

**Academic Scheme**  
**for**  
**B.Tech Computer Science and Engineering**  
**Four Years Programme**

**Course Structure & Syllabus**  
**for**  
**Choice Based Credit System (CBCS)**  
**(From I to VIII Semesters)**  
**Batch-2015 and Onwards**



**Department of Computer Science and Engineering**  
**Islamic University of Science and Technology**  
**Awantipora, Jammu and Kashmir-192122**

In reference to implementation of CBCS in SOT for batches admitted in 2015 and onwards, the following is the proposed scheme for department of Computer Science and Engineering (CSE).

### 1.Coding Scheme:

i) Codes suggested for branches/ disciplines are as follows:

Branch/ Discipline	Code
Physics	PHY
Chemistry	CHM
Mathematics	MTH
Civil Engg	CIV
Electrical Engg	ELE
Electronics & Communication Engg	ECE
Computer Science Engg	CSE
Mechanical Engg	MEC

ii) Code for any Core/ Compulsory Foundation subjects to be as follows:

#### **Branch-Sem-Core/CF/Elective-Sub (no/ title)-Theory /Practical**

**Code:** 1 for core  
0 for CF  
T for theory  
P for practical

e.g: If Data Structure of 3<sup>rd</sup> semester is the first core sub (theory) offered in this semester, therefore its code is: **CSE-311T**.

iii) Electives to be of two types: **Open** (Discipline centric or may be chosen from an unrelated discipline) and **Generic** (focusing on those courses which add generic proficiency to the students).

**Code:** E for Open Elective

G for generic Elective

Elective will not be semester specific. It has to be chosen from an open list. The code for an open elective subject offered by CSE will be: **CSE-E-sub (no/title) T**. However an open elective course if comprising of lab curriculum also, the code of the subject to be **CSE-E-sub (no/title) T/P**. Hence an elective may be coded as CSE- E01T and CSE-E02T/P respectively. Where as a generic elective will be coded as **XXX-G-sub (no/title)**. The code for any elective subject to be specified by the parent department. The L-P credits to be decided by the department offering the subject to its students and the syllabus to be framed accordingly by the parent department.

iv) In addition to the above details, each department to have a master list of all subjects (belonging to parent department) being offered showing separate sub divisions as follows:

1. Subjects offered as core to parent department
2. Subjects offered as core to sister departments
3. Subjects offered as core from sister Branches
4. Subjects offered as elective to sister departments
5. Core subjects from sister departments offered as elective to parent department.
6. Core subjects from parent department offered as elective to sister departments.
7. List of Open Elective Subjects

#### 8. List of Generic Elective Subjects

In context to this above suggested scheme the detailed outline of the course structure for the department of “Computer Science and Engineering” is as follows:

## Semester-I

Course Code	Course Title	L – P	Credit
PHY-111 T	Physics-I	4 – 0	4
CHM-111 T	Chemistry-I	4 – 0	4
MTH-111 T	Mathematics-I	4 – 0	4
ELE-101 T	Basic Electrical Engineering	3 – 0	3
BIO-101 T	Environmental Science	4 – 0	4
CIV-101 T/P	Engineering Drawing	2 – 3	4
MEC-101 P	Engineering Workshop	0 – 3	2
PHY-112 P	Physics-I Lab	0 – 2	1
CHM-112 P	Chemistry –I Lab	0 – 2	1
	<b>Total Credits</b>	<b>21 - 10</b>	<b>27</b>

## Semester-II

Course Code	Course Title	L – P	Credit
PHY-211 T	Physics-II	4 – 0	4
CHM-211 T	Chemistry-II	4 – 0	4
MTH-211 T	Mathematics-II	4 – 0	4
CSE-201 T	C Programming	4 – 0	4
CIV-201 T	Elements of Civil Engineering	3 – 0	3
ECE-201 T	Basic Electronics & communication Engineering	3 – 0	3
PHY-212 P	Physics-II Lab	0 – 2	1
CHM-212 P	Chemistry-II Lab	0 – 2	1
CSE-202 P	C Programming Lab	0 – 2	1
	<b>Total Credits</b>	<b>22 – 6</b>	<b>25</b>

**Semester-III**

Course Code	Course Title	L – P	Credit
CSE-311T	Object Oriented Programming	4 – 0	4
CSE -312T	Digital Electronics and Logic Design	4 – 0	4
ECE-317T	Communication I	4 – 0	4
XXX-GxxX	Elective-I		X
MTH-311T	Discrete Mathematics	4 – 0	4
CSE-313P	Object Oriented Programming Lab	0 – 4	2
CSE-314P	Digital Electronics and Logic Design Lab	0 – 2	1
CSE-315T/P	Internet and Web Designing	2 – 2	3
	<b>Total Credits</b>	<b>18– 08</b>	<b>22+X</b>

**Semester-IV**

Course Code	Course Title	L – P	Credit
CSE-411T	Data Structures	4 – 0	4
CSE-412T	Software Engineering	4 – 0	4
CSE-413T	Database Management System	4 – 0	4
CSE-414T	Data Communication	3 – 0	3
MTH-411T	Probability & Statistics	4 – 0	4
XXX-ExxX	Elective-II		X
CSE 415P	Data Structures Lab	0 – 4	2
CSE 416P	Database Management System Lab	0 – 2	1
	<b>Total Credits</b>	<b>19– 6</b>	<b>22+X</b>

**Semester-V**

Course Code	Course Title	L – P	Credit
CSE-511T	Design and Analysis of Algorithms	4 – 0	4
CSE-512T	Operating System	4 – 0	4
CSE-513T	Microprocessors, Peripherals and Interfacing	4 – 0	4
CSE-514T	Computer Networks	4 – 0	4
CSE-515T	Computer Architecture and Organization	4 – 0	4
XXX-ExxX	Elective-III		X
CSE-516P	Design and Analysis of Algorithms Lab	0 – 2	1
CSE-517P	Microprocessors, Peripherals and Interfacing Lab	0 – 2	1
CSE-518P	Computer Networks Lab	0 – 2	1
	<b>Total Credits</b>	<b>20 – 6</b>	<b>23+X</b>

**Semester-VI**

Course Code	Course Title	L – P	Credit
CSE 611T	Java Programming	4 – 0	4
CSE 612T	Formal Language and Automata Theory	4 – 0	4
CSE 613T	Computer Graphics	4 – 0	4
CSE 614T	Embedded Systems	4 – 0	4
MTH- 611T/P	Numerical Methods	3 – 1	4
XXX-ExxX	Elective IV		X
CSE 615P	Java Programming Lab	0 – 2	1
CSE 616P	Computer Graphics Lab	0 – 2	1
	<b>Total Credits</b>	<b>19 – 5</b>	<b>22+X</b>

**Semester-VII**

<b>Course Code</b>	<b>Course Title</b>	<b>L – P</b>	<b>Credit</b>
<b>CSE-711T</b>	Artificial Intelligence	4 – 0	4
<b>CSE-712T</b>	Compiler Design	4 – 0	4
<b>CSE-713T</b>	Network Security	4 – 0	4
<b>XXX-ExxX</b>	Elective –V		X
<b>XXX-ExxX</b>	Elective –VI		Y
<b>CSE-714P</b>	Artificial Intelligence Lab	0 – 2	1
<b>CSE-715P</b>	Compiler Design Lab	0 – 2	1
<b>CSE-716P</b>	Minor Project	0 – 4	2
<b>CSE-717P</b>	Industrial Training	0 – 2	1
<b>CSE-718P</b>	Seminar	0 – 2	1
	<b>Total Credits</b>	<b>12-12</b>	<b>18+X+Y</b>

**Semester-VIII**

<b>Subject Code</b>	<b>Course Title</b>	<b>L –P</b>	<b>Credit</b>
<b>CSE-811T</b>	Wireless Communication	4-0	4
<b>XXX-ExxX</b>	Elective –VII	-	X
<b>XXX-ExxX</b>	Elective –VIII	-	Y
<b>XXX-GxxX</b>	Elective –IX	-	Z
<b>CSE-813P</b>	Major Project	-	12
	<b>Total Credits</b>	<b>4-0</b>	<b>16+X+Y+Z</b>

## List of Department Electives

Course Code	Course Title	L - P	Credits	Pre-requisite	Preferred semester
CSE-E01T	System Analysis and Design	4 - 0	04	Nil	3 <sup>rd</sup>
CSE-E02T	Management Information System			Nil	3 <sup>rd</sup>
CSE-E03T/P	MATLAB for Engineers	1-2	02	Nil	3 <sup>rd</sup>
CSE-E04T	E-Business & ERP	4-0	04	Nil	3 <sup>rd</sup>
CSE-E05T	Multimedia Technology	4-0	04	Nil	3 <sup>rd</sup>
CSE-E06T	Modelling and Simulation	4-0	04	Nil	3 <sup>rd</sup>
CSE-E07T/P	Linux Internals	3-2	04	NILL	4 <sup>th</sup>
CSE-E08T	Software Testing and Quality Assurance	4-0	04	Software Engineering	4 <sup>th</sup>
CSE-E09T	XML and Web Services	4-0	04	Internet and Web Design	4 <sup>th</sup>
CSE-E10T	Software Project Management	4-0	04	Software Engineering	5 <sup>th</sup>
CSE-E11T	High Performance Computing	4-0	04	Computer Architecture & Organization	5 <sup>th</sup>
CSE-E12T	Object Oriented Software Engineering	4-0	04	Software Engineering <b>and</b> Object Oriented Programming	6 <sup>th</sup>
CSE-E13T	Distributed Computing	4-0	04	OS	6 <sup>th</sup>
CSE-E14T	Advanced Java	4-0	04	Java	7 <sup>th</sup>
CSE-E15T/P	C# and .Net Programming	3-2	04	OOPS	7 <sup>th</sup>
CSE-E16T	Computer Vision	4-0	04	DS	7 <sup>th</sup>
CSE-E17T	Selected Topics of Recent Trends in Computer Science and Engineering	4-0	04	CAO	7 <sup>th</sup>
CSE-E18T	Data Mining and Business Intelligence	4-0	04	DBMS	7 <sup>th</sup>
CSE-E19T-P	Web Technologies	3-2	04	I&WD and JAVA	7 <sup>th</sup>
CSE-E20T	Digital Image Processing	4-0	04		7 <sup>th</sup>
MTH-E01T	Operation Research	4-0	04		7 <sup>th</sup>
CSE-E21T	Pattern Recognition	4-0	04	DIP	8 <sup>th</sup>
CSE-E22T	Advanced Computer Architecture	4-0	04	CAO	8 <sup>th</sup>
CSE-E23T/P	Robotics	4-0	04	Embedded system	8 <sup>th</sup>
CSE-E24T	Big Data	4-0	04	DBMS	8 <sup>th</sup>
CSE-E25T	Ethical Hacking	4-0	04	Computer Network	8 <sup>th</sup>
CSE-E26T	Cloud Computing	4-0	04	Computer Networks	8 <sup>th</sup>
CSE-E27T	Internet of Things	4-0	04	Computer Networks, Embedded Systems	7 <sup>th</sup>
CSE-E35T	Natural language processing	4-0	04	Artificial Intelligence	8 <sup>th</sup>



<b>CSE-E36T</b>	Agile Software Development	4-0	04	Software Engineering	8 <sup>th</sup>
<b>CSE-E37T</b>	Biometric Technologies	4-0	04		8 <sup>th</sup>
<b>CSE-E38T</b>	Mobile Application Development	4-0	04	java	7 <sup>th</sup>
<b>CSE-E39T</b>	Object Oriented Analysis and Design	4-0	04	OOPS	6 <sup>th</sup>
<b>CSE-E40T</b>	Soft Computing	4-0	04	Design and Analysis of Algorithms	7 <sup>th</sup>
<b>CSE-E41T</b>	Evolutionary Computing	4-0	04	Design and Analysis of Algorithms	8 <sup>th</sup>

### List of Compulsory Foundation to Other Departments

Course Code	Course Title	Dept.	L – P	Credit
CSE-101T	Computer Fundamental	Food Tech.	4 - 0	4
CSE-102P	Computer Fundamental Lab	Food Tech.	0 - 2	1
CSE-201T	C Programming	ECE/CIV/ELE	4 - 0	4
CSE-202P	C Programming Lab	ECE/CIV/ELE	0 - 2	1
CSE-103T/P	Computer Fundamental	AFM	2 - 2	3
CSE-104T/P	Computer Fundamental and C Programming	AFM	2 - 2	3

### List of Core to Other Departments

Course Code	Course Title	Dept.	L – P	Credit
MTH-111T	Mathematics-I	ECE/CIV/ELE	4 - 0	04
MTH-211T	Mathematics-II	ECE/CIV/ELE	4 - 0	04
MTH-312T	Probability and Statistics	CIV	4 - 0	04
MTH-313T	Laplace, Fourier and Complex Analysis	ECE/ELE	4 - 0	04
MTH-411T	Probability and Statistics	ELE	4 - 0	04
MTH-412T	Numerical Methods	CIV	4 - 0	04
MTH-511T/P	Numerical Methods	ELE	3 - 1	04

### List of Electives to Other Departments

Course Code	Course Title	L - P	Credits	Pre-requisite	Preferred semester
MTH-E01T	Operation Research	4-0	04	Nil	7 <sup>th</sup>
MTH-E02T/P	Numerical Methods	3-1	04	Nil	5 <sup>th</sup>
MTH-E03T	Probability and Statistics	4-0	04	Nil	
MTH-E04T	Linear Algebra	4-0	04	Nil	
CSE-E03T/P	MATLAB for Engineers	1 – 3	03	Nil	3 <sup>rd</sup>
CSE-E28T/P	Data Structures	3-2	04	Nil	3 <sup>rd</sup>
CSE-E29T/P	Internet and Web Designing Lab	2– 2	03	Nil	3 <sup>rd</sup>
CSE-E30T/P	Computer Network	3-1	04	DS	4 <sup>th</sup>
CSE-E31T/P	Object Oriented Programming	3-2	04	Nil	3 <sup>rd</sup>
CSE-E32T/P	Data Base Management System	2-2	03	Nil	3 <sup>rd</sup>
CSE-E33T	Network Security	4-0	04	Data Comm. OR Computer Network	5 <sup>th</sup>
CSE-E34T/P	Computer Architecture and Organization	4-0	04	Digital Electronics	4 <sup>th</sup>

# B-Tech Computer Science & Engineering

## Semester-I

Course Code	Course Title	L – P	Credit
PHY-111 T	Physics-I	4 – 0	4
CHM-111 T	Chemistry-I	4 – 0	4
MTH-111 T	Mathematics-I	4 – 0	4
ELE-101 T	Basic Electrical Engineering	3 – 0	3
BIO-101 T	Environmental Science	4 – 0	4
CIV-101 T/P	Engineering Drawing	2 – 3	4
MEC-101 P	Engineering Workshop	0 – 3	2
PHY-112 P	Physics-I Lab	0 – 2	1
CHM-112 P	Chemistry –I Lab	0 – 2	1
	<b>Total Credits</b>	<b>21 - 10</b>	<b>27</b>

**Physics-I**  
**PHY-111 T**

**L – P**  
**4 – 0**

**UNIT I**

Vector Analysis: Rotation of coordinate axis and transformation of vectors, Gradient of scalar field, Divergence and curl of vector field in Cartesian, Spherical Polar and Cylindrical coordinate systems, Gauss's divergence theorem, Stokes theorem, Dirac Delta Function with Properties, Greens function.

