard 8255, 8253, 8279 and 8251 - 15 nos.
2. TASM/MASM simulator in PC (8086 programs) - 30 nos.
3. Interfacing with 8086 - PC add-on cards with 8255, 8253, 8279 and 8251 - 15 nos.
4. Stepper motor interfacing module - 5 nos.
5. Traffic light controller interfacing module - 5 nos.
6. ADC, DAC interfacing module - 5 nos.
7. CRO's - 5 nos.



<b>13IT49</b>	<b>COMMUNICATION SKILLS AND TECHNICAL SEMINAR</b> (Common to all B.E. / B.Tech. Degree Programmes)	<b>L T P C</b> <b>0 0 3 2</b>
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**COURSE OUTCOMES**

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

- Express themselves fluently and appropriately in social and professional contexts.
- Develop the sub-skills required for paper presentations and group discussions.
- Acquire the soft skills and interpersonal skills which will help them to excel in their workplace.

**A) LANGUAGE FUNCTIONS****(15 hrs)**

1. Compare and contrast
2. Giving reasons
3. Reporting
4. Expressing agreement and disagreement
5. Evaluating different standpoints
6. Analyzing a problem and giving solution
7. Describing daily routines, events, and weather
8. Describing Objects
9. Defending a point of view
10. Talking about future plans and intentions

Language Functions:

The teacher should build micro activities to develop the use of language required to handle these. Sub-functions of communication. In the process, the learners should get used to the linguistic. Elements needed for these functions.

**B) SPEECH PRACTICE****(15 hrs)**

The themes are:

1. Cloning
2. Artificial satellites
3. Renewable sources
4. Telecommunication
5. Cyber Revolution
6. Space research
7. Polythene pollution
8. Fossil fuels
9. Safety measures in Automobiles
10. Ecological threats
11. Water resources
12. Nuclear technology
13. Scientific farming
14. Thermal power plants
15. Nano Technology
16. Robotics
17. Artificial intelligence
18. Role of Fibre Optics
19. Exploration of Mars
20. Gas turbines
21. Indian space missions
22. Converting agricultural wastes for useful purposes
23. Developments in transportation
24. Scientific Farming
25. Impact of global warming
26. Desalination of water

27. Technology for national security
28. Industrial development and ecological issues
29. Recent trends in Automobiles
30. Hazards of E-waste
31. Mobile Jammer
32. Touch Screen Technology
33. Tidal Power
34. 3G Technology
35. Tsunami Warning System
36. Blue Tooth Technology

Seminar presentation on the themes allotted:

Each student should collect materials from Books, Internet, Journals and Newspapers for his/her theme and prepare a short Seminar Paper for 4 to 5 Pages. The presentation should be for 10 minutes using power point frames. It should be followed by a Viva Voce during which others should come forward to question, clarify, supplement or evaluate.

### C) GROUP DISCUSSION / DEBATE

(10hrs)

Grouping (each group consisting of 12 members)

Topics (12 topics – 3 topics to be selected by each group - to be practiced in cycles)

#### Group Discussion / Debate Topics:

1. Advertising is a legalized form of lying- Discuss.
2. Communicative competency in English is the golden key for success in the Global arena.
2. Is it just to force people to retire?
3. Attitude decides one's altitude in life.
4. Should an aspiring student go for a course which is in demand or for a course which he/she likes?
5. Is westernization a cultural degradation or enrichment?
6. Is Brain drain a threat to India?
7. Can Nuclear Energy be replaced by solar energy? – Discuss.
8. Do Mobile phones spoil the youth?
9. No two generations see eye to eye- Discuss.
10. Is scientific advancement a boon or a bane?
11. Does ragging develop friendship?

### D) SPEAKING ON THE GIVEN PICTURE/DIAGRAM/CHART/TABLE

(5 hrs)

#### RECORD LAY OUT:

Every student has to maintain a record in which he/she has to incorporate the following details.

- First page containing learner details and the topic of specialization
- Use of appropriate Language used in Language Function should be listed.
- Three news paper cuttings or journal or internet sources related to the specialized theme. (To be pasted on the pages)
- 10 Quiz questions of the specialized topic with expected answers.
- The seminar paper presented by the learner (to be pasted).
- Notes of observation - Lab. ( Details about Interview skills – GD – Soft skills )
- The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practical.

**TOTAL: 45 PERIODS**

#### REFERENCES

1. Rizvi.M.Ashraf, "Effective Technical Communication", The MC Graw Hill Education Private Limited, Companies, New Delhi, 2010.
2. Sangeetha Sharma and Binod Mishra, "Communication Skills for Engineers and scientists", PHI Learning Private Limited, 2009.

<b>13IT51</b>	<b>SYSTEM PROGRAMMING AND OPERATING SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Summarize the concrete view on the theoretical and practical aspects of machine architectures and identify what makes a computer system function and features of assembler and its working.
- CO 2: Explain the working progress of linkers and loaders and describe the various features of macro processors.
- CO 3: Solve process scheduling and synchronization problems.
- CO 4: Describe various memory management techniques.
- CO 5: Describe the various file access methods and disk scheduling techniques.

**UNIT I ASSEMBLERS 12**

System software and machine architecture – The Simplified Instructional Computer(SIC and SIC/XE) – Machine architecture – SIC and SIC/XE Programming examples – Basic assembler functions – A simple SIC assembler – Assembler algorithm and datastructures – Machine dependent assembler features – Instruction formats and addressingmodes – Program relocation

**UNIT II LOADERS ANDMACRO PROCESSORS 12**

Basic loader functions –Design of an Absolute Loader – A Simple Bootstrap Loader – Machine dependent loader features – Relocation – Program Linking – Algorithm andData Structures for Linking Loader –Basic macro processor functions – Macro Definition and Expansion – Macro ProcessorAlgorithm and data structures

**UNIT III PROCESS SCHEDULING AND SYNCHRONIZATION 12**

Introduction to operating systems–Processes: Process concept–CPU Scheduling: Scheduling criteria – Scheduling algorithms – The critical-section problem – Semaphores – Classic problems of synchronization – critical regions – Monitors. Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

**UNIT IV MEMORY MANAGEMENT 12**

Memory Management: Background – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging– Page replacement – Allocation of frames – Thrashing.

**UNIT V FILE SYSTEM INTERFACE 12**

File concept, Access methods, Directory and Disk Structure – Disk Structure, Disk Scheduling, and Disk Management –swap space management.

**L: 45 T: 15TOTAL: 60 PERIODS**

**TEXT BOOKS**

3. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3<sup>rd</sup> Edition, Pearson Education, Asia, 2011.
4. Abraham Silberschatz , Peter B. Galvin and Greg Gagne, "Operating System Concepts", 8<sup>th</sup> Edition, Wiley India Private Limited, 2012.

**REFERENCES**

6. Andrew S. Tanenbaum, Albert S. WoodHull, “Operating System Design and Implementation”, 3<sup>rd</sup> Edition, PHI, 2009.
7. D.M.Dhamdhare, “Systems Programming and Operating Systems”, 2<sup>nd</sup> Revised Edition, Tata McGraw- Hill Publishing Company Limited, New Delhi, 2009.

**13IT52****COMPUTER NETWORKS**

L	T	P	C
3	1	0	4

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Describe the functions of computer networks and various layered architectures.

CO 2: Analyze the principles of data link layer concepts and apply suitable techniques to solve data link layer issues.

CO 3: Identify, compare and contrast different techniques and design issues of network layer.

CO 4: Implement simple client-server applications using TCP and UDP

CO 5: Analyze the functions of various application layer protocols and use suitable application.

**UNIT I DATA COMMUNICATION AND NETWORKING 12**

Introduction – Data Communication Model – Network Topology – Transmission Media – Protocol Architecture: TCP/IP Protocol suite – OSI Model – Internet Architecture.

**UNIT II DATA LINK CONTROL PROTOCOLS 12**

Flow Control: Stop and Wait - Sliding Window – Error Control Mechanism – HDLC – Medium access: CSMA – Ethernet – Token ring – FDDI – Wireless LAN – 802.11 architecture.

**UNIT III NETWORK LAYER 12**

Circuit Switching – Packet Switching – Internet Protocols (IP): Principles of Internetworking – IP Operation- IPV4 – Introduction to IPV6 – ARP – DHCP – ICMP -Routing Algorithms: Distance Vector (RIP) and LinkState (OSPF) – Addressing – Subnetting : CIDR.

**UNIT IV TRANSPORT AND APPLICATION LAYER 12**

Duties of Transport layer – TCP – UDP – Congestion Control – Quality of Service (QoS) – Integrated service – Socket Basics – Email (SMTP, POP3, MIME) – HTTP – FTP – DNS.

**UNIT V ADVANCED TECHNOLOGY 12**

Traditional wireless technology: GSM, GPRS, UMTS, CDMA – Modern wireless technology: WiMax, Wi-Fi, IMS, and LTE.

**L: 45 T: 15 TOTAL: 60 PERIODS****TEXT BOOKS**

1. William Stallings, “Data and Computer Communications “, 8<sup>th</sup> Edition, Pearson Education, 2007.
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A systems approach”, 5<sup>th</sup> Edition, Morgan Kaufmann Publishers, 2011.

**REFERENCES**

1. Behrouz A. Forouzan, “Data communication and Networking”, 4<sup>th</sup> Edition, Tata McGraw – Hill, 2011
2. James F. Kurose, Keith W. Ross, “Computer Networking - A Top-Down Approach Featuring the Internet”, 5<sup>th</sup> Edition, Pearson Education, 2009.

13IT53

**SOFTWARE ENGINEERING**

**L T P C**  
**3 0 0 3**

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Describe the various phases involved in software development.
- CO 2: Apply the prototyping model during software requirement gathering.
- CO 3: Explain the design principles involved in various design models.
- CO 4: Compare the functionalities used in various software testing techniques.
- CO 5: Analyze the metrics used for measuring the software quality and understand the scheduling process.

**UNIT I SOFTWARE PRODUCT AND PROCESS 9**

Introduction – S/W Engineering Paradigm – Verification – Validation – Life Cycle Models - System Engineering – Computer Based System – Business Process Engineering - Overview – Product Engineering Overview.

**UNIT II SOFTWARE REQUIREMENTS 9**

Functional and Non-Functional – Software Document – Requirement Engineering Process – Feasibility Studies – Software Prototyping – Prototyping in the Software Process – Data – Functional and Behavioral Models – Structured Analysis and Data Dictionary.

**UNIT III ANALYSIS, DESIGN CONCEPTS AND PRINCIPLES 9**

Systems Engineering - Analysis Concepts - Design Process And Concepts - Modular Design – Design Heuristic – Architectural Design – Data Design – User Interface Design - Real Time Software Design – System Design – Real Time Executives - Data Acquisition System – Monitoring And Control System.

**UNIT IV SOFTWARE TESTING STRATEGIES 9**

Strategic approach to software testing – Test strategies for conventional software – Test strategies for object oriented software – Validation testing – System Testing – White box testing – Black box testing.

**UNIT V SOFTWARE PROJECT MANAGEMENT 9**

Metrics in the process and project domain – Software measurement – Metrics for software quality – Integrating metrics within the software process – Empirical estimation models – Project scheduling – Defining the task set for the software project- Scheduling – Earned value analysis.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Ian Sommerville, “Software engineering”, 9<sup>th</sup> Edition, Pearson Education, Asia, 2010
2. Roger S. Pressman, “Software Engineering – A practitioner’s Approach”, 7<sup>th</sup> Edition, McGraw-Hill International Edition, 2010.

**REFERENCES**

1. Watts S.Humphrey, ”A Discipline for Software Engineering”, Pearson Education, 2007.
2. James F.Peters and Witold Pedrycz, “Software Engineering, An Engineering Approach”, Wiley India, 2007.
3. Stephen R.Schach, “Software Engineering”, Tata McGraw-Hill Publishing Company Limited, 2007.

**13IT54****JAVA PROGRAMMING**

L	T	P	C
3	1	0	4

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Explain the features of object-oriented programming and Java.

CO 2: Apply the concepts of generic classes and collections

CO 3: Implement the applications using Network programming

CO 4: Describe exception handling and java framework.

**UNIT I****JAVA FUNDAMENTALS****12**

C++ versus Java – Defining Java classes – Methods – Access specifiers – Static members – Constructors – Finalize method – Input / Output streaming – Arrays – Strings – Packages – JavaDoc comments - Simple Java Programs.

**UNIT II****FEATURES****12**

Interfaces – Inheritance – Class hierarchy – Polymorphism – Dynamic binding – Finalize method – Final keyword – Object – Cosmic Super Class - Reflection- Object Cloning- Nested Class- Inner Class & Anonymous Classes -Abstract classes.

**UNIT III****GENERIC PROGRAMMING****12**

Defining Generic Class- Generic Methods- Restrictions and Limitations- Inheritance Rules for Generic Types- Wild Card Types- Reflection and Generics- Collection Framework- Collection Types- Map/List/Set Implementations - Array List / Linked List / Hash Set Collection Classes.

**UNIT IV****NETWORK PROGRAMMING****12**

Networking Programming - Networking Basics -Client-Server Architecture- Socket Overview- Networking Classes and Interfaces-Network Protocols-Socket programming - Developing Networking Applications in Java.

**UNIT V****EXCEPTION AND JAVA FRAME WORK****12**

Exception handling – exception hierarchy – Throwing and catching exceptions -MVC pattern- Persistent API- Spring framework – Hibernate.

**L: 45 T: 15 TOTAL: 60 PERIODS****TEXT BOOKS**

1. Herbert Schildt, “Java™ The Complete Reference”, 7<sup>th</sup> Edition, McGraw-Hill, 2007
2. Cay S. Horstmann and Gary Cornell, “Core Java: Volume II – Advanced Features”, 8<sup>th</sup> Edition, Sun Microsystems Press, 2008.

**REFERENCES**

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, 8<sup>th</sup> Edition, Sun Microsystems Press, 2008.
2. K. Arnold and J. Gosling, “The JAVA programming language”, 3<sup>rd</sup> Edition, Pearson Education, 2000.
3. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.
4. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, 4<sup>th</sup> Edition, Tata McGraw-Hill Publishing company Ltd., 2006.
5. Willie Wheeler, Joshua White, “Spring in Practice”, Manning Publications, 2013

<b>13IT55</b>	<b>PROFESSIONAL ETHICS AND HUMAN VALUES</b> (Common to all Branches)	<b>L T P C</b> <b>3 0 0 3</b>
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**COURSE OUTCOMES**

Upon completion of this course, the students will be able to

- CO1: recognize the core values that shape the ethical behavior of an engineer
- CO2: expose awareness on professional ethics and human values.
- CO3: distinguish their role in technological development

**UNIT I HUMAN VALUES 9**

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

**UNIT II ENGINEERING ETHICS 9**

Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9**

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9**

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and chernobyl case studies. Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

**UNIT V GLOBAL ISSUES 9**

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -Moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India, etc.

**L: 45 TOTAL: 45PERIODS**

**TEXT BOOKS:**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

**REFERENCES:**

3. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
4. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
5. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
6. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint)

**13IT57****NETWORKING LABORATORY**

L	T	P	C
0	0	3	2

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Implement simple client-server applications using socket programming.

CO 2: Design and simulate a simple network to experiment with network behavior using Cisco Packet Tracer.

**LIST OF EXPERIMENTS**

1. Study of Socket Programming and Client – Server model
2. Implementation of Simple TCP client server (Date time server)
3. Implementation of Echo client - server using TCP Sockets.
4. Implementation of File transfer using TCP Sockets.
5. Implementation of Chat Application using TCP Sockets.
6. Implementation of Echo client - server using UDP Sockets.
7. Implementation of DNS using UDP Sockets.
8. Implementation of Stop and Wait protocol
9. Implementation of Sliding Window Protocol
10. Implementation of ARP and RARP
11. Create a socket for HTTP for web page upload and download.
12. Write a program to implement RPC (Remote Procedure Call)
13. Perform different routing algorithms to select the network path with its optimum and economical during data transfer using CISCO Packet Tracer.
  - i. Distance vector
  - ii. LinkState routing

**P: 45 TOTAL: 45 PERIODS**



13IT58

**JAVA LABORATORY**

L	T	P	C
0	0	3	2

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Implement object oriented programming features using java.
- CO 2: Develop application using Applet / Swing and database.

**LIST OF EXPERIMENTS****Pre-requisite Programs**

1. Develop a java program using different data types and operators
2. Develop a java program using control flow statements

**Lab Experiments**

1. Develop a Java Program to implement constructor overloading and provide a method to return the number of active objects created. Use Java-Doc comments for documentation.
2. Develop a Java Program to implement Single inheritance, multi level and hybrid inheritance
3. Develop a Java package with simple Stack and Queue classes
4. Develop with suitable hierarchy classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
5. Design a Java interface named as Text which contains two methods such as Encryption() and Decryption(). Develop two different classes that implement this interface for communication.
6. Write a Program using Generic classes
  - Write a simple generics class example.
  - Write a simple generics class example with two type parameters.
  - Implement bounded types (extend superclass) with generics
  - Implement bounded types (implements an interface) with generics
7. Write a Program using Generics Wildcards
  - Generics Upper Bounded Wildcard
  - Generics Unbounded Wildcard
  - Generics Lower bounded Wildcard
8. Write a client program that connects to a server by using a socket and sends a greeting, and then waits for a response
9. Write a chat application using socket program
10. Write a simple example using spring framework
11. Write a simple example using hibernate

**P: 45 TOTAL: 45 PERIODS**

<b>13IT61</b>	<b>FUNDAMENTALS OF WIRELESS COMMUNICATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Excel in the basic concepts of Wireless channel and channel capacity.
- CO 2: Acquire the knowledge about diversity and multicarrier modulation techniques.
- CO 3: Discuss the various spread spectrum techniques.

**UNIT I OVERVIEW OF WIRELESS COMMUNICATIONS 9**

History of Wireless Communications – Wireless Vision – Technical Issues – Current Wireless Systems – Cellular Telephone Systems – Cordless Phones – Wireless LANs, Wide Area Wireless Data – Wireless Access – Paging Systems – Satellite Networks – Bluetooth – The Wireless Spectrum – Methods for Spectrum Allocation – Spectrum Allocations for Existing Systems.

**UNIT II CAPACITY OF WIRELESS CHANNELS 9**

Introduction - Capacity of Flat Fading Channels –Channel Distribution Information known – Channel Side Information at Receiver – Channel Side Information at the Transmitter and Receiver – Capacity with Receiver diversity – Capacity comparisons – Capacity of Frequency Selective Fading channels.

**UNIT III DIVERSITY 9**

Realization of Independent Fading Paths – Receiver Diversity – Selection Combining – Threshold Combining – Maximal Ratio Combining – Equal Gain Combining – Transmitter Diversity: Channel known at Transmitter – Channel unknown at Transmitter – The Alamouti Scheme.

**UNIT IV MULTICARRIER MODULATION 9**

Data Transmission using Multiple Carriers – Multicarrier Modulation with Overlapping Subchannels – Mitigation of Subcarrier Fading – Discrete Implementation of Multicarrier Modulation – Peak to average Power Ratio- Frequency and Timing offset – Case study: The IEEE 802.11a Wireless LAN Standard.

**UNIT V SPREAD SPECTRUM 9**

Spread Spectrum Principles – Direct Sequence Spread Spectrum – Frequency Hopping Spread Spectrum – Multiuser DSSS Systems – Multiuser FHSS Systems.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOK**

1. Andrea Goldsmith, “Wireless Communications”, Cambridge University Press, 2005.

**REFERENCES**

1. Theodore S. Rappaport, “Wireless Communications: Principles and Practice”, 2<sup>nd</sup> Edition, Prentice Hall Publications, 2002.
2. David Tse, Pramod Viswanath, “Fundamentals of Wireless Communication”, Cambridge University Press, 2005.
3. William Stallings, “Wireless Communications & Networks”, 2<sup>nd</sup> Edition, Pearson, 2004.
4. Arogyaswami Paulraj, Rohit Nabar, Dhananjay Gore, “Introduction to Space-Time Wireless Communications”, Cambridge University Press, 2003.
5. William C. Y. Lee, “Mobile Communications Engineering: Theory and Applications”, 2<sup>nd</sup> Edition, McGraw-Hill Professional, 1997.

13IT62

**INTERNET AND WEB TECHNOLOGY**

L T P C

**(In Collaboration with InfoSys)****3 0 0 3**

(Common to CSE, ECE and IT)

**COURSE OUTCOMES**

Upon successful completion of this course, the student will be able to

- CO 1: Understand the complexity of the real world objects
- CO 2: Learn the best practices for designing Web forms and Usability Reviews
- CO 3: Understand the Principles behind the design and construction of Web applications
- CO 4: Develop and Deploy an Enterprise Application

**UNIT I REVIEW OF OBJECT ORIENTED CONCEPTS****7**

Object oriented concepts – object oriented programming (review only) — advanced concept in OOP – relationship – inheritance – abstract classes – polymorphism – Object Oriented design methodology – approach – best practices. UML class diagrams – interface – common base class.

**UNIT II INTERNETWORKING****9**

Internetworking – Working with TCP/IP – IP address – sub netting – DNS – VPN – proxy servers – firewalls – Client/Server concepts - World Wide Web – components of web application – MIME types, browsers and web servers – types of web content – URL – HTML – HTTP protocol – Web applications – performance – Application servers – Web security. User Experience Design – Basic UX terminology – UXD in SDLC – Rapid prototyping in Requirements.

**UNIT III CLIENT BASED TECHNOLOGIES****9**

Client Tier using HTML – Basic HTML tags – Look and feel using CSS – Client side scripting using Java Script and Validations - Document Object Model (DOM).

**UNIT IV WEB DATABASE PROGRAMMING****10**

Business tier using POJO (Plain Old Java Objects) – Introduction to Frameworks – Introduction to POJO – Multithreaded Programming – Java I/O – Java Database Connectivity (JDBC).

**UNIT V SERVER BASED TECHNOLOGIES****10**

Presentation tier using JSP – Role of Java EE in Enterprise applications – Basics of Servlets - To introduce server side programming with JSP - Standard Tag Library.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Douglas E Comer, Internet Book, “The: Everything You Need to Know About Computer Networking and How the Internet Works”, 4<sup>th</sup> Edition, Prentice Hall, 2007
2. Jeffrey C. Jackson, “Web Technologies: A Computer Science Perspective”, Prentice Hall, 2007
3. Herbert Schildt, “Java: The Complete Reference”, McGraw-Hill Professional, 2006.

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1. <http://www.ietf.org/>
2. <http://www.w3.org/>
3. <http://www.vpnc.org/vpn-standards.html>
4. <http://java.sun.com/docs/books/tutorial/>
5. Michael Nash, Java Frameworks and Components, Cambridge University Press, 2002.
6. Ted Wugofski, XML Black Book 2nd Edition , Certification Insider Press
7. Developing Web Applications with JavaServer Faces found online at <http://java.sun.com/developer/technicalArticles/GUI/JavaServerFaces/>
8. Short introduction to log4j found online at <http://logging.apache.org/log4j/1.2/manual.html>
9. JUnit Cookbook by Kent Beck, Erich Gamma at <http://junit.sourceforge.net/>
10. <http://java.sun.com/>
11. <http://www.junit.org/>
12. Marty Hall and Larry Brown, Core Servlets and JavaServer Pages Vol.1: Core Technologies 2<sup>nd</sup> Edition, Sun Microsystems.
13. Bryan Basham, Kathy Sierra, and Bert Bates, Head First Servlets and JSP, SPD O’Reilly, 2005.
14. The Complete reference - JSP
15. Servlet Tutorial can be found online at <http://java.sun.com/docs/books/tutorial>
16. <http://java.sun.com/javaee/javaserverfaces/reference/docs/index.html>
17. JSF Tutorial can be found online at <http://java.sun.com/j2ee/1.4/docs/tutorial/doc/JSFIntro.html>

<b>13IT63</b>	<b>PRINCIPLES OF DIGITAL SIGNAL PROCESSING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Define the basics of Signals, Systems, and Signal Processing
- CO 2: Summarize the concepts of Frequency Analysis of Signals and Systems.
- CO 3: Apply the concepts of Discrete Time Signal and System techniques in Signal processing
- CO 4: Illustrate the Design of Digital Filters such as FIR and IIR
- CO 5: Design computation methods for DFT, Fast Fourier Transforms (FFTs)
- CO 6: Express the various signal processing applications.

**UNIT I SIGNALS AND SYSTEMS 12**

Basic Elements of Digital Signal Processing – Concept of Frequency in Continuous Time and Discrete Time Signals – Sampling Theorem – Discrete Time Signals – Discrete Time Systems – Analysis of Linear Time Invariant Systems – Z-Transform – Convolution and Correlation.

**UNIT II FREQUENCY TRANSFORMATIONS 12**

Introduction to DFT – Properties of DFT -Efficient Computation of DFT –Linear Filtering Methods Based on DFT– FFT Algorithms – Radix-2 FFT Algorithms – Decimation in Time – Decimation in Frequency– Use of FFT Algorithms in Linear Filtering and Correlation.

**UNIT III IIR FILTER DESIGN 12**

Structures of IIR systems – Analog filter design – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives- Discrete time IIR filter from analog filter - filter design using frequency translation.

**UNIT IV FIR FILTER DESIGN 12**

Symmetric and Antisymmetric FIR Filters – Design of Linear Phase Filter – Windowing Technique – Rectangular– Kaiser Windows. Design of Linear Phase Filter– Frequency Sampling Techniques – Structure for FIR Systems.

**UNIT V MULTIRATE SIGNAL PROCESSING 12**

Introduction, Integer sampling rate conversions, Sampling rate conversion by Rational Factor I/D, Implementation of Sampling Rate Conversion–Multistage Implementation of Sampling Rate Conversion– Sampling Rate Conversion by an Arbitrary Factor– Applications of Multirate Signal Processing –Digital Filter Banks –Two-Channel Quadrature Mirror Filter Bank – M-Channel QMF Bank.

**L: 45 T: 15 TOTAL: 60 PERIODS**

**TEXT BOOKS**

1. John G. Proakis & Dimitris G. Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", 4<sup>th</sup> Edition, Pearson education / Prentice Hall, 2007.
2. Sanjit K Mitra, "Digital Signal Processing - A Computer Based Approach", 3<sup>rd</sup> Edition, Tata McGraw-Hill Publishing Co. Pvt., Ltd., New Delhi, 2008
3. Emmanuel C. Ifeachor, & Barrie W. Jervis, "Digital Signal Processing", 2<sup>nd</sup> Edition, Pearson Education, Prentice Hall, 2002.

**REFERENCES**

1. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill, 2006.
2. Monson H. Hayes, "Statistical Digital Signal Processing and Modeling", John Wiley and Sons, Inc., Singapore, 2002.
3. Socrates J. Orfanidis, "Optimum Signal Processing", McGraw Hill, 2007.
4. Simon Haykin, "Adaptive Filter Theory", 4<sup>th</sup> Edition, Pearson Education, South Asia, 2009.

13IT64

**COMPILER DESIGN**

L	T	P	C
3	1	0	4

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Describe the theory and practice of compilation.
- CO 2: Explain lexical rules and grammars for a programming language.
- CO 3: Implement a parser in compiler-generation tools.
- CO 4: Implement semantic rules into a parser.

<b>UNIT I</b>	<b>OVERVIEW OF COMPUTER HARDWARE, SYSTEM SOFTWARE AND COMPILER</b>	<b>12</b>
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Introduction – Computer Hardware and types of System Software – Man-machine communication spectrum – Introduction to Compilers – Theory of computer languages – Design of language – Evolution of compilers – Stages of compilation.

<b>UNIT II</b>	<b>LEXICAL ANALYSIS</b>	<b>12</b>
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Introduction – Alphabets and tokens in computer languages – Representation of tokens and regular expression – Token reorganization and finite state automata – Implementation – Error recovery.

<b>UNIT III</b>	<b>SYNTAX ANALYSIS</b>	<b>12</b>
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Introduction – Context-free grammar and structure of language – Parser and its types – Top-down parser – Bottom-up parser – Implementation – Parser generator tool (Yacc) – Error handling.

<b>UNIT IV</b>	<b>RUN-TIME STORAGE ORGANIZATION AND INTERMEDIATE CODE GENERATION</b>	<b>12</b>
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**Run-time storage organization:** Introduction – Scope and lifetime of variables – Symbol table – Storage allocation – Access to non-local names from stack – Heap allocation – Garbage collection

**Intermediate code generation:** Introduction – Need for Intermediate code – Types of Intermediate code – Representation of all language constructs by three-address code – Grammar symbols and attributes – Semantic analysis – Semantic routines for intermediate code generation

<b>UNIT V</b>	<b>OPTIMIZATION AND CODE GENERATION</b>	<b>12</b>
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**Optimization:** Introduction – Hints on writing optimized code at user level – Construction of basic blocks and processing – Data-flow analysis using flow graph – Data-flow equations for blocks with backward flow control – Principal sources of optimization and transformations – Alias – procedural optimization – Loops in flow graph – Loop optimization

**Code generation:** Introduction – Issues in Code generation – Target machine architecture, Subsequent use information – Simple Code generator - Register allocation – Directed Acyclic Graph representation of basic blocks – Code generation from intermediate code – Peephole optimization – Code scheduling

**L: 45 T: 15 TOTAL: 60 PERIODS**

**TEXT BOOK**

1. K.Muneeswaran, “Compiler Design”, Oxford University Press 2013.

**REFERENCES**

1. Alfred Aho, Monica S.Lam, Ravi Sethi and Jeffrey D.Ullman, “Compiler Principles, Techniques and Tools”, 3<sup>rd</sup> Edition, Addison Wesley, 2006.
2. Steven S.Muchnick, “Advanced Compiler Design Implementation”, Morgan Kaufmann, 2003.

**13IT67**

**INTERNET AND WEB TECHNOLOGY LABORATORY**  
**(In Collaboration with InfoSys)**  
 (Common to CSE and IT)

**L T P C**  
**0 0 3 2**

**COURSE OUTCOMES**

Upon Successful completion of this course, the student will be able to

- CO 1: Understand, analyze and apply the role of languages HTML, Javascript, JSP in the workings of the web and web applications
- CO 2: Analyze a web page and identify its elements and attributes.
- CO 3: Able to develop web pages using JDBC
- CO 4: Able to build web applications using JSP.
- CO 5: Develop and Deploy an Enterprise Application.

**LIST OF EXERCISES**

1. Develop a java application for Bank Transaction with different constraints.
2. Develop a java program to get employees details with given constraints.
3. Analyze and design the java code for given problems.
4. Compute Body Mass Index.
5. Implement Body Mass Index Calculator.
6. Simpsons Database: There is a database for Springfield Elementary School with the following tables:
  - a. Courses(id, name, teacher\_id)
  - b. Grades(student\_id, course\_id, grade)
  - c. Students(id, name, email, password)
  - d. Teachers(id, name)
7. World Database: There is a world database with the following tables:  
 Countries(code, name, continent, surface\_area, population, life\_expectancy, gnp, ...)  
 Cities(id, name, country\_code, district, population)  
 CountriesLanguages(country\_code, language, official, percentage)
8. Design a web page for an Online voting Form with various HTML components.
9. Design a web page for an Email Registration Form with various HTML components. Develop a Servlet application to receive the email registration information and store the details into a table.
10. Design a web page for integrating the RMI server program to find minimum and maximum of three numbers send by the client program. Design a GUI Form for the RMI client to collect three numbers and display the result of minimum, maximum using Text Field.
11. Mini Project.

**P: 45 TOTAL: 45 PERIODS**

**LIST OF EQUIPMENTS AND COMPONENTS**

Sl. No	Course	S/W on Students Machine
1.	OOO (Java)	Eclipse 3.2
2.	Client tier (HTML/JS) & Business tier (JDBC)	Eclipse 3.2
3.	Presentation tier (JSP)	Tomcat server in Eclipse 3.2

An alternate Software requirement can be WAMPP (Windows, Apache, MySQL, Perl / PHP) combination. WAMPP is an open source package, hence free too.

**13IT68****CASE TOOLS LABORATORY**

L	T	P	C
0	0	3	2

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Design the suitable UML diagram for a given problem and develop the User Interface Design

**LIST OF EXPERIMENTS**

**Develop a mini-project for any one problem of your choice using the following guidelines**

1. Develop a problem statement.
2. Develop an IEEE standard SRS document. Also develop risk management and project plan.
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identify the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partiallayered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

***Suggested domains for Mini-project***

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Credit card processing
8. E-book management system
9. Recruitment system
10. Library management system
11. Conference management system
12. BPO management system

**P: 45 TOTAL: 45 PERIODS**

13IT69

COMPREHENSION

L T P C  
0 0 3 1**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Recall and Debug various programming languages.

CO 2: Describe about various hardware and software components of computer.

**Evaluation Procedure**

S. No	Subject Area	Responsible	Assessment Methods	Internal (50 Marks)		External (50 Marks)
				Weightage	Attendance	
1.	Object Oriented Programming using C++	DE-1 CC-2	Objective Tests	15	5	A panel of two members (one internal and one external) will be evaluating the Students.  Written – 30 Oral(VV) – 20
2.	Java Programming					
3.	C# and .NET Framework					
4.	Relational Database Management Systems					
5.	Computer Architecture	DE-1 CC-2	Objective Tests Assignments	15		
6.	Digital System Design					
7.	Data Structures					
8.	System Programming and Operating Systems					
9.	Algorithm Analysis and Design					
10.	Computer Networks	DE-1 CC-2	Objective Tests Assignments	15		
11.	Software Engineering Methodologies					
12.	Principles of Compiler Design					
13.	Internet and Web Technology					

[DE – Domain Expert CC – Course Coordinator VV – Viva-voce]

**P: 30 TOTAL: 30 PERIODS**



**13IT71****CRYPTOGRAPHY AND NETWORK SECURITY****L T P C  
3 1 0 4****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

CO1: apply mathematical concepts and solve given cryptographic problem.

CO2: identify the strength and limitations of cryptographic algorithms.

CO3: predict suitable key management and authentication techniques for a given application.

CO4: discuss network security and system level security.

**UNIT I INTRODUCTION****12**

Overview - Classical Encryption techniques - Block Ciphers - Data Encryption Standard - Block Cipher Design Principles and Modes of Operation - Evaluation criteria for AES - AES Cipher – Triple DES.

**UNIT II PUBLIC KEY CRYPTOGRAPHY****12**

Introduction to Number Theory: Modular Arithmetic, Euclid's Algorithm, Fermat's and Euler's Theorems, The Chinese Remainder Theorem and Discrete Logarithms - Confidentiality using Symmetric Encryption - Public Key Cryptography and RSA - Key Management – Diffie - Hellman key Exchange - Elliptic Curve Architecture and Cryptography.

**UNIT III AUTHENTICATION AND HASH FUNCTION****12**

Message Authentication requirements - Authentication functions - Message Authentication Codes (MAC) – Hash Functions - Security of Hash Functions and MACs. Hash Algorithms: MD5 message Digest Algorithm - Secure Hash Algorithm – RIPEMD-160 – HMAC- Digital Signatures - Digital Signature Standard - User Authentication Protocols.

**UNIT IV NETWORK SECURITY****12**

Kerberos - Web Security: Web Security issues - Secure Sockets Layer (SSL) - Transport Layer Security (TLS) - Secure Electronic Transaction (SET)- Electronic Mail Security: PGP - S/MIME - IP Security.

**UNIT V SYSTEM LEVEL SECURITY****12**

Intrusion detection - password management - Viruses and related Threats - Virus Counter measures - Firewall Design Principles - Trusted Systems.

**L: 45; T: 15; TOTAL: 60 PERIODS****TEXT BOOKS**

1. William Stallings, "Cryptography & Network Security", Pearson Education, Fourth Edition 2010.
2. Behrouz A. Foruzan and Debdeep Mukhopadhyay, "Cryptography and Network Security", Tata McGraw-Hill, Second Edition, 2010.

**REFERENCES**

1. Bruce Schneier, "Applied Cryptography: Protocols, Algorithms and Source Code in C", Wiley India (P) Ltd., Second Edition, 2008.
2. Charles P. Pfleeger and Shari Lawrence Pfleeger, "Security in Computing", Pearson Education, Fourth Edition, 2011.
3. Eric Maiwald, "Fundamentals of Network Security", Tata McGraw Hill, First Edition, 2011.
4. Wenbo Mao, "Modern Cryptography: Theory and Practice", Pearson Education, First Edition, 2007.
5. Thomas Calabrese, "Information Security Intelligence: Cryptographic Principles and Applications", Thomson Delmar Learning, 2004.

**13IT72****OPEN SOURCE SYSTEMS****L T P C  
3 1 0 4****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

- CO1: illustrate the features in open source development using Linux
- CO2: develop an application using PHP
- CO3: develop an application using Python
- CO4: develop an application using Ruby
- CO5: infer knowledge on Apache server and open source databases

**UNIT I INTRODUCTION TO OPEN SOURCE OPERATING SYSTEM 12**

History and emergence of open source software – Needs – open source software vs proprietary software – open standards - open source licenses – LINUX- Introduction- General Overview- Kernel mode and user mode Process-Architecture of Linux – Advanced Concepts – Scheduling – Cloning – Signals – Development with Linux

**UNIT II PHP PROGRAMMING 12**

PHP- Introduction – Programming in web environment – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling.