**UNIT II**

Electromagnetic Theory: Concept of Field, Coulomb's Law and Gauss's theorem, Calculation of electric field, Biot-Savart Law, Ampere's Law, Modification of Ampere's Law, Concept of Displacement Current, Faraday's law, Scalar and Vector Potentials, divergence and curl of magnetic and electric fields.

Maxwell's equations: (Free Space and Media) Integral and Differential Form, Boundary Conditions for E and B fields, Physical Significance of Maxwell's Equations.

**UNIT III**

**Diffraction:** Fraunhofer diffraction due to Single-Slit and Double-Slit.

**Interference:** Division of wave front and amplitude, Newton's rings and Fresnel Biprism

**Polarization:** Linear, Circular, Elliptical.

**UNIT IV**

Mechanics of System of Particles: Conservation of linear momentum, angular momentum and energy, Rigid body motion: Angular momentum of a rotating rigid body.

Collision of Particles: Laboratory and COM systems, kinematics of elastic scattering in laboratory system.

Non-inertial system and fictitious force: Physics in a rotating system, Coriolis force and centrifugal force, Central force motion as one body problem.

**UNIT V**

Waves and Vibrations: Differential equation of simple harmonic motion, energy of simple harmonic oscillator, Superposition of two linear SHMs, Lissajous Figures, damped harmonic motion, energy dissipation, forced oscillations, amplitude and velocity resonance, Q-value of an oscillator, sharpness of resonance, energy consideration in forced oscillations, Concept of Gravitational Wave, Shock Wave and Seismic Wave.

**References:**

1. Introduction to Vector Analysis, Schaum Series: M.R.Spiegel.
2. Introduction to Electrodynamics: D.J.Griffiths.
3. Introduction to Engineering Electromagnetics: Yeon Ho Lee.
4. Engineering Electromagnetics: W.H.Hayt and J.A.Buck.
5. Introduction to Optics: A. Ghatak
6. Introduction to Mechanics: D.S. Mathur
7. Introduction to Mechanics: Daniel Kleppner, Robert Kolenkow.
8. Introduction to Classical Mechanics: R.G.Takwale and P.S.Puranik.
9. Vibrations and Waves : A.P.French

## Chemistry –I CHM-111 T

L – P  
4 – 0

### Unit-I

**Chemical Thermodynamics:** Introduction and Importance, First Law of Thermodynamics, Work done in Isothermal and Adiabatic Conditions. Heat capacities, Relation between  $C_p$  and  $C_v$  relations, Second Law of Thermodynamics, Concept of Entropy, Carnot engine, Gibbs free energy. Free Energy Changes as Criteria of Reversible and Irreversible process, Gibbs-Helmholtz's equation, Clausius- Clapeyron equation.

### Unit-II

**Electro-chemistry:** Introduction, Conductivity of Electrolytes, Kohlrausch's Law of Independent Migration of Ions and its Application, Debye Huckel Theory of Strong Electrolytes. Electrochemical cells, Electrode-Potential, Standard Electrode Potential, Types of Electrodes (Metal-Metal Ion electrode, Gas Electrodes, Metal Insoluble Metal Salt Electrode), Fuel Cells, pH: Measurement and Control.

### Unit-III

**Environmental chemistry:** Introduction to Environmental Chemistry, Concept and Scope of Environmental Chemistry, Chemistry of the Atmosphere, Global Warming, Greenhouse effect, Acid Rain: Mechanism of Formation and Effects and Depletion of Ozone Layer, Chemistry of Water and Waste Water, Measurement of acidity, Alkalinity, Hardness, BOD, COD, and Treatment of Water for Domestic and Industrial Purpose. Toxic Chemicals in the Environment, Biochemical Effects of Arsenic, Lead, Mercury and, Pesticides.

### Unit-IV

**Alloys:** Introduction to Alloys, Advantages of Alloys over other Metallic Materials, Manufacturing of Alloys Fusion Method, Powder Metallurgy, Electrodeposition and Reduction method), Classification of Alloys (Ferrous and non-Ferrous metal Alloys), Carbon steels (Carbon Steels Classification, Composition and Uses), Alloy Steels (Low, Medium and High alloys steels), Effect of Different Alloying Elements on Properties of Alloy steels, Engineering Application of Copper, Nickel and Aluminum Alloys.

### Unit V

**Instrumental techniques I:** Introduction, Advantages and Disadvantages of Instrumental and Non-Instrumental Methods, Electromagnetic Radiation, Electromagnetic Spectrum, Light Absorption (Beers-Lambert Law) UV-Vis spectroscopy (Types of Transition, Chromophors, Auxo-chromes and Applications) Infrared Spectroscopy (Modes of vibration, IR bands corresponding to different functional groups and Applications).

### TEXT BOOKS

1. J.C. Kuriacose and J. Rejaraman: Chemistry in Engineering and Technology Volumes I & II (Tata McGraw Hill publishing company Limited, New Delhi)
2. P.C. Jain. Engineering Chemistry, (DhanpatRai& Sons, NaiSarak; New Delhi).
3. Physical Chemistry – Puri Sharma and Patharua.
4. Inorganic Chemistry (J.D. Lee).
5. Physical Chemistry by Peter Atkins, Juliodepaula
6. Electrochemistry and Corrosion Science by N.Perez
7. A Textbook of Organic Chemistry, V. K. Ahluwalia and MadhuriGoyal
8. Organic Chemistry: Stereochemistry, I. L. Finar, Pearson Education
9. Environmental chemistry by A. K. De, New Age International.

### REFERENCE BOOKS

1. C.V. Agarwal - Chemistry of Engineering Materials (Tata publishing Works, Varanasi)
2. L.A.Munro – Chemistry in Engineering (Prentice Hall, New York)
3. Chemistry of Engineering Materials, C.P. Murthy, C.V. Agarwal and A. Naidu BS
4. O.P.Vermani and A.K. Narula – Applied Chemistry Theory and Practice, (Wiley Eastern Limited, New Delhi).
5. R. M. E. Diamand: Applied Chemistry for Engineers, (Pitman)
6. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, DhanpatRai Publishing Company, New Delhi (2004).

**Mathematics-I**  
**MTH-111T**

**L – P**  
**4 – 0**

**Unit-I**

Introduction to differential calculus, Leibnitz's Theorem for  $n^{\text{th}}$  derivative, Taylor's theorem, Tangent and Normal, Partial Differentiation, Euler's theorem, Double points, asymptotes, curvature and tracing of curves.

**Unit-II**

Limit, continuity and differentiability of functions of several variables, Chain rule, Jacobi theorem. Taylor's theorem of one and two variables, extrema of functions, two or more variables using method of Lagrange's multipliers.

**Unit-III**

Ordinary differential equations: Exact ordinary differential Equations and Ordinary differential equations reducible to exact differential equations. Linear differential equations and equations reducible to linear form. Linear Differential equations of second and higher order with constant and variable coefficients. Applications of Ordinary Differential Equations

**Unit-IV**

Series solutions of Ordinary Differential Equations

**Unit-V**

Algebraic Equation, Elements of the theory of polynomial equations. Fundamental theorem of Algebra, Relation between the roots and the coefficients of an equation, Solution of cubic & bi-quadratic equations

**Books Recommended**

1. Differential calculus, Shanti Narayan, S.Chand
2. A text Book on Engineering Mathematics by Bali, N.P, Luxmi Publications
3. Ordinary and Partial Differential equation, M.D.Raisinghania, S.Chand and Co

**Reference Books**

1. Advanced Engineering Mathematics by Jain, R.K. and Iyengar SRK, Narosa, 2001
2. Advanced Engineering Mathematics, Kreyszig, J.Wiley
3. Linear Algebra, Hoffmann &Kunze, Prentice-Hall
4. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
5. Engineering mathematics Vol I-II, Sastry, Prentice Hall of India

## Basic Electrical Engineering

### ELE-101T

L – p  
3 – 0

#### Unit-I

Introduction to DC circuits, Active and passive two terminal elements, Types of Voltage and Current Sources, Ohms law, Voltage-Current relations for resistor, inductor, capacitor, Kirchhoff's Laws, Mesh analysis, Nodal analysis, current division, voltage division, Conventions for describing networks: Reference directions for currents and voltages.

#### Unit-II

Superposition Theorem, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Application of network theorems in solving various circuits, Star-Delta Transformation

#### Unit-III

Sinusoids, Generation of AC, Average and RMS values, Form and peak factors, concept of phasor representation, J operator, Analysis of R-L, R-C, R-L-C circuits, Introduction to three phase systems - types of connections, relationship between line and phase values.

#### Unit-IV

Working principle, construction and applications of DC machines and AC machines (1 - phase transformers, single phase induction motors, Introduction to alternator: Principle of operation and working.

#### Unit-V

Safety measures in electrical system- types of wiring- wiring accessories staircase, fluorescent lamps and corridor wiring- Basic principles of earthing- Types of earthing.

#### TEXT BOOKS

1. Engineering Circuit Analysis, by William H Hayt, J E Kemmerly and Steven M Durbin, Seventh Edition, Mc Graw Hill, 2007
2. Electrical Engineering Fundamentals by Deltoro, Prentice Hall India (PHI)
3. Kothari. D.P and Nagrath .I.J, "Basic Electrical Engineering", Second Edition, Tata McGraw - Hill, 2009
4. Basic Electrical and Electronics Engineering, by S.K. Bhattacharya, First Edition, Pearson Education, 2011.
5. Circuit Theory (Analysis & Synthesis) by A. Chakrabarti, Dhanpat Rai & Co

## Environmental Science

### BIO-101 T

L - P

4 - 0

#### Unit-I

Multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness.

#### Unit-II

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.

#### Unit-III

Ecosystems • Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. • Introduction, types, characteristic features, structure and function of the following ecosystem:-

a) Forest ecosystem. b) Grassland ecosystem. c) Desert ecosystem. d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

#### Unit-IV

Biodiversity and its conservation • Introduction – Definition: genetic, species and ecosystem diversity. • Biogeographical classification of India • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values • Biodiversity at global, National and local levels. • 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 of biodiversity.

#### Unit-V

Environmental Pollution Definition, Cause, effects and control measures of:-

a) Air pollution. b) Water pollution. c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) nuclear hazards. • Solid waste Management: Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Disaster management: floods, earthquake, cyclone and landslides.

#### Unit-VI

Social Issues and the Environment • From Unsustainable to Sustainable development • Urban problems related to energy • Water conservation, rain water harvesting, watershed management • Resettlement and rehabilitation of people; its problems and concerns. Case Studies • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. • Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control



of Pollution) Act. • Water (Prevention and control of Pollution) Act • Wildlife Protection Act • Forest Conservation Act • Issues involved in enforcement of environmental legislation. • Public awareness.

### **Unit-VII**

Human Population and the Environment • Population growth, variation among nations. • Population explosion – Family Welfare Programme. • Environment and human health. • Human Rights. • Value Education. • HIV/AIDS. • Women and Child Welfare. • Role of Information Technology in Environment and human health. • Case Studies.

### **Unit-VIII**

Field work • Visit to a local area to document environmental assets river /forest /grassland /hill /mountain • Visit to a local polluted site-Urban/Rural/Industrial/Agricultural • Study of common plants, insects, birds. • Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

### **REFERENCE BOOKS**

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
9. Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Weston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
13. Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
16. Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
17. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
18. Survey of the Environment, The Hindu (M)
19. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB) XI
20. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Stadards, Vol I and II, Enviro Media (R)
21. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (TB)
22. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

**Engineering Drawing**  
**CIV-101T/P**

**L – P**  
**2 - 3**

**Unit- I**

Basic Concepts of drawing quadrants, drawing instruments, types of lines etc. Dimensioning: General rules of dimensioning. Types: Aligned, unidirectional, chain, parallel, combined, title, block & margins. Orthographic projections: Concept of horizontal and vertical planes, first and third angle projections, orthographic projections of simple blocks, missing lines and missing views. Projection of points, lines and planes: Projection of points in different quadrants, projection of lines and planes positioned in different orientations with respect to the principle planes.

**Unit-II**

Projection of solids: Projection of simple geometrical solids placed in simple positions and with single rotations of the face, edge or axis of the solid with respect to one of the principal planes of projection.

**Unit-III**

Section of solids: Principal of sectioning, Section of simple geometrical solids, types of the section planes and their trace representation and location, true shape sections, sectioning by auxiliary planes.

**Unit-IV**

Development of surfaces: Development of surfaces of simple sectional solids and intersecting solids, transition pieces, cones & cylinders.

**Unit-V**

Isometric projections: Classification of pictorial projections, Isometric projection of plane figures, prisms, pyramids, cylinders and for the given orthographic projections. Introduction to Auto CADD. Basic commands of CADD.

**TEXT BOOKS**

1. Gill, P.S Engineering Drawing, S.K. Kataria and sons,
2. Bhatt, N.D Engineering Drawing, Charotar Book Stall, Tulsi Sadan, Anand
3. James, D Bethune Engineering Graphics with Auto CADD, 2006.
4. Narayana, Kannaiya Engineering Drawing, Scitech Publications, Chennai

**REFERENCE BOOKS**

1. Sham Tickoo, Auto CADD 2006
2. B.C.RanaM.B.Shah Engineering Drawing, Pearson Education

# Engineering Workshop

## MEC-101 P

L – P  
0 – 3

### Unit-I

**Machine Shop:** Operation and function of various machine tools like Lathe, for turning, facing, chamfering, grooving, knurling, boring and thread cutting, Shaper machine, for preparation of horizontal surfaces, slots and V-grooves, Milling machine, for side, end and face milling and making of spur gear, Drilling machines, for drilling and reaming operations, Grinding machines, for various grinding operations and CNC machine, for simple, step and taper turning operations.