**UNIT III PYTHON PROGRAMMING 12**

Python Programming Language – Overview – Strings – Data Structures – Lists and tuples – Dictionary – Functions – Modules – File I/O – Exceptions – Classes/ Objects – Database Access.

**UNIT IV RUBY PROGRAMMING 12**

Ruby Programming Language -Introduction – Classes, Objects, And Variables– Containers, Blocks, - Iterators - Sharing Functionality: Inheritance- Modules, - Mixins- Regular Expressions- – Fibers- Threads- Processes

**UNIT V OPEN SOURCE SERVER DATABASES 12**

Characteristics of Web Server – Apache Web server – Tomcat – features – applications – Open Source Database: MySQL, PostgreSQL, PostGIS, HeidiSQL

**L: 45; T: 15; TOTAL: 60 PERIODS****TEXT BOOK**

1. Deitel & Deitel, “Internet & World Wide Web How to Program”, Pearson Education India - 5<sup>th</sup> Edition, 2011

**REFERENCES**

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, New York, Second Edition, 2003.
2. Dave Thomas, with Chad Fowler and Andy Hunt, “Programming Ruby: The Pragmatic Programmers’ Guide”, Pragmatic Bookshelf, Fourth Edition, 2013.
3. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’ Reilly Publications, USA, Third Edition, 2013.
4. Wesley J Chun, “Core Python Programming”, Prentice Hall of India, New Delhi, Second Edition, 2006.
5. Peter Wainwright, “Professional Apache”, Wrox Press, USA, First Edition, 2002.
6. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, “Linux in a nutshell”, Oreilly Media, Sixth Edition, September 2009.

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1. [http://en.wikipedia.org/wiki/Open\\_source](http://en.wikipedia.org/wiki/Open_source)
2. [http://wgbis.ces.iisc.ernet.in/foss/index.php?option=com\\_content&task=view&id=22&Itemid=46](http://wgbis.ces.iisc.ernet.in/foss/index.php?option=com_content&task=view&id=22&Itemid=46)
3. <http://www.python.org/>
4. [http://postgis.net /](http://postgis.net/)
5. <http://www.apache.org/>
6. [www.postgresql.org/](http://www.postgresql.org/)
7. <https://www.mysql.com/>

**13IT73****MULTIMEDIA SYSTEMS****L T P C****3 1 0 4****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

CO1: describe 2D graphics and clipping algorithms.

CO2: explain computer graphic algorithms for clippings, hidden line and surface removal, shading and rendering

CO3: implement OpenGL programming concepts to create interactive computer graphics

CO4: apply the concept of Multimedia Compression techniques in Audio & Video

CO5: develop the Multimedia presentation using databases.

**UNIT I 2D PRIMITIVES****12**

Overview of Graphics Systems – Output Primitives - Line, Circle and Ellipse drawing algorithms – Attributes of output primitives - Two dimensional Geometric transformation - Pivot Point Rotation – Homogenous Coordinates – Two dimensional viewing – Clipping and Windowing-Line clipping algorithms (Cohen- Sutherland, Liang-Barsky, Nicholl–Lee).

**UNIT II 3D PROJECTIONS AND VIEWING****12**

Parallel and Perspective projections - Three dimensional object representation – Polygons, Curved lines, Splines, Quadric Surfaces- Visualization of data sets - Three-Dimensional Geometric and Modeling Transformations – Three-Dimensional Viewing - Visible surface identification - Depth Buffer Method – Wire frame Method - Hidden surface and line elimination.

**UNIT III COLOR MODELS & OPENGL PROGRAMMING****12**

Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects - Drawing three dimensional scenes - Introduction to Shading models – Flat and Smooth shading – Adding texture to faces –Fractals and Self similarity-Mandelbrot sets – Julia Sets.

**UNIT IV MULTIMEDIA COMPRESSION****12**

Multimedia-Media and data Streams- Medium and Traditional Data streams-sound and audio-MIDI Concepts-Image and Graphics-Video and animation-Computer based animation-JPEG compression-H.261-DVI.

**UNIT V MULTIMEDIA SYSTEMS AND APPLICATIONS****12**

Optical Storage Systems - Multimedia Communication Systems - Database System - Synchronization issues – Presentation requirements – Applications – Video conferencing – Virtual reality – Interactive Video.

**L: 45; T: 15; TOTAL: 60 PERIODS****TEXT BOOKS**

1. Donald Hearn, M.Pauline Baker, “Computer Graphics – C Version”, Pearson Education, Second Edition, 2004
2. F.S. Hill Jr, Stephen Kelley, “Computer Graphics using OPENGL”, Prentice Hall Education, Third Edition, 2007.

**REFERENCES**

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, “Computer Graphics-Principles and practice”, Pearson Education, Second Edition, 2007.
2. Tay Vaughan, “Multimedia Making It Work”, McGraw Hill, Seventh Edition, 2008
3. Ralf Steinmetz, Klara Steinmetz, “Multimedia Computing, Communications & Applications”, Pearson education, 2009.

**13IT74****SOFTWARE PROJECT MANAGEMENT****L T P C  
3 0 0 3****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

- CO1: define the process of project management in delivering successful IT projects.
- CO2: evaluate a project to develop the scope of work, provide cost estimates and evaluate the risk factors.
- CO3: use risk analysis techniques that identify the factors that put a project at risk and quantify the likely effect of risk on project timescales.
- CO4: analyze the monitoring and controlling procedures involved.
- CO5: analyze various projects and select the right person for the job to complete the project.

**UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9**

Project Definition – Contract Management and technical project management – Activities covered by Software Project Management – Overview of Project Planning – Some ways of categorizing software projects.

**UNIT II PROJECT EVALUATION 9**

Project portfolio management – Evaluation of individual projects - Cost Benefit Evaluation Techniques – Risk Evaluation – Strategic programme management.

**UNIT III ACTIVITY PLANNING 9**

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management: Categories of Risk – Risk Identification – Risk Assessment – Risk planning. Case Study: Constructing CPM Network.

**UNIT IV MONITORING AND CONTROL 9**

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages In Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance. Case Study: Configuration librarian's role.

**UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9**

Introduction – Understanding Behavior – Organizational Behavior: A Background – Selecting The Right Person For The Job – Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model Stress – Health and safety – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures. Case Study: Departmentalization.

**L: 45; TOTAL: 45 PERIODS****TEXT BOOK**

1. Bob Hughes, Mike Cotterell, "Software Project Management", Tata McGraw Hill Edition, Fifth Edition, 2011.

**REFERENCES**

1. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2006.
2. Royce, "Software Project Management", Pearson Education, 2000.
3. Jalote, "Software Project Management in Practice", Pearson Education, 2002.

**13IT77****MULTIMEDIA LABORATORY****L T P C**  
**0 0 3 2****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

CO1: enhance their perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.

CO2: create and evaluate graphic design projects using computer graphics software.

**LIST OF EXPERIMENTS**

1. To implement Bresenham's algorithms for line, circle and ellipse drawing.
2. To perform 2D Transformations such as translation, rotation, scaling, reflection and shearing of objects.
3. To implement Cohen-Sutherland 2D clipping and window view port mapping
4. To perform 3D Transformations such as translation, rotation and scaling.
5. To implement Composite 3D transformations.
6. To draw 3D objects and scenes using OPENGL.
7. To convert between color models (RGB, YIQ, CMY & HSV)
8. Implementation of text compression algorithm using RLE and Static Huffman.
9. To implement image compression using Huffman algorithm.
10. To perform animation using any Animation software (Macromedia Flash,Blender,CreaToon etc)
11. To perform basic operations on image using Photoshop /GIMP /any equivalent Image manipulation software

**Software:**

1. C/C++/Java
2. OpenGL 3.7 (precompiled GLUT libraries 3.7 – Open source)
3. Any open source software like GIMP 2.6/ Flash 8.0 /Adobe Photoshop/Blender 2.5

**P: 45; TOTAL: 45 PERIODS**

**13IT78****OPEN SOURCE LABORATORY****L T P C****0 0 3 2****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

CO1: Develop the web applications using Open Source programming languages like PHP, Python and Ruby.

**LIST OF EXPERIMENTS**

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. **Develop a dynamic webpage using PHP programming**
  - a. Viewing Client/Server Environment Variables
  - b. Form Processing and Business Logic
  - c. Querying a MySQL Database
3. **Develop a dynamic web page using Python programming**
  - a. Form Processing and Business Logic
  - b. Writing a cookie to the client computer and retrieves and displays client-side cookie values
  - c. Python's database connectivity
4. **Write the ruby programming**
  - a. Class, object and methods
  - b. Inheritance and Mixin
  - c. Fibers, Threads, and Processes
5. **Mini project**

**P:45; TOTAL: 45 PERIODS**

<b>13IT81</b>	<b>PRINCIPLES OF MANAGEMENT</b> (Common to all branches)	<b>L T P C</b> <b>3 0 0 3</b>
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**COURSE OUTCOMES**

Upon completion of this course, the students will be able to

- CO1: Discuss the development of management thoughts and different types of Business Organization.
- CO2: Practice the process of planning and decision making in an industrial situations.
- Co3: Design the suitable selection process for a particular job description.
- Co4: Apply different motivational techniques and leadership skills in the organization.
- Co5: Justify the various controlling techniques and tools in the organization.

**UNIT I INTRODUCTION 9**

Historical developments – approaches to management – Management and Administration – Development of Management Thoughts – Contribution of Taylor and Fayol – Functions of Management – Types of Business Organization, Meaning, features merits and demerits - Social responsibility.

**UNIT II PLANNING 9**

Nature and Purpose– Steps in Planning Process – Objectives – Setting Objectives – Process of Managing through Objectives – Strategies – Policies and PlanningPremises – Forecasting – Importance, Methods of Forecasting - Decision-making, Decision making Process & Types of Decisions.

**UNIT III FUNCTIONAL AREA OF ORGANISATION 9**

Formal and Informal organization – Organization Chart – Structure and Process – Departmentation by different strategies – Line and Staff authority – Benefits and Limitations – De-Centralization and Delegation of Authority – Staffing – Selection Process - Techniques – HRD – Managerial Effectiveness.

**UNIT IV DIRECTION 9**

Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication – Process of Communication – Types of Communication – Barriers and Breakdown - Effective Communication - Electronic Media in Communication.

**UNIT V CONTROLLING STRATEGIES 9**

System and process of Controlling – Requirements for effective control – The Budget as Control Technique – Information Technology– Computers in handling the information – Productivity – Problems and Management – Control of Overall Performance – Direct and Preventive Control – Reporting – The Global Environment – Globalization and Liberalization – International Management and Global theory of Management.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

7. Harold Koontz & Heinz Weihrich, “Essentials of Management – An International Perspective”, Tata Mcgraw Hill, 8<sup>th</sup> Edition, 2009.
8. Hellriegel, Slocum & Jackson, “Management – A Competency Based Approach”, Thomson South Western, 11<sup>th</sup> Edition, 2008.



**REFERENCES**

1. Stephen P. Robbins and Mary Coulter, "Management", Prentice Hall of India", 8<sup>th</sup> Edition, 2012.
2. Charles W.L Hill, Steven L McShane, "Principles of Management", Mcgraw Hill Education, Special Indian Edition, 2007.
3. Vijayaraghavan G.K & Sivakumar M. "Principles of Management", Lakshmi Publications, 1<sup>st</sup> Edition, 2012.
4. Ramachandran. S. "Principles of Management", Air Walk Publications, 1<sup>st</sup> Edition, 2012.
5. Andrew J. Dubrin, "Essentials of Management", Thomson South western, 9<sup>th</sup> Edition, 2011.

**13IT82****MOBILE COMPUTING  
(Common to IT, ECE and EEE)****L T P C  
3 0 0 3****COURSE OUTCOMES**

Upon Completion of this course, the students will be able to

- CO1: explain the basic concepts of mobile computing.
- CO2: describe the various schemes in MAC protocols.
- CO3: explain the functionalities of Mobile IP protocols
- CO4: discuss on routing and security issues in Ad hoc and Sensor networks.
- CO5: explain the architecture and components of Mobile Operating Systems.

**UNIT I INTRODUCTION 9**

Mobile Computing – Applications – Characteristics – Structure of Cellular Mobile Communication – GSM – services – Architecture – GPRS – services – Architecture services – UMTS .

**UNIT II MAC PROTOCOLS 9**

Properties – Wireless MAC – Taxonomy – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes – 802.11 MAC standards.

**UNIT III MOBILE INTERNET PROTOCOL 9**

Mobile IP – Terminologies of Mobile IP – Packet Delivery – Features of Mobile IP – Key Mechanism – Route optimization DHCP – Significance of DHCP .

**UNIT IV MOBILE ADHOC NETWORKS & WIRELESS SENSOR NETWORKS 9**

MANET : Characteristics – Routing Protocols- VANET –Security issues in MANET – Attacks on Adhoc Networks – Sensor Networks: Characteristics - Routing Protocols.

**UNIT V MOBILE APPLICATION DEVELOPMENT AND OPERATING SYSTEMS 9**

Responsibilities of OS in Mobile device – Mobile O/S-Windows Mobile-Palm OS-Symbian OS-Android and Blackberry OS-Mobile Devices as Web clients-WAP-Android Software Development Kit-M-Commerce-B2C and B2B applications-Security Issues.

**L: 45 ; TOTAL: 45 PERIODS****TEXT BOOKS**

1. Jochen H. Schller, “Mobile Communications”, Pearson Education, Second Edition, New Delhi, 2007.
2. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, PHI Learning Pvt. Ltd, New Delhi ,2012.

**REFERENCES**

1. Rappaport T.S., “Wireless Communications; Principles and Practice “, Prentice Hall, NJ, 1996.
2. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. C.K.Toth, “AdHoc Mobile Wireless Networks”, Pearson Education, First Edition, 2002.  
Android Developers: <http://developer.android.com/index.html>

<b>13ITAA</b>	<b>TCP/IP DESIGN AND IMPLEMENTATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explain the functions of Internetworking and create subnets from given IP address.
- CO 2: Describe the key features and functions of TCP.
- CO 3: Describe the key features and functions of IP.
- CO 4: Analyze the various routing algorithms and apply suitable algorithm in given problem.
- CO 5: Analyze and Describe the design concepts of Internetworking.

**UNIT I INTRODUCTION-INTERNETWORKING 9**

Motivation – Internetworking Concept Architectural Model – Classful Internet address – CIDR – Subnetting and Supernetting – ARP: Cache- ARP operation: Protocol design – network monitoring – Timeouts – Bridged networks – Duplicate address – proxy ARP – RARP: operation – Storms – primary and backup RARP servers.

**UNIT II TCP 9**

Introduction – Services – Header – Connection Establishment and Termination – Maximum segment size Half close – reset segments – Interactive Data Flow – Timeout and Retransmission: simple time out – Round trip time measurement – Congestion avoidance algorithms - Fast transmit and fast recovery algorithms – TCP timers – Futures and Performance.

**UNIT III IP 9**

Introduction – IP Header – IPV4 – Introduction to IPV6: advanced features – IPV4 & V6 header comparison – IPV6 address types – stateless auto configuration – IPV6 routing protocols – IPV4 & V6 Tunneling and translation techniques – Delivery and Forwarding of IP Packets – Connectionless Datagram Delivery – ICMP – IGMP.

**UNIT IV IP ROUTING 9**

Routing Architecture: Cores – Peers – Algorithms – Routing between Peers (BGP) – Routing with an Autonomous System RIP: RFC – operational mechanics – Topology changes – limitations of RIP – OSPF: Origins – Areas and routing updates – OSPF data structures – calculating routes.

**UNIT V APPLICATIONS 9**

Mobile IP: Technologies and Application – Voice over IP (RTP) – Finger Protocol – Gopher Protocol.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Douglas E Comer, "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1, 5<sup>th</sup> Edition 2006 and Vol.2, 3<sup>rd</sup> Edition, 1999.
2. W.Richard Stevens "TCP/IP Illustrated", Vol.1, Pearson Education, 2003

**REFERENCE**

1. Forouzan, "TCP/IP Protocol Suite" 2<sup>nd</sup> Edition, Tata MC Graw Hill, 2003.
2. Karanjit S.Siyan, Tim Parker "TCP/IP UNLEASHED" Low price 3<sup>rd</sup> Edition, 2002.

<b>13ITAB</b>	<b>NETWORK PROGRAMMING AND MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Describe the basics of socket programming using TCP Sockets.

CO 2: Describe about Socket Options.

CO 3: Explain the importance of SNMPv1, v2 and v3 protocols in network management

**UNIT I INTRODUCTION TO NETWORKING 9**

Introduction – Layering – Client-Server Model – Interprocess Communication: Pipes – FIFOs – Streams and messages – Message Queue- Communication Protocols: TCP/IP – XNS – SNA – OSI Protocols – UUCP – Remote Login – Remote Procedure Call.

**UNIT II SOCKETS AND APPLICATION DEVELOPMENT 9**

Introduction to Socket Programming – Elementary Sockets – TCP and UDP socket - Address conversion functions - POSIX Signal Handling - Server with multiple clients - Boundary conditions - Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – Select and Poll functions.

**UNIT III SOCKET OPTIONS AND NAMING CONVERSIONS 9**

Socket options - getsockopt and setsockopt functions - Generic socket options - IP socket options - TCP socket options - Multiplexing TCP and UDP sockets - Domain Name System - gethostbyname, gethostbyaddr, getservbyname and getservbyport functions.

**UNIT IV ADVANCED SOCKETS 9**

IPv4 and IPv6 interoperability - Threaded servers - Thread creation and termination - TCP echo server using threads - Raw sockets - Raw socket creation - Raw socket output - Raw socket input – ping program - traceroute program.

**UNIT V NETWORK MANAGEMENT 9**

Introduction- Network Management Requirements - NMS – SNMP - SNMPV2: Management Information – Protocol – SNMPV3 : Architecture and Application – Message Processing and user based security model – view based access control model – Introduction to Remote Monitoring (RMON).

**L: 45 TOTAL: 45PERIODS**

**TEXT BOOKS**

1. W. Richard Stevens, “UNIX Network Programming Vol-I”, 3<sup>rd</sup> Edition, PHI Pearson Education, 2003.
2. William Stallings, “SNMP, SNMPv2, SNMPv3 and RMON 1 and 2”, 3<sup>rd</sup> Edition, Pearson Edition, 2009.

**REFERENCE**

1. D.E. Comer, “Internetworking with TCP/IP Vol-III: Client-Server Programming and Application BSD Sockets Version”, 2<sup>nd</sup> Edition, Pearson Edition, 2003.

13ITAC

**DISTRIBUTED SYSTEMS**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Gain knowledge about various paradigms of communication in distributed environment.
- CO 2: Familiar with various concepts of distributed operating systems.
- CO 3: Acquire information about different models of distributed resource management.
- CO 4: Recognize the different ideas of fault tolerance system.
- CO 5: Study about Object and Coordination Based System.

**UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT 9**

Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Message – Oriented Communication – Unicasting, Multicasting and Broadcasting– Group Communication.

**UNIT II DISTRIBUTED OPERATING SYSTEMS 9**

Issues in Distributed Operating System – Threads in Distributed Systems – Clock Synchronization: Logical Clock – Vector Clock – Causal Ordering – Global States – Election Algorithms – Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols.

**UNIT III DISTRIBUTED RESOURCE MANAGEMENT 9**

Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models– Ivy – Munin– Distributed Scheduling – Distributed File Systems – Sun NFS.

**UNIT IV FAULT TOLERANCE 9**

Introduction to Fault Tolerance – Process Resilience – Reliable Client Server Communication – Reliable Group Communication – Distributed Commit Protocols – Failure – Recovery.

**UNIT V DISTRIBUTED OBJECT BASED SYSTEM 9**

Distributed Object Based System: Architecture –Communication – Naming – CORBA – Distributed Coordination Based System – Coordination model – Architecture – Content based routing – Synchronization.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Andrew S. Tanenbaum, M. Van Steen, “Distributed Systems”, 2<sup>nd</sup> Edition, Prentice Hall, 2006.
2. George Coulouris, Jean Dollimore, Tim Kindberg and Gordon Blair “Distributed Systems Concepts and Design”, 5<sup>th</sup> Edition, Pearson Education Asia, 2002.

**REFERENCES**

1. HagitAttiya and Jennifer Welch, “Distributed Computing: Fundamentals, Simulations and Advanced Topics”, 2<sup>nd</sup> Edition, Wiley publishers, 2004.
2. MukeshSinghal, “Advanced Concepts In Operating Systems”, 3<sup>rd</sup> Edition, McGraw Hill, 2004.
3. M. L. Liu, “Distributed Computing Principles and Applications”, 4<sup>th</sup> Impression, Pearson Education, 2009.
4. Pradeep K Sinha, “Distributed Operating Systems: Concepts and Design”, Prentice Hall of India, New Delhi, 2004.

<b>13ITAD</b>	<b>NEXT GENERATION NETWORKS</b>	<b>L T P C</b>
		<b>3 0 0 3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Discuss the various technologies of Next generation networks
- CO 2: Illustrate the principles of IMS and Convergent Management in Next generation networks
- CO 3: Explain the functions of IP Networks and its technologies
- CO 4: Explain the principles of multi service networks with MPLS technologies
- CO 5: Describe various applications of Next generation networks

**UNIT I NEXT GENERATION TECHNOLOGIES 9**

Introduction - Motivations for IP based services - Changes, Opportunities and Challenges – HFC Network – Digital TV - Next Generation Technologies - Next Generation Networks - Next Generation Services – Management of NG Services - Next Generation Society.

**UNIT II IP NETWORKS 9**

IP Networks: IP past, present and future - IP influence and confluence - IP versions - IP Network convergence - LAN Technologies - IP Routing - LAN Switching –Wide Area Technologies and Topologies - Wireless IP LANS - Mobility Networks - Global IP Networks: Global capacity - Globally Resilient IP - Internet – A Network of Networks.

**UNIT III MULTI SERVICE NETWORKS 9**

Origin of multi service ATM - Next Generation Multi service Networks - Next Generation Multi service ATM switching - Multi protocol Label switching Networks: Frame Based MPLS - Cell based MPLS - MPLS services and their benefits - multi service provisioning platforms (MSPP) & Multi service switching platform (MSSP).

**UNIT IV IMS AND CONVERGENT MANAGEMENT 9**

IMS Architecture - IMS services - QoS Control and Authentication - Network and Service management for NGN - IMS advantages - Next Generation OOS Architecture: Importance to OSS Architecture - OSS Interaction with IMS and SuM – NGN OSS Function/Information View Reference Model.

**UNIT V SERVICES AND APPLICATIONS 9**

Introduction – Intelligent Network Services: Voice based services – Internet based services - RAN architecture: Radio Access Network Architecture for GSM, GPRS and UMTS - QoS definition and management in GPRS and UMTS – Applications: Internet connectivity - e-commerce - call centres - third party application service provision – WAP – WiMAX - integrated billing - security and directory enable networks.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Thomas Playvyk, “Next generation Telecommunication Networks, Services and Management”, Wiley & IEEE Press Publications, 2012.
2. Robert Wood, “Next-Generation Network Services”, CISCO Press, 2006.

**REFERENCES**

1. Neill Wilkinson, “Next Generation Network Services: Technologies and Strategies”, John Wiley Publications, 2002.
2. Next Generation Telecoms Networks, Parliament office of Science and Technology (postnote). December 2007, No: 296, Ref. [www.parliament.uk/parliamentary\\_offices/post/pubs2007.cfm](http://www.parliament.uk/parliamentary_offices/post/pubs2007.cfm)
3. Josef F. Huber, “Mobile Next Generation Networks”, IEEE Multimedia, Vol.11, Issue I, PP: 72-83, Jan-March 2004.
4. J.C. Crimi, “Next Generation Network (NGN) Service”, A Telcordia Technologies white paper, Refer [www.telcordia.com](http://www.telcordia.com).

<b>13ITAE</b>	<b>HIGH SPEED NETWORKS</b> (Common to ECE, CSE and IT)	<b>L T P C</b> <b>3 0 0 3</b>
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**COURSE OUTCOMES**

Upon successful completion of this course students will be able to

- CO 1: Develop an in-depth understanding, in terms of architecture, protocols and applications, of major high-speed networking technologies.
- CO 2: Apply queuing analysis to control the effect of the congestion in high speed networks.
- CO 3: Compare the various approaches of the Integrated and Differentiated Services.
- CO 4: Discuss the protocols which provide QoS support for Real Time Applications.

<b>UNIT I</b>	<b>HIGH SPEED NETWORKS</b>	<b>9</b>
Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LANs – Fast Ethernet – Gigabit Ethernet – Fibre Channel – Wireless LAN’s applications, requirements – Architecture of IEEE 802.11.		
<b>UNIT II</b>	<b>QUEUING ANALYSIS AND CONGESTION CONTROL</b>	<b>9</b>
Single Server Queues – Multiserver Queues – Queues with Priorities – Networks of Queues –Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.		
<b>UNIT III</b>	<b>ATM CONGESTION CONTROL</b>	<b>9</b>
Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Framework – Traffic Control – ABR traffic Management – ABR rate control – RM cell formats – ABR Capacity allocations – GFR traffic management.		
<b>UNIT IV</b>	<b>INTEGRATED AND DIFFERENTIATED SERVICES</b>	<b>9</b>
Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFBQ – GPS – WFQ – Random Early Detection – Differentiated Services.		
<b>UNIT V</b>	<b>PROTOCOLS FOR QOS SUPPORT</b>	<b>9</b>
RSVP – Goals and Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol – RTCP.		
<b>L:45 TOTAL: 45 PERIODS</b>		

**TEXT BOOKS**

1. William Stallings, “High-speed Networks and Internet”, Pearson Education, 2<sup>nd</sup> Edition, 2002.
2. Jean Warland, Pravin Varaiya, “High-performance Communication Networks”, Jean Harcourt Asia Private Limited, 2<sup>nd</sup> Edition, 2000.

**REFERENCES**

1. Irvan Pepelnjk, Jim Guichard and Jeff Aparcar, “MPLS and VPN architecture”, Cisco Press, Volume.1 and 2, 2003.
2. Abhijit S. Pandya, Ercan Sen, “ATM Technology for Broadband Telecommunications Networks”, CRC Press, 2004

**13ITAF****CYBER FORENSICS**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explain the information on cyber forensics.
- CO 2: Explain the various types of forensics systems.
- CO 3: Analyze and validate the forensics data.
- CO 4: Work with various forensics tools.
- CO 5: Identify and authenticate an evidence of various forensics data.

**UNIT I OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY 9**

Fundamentals: Introduction – Use of Computer Forensics – Computer Forensics Services – Steps taken by Forensics Specialist – Types of Computer Forensics Technology: Military – Law Enforcement – Business – Specialized technologies – Spyware and Adware – Internet Tracing Methods – Security and wireless Technologies – Biometric Security Systems.

**UNIT II COMPUTER FORENSICS SYSTEMS AND EVIDENCE 9**

Types of Forensics systems: Internet Security, Intrusion Detection, Firewall Security, Network Disaster Recovery, Public Key Infrastructure, Wireless Network Security, Identity Theft, Satellite Encryption Security – Data Recovery – Evidence Collection and Data Seizure.

**UNIT III ANALYSIS AND VALIDATION 9**

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics: Collecting Network Based Evidence - Investigating Routers - Network Protocols – Processing crime and incident scenes : Identifying, collecting and processing digital evidence – prepare for a search – securing crime scene – seizing- storing – obtaining digital hash.

**UNIT IV VERIFICATION AND AUTHENTICATION 9**

Special needs of Evidential authentication – practical considerations – Practical implementation – Electronic document discovery : A powerful new litigation tool - Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices - Reconstructing Past Events: Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

**UNIT V FORENSICS TOOLS 9**

Current Computer Forensic tools: evaluating computer forensic tool needs, computer Forensics software tools, computer forensics hardware tools, validating and testing forensics software - E-Mail Investigations: role of e-mail in investigation, roles of the client and server in email, investigating e-mail crimes and violations, e-mail servers specialized e-mail forensic tools.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. John R.Vacca, “Computer Forensics Computer Crime Scene Investigation”, 2<sup>nd</sup> Edition, Cengage Learning 2005.
2. Nelson, Phillips, Enfinger, Stuart, “Computer Forensics and Investigations”, Cengage Learning, India Edition, 2008.

**REFERENCE**

1. Marjie T.Britz, “Computer Forensics and Cyber Crime”: An Introduction”, 3<sup>rd</sup> Edition, Prentice Hall, 2013.



**13ITAG****GAME PROGRAMMING**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Discuss the concepts of Game design and development.
- CO 2: Explain the processes, and use mechanics for game development.
- CO 3: Explain the Core architectures of Game Programming.
- CO 4: Use Game programming platforms, frame works and engines.

**UNIT I                    3D GRAPHICS FOR GAME PROGRAMMING                    9**

3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting, Color, Texturing, Camera and Projections, Culling and Clipping, Character Animation, Physics-based Simulation, Scene Graphs.

**UNIT II                    GAME ENGINE DESIGN                    9**

Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.

**UNIT III                    GAME PROGRAMMING                    9**

Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and caching game data, User Interface management, Game event management.

**UNIT IV                    GAMING PLATFORMS AND FRAMEWORKS                    9**

2D and 3D Game development using Flash, DirectX, Java, Python, Game engines - DX Studio, Unity.

**UNIT V                    GAME DEVELOPMENT                    9**

Developing 2D and 3D interactive games using DirectX or Python – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Mike Mc Shaffrfy and David Graham, "Game Coding Complete", 4<sup>th</sup> Edition, Cengage Learning, PTR, 2012.
2. Jason Gregory, "Game Engine Architecture", CRC Press / A K Peters, 2009.
3. David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to Real-Time Computer Graphics" 2<sup>nd</sup> Edition, Morgan Kaufmann, 2006.

**REFERENCES**

1. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", 2<sup>nd</sup> Edition, Prentice Hall / New Riders, 2009.
2. Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", 3rd Edition, Course Technology PTR, 2011.
3. Jesse Schell, The Art of Game Design: A book of lenses, 1<sup>st</sup> Edition, CRC Press, 2008.

**13ITBA****ADVANCED JAVA**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Describe the Swing Components
- CO 2: Write socket programming using java
- CO 3: Familiar with the application development using Servlets
- CO 4: Gain knowledge about server side programming languages using JSP
- CO 5: Explain about concepts of Enterprise Java Beans.

**UNIT I INTRODUCING SWING 9**

Swing – components and containers – the swing packages – Painting in a Swing – Exploring Swing: JLabel and ImageIcon – JTextField – The Swing Buttons – Jtabbed Pane – Jscroll Pane – Jlist – JComboBox – Trees – Jtable.

**UNIT II NETWORK PROGRAMMING IN JAVA 9**

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Data from the server – writing data – configuring the connection – Reading the header – telnet application – Java Messaging services.

**UNIT III SERVLETS 9**

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.

**UNIT IV JAVA SERVER PAGES (JSP) 9**

Introduction – Java Server Pages Overview – A First JavaServer Page Example – Implicit Objects – Scripting – Standard Actions – Directives – Custom Tag Libraries – Structs.

**UNIT V ENTERPRISE JAVA BEANS 9**

Introduction to J2EE – EJB Architecture — Session Beans – Entity Beans.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Herbert Schildt, “The Complete Reference Java - Tata McGraw Hill” Publishing Company Limited, 7<sup>th</sup> Edition, 2007.
2. Hortsman & Cornell, “Core Java 2 Advanced Features, Vol.II”, Pearson Education, 2002.

**REFERENCES**

1. H. M.Deitel, P. J. Deitel, S. E. Santry ,“Advanced Java 2 Platform HOW TO PROGRAM”, Prentice Hall
2. K. Arnold and J. Gosling , “The Java Programming Language”, 2<sup>nd</sup> Edition, Publication, 2000
3. Deitel & Deitel, “Java How to program”, 8<sup>th</sup> Edition, PHI.

<b>13ITBB</b>	<b>SERVICE ORIENTED ARCHITECTURE</b> (Common to IT and CSE )	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explain about principles of Service Orientation
- CO 2: Describe about service oriented analysis techniques
- CO 3: Describe the Service Oriented Design concepts
- CO 4: Explain the parts of the development and runtime ends of a distributed technology platform for SOA.
- CO 5: Describe about various Web service specification standards

**UNIT I PRINCIPLES OF SERVICE ORIENTATION 9**

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA - How components in an SOA interrelate - Principles of service orientation.

**UNIT II SERVICE ORIENTED ANALYSIS TECHNIQUES 9**

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination – Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer.

**UNIT III SERVICE ORIENTED DESIGN 9**

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task-centric business service design.

**UNIT IV SOA PLATFORM BASICS 9**

SOA platform basics – SOA support in J2EE – Java API for XML based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) - Web Services Interoperability Technologies (WSIT) – SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE).

**UNIT V WEB SERVICE SPECIFICATION STANDARDS 9**

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS-Security.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOK**

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology and Design”, Pearson Education, 2006.

**REFERENCES**

1. Thomas Erl, “SOA Principles of Service Design”, The Prentice Hall, 2007
2. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Prentice Hall Professional, 2005.
4. Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation”, 1<sup>st</sup> Edition, O’REILLY, 2006.

**13ITBC****MOBILITY ENGINEERING**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Acquire knowledge on various mobile technologies available and their future trends
- CO 2: Learn about the devices, platform, various layers involved in Mobile Architecture
- CO 3: Learn about Enterprise mobility Solution layers and Architecture
- CO 4: Develop mobile apps using Android OS
- CO 5: Describe about the mobile testing and its applications in various industries

**UNIT I INTRODUCTION TO MOBILITY 9**

Emergence of Enterprise Mobility: Development in Web Standards – Advance in Wireless Technology – Innovations in Mobile Device platforms – Enterprise Mobility Landscape: Mobile solution Types – Key players in the Mobility Landscape – Mobile Handsets – Challenges in Enterprise Mobility.

**UNIT II ENTERPRISE MOBILITY ADAPTATION AND MARKETING CHANNEL 9**

Enterprise Mobility Adaptation: Introduction – Key decision factors in defining a Mobility Adaptation strategy – Steps in defining a Mobility Adaptation strategy – Feature of mobile in Marketing – Types of Marketing – Integrated Mobile Marketing – New elements in HTML5

**UNIT III ENTERPRISE MOBILITY LAYERS AND SOLUTION ARCHITECTURE 9**

Enterprise mobility layers: Device layer – Access layer-Adaptation layer – Management Layer – Services Layer – Application layer – Enterprise mobility Solution Architecture: Thin client Solution Architecture – Thick client Solution Architecture – Mobility significance and Solution life cycle – Cross platform development.

**UNIT IV MOBILE APPLICATION DEVELOPMENT ENVIRONMENT 9**

Mobile platforms in the market: Android- iOS – Symbian - Windows Mobile – Black Berry Mobile Application Design: Mobile application technology – Architecture and design consideration – Mobile programming: Android – iPhone – Windows mobile.

**UNIT V MOBILITY TESTING AND APPLICATIONS 9**

Mobile application Testing Life Cycle – Simulator testing- Real Time Testing – Functional testing – Performance testing – Stability and Usability testing.  
Mobility Solution for the Healthcare Industry – Mobility in Education – Mobility in Financial service Industry – Mobile Social Networking – Location Based Services – Bring your own device (BYOD).

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Jithesh Sathyan , Anoop N, Navin Narayan , Shibu Kizhakke Vallathai , “A Comprehensive Guide to Enterprise Mobility”, CRC Press, 2013.

**REFERENCES**

1. Carsten Srensen, “Enterprise Mobility: Tiny Technology with Global Impact on Work (Technology, Work and Globalization)”, Publisher Palgrave Macmillan, 2011.
2. Greg Shackles, “Mobile Development with C#: Building Native IOS, Android, and Windows Phone Applications (Paperback)”, O'Reilly Media Publishers, 2012.
3. Sumi Helal, Raja Bose, Wengdong Li, “Mobile Platforms and Development Environments (Paperback)”, Morgan & Claypool Publishers, 2012.
4. Developing Modern Mobile Web Apps patterns & practices – Microsoft.

**13ITBD****SOFTWARE TESTING**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Recognize the roles and responsibilities in the testing area.
- CO 2: Design the test cases using various testing strategies
- CO 3: Analyze various levels of testing methodologies
- CO 4: Acquire knowledge on various test procedures and learn set of necessary skills needed for monitoring and controlling.