### Unit-II

**Fitting Shop:** Exercise on marking, cutting, chipping, filing, drilling, tapping, reaming, pipe threading and making nut and bolt and single ended spanner, Exercise on V, L, dove-tail and radius fittings.

### Unit-III

**Sheet Metal Shop:** Exercise on development of sheet metal surfaces like cylinder, funnel, rectangular duct and 90° bend, Soldering and brazing of various joints, making single/double riveted lap-joint and single cover plate riveted but-joint.

### Unit-IV

**Welding Shop:** Operation and function of various welding machines like Electric arc welding machine, for various joints like lap, butt and T and preparation of small cot-frame from conduit pipe, Gas welding machine, for cutting and joining operations and square pyramid from conduit pipe, TIG and MIG welding machines, for basic operations and Spot and Seam welding machines, for simple joints.

### Unit-V

**Carpentry and Pattern Making Shop:** Various types of timber, defects in timber, exercise on various operations and making joints like half lap (T, dove-tail, cross), mitre and lengthening and mortise and tenon, Simple exercise on wooden Lathe including pattern making and railing.

### Unit-VI

**Foundry Shop:** Exercise to prepare the green molding sand, to prepare core and mold (single/double piece pattern), Casting of ferrous & non-ferrous metals after mold preparation for simple castings.

### Unit-VII

**Smithy Shop:** Smith's tools and their use, exercise for forging operations for making L-hook, chisel, square and hexagonal head bolts.

### TEXT BOOKS

1. Raghuvanshi, B.S, A course in workshop technology, Vol. I - II. Dhanpat Rai and Sons.
2. Hajira Chowdry, Vol. I - II. Workshop Practice.

## Physics-I Lab

### PHY-112 P

L – P  
0 – 2

#### Experiment No: 1

- To determine the value of  $e/m$  of an Electron by Thompson Method

#### Experiment No: 2

- To determine the value of Acceleration due to gravity( $g$ ) by using Bar Pendulum

#### Experiment No: 3

- To determine the value of Acceleration due to gravity( $g$ ) by using Kater's Reversible Pendulum

#### Experiment No: 4

- To determine the Young's Modulus of rigidity rectangular Steel Bar by Bending of Beam Method.

#### Experiment No: 5

- To determine the Wavelength of Sodium Light by Newton's Rings.

#### Experiment No: 6

- To determine wavelength of Laser Source by Fresnel Biprism.

#### Experiment No: 7

- To determine the frequency of A.C. by Melde's Method.

#### Experiment No: 8

- To measure the magnetic field of circular current loops (Biot Savart Law)

#### Experiment No: 9

- To determine Resolving Power of Telescope.

#### Experiment No: 10

- To study the moment of inertia of a fly wheel.

## Chemistry-I Lab

### CHM-112 P

L – P  
0 – 2

#### List of Experiments

**NOTE:** Basic Introduction on Solution Preparation, Concentration terms, Handling of Glass wares Chemicals and Instruments, Precautions

1. Determination of strength of NaOH solution by standardization of sodium hydroxide using Oxalic acid
2. To determine the acid value of a given mineral oil or vegetable oil.
3. To determine the moisture content of a given sample of coal.
4. To determine the Degree of dissociation of a weak acid by Conductometry
5. Determination of the strength and  $pK_a$  value of the weak acid by titration with an alkali.
6. Estimation of calcium in Lime stone
7. To determine the Aniline point of the given sample of a Lubricating oil
8. To test the validity of Beer-Lambert law using spectrophotometer and determine the unknown concentration of solution.

#### Demonstration Experiments

1. Determination of pH of different concentration of acid and bases by pH meter
2. Determination of calorific value of solid fuels using Bomb Calorimetry.

# B-Tech Computer Science & Engineering

## Semester-II

Course Code	Course Title	L – P	Credit
PHY-211 T	Physics-II	4 – 0	4
CHM-211 T	Chemistry-II	4 – 0	4
MTH-211 T	Mathematics-II	4 – 0	4
CSE-201 T	C Programming	4 – 0	4
CIV-201 T	Elements of Civil Engineering	3 – 0	3
ECE-201 T	Basic Electronics & communication Engineering	3 – 0	3
PHY-212 P	Physics-II Lab	0 – 2	1
CHM-212 P	Chemistry-II Lab	0 – 2	1
CSE-202 P	C Programming Lab	0 – 2	1
	<b>Total Credits</b>	<b>22 – 6</b>	<b>25</b>

### UNIT I

**Quantum Mechanics:** Blackbody Spectrum, Particle nature of light, Compton Effect, double slit experiment, de-Broglie hypothesis, Davison-Germer experiment, wave function and its properties, expectation value, quantum mechanical operator, wave packet, Normalisation condition, uncertainty principle,.

Schrodinger wave equation: Time-Dependent and Time-Independent, Free Particle, Particle in 1D box. Tunnelling effect and its applications.

### UNIT II

**Elementary Solid State Physics:** Crystal Structure, Unit cells, Miller indices, Bravais Lattice, X-ray diffraction, Bragg Law

Fermi energy, Fermi Level in an Intrinsic and an Extrinsic Semiconductors.

**Superconductivity:** Messiner Effect, Type I and Type II superconductors, BCS-Theory (Qualitative only), Application of superconductors.

### UNIT III

**Introduction to Nuclear and Particle Physics:** Hypothesis of Structure of Nucleus. Basic Properties of Nucleus (Size, Charge, Spin, Density), Binding Energy, Q-value of a Nuclear Reaction. Nuclear Fission and Fusion, Liquid-Drop Model.

Fundamental Interactions, Fundamental Particles and their quantum numbers(Charge, Spin, Parity, Strangeness etc), Quark Model, Baryons and Mesons, Gell-Mann- Nishijima Relation, Conservation Rules.

### UNIT IV

**Special Theory of Relativity:** Frames of reference, Galilean Transformation, Michelson-Morley experiment, Basic postulates of special theory of relativity, Lorentz Transformation (No Derivation), length contraction, time dilation, Mass-Energy relation, Relativistic Momentum.

### UNIT V

**Lasers:** Introduction, Principle of laser, stimulate and spontaneous emission, population inversion, Einstein Coefficients, Optical pumping, Resonant Cavity and its modes, He-Ne Laser, Ruby Laser, Semiconductor Laser, Application of Lasers.

**Optical Fibre:** Principle, types and applications.

### References:

1. Introduction to Modern Physics: Aurthur Beiser
2. Introduction to Modern Physics: Kenneth S. Krane
3. Introduction to Quantum Mechanics. D.J.Griffiths
4. Introduction to Solid State Physics: M.A.Wahab
5. Introduction to Solid State Physics: Charles Kittel
6. Introduction to Special theory of Relativity: Robert Resnick
7. Introduction to Nuclear and Particle Physics: V.K.Mittal
8. Introduction to Optics: A. Ghatak
9. Introduction to Lasers: A. Ghatak , K.Thayagarajan

**Chemistry – II**  
**CHM-211 T**

**L – P**  
**4 – 0**

**Unit-I**

**Nano-technology:** Nanoscale and Its Significance, Properties at Nanoscale: Optical, Electrical, thermal, mechanical and Magnetic. General Methods of Preparation of nanomaterials viz top down (ball milling, nanolithography) and bottom up methods (sol-gel, solution based method), Carbon Nanotubes (properties and Applications),

**Unit-II**

**Corrosion:** Introduction, Effects of Corrosion, Factors Effecting the Rate of Corrosion (Nature of the Metal and Nature of the Environment), Electrochemical Theory of Corrosion, Dry Corrosion and Wet Corrosion, Types of Corrosion (Pitting Corrosion, Crevice Corrosion, Galvanic Corrosion and Stress corrosion), Testing and Measurement of Corrosion, Corrosion Protection and Inhibition, Cathodic Protection, Anodic Protection, Protective Coatings

**Unit-III**

**Polymers:** Advantages of Polymers over other Engineering Materials, Functionality, Degree of Polymerization, Concept of Molecular Weight, Polymerization (Addition, Condensation and Copolymerization), Polymerization Techniques (Bulk, Solution, Suspension and Emulsion polymerizations), Preparation, Properties and Engineering application of some Important Polymers, Polythene (LDPE and HDPE), Polyvinyl Chloride, Polystyrene, Teflon, Phenol Formaldehyde, urea-formaldehyde resin. Introduction to polymeric composites

**Unit-IV**

**Lubricants:** Introduction, Function of Lubricants, Mechanism of Lubrication, Classification of Lubricants (Liquid, Semisolid, Solid), Properties of Lubricants (Flash Point and Fire Point, Viscosity, Aniline Point Acid value)

**Unit-V**

**Instrumental techniques II:** Nuclear Magnetic Resonance: Principle, shielding mechanism, chemical shift, number of signals, application of nuclear magnetic resonance to simple organic molecules. Introduction to Thermal Analysis: Principle, Working and Application (TGS, DTA). X-ray Spectroscopy: Principle and Applications

**TEXT BOOKS**

1. S.S Dara A Text Book of Engineering S Chand & Co limited New Delhi
2. Advanced Practical Physical Chemistry by Yadav, Goyal publication
3. Spectroscopic methods : Williams and Fleming
4. Applied Chemistry : Theory And Practice By O. P. Vermani
5. A Text book of Engineering Chemistry by S.S. Dara, S.Chand& Co, New Delhi
6. Laboratory Manual on Engineering Chemistry by S.K. Bhasin and Sudha Rani, DhanpatRai Publishing Company, New Delhi (2004).
7. Applied chemistry, Balsaraf V. M. Et. Al., I. K. International Publishing House Pvt. Ltd (2010)
8. Electrochemistry and Corrosion Science by N.Perez
9. Analytical chemistry: An Introduction By Douglas A. Skoog, Donald M. West, F. James Holler 6<sup>th</sup> edition
10. Polymer Science (Wiley Easter Limited New Delhi) V.R.Goowriker, N.V Viswanathan and JayadevSreedhar,
11. Nanotechnology Fundamentals And Applications, Manasi Karkare, Rajni Bahuguna
12. Nanotechnology Importance And Application, Fulekar
13. Physical Chemistry – Puri Sharma and Patharua.
14. Solid State Chemistry and its Applications, Anthony R. West, Wiley Publisher.



**Mathematics-II**  
**MTH 211T**

**L – P**  
**4 – 0**

**Unit-I:**

Non-linear differential equation of first order, Simultaneous differential equation, Simultaneous differential equation of the form  $dx/P = dy/Q = dz/R$ , Applications of ordinary differential equations,

Differential Equation: Partial differential equations of first order, language linear equation Standard form, Charpit's Method to solve non-linear partial differential equation.

**Unit-II:**

Partial differential equations of second and higher, Homogeneous Partial Differential equations with constant coefficients, vibration of stretched flexible string, heat flow equation. Wave equation, solutions by the method of separation of variables.

**Unit-III:**

Fourier Series :Fourier Series, Integral Calculus: Differential under the sign of integration. Double and triple integrals, change of variables, Beta and Gamma functions

**Unit-IV:**

Matrices: Review of algebra of matrices, Orthogonal and unitary matrices, partitioning of Matrices, Trace of Matrices, Triangular matrices, Rank of a matrix. elementary transformations, Inverse by Elementary Transformation.

**Unit-V:**

Normal Form of a Matrix, solution of simultaneous equation by elementary operation, Caley-Hamilton theorem, Eigen values, and Eigen vectors of a matrix., Quadratic Form.

**Books Recommended:**

1. Advanced Engineering Mathematics by E.Kreyszig
2. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
3. Applied Mathematics for Engineers by P.N.Wartikar
4. Advanced Engineering Mathematics, 2/e by Greenberg, Pearson education, 2004
5. Ordinary and partial Differential equation, M.D.Raisingania, S.Chand and Co
6. Linear Algebra, Hoffmann & Kunze, Prentice-Hall
7. Mathematical Analysis by S.C.Malik & Savita Arora New Age international Limited
8. Integral Calculus by Shanty Narayan.

## C Programming CSE-201T

**L – P**  
**4 – 0**

### **Unit I**

Introduction to problem solving, Algorithms, Programming Methodologies.  
Structure of C program, Identifiers, Keywords, Data Types, Constant and Variables.

### **Unit II:**

Operators: Precedence and Associativity, Expressions, Statements, Input and Output functions, Storage Classes. type casting, Control structures: Branching

### **Unit III**

Control structures: Looping, One dimensional Array, Multidimensional Array and their applications, String Manipulation., Structures, Unions

### **Unit IV**

Library and User defined functions, Formal and Actual parameters, function prototypes, Parameter passing (Call-by-value), Recursion, Macros

### **Unit V**

Pointer variable, Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, dynamic memory allocation., pointer to structure & pointer to union, Pointers to Multidimensional Arrays, Introduction to files.

### **Text Books**

1. Programming in ANSI C – E. Balaguruswami, Sixth Edition, TMH
2. Programming in C – Byron Gottfried, Third Edition, 2010, TMH
3. Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, Second Edition, 2013, OXFORD University Press
4. The ‘C’ programming language , Ritchi, Kernighan, Second Edition, 2012 D.M.Ritchie, PHI
5. C The Complete Reference - H.Sohildt, Fourth edition, 2000 TMH
6. Let us C - Y. Kanetkar, Twelfth Edition, 2012, BPB Publications
7. Computer Science - A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, Third Edition, 2007, Cengage Learning
8. Richard Petersen, ”Linux: The Complete Reference”, 6th edition, Tata McGraw-Hill, 2007.
9. Mark G. Sobell. ”Practical Guide to Fedora and Red Hat Enterprise Linux”, 6th Edition, Prentice Hall, 2011.

**Elements of Civil Engineering**  
**CIV-201 T**

**L – P**  
**3 – 0**

**Unit-I**

**Introduction to Civil Engineering:** Overview of Civil Engineering; Civil Engineering land marks; Impact (social, economic, environmental) of Civil Engineering on society; introduction to various branches of civil Engineering Future directions: Job opportunities in Civil Engineering.