**UNIT I TESTING FUNDAMENTALS 9**

Testing as a Process – Software Testing Principles – The Tester’s Role in a Software Development Organization – Origins of Defects – Defect Classes, Defect Repository, and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

**UNIT II TEST CASE DESIGN 9**

Case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Equivalence Class Partitioning - Boundary Value Analysis – cause-effect graphing – state transition testing – error guessing – Using White Box Approach to Test design – Test Adequacy Criteria – Coverage and Control Flow Graphs – Covering Code Logic – Paths and their Role in White box Based Test Design – Additional White box test design approaches – Evaluating Test Adequacy Criteria.

**UNIT III LEVELS OF TESTING 9**

The Need for Levels of Testing – Unit Test: Functions, Procedures, Classes and Methods – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – System Testing – Functional Testing – Performance testing – Stress Testing- Configuration testing –Security Testing – Recovery Testing- Regression Testing – Ad-hoc testing – Alpha , Beta Tests – Acceptance Testing.

**UNIT IV TESTING PROCEDURES AND ORGANIZATION 9**

Test Planning – Test Plan Components – Test Plan Attachments –Locating Test Items - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

**UNIT V TEST CONTROLLING AND MONITORING 9**

Measurements and Milestones for Controlling and Monitoring: Testing Status-Tester Productivity – Testing Costs – Error, Faults and Failures – Test Effectiveness – Status Meetings, Reports and Control issues – Criteria for Test Completion – Software Configuration Management – Controlling and Monitoring: Three Critical Views.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2012.

**REFERENCES**

1. Srinivasan Desikan and Gopaldaswamy Ramesh, “Software Testing – Principles and Practices”, Pearson Education, 2006.
2. Aditya P. Mathur, “Foundations of Software Testing – Fundamental algorithms and techniques”, Dorling Kindersley, India Private Limited, Pearson Education, 2008

<b>13ITBE</b>	<b>SOFTWARE QUALITY ASSURANCE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Analyze various software engineering design models and its process.
- CO 2: Define various parameters which are associated with the software project development.
- CO 3: Analyze different models for software quality management.
- CO 4: Analyze the various software testing functionalities under different conditions.
- CO 5: Define the software quality assurance measurements.

**UNIT I FUNDAMENTALS OF MEASUREMENT THEORY 9**

Definition - Operational definition and measurement – Level of measurement – Some basic measures - Reliability and validity – Measurement errors.

**UNIT II SOFTWARE DEVELOPMENT MODELS 9**

Waterfall development model – The prototyping approach – Spiral model – Iterative development process model – Object oriented development process – Clean room methodology – process maturity framework and quality standards.

**UNIT III SOFTWARE QUALITY MANAGEMENT 9**

Product quality metrics – In-process quality metrics – metrics for software maintenances – Quality management models: Rayleigh model Framework – Code integration pattern – PTR sub model – PTR Arrival/ Backlog projection model – Reliability Growth model.

**UNIT IV SOFTWARE TESTING 9**

Software Testing fundamentals - Test case design – White box testing – Basic path testing – Control structure testing – Black box testing - Unit testing – Integration testing – Validation testing - System testing – Debugging.

**UNIT V APPLYING QUALITY TOOLS 9**

Ishikawas Seven basic tools – Check list – Pareto diagram – Histogram – Run charts – Scatter diagram – Control chart – Cause and effect diagram.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Stepen H.Kan, "Metrics and models in Software quality engineering", 2<sup>nd</sup> Edition, Pearson Education, 2012.
2. Roger S.Pressman, Software engineering- A practitioner's Approach, 7<sup>th</sup> Edition, McGraw-Hill International Edition, 2010.

**REFERENCES**

1. Ian Sommerville, "Software Engineering", 7<sup>th</sup> Edition, Pearson education Asia, 2007.
2. Watts S.Humphrey, "A Discipline for Software Engineering", Pearson Education, 2007.
3. Stephen R.Schach, "Software Engineering", Tata McGraw-Hill Publishing Company Limited, 2007.

13ITCA

**CLOUD COMPUTING**  
(Common to IT, ECE, CSE and EEE)

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Explain the fundamentals of cloud computing

CO 2: Distinguish the various cloud services

CO 3: Explore some important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

**UNIT I                      UNDERSTANDING CLOUD COMPUTING                      9**

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services.

**UNIT II                      DEVELOPING CLOUD SERVICES                      9**

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds.

**UNIT III                      CLOUD COMPUTING FOR EVERYONE                      9**

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

**UNIT IV                      USING CLOUD SERVICES                      9**

Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files.

**UNIT V                      OTHER WAYS TO COLLABORATE ONLINE                      9**

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware – Collaborating via Blogs and Wikis.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOK**

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.

**REFERENCE**

1. Haley Beard, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, Emereo Private Limited, July 2008.

**13ITCB****GREEN COMPUTING**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explain various issues in Green Computing
- CO 2: Realize the importance of technologies that conform to low-power computation
- CO 3: Use a range of tools to help monitor and design green systems
- CO 4: Acquire knowledge on the ways to make computing greener and more efficient
- CO 5: Familiar with different real time models of Green Computing

**UNIT I OVERVIEW AND INITIATIVES 9**

Overview – Issues: Toxin – Power consumption – Disposals –Power saving – Hardware saving - Current initiatives – Global initiatives – Asia Standards.

**UNIT II CONSUMPTION ISSUES 9**

Minimizing power usage: Power problems – Monitoring power usage – Reducing power usage – Low power computers and components – Cooling costs: Reducing cooling costs – Optimizing airflow – Data center design.

**UNIT III GREEN COMPUTING PLATFORMS 9**

Greening process – Datacenter design and redesign – Virtualization.

**UNIT IV GREEN COMPUTING ARCHITECTURE 9**

Rethinking of behavior – paperless communication – Recycling.

**UNIT V CASE STUDIES AND APPLICATION 9**

Google green datacenter - IBM green technology - Microsoft – Case Studies – Applying Green IT Strategies and Applications to a Home – Hospital - Packaging Industry and Telecom Sector.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Toby J.Velte, Anthony T.Velte and Robert Elsenpeter, “ Green IT Reduce your Information System’s Environmental impact while Adding to the Bottom Line”, Tata McGraw-Hill, 2008.

**REFERENCES**

1. Wu Chun Feng, “Green Computing: Large-Scale Energy Efficiency”, CRC Press INC, 2013.
2. BhuvanUnhelkar, “Green IT Strategies and Applications - Using Environmental Intelligence”, CRC Press, June 2011.
3. Jason Harris, “ Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting”, Lulu Publishers, 2008.



<b>13ITCC</b>	<b>ANALYTIC COMPUTING</b> (Common to IT, ECE and CSE)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, Students will be able to

- CO 1: Apply statistical analysis methods in Big Data Platform.
- CO 2: An ability to analyze a problems appropriate to mining data streams.
- CO 3: Apply the knowledge of clustering techniques in data mining.
- CO 4: Explain about social networking data analytics.
- CO 5: Use Visualization techniques for Distributed file systems

**UNIT I INTRODUCTION TO BIG DATA 9**

Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting - Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

**UNIT II MINING DATA STREAMS 9**

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications - real time sentiment analysis, stock market predictions.

**UNIT III FREQUENT ITEMSETS AND CLUSTERING 9**

Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

**UNIT IV SOCIAL NETWORKING DATA ANALYTICS 9**

An introduction to social network data Analytics-Introduction, Online Social Networks: Research Issues, Research Topics in Social Networks. Data mining in social media-Data mining in a Nutshell, Social Media, Motivations for Data Mining in Social Media, Data Mining Methods for Social Media, visualizing social networks, A Taxonomy of Visualizations, The Convergence of Visualization, Interaction and Analytics.

**UNIT V FRAMEWORKS AND VISUALIZATION 9**

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications:

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.

**REFERENCES**

1. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics”, John Wiley & sons, 2012.
2. Glenn J. Myatt, “Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O’Reilly, 2011.
3. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.
4. Charu C. Aggarwal, “Social Network Data Analytics”, Springer, 2011.

**13ITCD****SOCIAL COMPUTING**  
(Common to IT, ECE and CSE )**L T P C**  
**3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Describe the key concepts of analysis and design of social computing systems.

CO 2: Discuss the range of social computing applications.

CO 3: Apply the knowledge of social interaction technologies like blogs,wikis,podcasts,etc.,

CO 4: Show Proficiency in the general social network research process from data collection to mining.

**UNIT I FUNDAMENTAL CONCEPTS AND THEORIES 9**

Social Influence and Human Interaction with Technology- flow of information - Boundary roles and Innovation - Innovation and Information networks - Innovation Success Factors. Social Networking. Social Networks in Information Systems- SNA- Representations- visualization. Social Software.

**UNIT II DESIGN METHODOLOGIES 9**

Distributed Learning Environments - building a conceptual Framework - technical and Conceptual challenges. A Methodology for Integrating the Social Web Environment. Software Architectural Design.

**UNIT III DEVELOPMENT 9**

Information Systems Development – Framework .Social Networks Applied to E-Gov- Introduction - Stages and Services - Social Networks of Citizens – Ontology - Development of Adaptive Systems - DemonD: A Social Search Engine- Actor Network Theory in Information Retrieval Activity.

**UNIT IV TOOLS AND TECHNOLOGIES 9**

ERP-Systems- Modern Socio-Technical Systems Design - The design order Principle - The minimal Critical Specification Principle- The Task Completeness Principle - Evaluating the Effectiveness of Social Visualization Within Virtual Communities .The Hybrid Course.

**UNIT V SOCIAL COMPUTING AND COMMUNITY DETECTION 9**

Basic Concepts - social computing task. Nodes, ties and Influence- Importance of Nodes -Strengths of Ties- Influence Modeling. Node-Centric Community Detection - Group-Centric Community Detection .Social Media Mining-Classification with Network Data.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Subhasish Dasgupta George, “Social Computing: Concepts, Methodologies, Tools, and Applications”, Washington University, USA, 2010.
2. Lei Tang, Huan Liu, “Community Detection and Mining in Social Media”, Morgan & Claypool Publishers, 2010.

**REFERENCES**

1. Soumen Chakrabarti, “Mining the Web - Discovering Knowledge from Hypertext Data”, Morgan Kaufmann, 2003.
2. Bing Liu, “Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data”, 1<sup>st</sup> Edition, Springer Berlin Heidelberg, 2007.

13ITCE

**PARALLEL COMPUTING**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Discuss and employ the fundamental concepts and mechanisms which form the basis of the design of parallel computation models and algorithms.
- CO 2: Recognize problems and limitations to parallel systems, as well as possible solutions.
- CO 3: Familiar with some of the relevant papers in the area of parallel algorithms and systems.
- CO 4: Analyze applications that benefit from parallelism
- CO 5: Analyze and measure performance of parallel computing systems.

**UNIT I SCALABILITY AND CLUSTERING 9**

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

**UNIT II ENABLING TECHNOLOGIES 9**

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding.

**UNIT III SYSTEM INTERCONNECTS 9**

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

**UNIT IV PARALLEL PROGRAMMING 9**

Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

**UNIT V MESSAGE PASSING PROGRAMMING 9**

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata Mc GrawHill, New Delhi, 2003.
2. Michael J. Quinn, “Parallel Computing Theory and Practice”, 2<sup>nd</sup> Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2003.

**REFERENCES**

1. Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, “Introduction to Parallel Computing”, Pearson, Education, New Delhi, 2009.
2. Kai Hwang, Advanced Computer Architecture, Tata McGraw Hill, Tata McGraw Hill New Delhi, 2008.
3. David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, New Delhi, 1999.

**13ITDA** **ADVANCED DATABASE TECHNOLOGY** **L T P C**  
**(Common to CSE and IT)** **3 0 0 3**

**COURSE OUTCOMES**

Upon Successful completion of this course, the student will be able to

- CO 1: Understand about different database system architectures.
- CO 2: Identify the various databases such as distributed, parallel and object oriented databases.
- CO 3: Develop in-depth knowledge about web and intelligent database.
- CO 4: Understand the data storage structure in emerging information systems.

**UNIT I INTRODUCTION 8**  
 Database System Architectures: Centralized and Client-Server Architectures - Parallel Systems – Distributed Systems – Network Types.

**UNIT II DISTRIBUTED AND PARALLEL DATABASES 9**  
 Distributed Database Concepts: Homogeneous and Heterogeneous Databases- Distributed Data Storage - Distributed Query Processing - Distributed Transactions – Commit Protocols – Concurrency Control - Recovery.  
 Parallel Databases: Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems.

**UNIT III OBJECT ORIENTED DATABASES 8**  
 Concepts of Object Oriented Databases - ODMG Model – Object Definition Language- Object Query Language – Conceptual Design - Object Relational features in SQL, Oracle.

**UNIT IV INTELLIGENT DATABASES 10**  
 Active Databases Concepts and Triggers- Deductive Databases- Temporal Database - Spatial Databases - Data Mining:Overview.

**UNIT V EMERGING DATABASE TECHNOLOGIES AND APPLICATIONS 10**  
 Mobile Database. Multimedia Databases. Geographic Information Systems. Genome Data Management.

**L: 45 TOTAL:45 PERIODS**

**TEXT BOOKS**

1. Henry F Korth, Abraham Silberschatz, S. Sudharshan, “Database System Concepts”, 6<sup>th</sup> Edition, McGraw Hill, 2011. (Unit – I, II & V)
2. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, 6<sup>th</sup> Edition, Pearson Education/Addison Wesley, 2010. (Unit – III, IV & V)

**REFERENCE**

1. Thomas Connolly and Carlolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, 5<sup>th</sup> Edition, Pearson Education 2013.

<b>13ITDB</b>	<b>DATA WAREHOUSING AND DATA MINING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explain the data warehouse architecture and necessity for data mining.
- CO 2: Describe the concepts of data warehousing and OLAP.
- CO 3: Discuss data mining techniques and their applications.

**UNIT I DATA WAREHOUSE AND OLAP TECHNOLOGY 9**

Introduction to Data Warehousing - Data warehousing Components - Building a Data warehouse - Mapping the Data Warehouse to a Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools - Metadata – Business analysis reporting, Query tools and Applications - Online Analytical Processing (OLAP) - OLAP and Multidimensional Data model.

**UNIT II DATA PREPROCESSING 9**

Data Mining - Data Mining Functionalities - Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

**UNIT III ASSOCIATION RULES 9**

Association Rule Mining: Market Basket Analysis - Frequent pattern mining - Apriori algorithm - Generating Association rules from frequent items - Improving the efficiency of Apriori – mining - Multilevel association rules - Multidimensional association rules - Constraint based association Mining.

**UNIT IV CLASSIFICATION AND CLUSTERING 9**

Classification and Prediction, Issues - Decision Tree Induction - Bayesian Classification - Rule based classification - Other Classification Methods - Prediction - Accuracy and Error Measures - Cluster Analysis - Types of data - Categorization of Clustering methods - Partitioning methods - Hierarchical Methods - Outlier Analysis.

**UNIT V MINING MULTIMODAL DATA 9**

Multidimensional Analysis and Descriptive Mining of Complex Data Objects - Spatial Data mining - Multimedia Data mining - Text Mining – Mining the WWW - Applications and Trends in Data Mining.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Jiahei Han, MichelineKamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann, 2<sup>nd</sup> Edition, 2011.
2. Alex Berson, Stephen J.Smith, “Data Warehousing, Data Mining, & OLAP”, Tata McGraw-Hill Edition, 2004.

**REFERENCES**

1. Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, 2004.
2. Sam Anahory, Dennis Murry, “Data Warehousing in the real world”, Pearson Education, 2003.
3. David Hand, Heikki Manila and PadhraicSymth, “Principles of Data Mining”, Prentice Hall of India, 2004.
4. W.H.Inmon, “Building the Data Warehouse”, 3<sup>rd</sup> Edition, Wiley, 2003.
5. PaulrajPonniah, “Data Warehousing Fundamentals”, Wiley-Interscience Publication, 2003.

<b>13ITDC</b>	<b>INFORMATION STORAGE AND MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

- CO 1: Explain various storage technologies and their architecture
- CO 2: Demonstrate different RAID levels
- CO 3: Explain the fundamentals of cloud computing and virtualization technologies
- CO 4: Explain the concepts of backup and replication
- CO 5: Describe security solutions for FC-SAN, IP-SAN and NAS environments

**UNIT I STORAGE SYSTEM 9**

Introduction to information storage, virtualization and cloud computing - Key data center elements - Compute, application, and storage virtualization -Disk drive & flash drive components and performance – RAID - Intelligent storage system and storage provisioning (including virtual provisioning)

**UNIT II STORAGE NETWORKING TECHNOLOGIES AND VIRTUALIZATION 9**

Fibre Channel SAN components, FC protocol and operations - Block level storage virtualization - iSCSI and FCIP as an IP-SAN solutions - Converged networking option – FCoE - Network Attached Storage (NAS) - components, protocol and operations - File level storage virtualization - Object based storage and unified storage platform.

**UNIT III BACKUP, ARCHIVE, AND REPLICATION 9**

Business continuity terminologies, planning and solutions - Clustering and multi-pathing architecture to avoid single points of failure - Backup and recovery - methods, targets and topologies - Data deduplication and backup in virtualized environment - Fixed content and data archive - Local replication in classic and virtual environments - Remote replication in classic and virtual environments - Three-site remote replication and continuous data protection.

**UNIT IV CLOUD COMPUTING CHARACTERISTICS AND BENEFITS 9**

Cloud Enabling technologies – Characteristics and benefits of cloud computing - Services and deployment models - Cloud computing infrastructure – cloud challenges - Cloud migration considerations.

**UNIT V SECURING AND MANAGING STORAGE INFRASTRUCTURE 9**

Security threats, and counter measures in various domains - Security solutions for FC-SAN, IP-SAN and NAS environments - Security in virtualized and cloud environments - Monitoring and managing various information infrastructure components in classic and virtual environments - Information lifecycle management (ILM) and storage tiering.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Information Storage and Management: Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments, 2<sup>nd</sup> Edition, By: EMC Education Services, John Wiley & Sons, May 2012.

**REFERENCES**

1. Robert spadling, “Storage networks: The complete reference”, Tata McGrawhill, Osborne, 2003.
2. Marc Farley, “Building storage networks”, Tata McGraw Hill, Osborne, 2001.

<b>13ITDD</b>	<b>INFORMATION THEORY AND CODING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Excel in the basic concepts of information theory, Source coding, Channel coding and relations among them.
- CO 2: Obtain the knowledge about the Source coding methods on Text, Audio, Speech, image and video formats.
- CO 3: Design the encoder and decoder for the error control coding methods.

**UNIT I INFORMATION THEORY 9**

Information – Entropy, Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon–Fano coding, Huffman coding, Extended Huffman coding – Joint and conditional entropies, Mutual information – Discrete memoryless channels – BSC, BEC – Channel capacity, Shannon limit.