**Unit-II**

**Stress and Strain:** Forces and stresses, Body Forces, surface forces, Internal forces, components of stress in rectangular coordinates Uni-axial tensile test, Elasticity, An-elasticity , Work-hardening, anisotropy, homogeneity and continuity, generalized Hooke's law, Lamé's constants, Modulus of rigidity, Bulk modulus, relation between the elastic constants, Principle of superposition, Uniqueness theorem, Thermal effects. Center of Gravity (symmetrical & unsymmetrical sections), moment of inertia of symmetrical and unsymmetrical sections, parallel axis theorem, perpendicular axis theorem, radius of gyration

**Unit-III**

**Bending moment and Shearing Force:** Notation and sign convention for flexural loads, shear force and bending moment diagrams of determinate structures, (Cantilever, simply supported beams and varying load beams) supported to point loads, UDL and VDL; computing of reactions using equation of equilibrium.

**Unit-IV**

**Trusses:** Planar Truss structures, idealization of planar structures, sign convention and member force representation, analysis of trusses by methods of Joints, graphical and sections.

**Unit-V**

**Torsion of shafts:** Geometry of deformation of a twisted circular shaft, Stress and deformation in twisted circular solid and hollow shafts, Strain energy due to torsion, Power transmitted by circular shafts.

**Text Books:**

1. Shames I.H., Engineering Mechanics, Prentice Hall, New Delhi.
2. Beer, F.P. and Johnston, Vector Mechanics for Engineers, McGraw Hill – Eighth Edition.
3. D.S. Kumar, Engineering Mechanics, S.K. Kataria & Sons, New Delhi.
4. J. L. Meriam and L. G. Kraige, Engineering Mechanics, Vol I – Statics, 6th Ed, John Wiley.
5. Khurmi, Strength of Materials.
6. Ramamurtha, Strength of Materials

# Basic Electronics and Communication Engineering

## ECE-201 T

L – P

3 – 0

### Unit-I

**Electronic Components:** Active and Passive (Resistors, Capacitors and Inductors) components  
Introduction to Semiconductors: P and N type Semiconductors, Transport Mechanism of Charge Carriers, Charge Densities in a Semiconductor, Electric properties, Hall Effect, Generation, Recombination, Diffusion, Continuity Equation, Injected Minority Carrier Charge.

### Unit-II

**PN Junction:** Open Circuited PN Junction, Current Components in PN junction Diode, Basic Principle, Operation and Volt-Ampere Characteristics of PN Junction Diode, Temperature Dependence of V/I Characteristics, Piecewise linear Diode Characteristics, Diode Resistance, Diode Capacitances in detail, Charge Control Description of a Diode, Junction Diode Switching Times, BJT and its Types.

### Unit-III

**Digital Electronics:** Introduction to Digital Electronics, Gates (Basic & universal), Boolean algebra, laws & theorems - simplification of Boolean expression, Basics of Microprocessor 8085 and its pin diagram.

### Unit-IV

**Communication Systems:** Introduction to Communication System, Elements of Communication System, Benefits of Communication, Communication Media, Modulation and Demodulation (brief idea)

### Unit-V

**Transducers:** Classification of Transducers, Basic Requirements of Transducers, Passive Transducers: Strain Gauge, Thermistor, LVDT, Active Transducers: Piezoelectric and Thermocouple

### Text Books:

Electronic Devices & Circuits by J.B .Gupta

Integrated Electronics by Millman & Halkias.

Communication system; Analog and Digital, Sanjay Sharma

### Reference Books:

1. Electronic Communication system; G. Kennedy

2. Electronic Communication Systems (Fundamentals through advanced), W. Tomassi, Pearson Education

3. Electronic Devices and Circuit Theory by Boylestead and Nashelsky.

**Physics - II Lab**  
**PHY-212 P**

**L – P**  
**0 – 2**

**Experiment No: 1**

- To determine the refractive index of Crown Glass Prism.

**Experiment No: 2**

- To determine the wavelength of Sodium Light by Plain diffraction Grating.

**Experiment No: 3**

- To study the characteristics of Zener Diode.

**Experiment No: 4**

- To determine the Wavelength of Prominent lines of Mercury Light by Plain Diffraction Grating.

**Experiment No: 5**

- To study the characteristics of PN Junction Diode.

**Experiment No: 6**

- To study the characteristics of G.M. Tube.

**Experiment No: 7**

- To determine Planck's Constant by LED Method.

**Experiment No: 8**

- To study Hall Effect and determine Hall Coefficients and charge carrier density.

**Experiment No: 9**

- To determine Energy Band Gap of a semi-conductor specimen by Four Probe Method.

**Experiment No: 10**

- To verify Stefan's Law by Electrical method.

## Chemistry - II Lab

### CHM-212 P

L – P  
0 – 2

#### List of Experiments:

1. Synthesis of the phenol formaldehyde resin
2. To titrate Fe (II) with  $\text{KMnO}_4$  spectrophotometrically.
3. To determine the dissociation constant of methyl red by spectrophotometric method
4. To determine the temporary and permanent hardness of the a sample of water by complexometric titration
5. To determine the Alkalinity of the given sample of water.
6. Determination of the ion exchange capacity of cation exchange resin.
7. Separation of a mixture of inorganic ions by paper chromatography.

#### Demonstration of experiments

- 1) Determination of specific rotation of the sucrose by polarimetry.
- 2) Spectrophotometer (concentration determination, wavelength maximum).

## C Programming Lab

CSE 202P

L – P

0 – 2

### Lab Details

1. Installation of Linux.
2. Basic Commands in Linux.
3. Introduction to Vi Editor.
4. Programs to understand the basic data types.
5. Program for looping and decision statements.
6. Programs to generate odd, even, fibnocci, lucas and other common series using loops.
7. Programs using built-in math functions.
8. Programs on arrays.
9. Program to implement linear search.
10. Programs on two dimension array.
11. Program to add and multiply two Matrices.
12. Program to find transpose of a Matrix
13. Program to read and display array using functions
14. Programs on string manipulations
15. Write functions for finding sum, difference, product and remainder between two numbers and return the result.
16. Programs on functions.
17. Write a function to find factorial using recursion.
18. Programs on structures and unions.
19. Programs on pointers
20. Write a function to swap two numbers using call by reference?
21. Write a function to find minimum of an array using pointers.?
22. Write a function to reverse a string using pointers?
23. Programs on basic file operations.
24. Small project as Assignment.

# B-Tech Computer Science & Engineering

## Semester-III

Course Code	Course Title	L – P	Credit
CSE-311T	Object Oriented Programming	4 - 0	4
CSE -312T	Digital Electronics and Logic Design	4 – 0	4
ECE-317T	Communication I	4 – 0	4
XXX-GxxX	Elective-I		X
MTH-311T	Discrete Mathematics	4 – 0	4
CSE-313P	Object Oriented Programming Lab	0 – 4	2
CSE-314P	Digital Electronics and Logic Design Lab	0 - 2	1
CSE-315T/P	Internet and Web Designing	2 – 2	3
	<b>Total Credits</b>	<b>18– 08</b>	<b>22+X</b>



# Object Oriented Programming

CSE-311T

L P

4 0

## Unit- I

**Introduction:** Basic features & concepts of Object Oriented Programming (OOP), Benefits, Languages and Applications of OOPs.

**Tokens, Expressions and Control Structures:** Tokens, Keywords, Identifiers & Constants, Basic Data types, User-defined Data types, Derived Data Types, Memory Management Operators, Manipulators, Expressions, Operator Overloading, Control Structures.

## Unit- II

**Functions in C++:** Main function, function prototyping, call by reference, inline functions, default functions, function overloading.

**Classes and Objects:** Specifying a class, defining member functions, private member functions, array within a class, memory allocation for objects, arrays of objects, objects as function arguments, returning objects, pointers to members, local classes.

## Unit- III

**Constructors & Destructors:** Constructors, Parameterized Constructors, Constructors with Default arguments, Dynamic Initialization of objects, Dynamic Constructors & Destructors.

## Unit- IV

**Operator Overloading & Type Conversion:** Definition & Rules of overloading Operators, Overloading Binary & Unary Operators. **Inheritance:** Definition, single, multilevel, multiple, hierarchical and hybrid inheritance, virtual base classes, abstract classes

**Pointers, Virtual Functions and Polymorphism:** Pointers, Pointers to Objects and derived classes, virtual functions, Pure virtual functions.

## Unit- V

**Templates:** Class templates, function templates, overloading of function templates, member function templates. **Strings:** Creating and manipulating string objects, accessing characters in strings, comparing and swapping.

### Books Recommended:

1. E Balagurusamy ,Object Oriented Programming with C++,
2. Robert Lafore ,Object Oriented Programming in Turbo C++,
3. Al Stevens, Teach Yourself C++,
4. Farouzan & Gilberg ,A Structured Approach using C++,
5. jarne Stroustrup, C++ Programming Language , Addison Wesley
6. Lipman, Stanley B, Jonsce Lajole, C++ Primer Reading , AWL, 1999
7. Mercer, Computing Fundamental with C++ , Palgrave Macmillan
8. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.

## Digital Electronics & Logic Design

CSE-312T

L- P

4- 0

### Unit-I: Number Systems And Codes

Binary arithmetic, binary code, excess-3 code, gray code, error detection and correction codes. Boolean algebra: Postulates and theorems, logic functions, minimization of Boolean functions using algebraic, Karnaugh map and Quine – McClusky methods, realization using logic gates.

### Unit-II: Combinational Circuits

Introduction to combinational circuit: Realization of basic combinational functions like Adder /BCD Adder/ Subtractor, Encoder / decoder, Multiplexer /Demultiplexer, Comparators, Delays and hazards in combinational circuits.

### Unit-III: Sequential Circuits

Flip-Flops - SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis of clocked sequential circuits - their design, State minimization, state assignment, Circuit implementation.

### Unit-IV: Registers and Counters

Registers-Shift registers, Ripple counters, Synchronous counters, Timing signal.

### Unit-V: Logic Families and Data Converters

RTL, DTL, TTL, ECL, ICL, HTL, NMOS & CMOS logic gates, Circuit diagram and analysis characteristics and specifications, tri-state gates.

Analog to Digital converters, Digital to Analog converters, Programmable Logic Devices. (PLD's)

### Books Recommended:

1. Morris Mano, "Digital logic and Computer Design ", Prentice-Hall of India.
2. Ronald J. Tocci, "Digital Systems, Principles and Applications", Prentice-Hall of India.
3. Jain R.P., "Modern Digital Electronics ", Tata McGraw Hill.
4. Floyd T.L., "Digital Fundamentals ", Charles E. Merrill Publishing Company.

**Communication –I**  
**ECE- 317 T**

**L -- P**  
**4 -- 0**

**Unit-I**

Evolution, introduction and benefits of communication technology, Review of signal spectra, Modulation & Need for modulation. Amplitude modulation (AM): definition, AM modulation index, spectrum of AM signal, power analysis of AM signal, Standard AM generation, detection using envelop detector. DSB/SC-AM, Generation & detection of SSB-SC modulation, Vestigial Side band A M signal (Brief ideas).

**Unit-II**

Frequency modulation (FM): Basic definition, Frequency modulation index, Carson bandwidth of FM signal, Narrow band and broad band FM signal. Generation and detection of FM, pre-emphasis, de-emphasis, FM threshold effect, Capture effect, Comparison of bandwidth between FM and AM.

**Unit-III**

Elements of digital communication systems, advantages of digital communication systems, Sampling, Quantization and Coding, Quantization error (proof not required), Sampling theorem (proof), Pulse code Modulation (PCM), PCM Transmitter and receiver, Bandwidth, Differential PCM systems(DPCM), Delta modulation, its drawbacks, adaptive delta modulation, comparison of PCM and DM systems.

**Unit-IV**

Digital Modulation techniques, generation and detection of ASK, FSK, PSK, DPSK, QPSK, QAM. Pulse modulation Techniques-Pulse Amplitude modulation (PAM), Pulse Position Modulation (PPM) Pulse Width Modulation (PWM), Shannon's law, Spread Spectrum Modulation Techniques and PN-sequences.

**Unit-V**

Frequency division multiplexing (FDM), Tuned radio frequency receiver, Heterodyne receiver, image frequency, Receiver characteristics, Sources of noise, signal to noise ratio, SNR of base band communication system, SSB, DSB/SC, Standard-AM, SNR of FM, Noise figure, Relative performance.

**Text Books:**

1. Electronic Communication system; G. Kennedy
2. Electronic Communication Systems(Fundamentals through advanced), W. Tomassi, Pearson Education
3. Communication System by Simon Haykin
4. Communication Systems by Manoj Dhuan, IK International

**References Books:**

1. Communication system; Analog and Digital, Sanjay Sharma
2. Electronic Communications, Roody- Coolan, PHI
3. Electronic Communication by Louis. E. Frenzel

**Discrete Mathematics**  
**MTH-311T**

**L – P**  
**4 - 0**

**Unit I**

**Relations:** Sets, Product sets, Relations, Representation of Relations, Composition of Relations, Partitions, Equivalence Relations.

**Unit II**

**Ordered sets and Lattices:** Ordered sets, Diagram of Partially ordered sets, Supremum and Infimum, well ordered sets, Lattices, Bounded and complemented lattice, Distributive Lattice.

**Unit III**

**Propositional Calculus:** Statements, Basic operations, Truth value of compound statements, Algebra of Propositions, Tautologies and contradiction, Conditional and Bi-conditional statements, logical implications, logical equivalence, predicates, Universal and existential quantifiers. Logic gates, Boolean Algebra, Postulates of Boolean Algebra; Theorems of Boolean Algebra, Sum of products and product of sums Simplification, NAND and NOR implementation.

**Unit IV**

**Graph Theory:** Graphs and Multi-graphs, Degree of a vertex, Paths connectivity, Cut points Bridges, Walks, paths, cycles, connected graphs, Bipartite, Regular, Planar and connected graphs, Components, Euler graphs, Euler's theorem, Hamiltonian path and circuits, Graph coloring, chromatic number, isomorphism and Homomorphism of graphs, Konigsberg seven bridge problem, Shortest path. Trees, properties of trees, pendant vertices in trees, Degree sequences in trees, Necessary and sufficient conditions for a sequence to be a degree sequence of a tree.

**Unit V**

**Group Theory:** Groups, semi group, infinite group, Finite group, order of a group, Abelian group, subgroup, Necessary and sufficient condition for a subset to be a subgroup of a group, Lagrange's Theorem, Cosets, Normal Subgroups, order of an element of a group, cyclic group. Rings, Homomorphism and Isomorphism of rings.

**Books Recommended**

1. C. L. Liu : Elements of Discrete Mathematics, 2nd Ed. Tata Mc-Graw Hill.
2. Kolman, Busby and Ross : Discrete Mathematical Structures, 6th Ed. PHI (2009).
3. Narsingh Deo : Graph Theory with Applications to Engineering and Computer Sciences, PHI.
4. Murry R. Spiegel: Discrete Mathematics (Schaums Outline series) Tata McGraw Hill (2009).

**Reference Books**

1. Kenneth H. Rosen : Discrete Mathematics and its applications, 5th Ed. Tata McGraw Hill (2003).
2. K.R Parthasarty : basic Graph Theory, Tata Mc-Graw Hill

## Object Oriented Programming Lab

CSE-313P

<b>L</b>	<b>P</b>
<b>0</b>	<b>4</b>

### Lab Details:

1. Function overloading, default arguments in C++
2. Simple class design in C++, namespaces, objects creations
3. Class design in C++ using dynamic memory allocation,
4. Destructor, copy constructor
5. Operator overloading, friend functions
6. Overloading assignment operator, type conversions
7. Inheritance, run-time polymorphism
8. Template design in C++
9. Interfaces and Inheritance
10. Exceptions handling
11. Small project as Assignment.

# Digital Electronics and Logic Design Lab

CSE-314P

L P

0 2

## Lab Details

1. To verify the truth table of the following logic gates:
  - AND, OR, NOT
  - NAND, NOR, XOR, XNOR
2. Realization of :
  - Half Adder and verify its truth table
  - Full Adder and verify its truth table
  - Half subtractor and verify its truth table
  - Full subtractor and verify its truth table
3. To design multiplexer and demultiplexer using 2-input NAND gates.
4. Realization of :
  - Flip-Flops
  - Ripple Counters

### **Unit-1**

HTML for structure, CSS for layout, and JavaScript for client-side programming; Suggestions for learning. Web Site Basics: Dreamweaver, HTML: Elements. Attributes and values. HTML Tables: Table, heading, row, data elements and attributes. Table structure not for page layout. Links and server-side includes: HTML links and anchors. Linking to external files to modularize html, build script libraries, or share styles; Server-side Includes. Standards: W3C, the World Wide Web Consortium: W3C recommendations as standards. HTML rules: Extensible markup languages

### **Unit-II**

Frames: A glance at a common but deprecated element; advantages and disadvantages; frame and frameset properties. Images: Image types (JPG, GIF, PNG). Inline, embedded, and external styles. Writing Style Rules: Writing CSS selectors and rules to tie style attributes and values to html elements. The cascade: Inheritance, specificity, and the cascade. CSS positioning: Static, relative, and absolute positioning.

### **Unit-III**

Client-side programming for browsers. Event Handlers. JavaScript Overview: Language characteristics. Variables. Assignment and comparison operators; expressions. HTML Forms: The form element and inputs: textbox, radio buttons, checkbox, textarea.

### **Unit-IV**

HTML Form Basics, JavaScript, JavaScript Functions: Writing blocks of separate, reusable code, Getting started with developing simple functions for form validators. Form Validation: JavaScript for Simple Form Validation,

### **Unit-V**

The DOM and JavaScript Object Models: The W3C Document Object Model; using nodes; DHTML: JavaScript + CSS = Dynamic HTML, Advanced form validation: Javascript's innerHTML and dynamic CSS for advanced form validation

### **Lab Details**

1. Develop and demonstrate an HTML document using HTML tags.
2. Working with lists and tables.
3. Working with images, multimedia.
4. Working with frames and forms.
5. Develop and demonstrate an HTML that illustrates the use of style sheet, ordered list, table, borders, padding, colour and <spam> tag, navigation bar, page layout
6. Develop an HTML file that includes JAVA script code.
7. Develop an HTML file that includes JAVA script working with event handlers, forms, forms array.
8. To write functions in HTML, validate using regular expressions.
9. Installing and web hosting using popular web servers, IIS, Apache
10. Creating the Web Site

### **Text Books:**

1. Dietel & Dietel "Internet & Web Designing".

### **Reference Books:**

1. Greenlaw R and Hepp E "Fundamentals of Internet and www".
2. B. Underdahle and K. Underdahle, "Internet and Web Page / WebSite Design", IDG Books India (P) Ltd.
3. D. Comer, "The Internet Book", Prentice Hall of India.

# B-Tech Computer Science & Engineering

## Semester-IV

Course Code	Course Title	L – P	Credit
CSE-411T	Data Structures	4 – 0	4
CSE-412T	Software Engineering	4 – 0	4
CSE-413T	Database Management System	4 – 0	4
CSE-414T	Data Communication	3 – 0	3
MTH-411T	Probability & Statistics	4 – 0	4
XXX-ExxX	Elective-II		X
CSE 415P	Data Structures Lab	0 – 4	2
CSE 416P	Database Management System Lab	0 – 2	1
	<b>Total Credits</b>	<b>19– 6</b>	<b>22+X</b>



**Data Structures**  
**CSE-411T**

**L - P**  
**4 - 0**

**Unit I:**

Introduction to data structures, classification of Data Structures, Primitive vs. Non Primitive data structures, Linear vs Non Linear data structures, Primitive Data Structures Operations, Recursion Function & its Examples. String Manipulation.

**Unit II:**

Linked Lists -Singly, Doubly and Circular, their Implementation & Comparison, Concept of Stack & Queue, Array Based & Linked List Based Implementation of Stack & Queue & their Applications. Different types of queues.

**Unit III:**

Searching: Sequential & Binary Search on Array-based Ordered Lists, Binary Trees, their Implementation & Traversal, Binary Search Trees: Searching, Insertion & Deletion of Nodes, Height Balanced Trees & Concept of AVL Trees, Concept & purpose of B Trees & B+ Trees.

**Unit IV:**

Graphs: Definition, Terminology & Representation using Adjacency Matrix & Linked List. Graph Traversals: BFS & DFS algorithms & their Implementations. Spanning Tree.

**Unit V:**

Sorting Techniques: Insertion Sort, Selection Sort, Merge Sort, Quick Sort, Heap Sort, Sell Sort, Radix Sort. Concept of Hash Functions, Hash-tables & Hashing with Chaining.

File Structure: Sequential Files, Indexed Files, Direct Files.

**Books Recommended:**

1. Shaum's outlines "Data Structures with C" Seymour Lipschutz, Tata McGraw Hill Education.
2. Langsam Augenstein Tenenbaum "Data Structures using C and C++"

**Reference Books :**

1. Tremblay & Sorenson , "An Introduction To Data Structures With Applications" , McGraw hill, Kongakusha.
2. Horowitz Sahni Mehta , "Fundamentals of Data structures", SBCS Publication.

**Software Engineering**  
**CSE 412T**

**L P**  
**4 0**

**Unit I:**

Introduction: Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM. Software Metrics: Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

**Unit II:**

Software Project Planning: Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management. Software Requirement Analysis and Specifications: Problem Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioral and non-behavioral requirements, Software Prototyping.

**Unit III:**

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design. Software Reliability: Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar time Component, Reliability Allocation.

**Unit IV:**

Software Testing: Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards. An introduction to software reliability theory.

**Unit V:**

Software Maintenance: Management of Maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

**Text Books:**

1. R. S. Pressman, "Software Engineering – A practitioner's approach", 3rd ed., McGraw Hill Int. Ed., 1992.

**Reference Books:**

1. R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
2. P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
3. Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
4. James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons
5. I. Sommerville, "Software Engineering ", Addison Wesley, 1999.

**Data Base Management System  
CSE-413T**

**L - P  
4 - 0**

**Unit-I**

Basic Concepts and Conceptual Database Design: Database Users, Characteristics of the Database, Database Systems, Data Models, DBMS Architecture & Data Independence, Database Languages & Interfaces. Overview of Hierarchical, Network & Relational Data Base Management Systems. Data Modeling Using The Entity-Relationship Model – Entities, Attributes and Relationships, Cardinality of Relationships, Strong and Weak Entity Sets, Generalization, Specialization, and Aggregation, Translating your ER Model into Relational Model.

**Unit-II**

Relational Data Base Design and Oracle Architecture: Functional Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal Forms, Lossless Join & Dependency, Preserving Decomposition, Database Storage, Oracle Software Structures, Shared Database Access Mechanism, Database Protection. Case Study – ORACLE.

**Unit-III**

Relational Model, Languages & Systems: Relational Data Model, Relational Model Concepts, Relational Model Constraints, Relational Algebra, SQL – A Relational Database Language, Data Definition & Manipulation in SQL, View and Queries in SQL, Specifying Constraints and Indexes in SQL, Practicing SQL commands using ORACLE. Case Study – ORACLE. Brief introduction of PL-SQL.

**Unit-IV**

Transaction Management: Transaction Concept and State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Concurrency Control Techniques: Lock-Based Protocols, Timestamp-based Protocols, Validation-based Protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Recovery System, Failure Classification, Storage Structure. Recovery and Atomicity: Log-based Recovery, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage.

**Unit-V**

Advanced Recovery Techniques, Remote Backup Systems. Indexing, Hashing and Query Processing: Query Processing, Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions, Concepts of Object Oriented Database Management Systems, Distributed Data Base Management Systems.

**Reference Books:**

1. Elmsari and Navathe, “Fundamentals of Database Systmes”, A. Wesley
2. Korth, Silberschatz, “Database System Concepts”, TMH
3. Steve Bobrowski, “Oracle 8 Architecture”, TMH
4. Date C. J., “An Introduction to Database Systems”, Narosa Publishing
5. Ullman J. D., “Principles of Database Systems”, Galgotia Publications
6. William Page, “Using Oracle 8i – Special Edition”, Que/PHI
7. Ivan Bayross, ”SQL & PL/SQL Using Oracle 8i & 9i with SQLJ”, BPB

**Data Communication**  
**CSE-414T**

**L P**  
**3- 0**

**Unit -I**

**Data and Signals:** Data, Signals, Types of Signals, Bandwidth, spectrum, Digitization of analog signals, sampling, Nyquist sampling theorem, quantization, quantization noise, Pulse code modulation

**Unit-II**

**Digital Modulation Techniques:** ASK, FSK, PSK, DPSK, M-ary PSK, QAM. Signal constellation. Line coding techniques: NRZ, RZ, Biphasic, Manchester coding, AMI, HDBn.

**Unit III**

**Transmission media:** Guided and un-guided media, twisted wire pair, coaxial cable, optical fibre, microwave links, satellite microwave link, their characteristic features and applications for data transmission.

**Data transmission:** simplex, half duplex and full duplex, Asynchronous and synchronous data transmission. Carrier, bit and frame synchronization techniques, Phase lock loop.

**Unit IV**

**Multiplexing Techniques:** Frequency Division Multiplexing, Time Division Multiplexing, Wavelength division Multiplexing and Code Division Multiplexing. Spread Spectrum.

**Errors in data communication:** Types of errors, error detection and correction techniques, forward error correction, polynomial error detection scheme, computation of CRC. Hardware

**Unit -V**

**Data communication network:** Basic concept of network, Advantages and applications, Types of networks (LAN, MAN and WAN), Different network topologies like star, ring, hybrid, tree. Introduction to OSI model.

**Books recommended**

1. William Stallings: Data & Computer Communications, 9th Ed, PHI
2. Data Communications and Networking: Behrouz A. Forouzan
3. Andrew Tanenbaum, "Computer Networks" PHI
4. Sklar, "Digital Communications fundamentals & Applications" 2nd Ed Pearson Pub.
5. Keizer, "Local Area Networks" McGraw Hill

**Probability & Statistics**  
**MTH 411T**

**L P**  
**4 0**

**Unit-I:**

Statistics: Measures of central tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Moment generating functions, problems.

**Unit-II:**

Probability: Random experiment, sample space, events, classical, statistical and axiomatic definitions of probability. Statements and proof of theorems on addition and multiplication of probabilities, problems.

**Unit-III:**

Conditional Probability: Bayes theorem on conditional probability. Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases. Laws of expectation problems. Problems.

**Unit-IV:**

Standard Distributions: Binomial, Poisson and Normal Distributions, Beta and Gamma Distribution, t Distribution, F-Distribution, Chi-square Distribution and their applications.

**Unit-V:**

Method of Least Squares & Correlation: Methods of least squares, fitting of straight line and parabola of degree 'p'. Regression and Correlation. Multiple and Partial Correlation. Problems

**Books Recommended:**

1. Fundamentals of Mathematical Statistics by S.C. Gupta and V.K. Kapoor, Sulltan Chand & Sons New Delhi, Latest edition.
2. Statistical Theory and Methodology in Science & Engineering by Brownlee, John Wiley & Sons.
3. Introduction to Mathematical Statistics by R.E. Walpole 3<sup>rd</sup> edition New York Macmillan publication.
4. Data Analysis for Scientists & Engineers by Meyer, John Wiley & Sons.

## Data Structures Lab

CSE-415P

L P

0 4

### Lab Details:

1. Program on arrays.
2. Implementation of String Manipulation
3. Programs on Recursion.
4. Implementation of single and doubly linked list and various operations on them.
5. Applications of Linked List Polynomial Manipulation.
6. Circular Linked List.
7. Implementation of Stack and Queue using Array and linked list.
8. Applications of stack like Tower of Hanoi , Conversion of Infix Expression to polish notation, Conversion of Polish Expression to Code.
9. Implementation of Double Ended Queue
10. BST and its implementation.
11. Implementation of Sorting techniques- Selection Sort ,Insertion Sort, Merge Sort, Quick Sort, Radix Sort , Heap Sort, Shell Sport

## Data Base Management Systems Lab

CSE 416P

L P

0 2

### Lab Details:

SQL Data Definition and Data Types.

Specifying Basic Constraints in SQL.

Schema change statements in SQL.

Insert, Delete and Update Statements in SQL.

Basic Queries in SQL.

Joining Multiple Tables : Inner Joins , Outer Joins ,Cross Joins.

Correlated and Nested Queries in SQL.

Implement all the operation like Union, Intersect, minus, in, exist, aggregate and Statistical functions . Group By And Having clause.

Creating Views, Writing Assertions.

### **PL/Sql**

PL/SQL data Types ,Control Structures, Logical Operators(And, Not, Or), Relational Operators(IS NULL, Like, Between , In etc).

Built in Functions.

Functions and procedures.

Cursors , Collections and records.

Packages and Triggers.

Error handling .

Oracle administration

Creating FORMS

Generating REPORTS.