**UNIT II SOURCE CODING: TEXT, AUDIO AND SPEECH 9**

Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 – Speech: Channel Vocoder, Linear Predictive Coding.

**UNIT III SOURCE CODING: IMAGE AND VIDEO 9**

Image and Video Formats – GIF, TIFF, SIF, CIF, QCIF – Image compression: READ, JPEG – Video Compression: Principles–I, B, P frames, Motion estimation, Motion compensation, H.261, MPEG standard.

**UNIT IV ERROR CONTROL CODING: BLOCK CODES 9**

Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding – Single parity codes, Hamming codes, Repetition codes – Linear block codes, Cyclic codes – Syndrome calculation, Encoder and decoder – CRC.

**UNIT V ERROR CONTROL CODING: CONVOLUTIONAL CODES 9**

Convolutional codes – code tree, trellis, state diagram – Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. R Bose, “Information Theory, Coding and Cryptography”, 2<sup>nd</sup> Edition, TMH, 2008.
2. Fred Halsall, “Multimedia Communications: Applications, Networks, Protocols and Standards”, Pearson Education Asia, 2002.

**REFERENCES**

1. K Sayood, “Introduction to Data Compression”, 3<sup>rd</sup> Edition, Elsevier, 2006.
2. S Gravano, “Introduction to Error Control Codes”, Oxford University Press, 2007.
3. Amitabha Bhattacharya, “Digital Communication”, TMH, 2006.
4. Simon Haykin, “Communication Systems”, 4<sup>th</sup> Edition, Wiley India, 2008.

<b>13ITEB</b>	<b>MOBILITY WITH ANDROID LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Describe the components and structure of mobile application development frameworks for Android OS based mobiles.

CO 2: Design and Implement various mobile applications using emulators.

CO 3: Deploy applications to hand-held devices

**LIST OF EXPERIMENTS**

1. Develop an application that uses GUI components, font and colors.
2. Develop an application that uses layout manager and event listeners
3. Creating navigation App using Intent filter
4. Develop a native calculator application
5. Develop an Email app using Android.
6. Develop a SMS app using Android
7. Develop an Android App to display the Video
8. Implement an application that implements multithreading
9. Develop a native application that use GPS location information
10. Implement an application that writes data to SD card
11. Implement an application that creates an alert upon receiving message
12. Develop an SQLITE App to store and retrieve the student data from SQLITE database
13. Develop a ServerHit App to store and retrieve the student data from MySQL database.

**P:45 TOTAL: 45 PERIODS**



**13ITEC****SOFTWARE TESTING LABORATORY**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Test a process of executing a program with the intent of finding an error.

CO 2: Test the programs with various applications.

CO 3: Analyze about various testing tool and write a test suite.

**LIST OF EXPERIMENTS**

1. Write programs in C++ Language to demonstrate the working of the following
  - a. constructs: i) do...while ii) while....do iii) if...else iv) switch v) for
2. A program written in C++ language for Matrix Multiplication fails Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any real time system and study its system specifications and report the various bugs.
4. Write and test a program to update 10 student records into table into Excel file.
5. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
6. Write and test a program to provide total number of objects present available on the page.
7. Write and test a program to get the number of list items in a list combo box.
8. Study of any testing tool (e.g. Win runner)
9. Study of any web testing tool (e.g. Selenium)
10. Using Selenium IDE, Write a test suite containing minimum 4 test cases.

**P:45 TOTAL: 45 PERIODS**

<b>13ITFA</b>	<b>TOTAL QUALITY MANAGEMENT</b> (Common to all Branches)	<b>L T P C</b> <b>3 0 0 3</b>
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**COURSE OUTCOMES**

Upon completion of this course the students will be able to,

- CO1: Recognize the need for total quality management and areas of application of this management concept.
- CO2: Predict the need for customer expectations and employee involvement.
- CO3: Estimate six-sigma and perform benchmarking.
- CO4: Devise methods to use Quality Function Deployment (QFD), failure Mode Effect Analysis (FMEA) and Taguchi's loss functions.
- CO5: Describe ISO 9000 and Environmental Management System (EMS) standards.

**UNIT I INTRODUCTION 9**

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM - Contributions of Deming, Juran and Crosby – Cost of Quality, Analysis Techniques for Quality Costs - Barriers to TQM.

**UNIT II TQM PRINCIPLES 9**

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement – Juran Trilogy, PDCA Cycle, 5S, Kanban, Kaizen, POKA-YOKE, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, - Business Excellence Model-Rajiv Gandhi National Quality Award.

**UNIT III TQM TOOLS & TECHNIQUES I 9**

The seven traditional tools of quality – New management tools – Deviation and Standard Deviation; Phases and Defective Units of Six Sigma; Its Importance; Overview of Master Black and Green Belt– Bench marking– Reason to bench mark, Bench marking process – FMEA – Stages, Types.

**UNIT IV TQM TOOLS & TECHNIQUES II 9**

Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA.

**UNIT V QUALITY SYSTEMS 9**

Need for ISO 9000 - ISO 9000-2000 Quality System –Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 - ISO/TS 16949 – Concepts, Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

9. Dale H.Besterfiled, et at., “Total Quality Management”, Pearson Education Asia, 3<sup>rd</sup> Edition, Indian Reprint (2010).
10. James R. Evans and William M. Lindsay, “The Management and Control of Quality”, 6<sup>th</sup> Edition, South-Western (Thomson Learning), 2005.

**REFERENCES**

11. Oakland, J.S. “TQM – Text with Cases”, Butterworth – Heinemann Limited, Oxford, 3<sup>rd</sup> Edition, 2003.
12. Suganthi,L and Anand Samuel, “Total Quality Management”, Prentice Hall (India) Private Limited, 2006.
13. Janakiraman B and Gopal R.K, “Total Quality Management – Text and Cases”, Prentice Hall (India) Private Limited, 2006.
14. Ramachandran, S. “Total Quality Management”, Air Walk Publications, 2<sup>nd</sup> Edition 2008.

**FEW HYPERLINKS FOR REFERENCES**

- <http://nptel.ac.in/courses/110101010/16>
- [http://www.iso.org/iso/qmp\\_2012.pdf](http://www.iso.org/iso/qmp_2012.pdf)
- [http://en.wikipedia.org/wiki/ISO\\_9000](http://en.wikipedia.org/wiki/ISO_9000)

**13ITFB****INTELLECTUAL PROPERTY RIGHTS**

(Common to IT &amp; Civil)

**L T P C****3 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: understand the principles, functions and basic legal rules of IP law

CO 2: Recognize the relevant criteria for generating and protecting intellectual work.

**UNIT I****TYPES OF PROPERTY****9**

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property (ii). Immovable Property and (iii). Intellectual Property.

**UNIT II****PATENTS AND APPLICATION PROCEDURES****9**

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark Registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures.

**UNIT III****INTERNATIONAL PARTICES****9**

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

**UNIT IV****LEGISLATIONS AND POLICY****9**

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

**UNIT V****CASE STUDIES****9**

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Subbaram N.R. “Handbook of Indian Patent Law and Practice “, S.Viswanathan Printers and Publishers Private Limited, 1998.

**REFERENCES**

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1974.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707\\_gibbs.html](http://www.ipmatters.net/features/000707_gibbs.html).

<b>13ITFC</b>	<b>BUSINESS INTELLIGENCE AND ITS APPLICATIONS</b> (Common to CSE, ECE and IT)	<b>L T P C</b> <b>3 0 0 3</b>
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**COURSE OUTCOMES**

Upon successful completion of this course, the student will be able to,

- CO 1: Develop a foundation in Business Intelligence (BI) for Business Analysis.
- CO 2: Understand the different aspects of the BI environment, and key success factors.
- CO 3: Understand Technology enabling process in an organization.
- CO 4: Identify and analyze the new Techniques in BI.
- CO 5: Be able to apply the techniques in the context of a business problem.

<b>UNIT I</b>	<b>INTRODUCTION TO BUSINESS INTELLIGENCE</b>	<b>9</b>
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Business intelligence and its impact - Factors driving Business Intelligence – Business Intelligence and Related Technologies – Case Study - Obstacles to Business Intelligence.

<b>UNIT II</b>	<b>BUSINESS INTELLIGENCE CAPABILITIES</b>	<b>9</b>
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Introduction – Core Capabilities of BI - – Synergistic Business Intelligence Capability - Information Integration – Factors Necessitating Information Integration Capability – Technology Enabling Information Integration Capability - Presentation.

<b>UNIT III</b>	<b>TECHNOLOGY ENABLING BUSINESS INTELLIGENCE</b>	<b>9</b>
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Technology enabling Organizational Memory – Information Integration – Enabling Insights and Decision – Enabling Presentation - OLAP Cube, Data Slice and Dice - BI in Practice - Performance Dashboards - Balanced Scorecards - IT Governance - Case Study.

<b>UNIT IV</b>	<b>BUSINESS INTELLIGENCE IMPLEMENTATION: INTEGRATION AND EMERGING TRENDS</b>	<b>9</b>
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Implementing BI – Overview – BI and Integration Implementation – Connecting BI System to Database and other Enterprise Systems – On-Demand BI – Issues of Legality, Privacy, and Ethics – Emerging Topics in BI – The Rise of Collaborative Decision Making.

<b>UNIT V</b>	<b>MANAGEMENT AND FUTURE OF BUSINESS INTELLIGENCE</b>	<b>9</b>
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Development of BI - Business Intelligence System - Reporting system - Data Warehouse - Data Mart - Knowledge Management Systems - Discussion and Case Study – The Future of Business Intelligence.

**L: 45 TOTAL: 45 PERIODS**

**TEXT BOOKS**

1. Rajiv Sabherwal, Irma Becerra-Fernandez “Business Intelligence Practices, Technologies, and Management”, Wiley, 2011.
2. Efraim Turban, Ramesh Sharda, Jay E.Aronson, David King, “Business Intelligence: A Managerial Approach”, Pearson Education, 2011.

**REFERENCES**

1. Rajiv Sabherwal, “e-Study Guide for Business Intelligence”, 2014. [Kindle Edition]
2. Swain Scheps, “Business Intelligence for Dummies”, Wiley, 2008

**13ITFD****KNOWLEDGE MANAGEMENT**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Describe the cognitive thinking approaches of Knowledge
- CO 2: Discuss the Knowledge creation and Knowledge Architecture
- CO 3: Describe the Knowledge Capturing Techniques
- CO 4: Analyze and define Data Management and testing approaches.

**UNIT I BASICS OF KNOWLEDGE MANAGEMENT 9**

KM Myths – KM Life Cycle – Understanding Knowledge – Cognitive Psychology – Types of Knowledge – Expert Knowledge – Human Thinking and Learning.

**UNIT II KNOWLEDGE MANAGEMENT SYSTEM LIFECYCLE 9**

Challenges in Building KM Systems – Conventional Vs KM System Life Cycle (KMSLS)– Knowledge Creation and Knowledge Architecture – Nonaka’s Model of Knowledge Creation and Transformation - Knowledge Architecture.

**UNIT III CAPTURING THE TACIT KNOWLEDGE 9**

Evaluating the Expert – Developing Relationship with Experts – Fuzzy Reasoning and the Quality of Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol Analysis – Consensus Decision Making – Repertory Grid- Concept Mapping –Blackboarding.

**UNIT IV KNOWLEDGE CODIFICATION 9**

Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer’s Skill Sets – System Testing and Deployment – Knowledge Testing –Approaches to Logical Testing, User Acceptance Testing – KM System Deployment Issues – User Training – Post implementation.

**UNIT V KNOWLEDGE SHARING AND TRANSFER 9**

Transfer Methods – Role of the Internet – Knowledge Transfer in e-world – KM System Tools – Neural Network – Association Rules – Classification Trees – Data Mining and Business Intelligence – Decision Making Architecture – Data Management – Knowledge Management Protocols – Managing Knowledge Workers.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOK**

1. Elias M. Awad, Hassan M. Ghaziri, “Knowledge Management”, 2<sup>nd</sup> Edition”, Prentice Hall, ISBN Learning Private Limited, 2010.

**REFERENCES**

1. Guus Schreiber, Hans Akkermans, AnjoAnjewierden, Robert de Hoog, Nigelhadbolt, Walter Van de Velde and Bob Wielinga, “Knowledge Engineering and Management”, Universities Press, 2001.
2. C.W. Holsapple, “Handbooks on Knowledge Management”, International Handbooks on Information Systems, Vol.1 and 2, 2003.

**13ITFE****M-COMMERCE  
(Common to CSE and IT)****L T P C  
3 0 0 3****COURSE OUTCOMES**

Upon successful completion of this course, the student will be able to

- CO 1: Comprehend the underlying economic mechanisms and driving forces of E-Commerce
- CO 2: Understand the critical building blocks and network infrastructure of E-Commerce
- CO 3: Realize the infrastructure and types of M-Commerce Services
- CO 4: Recognize the availability of latest technologies of M-commerce in various domains.
- CO 5: Show Competency in business application services of M-Commerce.

**UNIT I E-COMMERCE 9**

Electronic Commerce Framework – Electronic Commerce and Media Convergence– Anatomy of E-Commerce Applications – Consumer Application -Electronic Commerce organization application.

**UNIT II NETWORK INFRASTRUCTURE 9**

Introduction - Market forces influencing the I-Way - Components of the I-Way - Network access equipment - The Last Mile: Local Roads and Access Ramps - Global information distribution networks - Public policy issues shaping the i-way.

**UNIT III M-COMMERCE: BASICS 9**

Introduction, Infrastructure of M-Commerce, Types of Mobile Commerce Services, Technologies of Wireless Business, Benefits and Limitations, Support, Mobile Marketing & Advertisement, Non-Internet Applications in M-Commerce, Wireless/Wired Commerce Comparisons

**UNIT IV TECHNOLOGIES 9**

Mobile Communications: A Quick Primer - Historical perspective – Basic Architecture – Multiplexing Schemes, 2G Landscape, Closer look at GSM, Roaming and Billing, Transition Toward 3G-GSM, TDMA, PDC Migration and CdmaOne Migration.

**UNIT V BUSINESS APPLICATIONS AND SERVICES 9**

Mobile Information Services, Directory Services, Banking and Trading, E-Tailing and E-Ticketing, Entertainment, Business Applications and Services, Next Generation M-commerce Scenarios, Personalization, Location - Based Services.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Ravi Kalakota, B.Andrew Whinston, “Frontiers of Electronic Commerce”, Pearson Education, 9<sup>th</sup> Impression, 2009.
2. Paul May, “Mobile Commerce: Opportunities, Applications and Technologies of Wireless Business”, Cambridge University Press, 2001.
3. Norman Sadeh, “M-Commerce: Technologies, Services and Business models”, John Wiley & Sons, 2002.

**REFERENCES**

1. P. J. Louis, “M-commerce Crash Course”, McGraw – Hill Companies, 2001.
2. P.Candace Deans, “E-Commerce and M-Commerce Technologies”, Idea Group Inc (IGI), 2005.
3. Brian E. Mennecke, Troy J. Strader, “Mobile Commerce: Technology, Theory and Applications”, Idea Group Inc., IRM press, 2003.

**13ITFF****NATURAL LANGUAGE PROCESSING**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: Explain natural language processing and apply basic algorithms.

CO 2: Describe the concepts of information retrieval.

CO 3: Apply NLP in text processing.

CO 4: Design an application that uses different aspects of language processing

**UNIT I INTRODUCTION 9**

Natural Language Processing – Linguistic Background - Spoken language input and output Technologies – Written language Input - Mathematical Methods – Statistical Modeling and Classification Finite State methods Grammar for Natural Language Processing – Parsing – Semantic and Logic Form – Ambiguity Resolution – Semantic Interpretation.

**UNIT II INFORMATION RETRIEVAL 9**

Information Retrieval architecture - Indexing- Storage – Compression Techniques – Retrieval Approaches – Evaluation - Search engines- commercial search engine features- comparison - performance measures – Document Processing - NLP based Information Retrieval – Information Extraction.

**UNIT III TEXT MINING 9**

Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering - Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organizing retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

**UNIT IV GENERIC ISSUES 9**

Multilinguality – Multilingual Information Retrieval and Speech processing – Multimodality – Text and Images – Modality Integration - Transmission and Storage – Speech coding - Evaluation of systems – Human Factors and user Acceptability.

**UNIT V APPLICATIONS 9**

Machine Translation – Transfer Metaphor - Interlingua and Statistical Approaches - Discourse Processing – Dialog and Conversational Agents – Natural Language Generation – Surface Realization and Discourse Planning.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Daniel Jurafsky and James H. martin, “Speech and Language Processing”, 2000.
2. Ron Cole, J.Mariani, et.al “Survey of the State of the Art in Human Language Technology”, Cambridge University Press, 1997.

**REFERENCES**

1. James Allen “Natural Language Understanding”, Benjamin, Cummings Publishing Co. 1995.
2. Gerald J. Kowalski and Mark.T. Maybury, “Information Storage and Retrieval systems”, Kluwer academic Publishers, 2000.
3. TomekStrzalkowski “Natural Language Information Retrieval“, Kluwer academic Publishers, 1999.
4. Michael W. Berry “Survey of Text Mining: Clustering, Classification and Retrieval”, Springer Verlag, 2003.
5. Christopher D.Manning and HinrichSchutze, “Foundations of Statistical Natural Language Processing “, MIT Press, 1999.



13ITFG

**EMBEDDED SYSTEMS**

L	T	P	C
3	0	0	3

**COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: Explain how microprocessor, memory, peripheral components and buses interact in an embedded system
- CO 2: Evaluate how architectural and implementation decisions influence performance and power dissipation
- CO 3: Use the implementation of Embedded networks
- CO 4: Describe the performance issues of multiprocessors
- CO 5: Sketch a design of an embedded system around a microprocessor or DSP

**UNIT I                    EMBEDDED COMPUTING AND INSTRUCTION SETS                    9**

Complex Systems and Microprocessor – Embedded system design process. –Formalism for Design process- Model Train controller- ARM processor – Architecture, Instruction sets and programming-T1 C55X DSP processor.

**UNIT II                    MEMORY MANAGEMENT, PROGRAM DESIGN AND ANALYSIS                    9**

Programming Input and Output – Memory system mechanisms –CPU performance-design example -Memory and I/O devices with interfacing – Development debugging –system level performance analysis –Assembly, Linking and Loading-Program optimization and validation.

**UNIT III                    OPERATING SYSTEMS AND MULTIPROCESSORS                    9**

Scheduling policies – Interprocess Communication mechanisms – Performance issues-CPU's and Accelerators-Multiprocessors - Design examples.

**UNIT IV                    EMBEDDED NETWORKS                    9**

Distributed Embedded Architectures- I<sup>2</sup>C Protocol basics -serial communication using I<sup>2</sup>C bus- Ethernet communication -Vehicles as networks –Sensor Networks.

**UNIT V                    EMBEDDED SYSTEM DEVELOPMENT                    9**

Design issues and techniques –System Analysis and Architecture Design- Quality Assurance-Case studies – Complete design of example embedded systems.

**L: 45 TOTAL: 45 PERIODS****TEXT BOOKS**

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computing System Design", Second Edition, Elsevier, 2008.
2. Michael J. Pont, "Embedded C", Pearson Education, 2007.

**REFERENCES**

1. Steve Heath, "Embedded System Design", Elsevier, 2005.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", 2<sup>nd</sup> Edition, Pearson Education, 2007.
3. **Embedded Systems Architecture** – Tammy Noergaard, Elsevier, 2005.

13TD01

**INDIAN BUSINESS LAWS****L T P C****0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: explain the elements of a valid contract.
- CO 2: discuss main provisions relating to Sale of Goods Act and Negotiable Instruments Act.
- CO 3: explain provisions relating to incorporation and functioning of company and partnership firm.
- CO 4: understand the fundamentals of Consumer Protection Act and Foreign Exchange Management Act.
- CO 5: understand the basic knowledge of Information Technology Act and RTI Act.

**UNIT I THE INDIAN CONTRACT ACT, 1872**

Definition of a Contract and its essentials - Formation of a valid Contract - Offer and Acceptance, Consideration - Capacity to Contract - Free consent - Legality of object - Discharge of a Contract by performance - Impossibility and Frustration - Breach, Damages for breach of a contract - Quasi contracts - Special Contracts - Contract of Indemnity and Guarantee - Contract of Bailment and Pledge - Contract of Agency.

**UNIT II THE SALE OF GOODS ACT, 1930**

Definition of a Contract of Sale - Conditions and Warranties - Passing of Property - Right of Unpaid Seller against the Goods - Remedies for Breach - The Negotiable Instrument Act, 1881  
Definition and characteristics - Kinds of negotiable instruments - Promissory Note - Bill of Exchange and Cheques - Holder and Holder in due course - Negotiation, Presentment, Discharge from Liability - Noting and Protest – Presumption - Crossing of Cheques - Bouncing of Cheques.

**UNIT III THE COMPANIES ACT, 1956**

Nature and Definition of a Company - Registration and Incorporation - Memorandum of Association - Articles of Association – Prospectus - Kinds of Companies - Directors: Their powers and duties – Meetings - Winding up - The Indian Partnership Act, 1932 - Definition of Partnership and its essentials - Rights and Duties of Partners: Types of Partners - Minor as a partner - Doctrine of Implied Authority - Registration of Firms - Dissolution of firms - Limited Liability Partnership Act, 2000.

**UNIT IV THE CONSUMER PROTECTION ACT, 1986**

Aims and Objects of the Act - Redressal Machinery and Procedure for complaints under the Act – Remedies – Appeals - Enforcement of orders and Penalties - Foreign Exchange Management Act 2000 - Definition and Main Provisions.

**UNIT V THE INFORMATION TECHNOLOGY ACT**

Definition, Digital Signature - Electronic Governance – Attribution - Acknowledgment and Dispatch of Electronic Records - Sense Electronic Records and Sense Digital Signatures - Regulation of Certifying Authorities Digital Signature Certificates - Duties of Subscribers - Penalties and Offences - The Right to Information Act, 2005 - Right to know - Salient Features of the Act - Obligation of Public Authority - Designation of Public Information Officer - Request for obtaining information - Duties of a PIO - Exemption from Disclosure of Information - Partial Disclosure of Information - Information Commissions - Powers of Information Commissions - Appellate Authorities – Penalties - Jurisdiction of Courts.

**TEXT BOOKS**

1. Kuchhal M.C, “Business and Industrial Laws”, 3<sup>rd</sup> Edition, JBA Publishers, New Delhi, 2013.
2. Gulshan S.S, “Merchantile Law”, 3<sup>rd</sup> Edition, JBA Publishers, New Delhi, 2007.

**REFERENCES**

1. Mulla D.F, “The Sale of Goods Act and the Indian Partnership Act”, 10<sup>th</sup> Edition, LexisNexis Ltd., India, 2012.
2. Dabas J, “Negotiable Instruments Act”, 2<sup>nd</sup> Edition, JBA Publishers, New Delhi, 2013.
3. Avtar S, “The Principles of Mercantile Law”, 9<sup>th</sup> Edition, Eastern Book Company, India, 2011.

**13TD02 LEADERSHIP AND PERSONALITY DEVELOPMENT****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: identify the various leadership skills.
- CO 2: understand group dynamics and factors influencing the team performance.
- CO 3: describe the personality dimensions based on personality theories.
- CO 4: explain personality determinants and personality types.
- CO 5: apply effective training program for personality development.

**UNIT I INTRODUCTION**

Leadership – Meaning, Concepts and Myths about Leadership, Components of Leadership- Leader, Followers and Situations - Leadership Skills – Basic Leadership Skills - Building Technical Competency - Advanced Leadership Skills - Team Building for Work Teams - Building High Performance Teams.

**UNIT II TEAMS AND LEADERSHIP**

Assessing Leadership & Measuring Its Effects - Group- Nature, Size, Roles, Norms, Cohesion, and Stages of Group Development - Teams and their Leadership – Effective Team Characteristics and Team Building - Ginnetts Team Effectiveness Leadership Model.

**UNIT III PERSONALITY**

Personality - Meaning, Concept, Personality Patterns, Symbols of Self, Moulding the Personality Pattern, Persistence & Change - Personality & Personal Effectiveness - Psychometric Theories – Cattel and Big Five - Psychodynamic Theories - Carl Jung and MBTI - Transactional Analysis - Johari – Window - Personal Effectiveness.

**UNIT IV PERSONALITY DETERMINANTS**

Personality Determinants – Heredity and Environment – Types of personality.

**UNIT V PERSONALITY TRAINING**

Concept, Role, Need, Importance and types of personality Training - Understanding Process of Learning - Developing an Integrated Approach of Learning in Training Programme - Training Needs Assessment.

**TEXT BOOKS**

1. Yukl G, “Leadership in Organisations”, 8<sup>th</sup> Edition, Pearson Education Ltd., England, 2013.
2. Lall M, Sharma S, “Personal Growth Training & Development”, Kindle Edition, USA, 2009.

**REFERENCES**

1. Janakiraman B, “Training and Development”, Wiley Dream tech, Biztantra, 2005.
2. Pareek U, “Understanding Organizational Behaviour”, 2<sup>nd</sup> Edition, Oxford University Press, USA, 2007.

**13TD03****INTERNATIONAL BUSINESS MANAGEMENT****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: understand the global business environment.
- CO 2: explain the impact of economic, legal, cultural, geographical and political factors on international business.
- CO 3: discuss the issues and problems of Multinational Enterprises.
- CO 4: discuss the role of various international financial institutions.
- CO 5: discuss about important aspects of WTO and GATT agreement.

**UNIT I INTERNATIONAL BUSINESS ENVIRONMENT**

International Business Environment - Globalization - Forces, Meaning, Dimensions and Stages in Globalization - Trading Environment of International Trade - Tariff and Non-tariff Barriers - Trade Blocks.

**UNIT II RISK ANALYSIS AND PRACTICES**

Country Risk Analysis - Political, Social and Economic - Cultural and Ethical practices - Responsibilities of International Business - Economic crisis in foreign countries.

**UNIT III MULTINATIONAL ENTERPRISES**

Managing Multinational Enterprises - Problems and Potential - Multinational Service Organizations - Indian companies becoming multinationals - Potential, Need and Problems.

**UNIT IV INTERNATIONAL FINANCIAL MANAGEMENT**

Introduction to International Financial Management - Balance of Trade and Balance of Payment - International Monetary Fund, Asian Development Bank and World Bank - Financial Markets and Instruments - Introduction to Export and Import Finance - Methods of Payment in International Trade.

**UNIT V INTERNATAIONAL AGREEMENT**

General Agreement on Trade and Tariffs, (GATT) - World Trade Organization - Seattle and Doha Round of Talks - Dispute Settlement Mechanism under WTO - Problems of Patent Laws - International Convention on Competitiveness - Global Sourcing and its Impact on Indian Industry - Globalization and Internal Reform Process.

**TEXT BOOKS**

1. Bhalla V.K, Shivaramu S, "International Business Environment", 9<sup>th</sup> Edition, Anmol Publications Pvt. Ltd., Delhi, 2005.
2. Apte P.G, "International Financial Management", 5<sup>th</sup> Edition, Tata McGraw Hill, India, 2008.
3. Cherulinam F, "International Business", 5<sup>th</sup> Edition, Prentice Hall of India, New Delhi, 2010.

**REFERENCES**

1. Rao, Rangachari, "International Business", Himalaya Publishing House, New Delhi, 2010.
2. Hill C, "International Business", 10<sup>th</sup> Edition, Tata McGraw Hill Education, New Delhi, 2014.
3. Daniels J.D, "International Business Environment", 15<sup>th</sup> Edition, Prentice Hall of India, New Delhi, 2014.

**13TD04****BASICS OF MARKETING****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: describe the basic concepts of marketing.
- CO 2: discuss the significance of consumer behavior and market segmentation.
- CO 3: discuss brand, trade mark, after- sales service and product life cycle concepts.
- CO 4: formulate strategies for pricing and channels of distribution.
- CO 5: analyze and selection of best promotional technique.

**UNIT I INTRODUCTION**

Nature and Scope of Marketing - Importance of Marketing – Concepts: Traditional and Modern - Selling Vs. Marketing - Marketing Mix - Marketing Environment.

**UNIT II CONSUMER BEHAVIOR AND MARKET SEGMENTATION**

Nature, Scope and Significance of Consumer Behavior - Market Segmentation - Concept and Importance - Bases for Market Segmentation.

**UNIT III PRODUCT PLANNING**

Concept of Product - Consumer and Industrial Goods - Product Planning and Development - Packaging - Role and Functions - Brand Name and Trade Mark - After- Sales Service - Product Life Cycle Concept.

**UNIT IV PRICING AND PHYSICAL DISTRIBUTION**

Price - Importance of Price in the Marketing Mix - Factors Affecting Price of a Product/Service - Discounts and Rebates - Distribution Channels - Concept and Role - Types of Distribution Channels - Factors Affecting Choice of a Distribution Channel - Retailer and Wholesaler - Distributions Channels and Physical Distribution.

**UNIT V PROMOTION**

Definition - Methods of Promotion - Optimum Promotion Mix - Advertising Media - Their Relative Merits and Limitations - Characteristics of an Effective Advertisement - Personal Selling - Selling as a Career - Classification of a Successful Sales Person - Functions of Salesman.

**TEXT BOOKS**

1. Etzel M.J, Walker B.J, Stanton W.J, “Fundamentals of Marketing”, 13<sup>th</sup> Edition, McGraw Hill, New York, 2004.
2. Tanner J, Raymond M, “Principles of Marketing”, University of Minnesota Libraries Publishing, New York, 2015.

**REFERENCES**

1. Rajan Nair N, Varma M.M, “Marketing Management”, 2<sup>nd</sup> Edition, S.Chand & Sons, New Delhi, 2005.
2. Ramaswamy V.S, Namakumari S, “Marketing Management”, 3<sup>rd</sup> Edition, Macmillan India Limited, London, 2002.

**13TD05****RETAILING AND DISTRIBUTION MANAGEMENT****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: explain the concepts of retailing and distribution management.
- CO 2: analyze and solve retailers' problems to make decisions in retail organizations.
- CO 3: plan and formulate strategy for retail management process.
- CO 4: discuss about various distribution technology and stores management.
- CO 5: analyze the issues and challenges in Logistic Management

**UNIT I INTRODUCTION**

Meaning and Nature of Distribution and Retail Industry - Future of Retailing and Distribution in India - Distribution Channels – Concept, Role and Types - Factors Affecting Choice of Distribution Channel.

**UNIT II TYPES OF RETAILING**

Stores Classified by Owners - Stores Classified by Merchandising Categories - Wheel Of Retailing - Traditional Retail Formats Vs. Modern Retail Formats in India - Store and Non-Store Based Formats - Cash and Carry Business - Retailing Models – Franchiser Franchisee, Directly Owned - Wheel of Retailing and Retailing Life Cycle – Issues in Retailing.

**UNIT III MANAGEMENT OF RETAILING OPERATIONS**

Meaning - Functions of Retail Management - Strategic Retail Management Process - Retail Planning - Importance and Process - Developing Retailing Strategies.

**UNIT IV TECHNOLOGY IN DISTRIBUTION**

Bar-Coding – RFID – Electronic Payment Systems - Store Administration - Floor Space Management – Managing Store Inventories and Display Action Plans - Pricing Strategies and Location Strategies.

**UNIT V LOGISTICS OF RETAIL MANAGEMENT**

Components and Functions; Distribution Related Issues and Challenges - Gaining Competitive Advantage through Logistics Management.

**TEXT BOOKS**

1. Agrawal D. K., “Distribution & Logistics Management: A Strategic Marketing Approach”, Macmillan Publishers India Limited, New Delhi, 2007.
2. Berman B, Evans J.R, “Retail Management – A Strategic approach”, 12<sup>th</sup> Edition, Pearson Education Ltd., England, 2013.
3. Cox R, Brittan P, “Retailing an introduction, Financial Times Management”, 5<sup>th</sup> Edition, Pearson Education Limited, England, 2004.

**REFERENCES**

1. Rushton A, Croucher P, Baker P, “The Handbook of Logistics & Distribution Management”, Kogan Page Limited, London, 2006.
2. Coughlan A.T, Anderson E, Stern L.W, El-Ansary A.I, “Marketing Channels”, 7<sup>th</sup> Edition, Prentice Hall, New Jersey, 2006.
3. Sinha P. K, Uniyal D.P, “Managing Retailing”, Oxford University Press, India, 2007.

**13TD06****INTERNATIONAL ECONOMICS****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: discuss the impact of globalization.

CO 2: identify and analyze different theoretical models of international economics in light of 'real world' situations.

CO 3: examine the consequences of trade policies.

CO 4: explain the importance of international financial markets.

CO 5: discuss the important aspects of international banking.

**UNIT I INTRODUCTION**

Background of International Business Economics - Globalization and International Business – The Emergence of Global Institutions – Drivers of Globalizations - The Globalization Debate.

**UNIT II THE INTERNATIONAL TRADE THEORY**

The Law of Comparative Advantage – The Demand and Supply, Offer Curves - The Terms of Trade – Factor Endowments and the Heckscher – Ohlin Theory – Implications of Trade Theories - Economics of Scale - Imperfect Competition.

**UNIT III INTERNATIONAL TRADE POLICY**

Trade Restrictions - Tariffs, Non –Tariff Trade Barriers - Tariff Vs. Quota - The New Protectionism – Economic Integration - Custom Unions and Free Trade Areas - Major Regional Trade Agreements - Foreign Exchange Market – Types of Foreign Exchange Transactions – Reading Foreign Exchange Quotations – Forward and Futures Market – Foreign - Currency Options – Exchange Rate Determination – Arbitrage – Speculation and Exchange - Market Stability.

**UNIT IV WORLD FINANCIAL ENVIRONMENT**

Global Foreign Exchange Markets – Economic Theories of Exchange - Rate Determination - International Regime for FDI and MNC - Consequences of Economic Globalization.

**UNIT V INTERNATIONAL BANKING**

Reserves, Debt and Risk - Nature of International Reserves – Demand for International Reserves – Supply of International Reserves – Gold Exchange Standard – Special Drawing Rights – International Lending Risk – The Problem of International Debt – Financial Crisis and The International Monetary Fund – Eurocurrency Market.

**TEXT BOOKS**

1. Krugman P.R, Obstfeld M, “International Economics Theory and Policy”, 8<sup>th</sup> Edition, Prentice Hall, Boston, 2008.
2. Carbaugh R.J, “International Economics”, 15<sup>th</sup> Edition, South Western College publication, USA, 2014.

**REFERENCES**

1. Daniels J, Radebaugh L, Sullivan D, Salwan P, “International Business”, 12<sup>th</sup> Edition, Pearson Education, New Delhi, 2010.
2. Suranovic S, “International Economics: Theory and Policy”, Flat World Knowledge, USA, 2010.

13TD07

**INDIAN ECONOMY****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: discuss the current economic development in India
- CO 2: describe the key indicators of estimation of national income
- CO 3: explain elementary concepts of economic planning and development in India
- CO 4: discuss the concept of public finance and preparation of budget
- CO 5: discuss the influence of infrastructure growth on economic development

**UNIT I ECONOMIC DEVELOPMENT**

Meaning - Measurement of Economic Development - Characteristic of underdeveloped and developed economies - Causes for Indian economic underdevelopment - Major issues in development - Strategies for economic development Import substitution and Export oriented strategies - Determinants of economic development.

**UNIT II NATIONAL INCOME**

The National Income and its estimates in India - Limitations of National income estimation - Trends in National income of India: Growth and Structure - Inter-state variations in National income - Income distribution - Measurement of poverty in India.

**UNIT III ECONOMIC PLANNING**

Planning and economic development in India - Planning models in India (Elementary concepts) - Capital formation - Growth of Public and Private sector in India – Industrial policies an assessment - Capital formation and domestic saving.

**UNIT IV INDIAN PUBLIC FINANCE**

Budgetary policies of the central government - Composition and trends in public revenue and expenditure - Expenditure control and government consumption expenditure - concepts of Budgetary deficits and implications - state budget.

**UNIT V INFRASTRUCTURE AND ECONOMIC DEVELOPMENT**

Power and energy - Transport system in India's economic development - Communication system in India - Urban infrastructure - Science and technology - Private investment in infrastructure - Outlook and prospects.

**TEXT BOOKS**

1. Dutt R, Sundaram K.P.M, "Indian Economy", S.Chand and Co., New Delhi, 2006.
2. Agarwal A.N, Agarwal M.K, "Indian Economy: Problems of Development and Planning", 41<sup>st</sup> Edition, New Age International Ltd., New Delhi, 2016.

**REFERENCES**

1. Arvind P, "India: The Emerging Giant", Oxford University Press, USA, 2008.
2. Government of India, Economic Survey, (2010 -11 to 2014 -15).



**13TD08****RURAL ECONOMICS****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO 1: discuss the role and importance of agriculture in economic development of India.

CO 2: describe the impact of agricultural forming in rural employment, wage policy, technological change and green revolution.

CO 3: analyze the relationship between rural and urban society.

CO 4: recognize the formation and system of rural social institutions.