# B-Tech Computer Science & Engineering

## Semester-V

<b>Course Code</b>	<b>Course Title</b>	<b>L – P</b>	<b>Credit</b>
<b>CSE-511T</b>	Design and Analysis of Algorithms	4 – 0	4
<b>CSE-512T</b>	Operating System	4 – 0	4
<b>CSE-513T</b>	Microprocessors, Peripherals and Interfacing	4 – 0	4
<b>CSE-514T</b>	Computer Networks	4 – 0	4
<b>CSE-515T</b>	Computer Architecture and Organization	4 – 0	4
<b>XXX-ExxX</b>	Elective-III		X
<b>CSE-516P</b>	Design and Analysis of Algorithms Lab	0 – 2	1
<b>CSE-517P</b>	Microprocessors, Peripherals and Interfacing Lab	0 – 2	1
<b>CSE-518P</b>	Computer Networks Lab	0 – 2	1
	<b>Total Credits</b>	<b>20 – 6</b>	<b>23+X</b>



**Design and Analysis of Algorithms**  
**CSE-511T**

**L P**  
**4 0**

**Unit-I**

**Introduction:** Algorithm Design paradigms- motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptomatic Notations.

**Divide & Conquer:** Structure of divide and conquer algorithms: examples, Binary search, Quick sort, analysis of divide and conquer run time reference relations.

**Unit-II**

**Greedy method:** Overview of the greedy paradigm, examples of exact optimization solution (minimum cost spanning tree), approximate solution (Knapsack problem), single source shortest paths.

**Dynamic Programming:** Overview, difference between dynamic programming and divide and conquer, applications: shortest path in graph, matrix multiplication, travelling salesman problem, longest common sequence.

**Unit-III**

**Graph searching and traversal:** Overview, traversal methods, depth first and breadth first search. Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths.

**Unit-IV**

**Back Tracking:** Overview, 8-queen problem and Knapsack problem.

**Branch & Bound:** LC searching, bounding, FIFO branch and bound, Applications: 0/1 Knapsack problem, Travelling salesman problem.

**Unit-V**

**String matching:** The naïve String Matching algorithm, The Rabin-Karp Algorithm, The Knuth-Morris Pratt algorithm.

**Computational complexity:** Complexity measures, Polynomial vs non-polynomial time complexity; NP hard and NP complete classes, examples

**Books Recommended:**

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 2<sup>nd</sup> Ed., PHI, 2004.

**References Books:**

1. Ellis Horowitz and Sartaz Sahani, "Computer Algorithms", Galgotia Publications, 1999.
2. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addison Wesley, 1998.
3. D. E. Knuth, "The Art of Computer Programming", 2<sup>nd</sup> Ed., Addison Wesley, 1998.

**Operating System**  
**CSE-512T**

**L P**  
**4 0**

**UNIT I**

Computer System Overview-Basic Elements, Instruction Execution, Operating system functions and structure, Interrupts, Memory Hierarchy, Cache Memory, Direct Memory Access, Multiprocessor and Multicore Organization. Operating system overview-objectives and functions, Evolution of Operating System, Distributed OS.

**UNIT II**

Process concept, Process States, Process Description and Process Control, Interprocess Communication, Processes and Threads, Types of Threads, Multicore and Multithreading,

**UNIT III**

Principles of Concurrency - Mutual Exclusion, Semaphores, Monitors, Readers/Writers problem. Deadlocks – prevention- avoidance – detection, Scheduling- Types of Scheduling – Scheduling algorithms.

**UNIT IV**

Memory management requirements, Partitioning, Paging and Segmentation, Virtual memory - Hardware and control structures, operating system software, Linux memory management, Windows memory management. Virtual memory management.

**UNIT V**

I/O management and disk scheduling – I/O devices, organization of I/O functions; OS design issues, I/O buffering, disk scheduling, RAID, Disk cache. File management – Organization, Directories, File sharing, and Record blocking, secondary storage management.

**Text Books:**

1. Silberschatz, Peter Galvin, Greg Gagne “Operating System Principles”.

**Reference Books:**

1. Andrew S. Tannenbaum & Albert S. Woodhull, “Operating System Design and Implementation”, Prentice Hall.
2. William Stallings, “Operating Systems – internals and design principles”, Prentice Hall.
3. Andrew S. Tannenbaum, “Modern Operating Systems”, Prentice Hall.
4. Gary J. Nutt, “Operating Systems”, Pearson/Addison Wesley.
5. Pramod Chandra P. Bhatt, “An Introduction to Operating Systems Concepts and Practice”.

**Microprocessors, Peripherals and Interfacing**  
**CSE-513T**

**L P**  
**4 0**

**UNIT-I**

Introduction To 8-bit Microprocessor: History of Microprocessor, 8085 Microprocessor architecture, buses, register, flags. 8085 pin configuration & function of each pin. Fetch, Decode and execute operations. Op-code Fetch, execute cycle, T state, Machine cycle. Memory and I/O read and write cycles WAIT state, interrupt timing diagram.

**UNIT-II**

Intel 8085 Microprocessor Instruction Set and Programming: Addressing modes of 8085. Data transfer, Arithmetic, Logical, Rotate, Branch and machine control instructions. Development of 8085 assembly language programs, time delays. Concept of stack and Instruction related to stack. 8085 interrupts, RST, RIM, SIM instructions. Subroutines and conditional call instruction

**UNIT-III**

Interfacing of Memory Chips & Input / Output Chips: Memory mapped I/o and I/O mapped I/O. Address decoding, interfacing of memory chips with 8085. Interfacing of input/output chips with 8085

**UNIT-IV**

Peripherals IC and Applications: Block diagram, Pin description and Interfacing of 8255(PPI) with 8085 Microprocessor. Interfacing of keyboard, display, ADC and DAC to 8255. Block diagram, Pin description and Interfacing of 8253(PIT) with 8085 Microprocessor. Brief description and application of 8259 PIC, 8251 USART and 8237 DMA Controller

**UNIT-V**

Introduction advance Microprocessor: Intel 8086 Microprocessor architecture, Addressing Modes, 8086 pin configuration & function of each pin. Introduction and advance features of 8088, 80186, 80286, 80386 and 80486microprocessor

**RECOMMENDED BOOKS:**

1. Microprocessor Architecture, Programming, and Applications with the 8085 –Ramesh S. Gaonkar Pub: Penram International.
2. Microprocessor 8085 and its Interfacing, By Sunil Mathur, Second Edition, PHI Learning Pvt. Ltd.
3. 8085 Microprocessor And its Applications, By A. Nagoor Kani, Third Edition, TMH Education Pvt. Ltd
4. Microprocessors and interfacing - Douglas V. Hall, TMH, 2nd Edition, 1999.

**Computer Networks  
CSE-514T**

**L P  
4 0**

**Unit I**

**Introduction:** Uses of Computer Networks, Network and Protocol Architecture, Reference Model (ISO-OSI, TCP/IP-Overview).

**UNIT-II**

**Data Link layer** – Design Issues, Error detection and Correction, Elementary and sliding Window data link protocols, Data link layer in HDLC, Point to Point protocol ALOHA, carrier sense multiple access, collision free protocols, IEEE standards –802.3, 802.4, 802.5: Transparent and source routing bridges.

**UNIT-III**

**Network Layer:** IP Addressing, IPv.4 Vs IPv.6, Class C Subnetting, virtual circuit and datagram subnets – Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad-cast, multicast, distance vector routing. Congestion control Algorithms – General principles of congestion prevention policies.

**UNIT-IV**

Internet working: The Network layer in the Internet.

**Transport Layer:** Transport services, Elements of Transport protocols, Internet Transport Protocols. TCP, UDP, TCP sockets

**UNIT-V**

**Application Layer**-Network Security: Domain Name system: Electronic Mail; The world Wide Web; DHCP;

**TEXT BOOKS:**

1. W. Stallings, “Computer Communication Networks”, PHI, 1999.
2. Larry L.Peterson, Peter S. Davie, “*Computer Networks*”, Elsevier, Fifth Edition, 2012.
3. Computer Networks – Third Edition – Andrew S. Tanenbaum, Prentice Hall of India.
4. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

**References:**

1. U. Black, “Computer Networks-Protocols, Standards and Interfaces”, PHI, 1996.
2. Laura Chappell, “Introduction to Cisco Router Configuration”, Techmedia, 1999.
3. Michael A. Miller, “Data & Network Communications”, Vikas Publication, 1998.
4. William A. Shay, “Understanding Data Communications & Networks”, Vikas Publication, 1999.

**Computer Architecture and Organization**  
**CSE-515T**

**L – P**  
**4 - 0**

**Unit-I:**

**Register Transfer and Micro-operations**

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description. Control Memory, Address Sequencing, Micro program Example.

**Unit-II: Design of Control Unit**

Hardware and Software Control Unit, single Bus architecture

**Unit-III: Input-Output Organization**

Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, I/O Controller

**Unit-IV: Memory Organization**

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

**Unit-V: Arithmetic -**

Addition and Subtraction of Signed Numbers, Addition/Subtraction Logic Unit, Design of Fast Adders, Carry Lookahead Addition, Multiplication of Positive Numbers, Signed Operand Multiplication, Booth Algorithm, Integer Division, IEEE Standard for floating point numbers.

**Text Books:**

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, McGraw-Hill, Fifth Edition, Reprint 2012.

**Recommended Books:**

1. Ghosh T. K., “Computer Organization and Architecture”, Tata McGraw-Hill, Third Edition, 2011.
2. W. Stallings, “Computer Organization & Architecture”, PHI.
3. J. P. Hayes, “Computer Architecture and Organization”, McGraw Hill
4. J. L. Hennessy and D. A. Patterson, “Computer Architecture: A quantitative approach”, Morgan Kaufman, 1992.
5. Computer Systems Organization and Architecture, John D. Carpinelli, Pearson Education Inc.

**Design and Analysis of Algorithms Lab**  
**CSE-516P**

**L P**  
**0 2**

**Lab Details:**

**The Following Problems Are To Be Solved In C**

Simple Experiments on time and space complexity of a program

**Divide and Conquer Approach:** Merge Sort, Quick sort, Medians and Order statistics, Strassen's algorithm for Matrix Multiplications.

**Greedy Algorithms:** Knap Sack Problem, An activity selection problem, Huffman Codes, A task scheduling problem.

**Dynamic Programming:** Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems.

**Graph Algorithms:** Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths.

**Back Tracking:** 8-queen problem and Knapsack problem.

**Branch & Bound:** LC searching, bounding, FIFO branch and bound,

**String matching:** The naïve String Matching algorithm, The Rabin-Karp Algorithm, The Knuth-Morris Pratt algorithm.

**Microprocessors, Peripherals & Interfacing lab**  
**CSE-517P**

**L P**  
**0 2**

**Lab Details:**

1. To develop a program to add two double byte numbers.
2. To develop a subroutine to add two floating point quantities.
3. To develop program to multiply two single byte unsigned numbers, giving a 16 bit product.
4. To develop subroutine which will multiply two positive floating point numbers.
5. To write program to evaluate  $P*Q+R*$  & S are 8 bit binary numbers.
6. To write a program to divide a 4 byte number by another 4 byte number.
7. To write a program to divide an 8 bit number by another 8 bit number upto a fractional quotient of 16 bit.
8. Write a program for adding first N natural numbers and store the results in memory location X.
9. Write a program which decrements a hex number stored in register C. The Program should half when the program register reads zero.
10. Write a program to introduce a time delay of 100 ms using this program as a subroutine display numbers from 01H to 0AH with the above calculated time delay between every two numbers.
11. N hex numbers are stored at consecutive memory locations starting from X. Find the largest number and store it at location Y.
12. Interface a display circuit with the microprocessor either directly with the bus or by using I/O ports. Write a programme by which the data stored in a RAM table is displayed.
13. To design and interface a circuit to read data from an A/D converter, using the 8255 A in the memory mapped I/O.
14. To design and interface a circuit to convert digital data into analog signal using the 8255 A in the memory mapped I/O.
15. To interface a keyboard with the microprocessor using 8279 chip and transfer the output to the printer.
16. To design a circuit to interface a memory chip with microprocessor with given memory map.

**Computer Network Lab  
CSE-518P**

**L – P  
0 - 2**

**Lab Details:**

1. Identification of guided media (UTP,Fibre) /Color coding.
2. To Connect two pc using peer to peer communication/via switch/via router.
3. IP addressing (static and dynamic).
4. Sharing the resources in wired network (software and hardware).
5. Configuring the Windows server (Active directory) and DHCP server.
6. Study of NS2/ GLOMOSIM / OPNET.
7. To implement wired network topology and wireless network topology in NS2.



# B-Tech Computer Science & Engineering

## Semester-VI

Course Code	Course Title	L – P	Credit
CSE 611T	Java Programming	4 – 0	4
CSE 612T	Formal Language and Automata Theory	4 – 0	4
CSE 613T	Computer Graphics	4 – 0	4
CSE 614T	Embedded Systems	4 – 0	4
MTH- 611T/P	Numerical Methods	3 – 1	4
XXX-ExxX	Elective IV		X
CSE 615P	Java Programming Lab	0 – 2	1
CSE 616P	Computer Graphics Lab	0 – 2	1
	<b>Total Credits</b>	<b>19 – 5</b>	<b>22+X</b>

**Java Programming**  
**CSE-611T**

**L P**  
**4 0**

**Unit-I**

Introduction to java, importance of java to internet, Java Virtual Machine Architecture, Class loading process by Class loaders, Role of Just in Time Compiler (JIT) , Data Types, Variables and Arrays ,precedence and associability rules, Operators, Control statements, Object oriented Paradigms  
Class Fundamentals, Command Line Arguments, static initializer, Inheritance, abstract classes, Variable Hiding ,Overloading and Overriding of Methods , Access Controls modifiers, Nested and Inner Classes ,Dynamic method dispatch introduction to Packages, Understanding CLASSPATH, Access Protection, Importing Packages, Distributing packages as ZIP and Jar files, Defining and implementing an Interface, Abstract classes Vs Interfaces.

**Unit-II**

Fundamentals of Exception handling, Types of exceptions, exception handlers, Try and catch , Multiple catch clauses, Nested try statements, throw, throws and finally ,Creating custom exceptions  
String class, String buffer class, String builder class, Wrapper class. File Handling, Binary Streams, Character Streams, Serialization.

Lambda Expressions: Introduction to Lambda Expressions, Using Lambda Expression, Method References

**Unit-III**

Windows Programming: introduction to AWT, containers and components, AWT classes, AWT controls, Layout managers and Menus

Event Delegation Model: Event Classes Event Listeners

Swing: Introduction to JFC Controls.

Applet: Applet Basics, Architecture and Skelton, Simple Applet Display Methods.