CO 5: compare the social changes in the rural society after modernization and globalization.

**UNIT I INTRODUCTION**

Nature and Scope of Rural Economy - Importance of Agriculture in Economic Development of India - Nature of Land Problems - Evolution of Policy – Land Tenure System - Land Reform Measures.

**UNIT II AGRICULTURE AND FARMING**

Agricultural Holdings - Fragmentation and Sub-Division of Holdings, Cooperative Farming-Rural Labour Problems - Nature of Rural Unemployment - Employment and Wage Policy - Sources of Technological Change and Green Revolution.

**UNIT III RURAL SOCIETY**

Rural Society Structure and Change - Village and its Social Organization - Indian Village and its Types - Rural-Urban Continuum and Rural-Urban Relationships.

**UNIT IV RURAL SOCIAL INSTITUTIONS**

Rural Social Institutions - Family, Property, Caste, Class, Agrarian Structure - Indebtedness and Poverty - Jajmani System - Religion, Village, Panchayat Raj and Community Development Programmes – Problems.

**UNIT V SOCIAL CHANGES**

Social Change in Rural India-Impact of Westernization - Secularization, Urbanisation, Industrialisation, Migration, Transportation, Modernization of Indian Rural Society - Post Modernization and Globalization and Indian Villages.

**TEXT BOOKS**

1. Carver T.N, “The Principles of Rural Economics”, Ginn and company, USA, 1911.
2. Desai A.R, “Rural Sociology in India”, 5<sup>th</sup> Edition, Popular Prakashan Ltd., Mumbai, 2011.

**REFERENCES**

1. Dube S.C., “India’s changing villages”, Psychology Press, UK, 2003.
2. Datt R, Sundharam K.P.M, Datt G, Mahajan A, “Indian Economy”, 72<sup>nd</sup> Edition, S.Chand & Co., New Delhi, 2016.
3. Chaudhari, C.M., “Rural Economics”, Sublime Publication, Jaipur, 2009.

**13TD09****INTERNATIONAL TRADE****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: discuss the importance of international trade in developing countries.
- CO 2: describe the impact of Trade agreements in international Business environment.
- CO 3: explain the role of foreign exchange and their impact on trade and investment flows.
- CO 4: discuss the benefits of Multinational Corporation in Internal Trade
- CO 5: analyze the key role of globalisation in Indian economy.

**UNIT I INTRODUCTION**

International Marketing - Trends in International Trade - Reasons - Global Sourcing and Production Sharing - International Orientations - Internationalization Stages and Orientations - Growing Economic Power of Developing Countries – International Business Decision.

**UNIT II INTERNATIONAL BUSINESS ENVIRONMENT**

Trading Environment - Commodity Agreements – State Trading - Trading Blocks and Growing Intra-Regional Trade - Regional Groupings – SAARC, BRICS, ECM, ASEAN - Trade Liberalization - The Uruguay Round-Evaluation – UNCTAD – GATT – WTO.

**UNIT III INTERNATIONAL FINANCIAL ENVIRONMENT**

International Money and Capital Markets - Foreign Investment Flows – Pattern, Structure and Effects - Movements in Foreign Exchange and Interest Rates and their Impact on Trade and Investment Flows - Exchange Rate Mechanism and Arrangement.

**UNIT IV MULTINATIONAL CORPORATIONS**

Definition - Organizational Structures - Dominance of MNC's - Recent Trends - Code of Conduct - Multinationals in India - Issue in Investment, Technology Transfer, Pricing and Regulations - International Collaborations and Strategic Alliances.

**UNIT V INDIA IN THE GLOBAL SETTING**

India an Emerging Market - India in the Global Trade - Liberalization and Integration with Global Economy - Factors Favouring and Resisting Globalization - Trade Policy and Regulation in India - Trade Strategies - Export-Import Policy - Regulation and Promotion of Foreign Trade in India.

**TEXT BOOKS**

1. Daniels J.D, Radebaugh L.H, Sullivan D.P, “International Business: Environment and Operations”, 12<sup>th</sup> Edition, Prentice Hall, USA, 2009.
2. Ricky W.G, Michael W.P, “International Business: A Managerial Perspective”, Prentice Hall, USA, 2009.

**REFERENCES**

1. Bhattacharya B, Varshney R.L, “International Marketing Management”, 25<sup>th</sup> Revised Edition, S. Chand & Sons, New Delhi, 2015.
2. Verma M.L, “International Trade”, Common wealth Publisher, New Delhi, 2010.

**13TD10****GLOBAL CHALLENGES AND ISSUES****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: understand the various global issues.
- CO 2: demonstrate a reasonable understanding of environmental debates and issues.
- CO 3: explain the developmental issues relating to food, health and energy.
- CO 4: demonstrate the economical issues in international trade.
- CO 5: describe the civilization issues relating to human rights and social justice.

**UNIT I SECURITY ISSUES**

Nuclear Issues - Global and South Asian Context - Small Weapons Proliferation and Internal Arms Race - Chemical and Biological Weapons – Terrorism - Causes, Consequences And Trends - Cyber Terrorism – Counter Terrorism.

**UNIT II ENVIRONMENTAL ISSUES**

Global Warming and Climate Change - Threats to Bio-Sphere and Space - Pollutions, De-Forestation, Solid, Chemical and Nuclear Wastes and their Management - Preserving the Green Cover and Wild Life.

**UNIT III DEVELOPMENTAL ISSUES**

Food Security - Poverty and Hunger - Energy Security - Supply and Demand - Traditional and Alternative Sources of Energy – ITER - Health Security – Health for all - Development Vs. Environment - Sustainable Development.

**UNIT IV ECONOMIC ISSUES ON INTERNATIONAL TRADE**

International Trade - GATT, WTO - Regional Associations - ECM, ASEAN, OPEC, BRICS - Financial Crisis - ASEAN, Mexico and Greece - Global Issues in Trade and Commerce.

**UNIT V CIVILIZATION ISSUES**

Human Rights - Issues Relating to Freedom of Speech and Expression - Right to Self Determination - Preservation of Cultures and Cultural Diversities - Rights of Women and Children - Dividends of Globalization and Social Justice – Good Governance.

**TEXT BOOKS**

1. Payne R, “Global Issues”, 4<sup>th</sup> Edition, Pearson Education Ltd., New York, 2013.
2. Owens P, Baylis J, Smith S, “The Globalization of World Politics”, 3<sup>rd</sup> Edition, Oxford University Press, USA, 2013.

**REFERENCE**

1. Chirco J.A, “Globalization: Prospects and Problems”, Sage Publications, New Delhi, 2013.

**13TD11****INDIAN CULTURE AND HERITAGE****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO1: describe Indian culture, civilization and its features.

CO2: demonstrate stone age, Indian races and their contribution in pre-historic culture.

CO3: explain historical development of Indian culture.

CO4: explain the significance, conditions and development of Vedic culture.

CO5: analyze the advent of Islam and European culture.

**UNIT I INTRODUCTION**

Introduction to Culture - Meaning and Scope - Culture and Civilization - General Characteristics Features of Indian Culture - Geographical Impact on Indian Culture.

**UNIT II PRE-HISTORIC CULTURE**

Dravidian Culture - Old Stone Age - New Stone Age - Metal Age - Indian Races and their Contribution to Indian Culture.

**UNIT III HISTORICAL DEVELOPMENT OF INDIAN CULTURE**

Indus Valley Culture - City Planning - Social and Religious Conditions - Vedic and Later Vedic Cultures - Dharmasastras and Caste Systems - Comparison of Indus and Vedic Culture - Importance of Indus Valley and Vedic Cultures.

**UNIT IV CULTURE IN SANGAM AGE AND POST SANGAM AGE**

Sangam Literature - Society - Political and Economical Conditions - Trade - Religion and Fine Arts.

**UNIT V ADVENT OF ISLAM AND EUROPEAN CULTURE**

Impact on Indian Culture and Heritage – Reform Movements - Brahma Samaj, Ariya Samaj, Self Respect Movement – Post Colonial Development.

**TEXT BOOKS**

1. Luniya B.N, "Evolution of Indian Culture", Lakshmi Narain Agarwal Publishers, Agra, 1986.
2. Jeyapalan N, "History of Indian culture", Atlantic publishers, New Delhi, 2001.
3. Sharma H.C, "Indian Culture and Heritage", Neha Publishers & Distributors, New Delhi, 2012.

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1. John G.A, "Dictionary of Indian Philosophy (Sanskrit-English)", University of Madras, Madras, 1998.
2. Misra R.S, "Studies in philosophy and Religion", Bharathiya Vidya Prakasans, Varanasi, 1991.
3. Misra S.K, "Culture and Rationality", Sage publications India pvt. Ltd., New Delhi, 1988.
4. Suda J.P, "Religious in India", Sterling Publishers Pvt. Ltd., New Delhi, 1978.

**13TD12****INDIAN HISTORY****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO1: illustrate the basics of Indian cultural heritage.

CO2: describe interaction between Ancient Indian cultural heritage and Islamic culture.

CO3: demonstrate Innovation by rulers of medieval period in the area of Administration, and their contact with the Europeans.

CO4: analyse modern Indian movements, Economic history and Impact of the British rule on India.

CO5: demonstrate the concepts of Indian National Movement and the history of freedom struggle in India.

**UNIT I ANCIENT INDIAN CULTURE**

Ancient Indian Cultural Heritage - Social, Political, Legal and in the Area of Religion and Philosophy.

**UNIT II LAW RELATING TO CULTURE**

Law Givers and Dispute Resolution Systems in Ancient India (Administration of Justice in Ancient India - Pre-Islamic Period) - Law Relating to Culture - The Advent of Islam - Interaction between Ancient Indian Cultural Heritage and Islamic Culture - The Emergence of Synthetic Indian Culture.

**UNIT III ADMINISTRATION IN ANCIENT INDIA**

Innovation by Rulers of Medieval Period in the Area of General and Revenue Administration - District Administration - Court Systems - Indian Contact with the Europeans.

**UNIT IV SOCIO-ECONOMIC HISTORY**

Socio-Religious Reform Movements in Modern India and its Legal Culture - Economic History of India During British Period - Impact of the British Rule on India – Education.

**UNIT V EUROPEAN CULTURE IMPACT**

Impact of European Culture and Liberal Thought on India – The Indian National Movement - The History of Freedom Struggle in India upto 1947.

**TEXT BOOKS**

1. Sreenivasa M.H.V, “History of India Part I and II”, JBA Publishers, New Delhi, 2015.
2. Agarwal R.C, Bhatnagar M, “Constitutional Development and National Movement of India”, S. Chand Publishers, New Delhi, 2005.

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1. Altekar S, “State and Government in Ancient India”, Motilal Banarsidass Publishers, New Delhi, 2002.
2. Majumdar R.C, “History and Culture of the Indian People”, Vol. 2, The Age of Imperial Unity, Bharatiya Vidya Bhavan, New Delhi, 2001

**13TD13****SUSTAINABLE DEVELOPMENT AND PRACTICES****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO 1: recognize the sustainable development and the way to achieve the sustainable development.
- CO 2: outline the concept, factors governing the sustainability and their linkages.
- CO 3: explain the environmental impact assessment and environmental audit.
- CO 4: describe the environmental planning and managing the resources.
- CO 5: acquire the knowledge about the environmental problems and their solutions.

**UNIT I SUSTAINABLE DEVELOPMENT**

Need for Sustainability - Nine Ways to Achieve Sustainability - Economics as the Dismal Science - Population, Resources and Environment.

**UNIT II CHALLENGES OF SUSTAINABLE DEVELOPMENT**

Concept of Sustainability - Factors Governing Sustainable Development - Linkages among Sustainable Development, Determinants of Sustainable Development - Case Studies on Sustainable Development.

**UNIT III ENVIRONMENT IMPACT ASSESSMENT AND AUDIT**

Concepts-process-evaluation methodology-EIA and EMS integration-setting up of audit programme - typical audit process - carrying out the audit-benefits of environmental auditing-environmental audit programmes in India.

**UNIT IV ENVIRONMENTAL PLANNING**

Introduction - Perspective of Environmental Planning - land resource development planning - Planning and managing the natural resources - landscape ecological planning - information and decision of environmental planning - Land use policy in India.

**UNIT V ENVIRONMENTAL EDUCATION**

Knowledge about the environment - Knowledge about the environment and population growth - Knowledge about the solution and environmental problems - Environmental education (EE) – Strategies for EE – Models for future Environmental Education Systems.

**TEXT BOOKS**

1. Rogers P, Jalal K.F, Boyd J.A, “An introduction to sustainable development”, Earthscan Publications Ltd., UK, 2006.
2. Santra S.C,” Environmental Science”, 3<sup>rd</sup> Edition, New Central Book Agency (P) Ltd., London, 2013.

**REFERENCES**

1. Stavins R.N. “Economics of the Environment: Selected Readings”, 5<sup>th</sup> Edition, W.W. Norton and Company, New York, 2005.
2. Sachs J.D, “The Age of Sustainable Development”, Columbia University Press, New York, 2015.

**13TD14****WOMEN IN INDIAN SOCIETY****L T P C  
0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO1: Demonstrate historical perspective about women in Indian society.

CO2: Explain social problems of women.

CO3: Understand the legislation for women protection in India.

CO4: Demonstrate the involvement of women literacy, career and politics.

CO5: Analyse the role of NGO's in women empowerment.

**UNIT I INTRODUCTION**

A Historical Perspective - Early Vedic, Colonial and Modern Periods - Position of Women in Contemporary India.

**UNIT II SOCIAL ISSUES**

Issues of Girl Child - Female Infanticide and Foeticide, Sex Ratio, Child Marriage, Dowry and Property Rights - Women's Health and Birth Control - Reproduction - Violence against Women - Domestic Violence - Female Headed Households - Women in the Unorganized Sector of Employment - Women's Work- Status and Problems - Problems of Dalit Women.

**UNIT III PROTECTIVE LEGISLATION FOR WOMEN**

Protective Legislation for Women in the Indian Constitution - Anti Dowry, SITA, PNDD, And Prevention Sexual Harassment At Workplace (Visaka Case) - Domestic Violence(Prevention) Act.

**UNIT IV WOMEN AND EDUCATION**

Formal and Non-Formal Literacy - Post Literacy - Vocational Training - Dual Career Modernization - Women and Politics - Political Status - Global Movements and Indian Movements.

**UNIT V ROLE OF NGO'S IN WOMEN EMPOWERMENT**

Gender Economy - All India Women's Conference (AIWC) - Women's India Association (WIA) - National Council of Women in India (NCWIE) - Indian Association of Women's Studies - Women Development Cells - Self Help Groups.

**TEXT BOOKS**

1. Majumdar M, "Social Status of Women in India", Wisdom Press, New Delhi, 2012.
2. Harish R, Harishankar V.B, "Re-Defining Feminisms", Rawat Publications, Jaipur, 2011.

**REFERENCES**

1. Rathod P.B, "An Introduction to Women's Studies", ABD Publishers, Jaipur, 2010.
2. Ray R, "Hand Book of Gender", Oxford University Press, New Delhi, 2012.

**13TD15****INDIAN CONSTITUTION****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

CO1: describe the basic understanding of the Indian Constitution.

CO2: understand the structure and functions of parliament.

CO3: demonstrate the organization and working of the Judiciary.

CO4: understand the structure and functions of state legislature.

CO5: understand the 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments.

**UNIT I INDIAN CONSTITUTION**

Salient Features - Preamble - Fundamental Rights – Directive Principles of State Policy - Fundamental Duties.

**UNIT II PARLIAMENTARY SYSTEM**

Powers and Functions of President and Prime Minister - Council of Ministers - The Legislature Structure and Functions of Lok Sabha and Rajya Sabha – Speaker.

**UNIT III THE JUDICIARY**

Organisation and Composition of Judiciary - Powers and Functions of the Supreme Court - Judicial Review – High Courts.

**UNIT IV STATE GOVERNMENTS**

Powers and Functions of Governor and Chief Minister – Council of Ministers - State Legislature.

**UNIT V LOCAL GOVERNMENTS**

73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments – Federalism - Center – State Relations.

**TEXT BOOKS**

1. Basu D.D,” Introduction to Indian Constitution”, Prentice Hall of India, New Delhi, 2015.
2. Gupta D.C, “Indian Government and Politics”, Vikas Publishing House, New Delhi, 2010.

**REFERENCES**

1. Pylee M.V, “Introduction to the Constitution of India”, Vikas Publishing House, NewDelhi, 2011.
2. Kashyap S, “Our Constitution”, National Book Trust, New Delhi, 2010.



**13TD16****BIO MECHANICS IN SPORTS****L T P C**  
**0 0 0 3****COURSE OUTCOMES**

Upon Successful completion of this course, the students will be able to

- CO1: discuss the basics of biomechanics in sports & movement technique accurately.
- CO2: discuss the basics of linear kinematics and its applications in the field of sports.
- CO3: demonstrate the linear kinematics in the field of sports.
- CO4: discuss the basics of angular kinematics and its applications in the field of sports.
- CO5: demonstrate the angular kinematics in the field of sports.

**UNIT I INTRODUCTION**

Meaning, Aim and Objectives, Importance of Biomechanics in Sports - Types of Motion Linear, Angular, Curvilinear and Circular Motion.

**UNIT II LINEAR KINEMATICS**

Speed, Velocity, Acceleration, Motion, Projectile Motion – Application of Linear Kinematics in The Field of Physical Education and Sports.

**UNIT III ANGULAR KINEMATICS**

Angular Speed - Angular Velocity - Angular Acceleration - Relationship between Linear and Angular Motion – Application of Angular Kinematics in the Field of Physical Education and Sports.

**UNIT IV LINEAR KINETICS**

Mass, Weight, Force, Pressure, Work, Power, Energy, Impulse, Momentum, Impact, Friction, Newton's Law of Motion - Law of Inertia and Types of Inertia.

**UNIT V ANGULAR KINETICS**

Levers, Equilibrium and Centre of Gravity – Friction and its Types, Centrifugal and Centripetal Force Bio Mechanical Principles Involved in Designing Sports Equipments.

**TEXT BOOKS**

1. Singh S.K, "Biomechanics in Sports", Neha Publishers & Distributors, New Delhi, 2009.
2. McGinnis P.M, "Biomechanics of Sports and Exercise", 2<sup>nd</sup> Edition, Human Kinetics Publishers, USA, 2004.

**REFERENCES**

1. Saxena A, "Biomechanics in Sports", Neha Publishers & Distributors, New Delhi, 2011.
2. Heyward V.H, Gibson A.L, "Advanced Fitness Assessment and Exercise Prescription", 7<sup>th</sup> Edition, Human Kinetics, USA, 2014.