**Unit-IV**

The Java Thread Model, Creating a Thread: Extending Thread, Implementing Runnable, Creating Multiple Threads and Context Switching, Synchronization, Inter-thread Communication , Java collection framework, maps and Generics, Introduction to Stream API, Stream API Examples.

**Unit-V**

RMI: Distributed Applications, RMI Architecture, Implementation of RMI Server and Client ,Call-back Mechanism

JDBC: JDBC Drivers, JDBC API,Executing statements, prepared statements and callable statements, Metadata ,Scrollable & Updatable ResultSet, Data Source & Connection Pooling, Batch Updates ,Rowsets

**Text Books/References**

1. The Java Handbook by Patrick Naughton, Michael Morrison Osborne/McGraw-Hill publication
  2. Java 2 The Complete Reference by Herbert Schildt Tata McGraw-Hill publication.
  3. Professional Java Server Programming J2EE edition Volume I,II Wrox publications
  4. SCJP Sun certified programmer for java 6 exam study guide by Kathy Sierra and Bert Bates dreamtech press
  5. Head First Java by Kathy Sierra and Bert Bates oreilly publications
  6. Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley
  7. "Programming with Java" by E Balaguruswamy.
  8. Decker & Hirshfield, "Programming,Java", Vikas Publication.
  9. Java: An Introduction to Computer Science and Programming by W.Savitch (Prentice-Hall).
- Advanced Java: Internet Applications by A.Gittleman (Scott Jones). Covers a broad range of advanced topics from JDBC, servlets and JSP to Java2D and beans.

# Formal Languages and Automata Theory

CSE-612T

L - P

4 - 0

## Unit -I

**Introduction to finite Automata:** Introduction to finite automata, The central concepts of Automata theory, Deterministic finite automata, Nondeterministic finite Automata

## Unit-II

**Finite Automata & Regular Expressions:** An application of finite Automata, Finite Automata with epsilon-transitions, Regular Expressions, Finite Automata, Pumping Lemma for Regular Expressions, Equivalence and Minimization Of Automata

## Unit-III

**Context Free Grammars and Languages:** Context free grammars, Parse trees, Ambiguity in Grammars, Left Recursion, Eliminating Epsilon Productions, Eliminating Unit productions, Chomsky Normal Form, Grieback Normal Form

## Unit-IV

**Pushdown Automata:** Definition of the pushdown automata, the languages of a PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata

## Unit-V

**Introduction to Turing Machine:** The Turing Machine, Programming techniques for Turing machines, Extensions to the basic Turing machines

### TEXT BOOKS:

1. Jhon E. Hopcroft,,Rajeev Motwani, Jeffery D.Ullman: Introduction to Automata Theory, Languages and Computation, 3<sup>rd</sup> edition, pearson education, 2007

### REFERENCE BOOKS:

1. K.L.P. Mishra: Theory of Computer Science, Automata , Languages and Computation, 3<sup>rd</sup> edition, PHI, 2007
2. Jhon C martin: Introduction to languages and Automata Theory, 3<sup>rd</sup> edition ,Tata McGraw-hill,2007
3. A.M. Padma reddy : Formal Languages and Automata theory, 3<sup>rd</sup> edition, United Publishers,2009
4. Shirish S. Sane: Theory of computer science, 2<sup>nd</sup> edition, Technical publications Pune

**Computer Graphics**  
**CSE-613 T**

**L P**  
**4 0**

**Unit: I:**

Introduction to Graphics, Manual drafting vs. Computer Graphics, Advantages of Computer Graphics, Characteristics & Applications of Computer Graphics, Graphic Display Devices (CRT, Random Scan Display monitors, Raster Scan Display monitors). Graphic Input Devices (Keyboard, Mouse, Trackballs & Space balls, Joy-sticks, Touch-screens).

**Unit: II:**

Points & Lines, Line Drawing Algorithms (DDA, Bresenham's Line Algorithm). Circle – Generating Algorithms (Basic concepts & properties of circle drawing, Mid-pt. circle algorithm). Ellipse Generating Algorithms (Basic concepts & properties of ellipse drawing, Mid-pt. Ellipse-algorithm). Boundary Filling Algorithm, Flood Filling Algorithm, Aliasing / Anti-aliasing.

**Unit: III:**

Introduction to 2D- transformation: Basic transformation (Translation, Rotation & Scaling). Composite Transformations (Translation, Rotation & Scaling). Other Transformations (Reflection & Shearing).

2-D Viewing: The viewing pipeline, Clipping operations, Point Clipping, Line clipping (Cohen – Sutherland Line Clipping). Polygon clipping (Sutherland-Hodgeman Polygon Clipping), Text clipping.

**Unit: IV:**

Projections (Parallel Projections & Perspective Projections), Visible-Surface Detection Methods (Classification of Visible –Surface Detection Algorithms,

**Unit: V:**

Back-Face Detection, Depth-Buffer Method, Scan-line Method).

Interactive Picture –Construction Techniques (Basic Positioning Methods, Constraints, Grids, Gravity field, Rubber Band Techniques , Dragging , Painting & Drawing , Inking ).

**Text Books:**

1. Computer Graphics by Donald Hearn & M. Pauline Baker.

**Reference Books:**

1. Principles Of Interactive Computer Graphics by William. M. Newman & Robert. F. Sproull.
2. Steven Harrington."Computer Graphics A Programming Approach" McGraw Hill.
3. James .D. Foley, VanDam Fundamentals of interactive Computer Graphics.
4. David F. Frogers & J Alan Adams- Procedure and elements of Computer graphics.

### **UNIT – I**

Introduction to an embedded systems design & RTOS: Introduction to Embedded system, Processor in the System, Microcontroller, Memory Devices, common examples of Embedded Systems. Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services (overview).

### **UNIT – II**

Overview of Microcontroller: Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits and PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs, Single-bit instruction programming, Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming.

### **UNIT – III**

Communication with 8051: Basics of Communication, Overview of RS-232, UART, USB, 8051 connections to RS-232, 8051 serial communication programming, 8051 interrupts, Programming of timer interrupts, Programming of External hardware interrupts, Programming of the serial communication interrupts, Interrupt priority in the 8051.

### **UNIT -IV**

Interfacing with 8051: Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051.

### **UNIT-V**

Motor Control: Electromechanical relays, optoisolator, interfacing a stepper motor, and interfacing DC motor. Arduino: Hardware overview, Arduino IDE and Arduino syntax (basic examples), interfacing LED.

#### **Text books:**

1. Raj Kamal, “Embedded Systems”, TMH, 2004.
2. M.A. Mazidi and J. G. Mazidi, “The 8051 Microcontroller and Embedded Systems”, PHI, 2004.

#### **References books:**

1. David E. Simon, “An Embedded Software Primer”, Pearson Education, 1999.
2. K.J. Ayala, “The 8051 Microcontroller”, Penram International, 1991.
3. Dr. Rajiv Kapadia, “8051 Microcontroller & Embedded Systems”, Jaico Press
4. Dr. Prasad, “Embedded Real Time System”, Wiley Dreamtech, 2004.

## Numerical Methods MTH 611T/P

L - P  
3 - 1

### Unit-I:

**Finite Difference:** Difference Table and its usage. The difference operators  $\Delta$ ,  $\nabla$  and the operator  $E$ .

**Interpolation:** Interpolation with equal intervals, Newton's advancing difference formula. Newton's backward difference formula. Interpolation with unequal intervals. Newton's divided difference formula. Lagrange's interpolation formula.

**Central Differences:** The central difference operator  $\delta$  and the overranging operator  $\mu$ . Relations between the operators. Gauss forward and backward interpolation formula, Sterlings, Bessel's, Laplace and Everetts formulae.

### Unit-II

**Inverse interpolation:** Inverse interpolation by (i) Lagrange's (ii) Methods of successive approximation & (iii) Methods of elimination of third differences

**Numerical solution of algebraic and Transcendental Equations:** Graphic Method, Regula-Fast method, Balzano's Process of bisection of intervals, Newton-Raphson Method and its geometrical significance.

### Unit-III:

**Numerical Integration:** Numerical Integration, General Quadrature Formula, Simpson's one-third and three-eighth rules, Weddles' rule, Hardy's rule, Trapezoidal rule.

**Numerical differentiation :** Numerical differentiation of a function. Differential coefficient of a function in terms of its differences. Applications

### Unit-IV

**Difference Equations:** Linear-homogeneous and non-homogeneous difference equations of order  $n$  with constant coefficient, and their solution, methods of undetermined coefficient.

**Numerical Solution of ordinary differential equations:** Numerical solution of ordinary differential equations, Picard's method. Taylor's series method, Euler's method, Runge-Kutta Method.

### Unit-V

**Laboratory:** Writing computer programmes for numerical methods like Simpson's rule, Newton-Raphson method & Runge-Kutta method etc. Running of programme exercises.

### Books Recommended:

1. Numerical Methods for Scientists and Engineering by M.K.Jain, S.R.Iyengar & R.K. Jain, Wiley Eastern Ltd.
2. Mathematical Numerical Analysis by S.C. Scarborough, Oxford and IBH .
3. Introductory methods in Numerical Analysis by S.S.Sastry, Prentice Hall of India.
4. Numerical Solution of Differential equations by M.K.Jain.
5. Numerical Methods for Science & Engineering by R.G.Stanton.

**Java Programming Lab**  
**CSE-615P**

**L P**  
**0 2**

**Lab Details:**

1. Write a Java program that prints all real solutions to the quadratic equation  $ax^2 + bx + c = 0$ . Read in a, b, c and use the quadratic formula. If the discriminant  $b^2 - 4ac$  is negative, display a message stating that there are no real solutions.
2. The Fibonacci sequence is defined by the following rule. The first two values in the sequence are 1 and 1. Every subsequent value is the sum of the two values preceding it. Write a Java program that uses both recursive and non recursive functions to print the nth value in the Fibonacci sequence.
3. Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that. Integer.
4. Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.
5. Write a Java program for sorting a given list of names in ascending order.
6. Write a Java program to multiply two given matrices.
7. Write a Java Program that reads a line of integers, and then displays each integers, and the sum of all the integers (use string to tokenizer class)
8. Write a Java program that reads on file name from the user then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.
9. Write a Java program that reads a file and displays a file and displays the file on the screen, with a line number before each line.
10. Write a Java program that displays the number of characters, lines and words in a text file.
11. Write a Java program that:
  - a) Implements stack ADT.
  - b) Converts infix expression into Postfix form.
12. Write an applet that displays a simple message.
13. Write an applet that computes the payment of a loan based on the amount of the loan, the interest rate and the number of months. It takes one parameter from the browser: Monthly rate; if true, the interest rate is per month; Other wise the interest rate is annual.
14. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the + - \* % operations. Add a text field to display the result
15. Write a Java program for handling mouse events.
16. Write a Java program for creating multiple threads
17. Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.
18. Write a Java program that lets users create Pie charts. Design your own user interface (with swings & AWT)
19. Write a Java program that allows the user to draw lines, rectangles and Ovals.
20. Write a Java program that implements a simple client/server application. The client sends data to a server. The server receives the data, uses it to produce a result, and then sends the result back to the client. The client displays the result on the console. For ex: The data sent from the client is the radius of a circle, and the result produced by the server is the area of the circle.
21. Write a Java program that illustrates how run time polymorphism is achieved.
22. Simple exercises to learn the concept of RMI, Servlets, JSP
23. Finding Simple and Compound interest using RMI
24. RMI-based implementation of Airline Reservation system.

## Computer Graphics Lab

CSE-616P

L - P

0 - 2

### Lab Details:

1. Line drawing algorithms
  - a) DDA Algorithm.
  - b) Bresanham's Line Algorithm.
2. Circle Generating Algorithms.
3. Eclipse Generating Algorithms.
4. Creation of segments Algorithms.
5. Translation Algorithm.
6. Rotation Algorithms.
7. Scaling Algorithms.
8. Clipping Operation Algorithms.



# B-Tech Computer Science & Engineering

## Semester-VII

<b>Course Code</b>	<b>Course Title</b>	<b>L – P</b>	<b>Credit</b>
<b>CSE-711T</b>	Artificial Intelligence	4 – 0	4
<b>CSE-712T</b>	Compiler Design	4 – 0	4
<b>CSE-713T</b>	Network Security	4 – 0	4
<b>XXX-ExxX</b>	Elective –V		X
<b>XXX-ExxX</b>	Elective –VI		Y
<b>CSE-714P</b>	Artificial Intelligence Lab	0 – 2	1
<b>CSE-715P</b>	Compiler Design Lab	0 – 2	1
<b>CSE-716P</b>	Minor Project	0 – 4	2
<b>CSE-717P</b>	Industrial Training	0 – 2	1
<b>CSE-718P</b>	Seminar	0 – 2	1
	<b>Total Credits</b>	<b>12-12</b>	<b>18+X+Y</b>

**Artificial Intelligence**  
**CSE- 711T**

**L – P**  
**4 - 0**

**Unit I – General Issues and overview of AI**

The AI problems: what is an AI technique, Characteristics of AI applications Problem Solving, Search and Control Strategies General Problem solving, Production systems, Control strategies, forward and backward chaining.

**Unit II – Search Techniques**

Search, Depth first Search, Breadth first Search, Hill climbing, Branch and Bound technique, Best first search and A\* algorithm, AND/OR Graphs, Problem reduction and AO\* algorithm, Constraint Satisfaction problems Game Playing Min Max Search procedure, Alpha-Beta cutoff.

**Unit III – Knowledge Representation**

First Order Predicate Calculus, Skolemisation, Resolution Principle and Unification, Inference Mechanisms Horn's Clauses, Semantic Networks, Frame Systems and Value Inheritance, Scripts, Conceptual Dependency Knowledge Acquisition.

**Unit IV languages used for AI**

AI Programming Languages Introduction to LISP, Syntax and Numeric Function, List manipulation functions, Iteration and Recursion, Property list and Arrays, Introduction to PROLOG with some examples.

**Unit V – Expert Systems**

Introduction to Expert Systems, Architecture of Expert Systems, fuzzy logic and its applications, Basic Probability Notation, Baye's Rule and Its Use, Representing Knowledge in an Uncertain Domain, Other Approaches to Uncertain Reasoning, Rule-based methods for uncertain reasoning.

**Text Books**

1. Elaine Rich and Kevin Knight: Artificial Intelligence – Tata McGraw Hill.

**Reference Books**

1. Char nick "Introduction to Artificial Intelligence", Addison Wesley.
2. Dan W.Patterson, Introduction to Artificial Intelligence and Expert Systems – Prentice Hal of India.
3. Winston, "LISP", Addison Wesley.
4. Artificial Intelligence : A Modern Approach, Stuart Rusell, Peter Norving, Pearson Education 2nd Edition.

# Compiler Design

CSE-712T

L - P

4 - 0

## UNIT I

Introduction to compilers, Phases of Compiler, Compiler construction tools, Classification of grammars, Context free grammars.

## UNIT II

Scanners, Top down parsing, LL grammars, Bottom up parsing, Polish expression Operator, Precedence grammar, IR grammars.

## UNIT III

Comparison of parsing methods, Error handling. Symbol table handling techniques, Organization for non-block and block structured Languages

## UNIT IV

Run time storage administration, Static and dynamic allocation, Intermediate forms of source program, Polish N-tuple and syntax trees, Semantic analysis and code generation.

## UNIT V

Code optimization, Folding, redundant sub-expression evaluation, Optimization within Iterative loops.

### TEXT BOOKS:

1. Aho, Ullman & Ravi Sethi, "Principles of Compiler Design", Pearson Education

### REFERENCE BOOKS:

1. Tremblay, et. al., "The Theory and Practice of Compiler Writing", McGraw Hil, New York
2. Holub, "Compiler Design in C", PHI
3. Andrew L. Appel, "Modern Compiler Implementation in C", Delhi Foundation Books
4. Dick Grune et. Al., "Modern Compiler Design", John Wiley and Sons

**Network Security**  
**CSE-713T**

**L P**  
**4 0**

**Unit I**

Introduction to network security, Secure network services, X.800, Attacks, Security, Architecture, Security Mechanism, Introduction to cryptography, Symmetric and Asymmetric Ciphers, Data Encryption Standard, Design and analysis, AES, IDEA (International Data Encryption), RC4.

**Unit II**

Public Key Cryptography and Authentication, Approaches to Message, Authentication, Secure Hash Functions, Message Authentication Codes. Public-Key Cryptography Principles, Public-Key Cryptography Algorithms.

**Unit III**

Web Security Considerations, Secure Socket Layer and Transport Layer Security

Transport Layer Security, HTTPS, Secure Shell (SSH).

**Unit IV**

Web security, Java, cookies, HTTP/HTTPS, Web objects, DNS security, Smartcards/Biometrics, Privacy, Wireless security.

**Unit V**

Firewall, The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations.

**Book Recommended**

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Prentice Hall of India, Third Edition, 2003.

**REFERENCES**

1. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
3. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.
4. Networking Essentials by Willium.S.Stallings

**Artificial Intelligence Lab  
CSE 714P**

**L – P  
0 - 2**

**Lab Details:**

**PROLOG LAB CONTENTS**

1. Input & Output
2. Operators and Arithmetic
3. Facts & Variables
4. Simple facts and facts with arguments
5. Rules & Predicates
6. Simple Predicates, Predicate Inference, Goal queries
7. Recursion
8. Graph Traversal
9. Depth First Search, Breadth First Search

**Simulators:-** 1) Win-Prolog  
2) Strawberry Prolog

**LISP LAB CONTENTS**

1. Data Types
2. symbols & lists
3. Local variables & global variables
4. Standard input/output
5. Functions & predicates
6. User defined functions
7. Recursion
8. factorial, fibanocci

**Simulators:-** ANSI common Lispworks Studio 6

**Compiler Design Lab**  
**CSE 715P**

**L-P**  
**0-2**

**Lab Details:**

1. Design NFA/DFA to recognize an identifier.
2. Design a Lexical analyzer for the given language.
3. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools.
4. Design Predictive parser for the given language
5. Design LALR bottom up parser for the given language.

**Minor Project  
CSE-716P**

**L – P  
0 -- 4**

**Objectives**

The students will carry out a project in one of the specializations of program under study with substantial multidisciplinary component. Student groups will be formed and a faculty member will be allocated to guide them in such a way so that they carry out a work on a topic as a forerunner to the full fledged project work to be taken subsequently in VIII semester.

**Industrial Training**  
**CSE-717P**

**L – P**  
**0 -- 2**

**Objectives**

Students have to undergo four week practical training in Computer Science and Engineering related industries/ Training Centers / Corporate offices in various domains (hardware, software, networking, maintenance and testing) so that they become aware of the practical application of theoretical concepts studied in the class rooms. At the end of the training student will submit a report as per the prescribed format to the department.



**Seminar  
CSE-718P**

**L – P  
0 -- 2**

**Objectives**

It should consist of a talk of 15-20 minutes on a topic preferably from the area in which a student intends to work for his Project during Semester – VII and Semester – VIII. Student will also submit a report as per the prescribed format to the department.

# B-Tech Computer Science & Engineering

## Semester-VIII

Subject Code	Course Title	L –P	Credit
CSE-811T	Wireless Communication	4-0	4
XXX-ExxX	Elective –VII	-	X
XXX-ExxX	Elective –VIII	-	Y
XXX-GxxX	Elective –IX	-	Z
CSE-813P	Major Project	-	12
	<b>Total Credits</b>	<b>4-0</b>	<b>16+X+Y+Z</b>

**Wireless Communication**  
**CSE 811T**

**L - P**  
**4 - 0**

**Unit – I**

Introduction To Wireless Communication Systems: Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

**Unit -II**

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications.

**Unit - III**

2G Networks: Second generation, digital, wireless systems: GSM, IS\_136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. Spread Spectrum Systems- Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

**Unit - IV**

2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS):GPRS architecture, GPRS Network nodes, EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

**Unit – V**

Wireless Local Loop (WLL): Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks. Global Mobile Satellite Systems.

**Text Books:**

1. William Stallings “Wireless Communications & Networks”
2. Theodore S. Rappaport, “Wireless Communication- Principles and practices,” 2nd Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

**Reference Books:**

1. T.L.Singhal “Wireless Communication”, Tata McGraw Hill Publication.
2. Jochen Schiller, “Mobile communications,” Pearson Education Pvt. Ltd., 2002.
3. Lee, W.C.Y., “Mobile Cellular Telecommunication”, 2nd Edition, McGraw Hill,1998.
4. Smith & Collins, “3G Wireless Networks,” TMH, 2007.

## B-Tech Computer Science & Engineering

### List of Department Electives

Course Code	Course Title	L - P	Credits	Pre-requisite	Preferred semester
CSE-E01T	System Analysis and Design	4 - 0	04	Nil	3 <sup>rd</sup>
CSE-E02T	Management Information System	4 - 0	04	Nil	3 <sup>rd</sup>
CSE-E03T/P	MATLAB for Engineers	1-2	02	Nil	3 <sup>rd</sup>
CSE-E04T	E-Business & ERP	4-0	04	Nil	3 <sup>rd</sup>
CSE-E05T	Multimedia Technology	4-0	04	Nil	3 <sup>rd</sup>
CSE-E06T	Modelling and Simulation	4-0	04	Nil	3 <sup>rd</sup>
CSE-E07T/P	Linux Internals	3-2	04	NILL	4 <sup>th</sup>
CSE-E08T	Software Testing and Quality Assurance	4-0	04	Software Engineering	4 <sup>th</sup>
CSE-E09T	XML and Web Services	4-0	04	Internet and Web Design	4 <sup>th</sup>
CSE-E10T	Software Project Management	4-0	04	Software Engineering	5 <sup>th</sup>
CSE-E11T	High Performance Computing	4-0	04	Computer Architecture & Organization	5 <sup>th</sup>
CSE-E12T	Object Oriented Software Engineering	4-0	04	Software Engineering and Object Oriented Programming	6 <sup>th</sup>
CSE-E13T	Distributed Computing	4-0	04	OS	6 <sup>th</sup>
CSE-E14T	Advanced Java	4-0	04	Java	7 <sup>th</sup>
CSE-E15T/P	C# and .Net Programming	3-2	04	OOPS	7 <sup>th</sup>
CSE-E16T	Computer Vision	4-0	04	DS	7 <sup>th</sup>
CSE-E17T	Selected Topics of Recent Trends in Computer Science and Engineering	4-0	04	CAO	7 <sup>th</sup>
CSE-E18T	Data Mining and Business Intelligence	4-0	04	DBMS	7 <sup>th</sup>
CSE-E19T-P	Web Technologies	3-2	04	I&WD and JAVA	7 <sup>th</sup>
CSE-E20T	Digital Image Processing	4-0	04		7 <sup>th</sup>
MTH-E01T	Operation Research	4-0	04		7 <sup>th</sup>
CSE-E21T	Pattern Recognition	4-0	04	DIP	8 <sup>th</sup>
CSE-E22T	Advanced Computer Architecture	4-0	04	CAO	8 <sup>th</sup>
CSE-E23T/P	Robotics	4-0	04	Embedded system	8 <sup>th</sup>
CSE-E24T	Big Data	4-0	04	DBMS	8 <sup>th</sup>
CSE-E25T	Ethical Hacking	4-0	04	Computer Network	8 <sup>th</sup>
CSE-E26T	Cloud Computing	4-0	04	Computer Networks	8 <sup>th</sup>
CSE-E27T	Internet of Things	4-0	04	Computer Networks, Embedded Systems	7 <sup>th</sup>
CSE-E35T	Natural language processing	4-0	04	Artificial Intelligence	8 <sup>th</sup>
CSE-E36T	Agile Software Development	4-0	04	Software Engineering	8 <sup>th</sup>

<b>CSE-E37T</b>	Biometric Technologies	4-0	04		8 <sup>th</sup>
<b>CSE-E38T</b>	Mobile Application Development	4-0	04	java	7 <sup>th</sup>
<b>CSE-E39T</b>	Object Oriented Analysis and Design	4-0	04	OOPS	6 <sup>th</sup>
<b>CSE-E40T</b>	Soft Computing	4-0	04	Design and Analysis of Algorithms	7 <sup>th</sup>
<b>CSE-E41T</b>	Evolutionary Computing	4-0	04	Design and Analysis of Algorithms	8 <sup>th</sup>

**System Analysis and Design**  
**CSE-E01T**

**L - P**  
**4 - 0**

**Unit-I**

System definition and concepts: Characteristics and types of system, Manual and automated systems. Real-life Business sub-systems: Production, Marketing, Personal, Material, Finance Systems models types of models: Systems environment and boundaries, Realtime and distributed systems, Basic principles of successful systems. Role and need of systems analyst Qualifications and responsibilities, Systems Analyst as an agent of change.

**Unit-II**

Introduction to systems development life cycle (SDLC): Various phases of development Analysis, Design, Development, Implementation, Maintenance. Systems documentation considerations: Principles of systems documentation, Types of documentation and their importance, Enforcing documentation discipline in an organization.

**Unit-III**

Data and fact gathering techniques: Interviews, Group communication, Presentations, Site visits. Feasibility study and its importance, Types of feasibility reports System Selection plan and proposal Prototyping. Cost-Benefit and analysis: Tools and techniques.

**Unit-III**

Process modelling, Logical and physical design, Design representation, Systems flowcharts and structured charts, Data flow diagrams, Common diagramming conventions and guidelines using DFD and ERD diagrams. Data Modelling and systems analysis.

**Unit-IV**

**Classification of forms:** Input/output forms design, User-interface design, Graphical Interfaces Module specifications, Module coupling and cohesion, Top-down and bottom-up design.

**Unit-V**

Planning considerations, Conversion methods, producers and controls, System acceptance Criteria, System evaluation and performance, Testing and validation, Systems qualify Control and assurance, Maintenance activities and issues.

**Texts Books**

1. System analysis and design - Elias M. Awad.

**References**

1. System analysis and design –Perry Edwards
2. Analysis and design of information systems – James A.Senn

**Management Information System**  
**CSE-E02T**

**L - P**  
**4 - 0**

**Unit I: Introduction to Management Information System:**

Background, Meaning, Nature, Characteristics, Myths, Requirements, Problems and Solutions, Benefits, Limitations, Significance and Role of Management Information System.

Fundamentals of Information: Concept of information, Characteristics of Information, Value of information, Manager as information processor, Types of Information, Level of management and their information requirement.

**Unit II: Conceptual Framework of Information System:**

Concept of System, Definition of System, Characteristics of System, System Stakeholder, Types of System, Environment drivers for today's Information System, Evolution of Information System, Approaches to management information system, A framework for management information system Architecture, Components of management information system, Classification of Information System, Major challenges of information system, Future of Management Information System. Management Process and Information System: Process of Management, Meaning of Planning, Organizing.

Staffing: Directing, Controlling functions and how MIS supports these functions.

**Unit III: Management Information System for Business Operations:**

Various functional areas of management, Sub-systems, components and working of Finance & accounting, Marketing, HR, Production, and R & D information systems.

**Unit IV: Concept of Decision Making and MIS:**

Introduction, Decision Making and Managers, Classification of managerial decisions, Models for decision making, Management Information System and decision making, Concept of Balance, efficiency and effectiveness of MIS.

**Unit V: Development of Management Information System:**

Introduction, Information system planning, Motivational forces behind development of information system, Principles for information system development, SDLC approach for MIS development. Tools for Management Information System: Introduction, Factors affecting selection of tools, Development tools for Management Information System.

**Text Books:**

1. Laudon, Kenneth C., and Laudon, Jane P., Management Information Systems-Managing Digital Firm, Tenth Edition, Prentice Hall, 2007.
2. Management Information Systems: A Computer oriented approach for business applications by Dharminder Kumar, Sangeeta Gupta, Excel books, 2006, New Delhi.

**Reference books:**

1. Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
2. Management Information System; James A.O'Brien; TMH
3. Management Information System by Davis Olson Mac Graw Hill.

# MATLAB for Engineers

## CSE-E03T/P

L – P  
1 – 2

### Unit-I

Introduction to MATLAB and why it is widely used in engineering and science, advantages and limitations of the student edition of MATLAB, Start the MATLAB program and solve simple problems in the command window, Identify and use the various MATLAB windows, Define and use simple matrices, Name and use variables, difference between scalar, array, and matrix calculation[s], Express numbers in either floating-point or scientific notation, Adjust the format used to display numbers in the command window, Save the value of variables used in a MATLAB session, Save a series of commands.

### Unit-II

Built in functions, elementary math functions (common math functions, rounding functions, discrete mathematics functions, trigonometric functions), data analysis functions (maximum and minimum, mean and median, sums and products), sorting functions, random numbers, complex numbers, Recognize and be able to use the special values and functions built into MATLAB.

### Unit-III

Creating Function M-Files, Creating Your Own Toolbox of Functions, Anonymous Functions and Function Handles, Functions, Sub-functions. user defined input, output options, graphical input, Relational and logical operators, Find function, if/else, switch/case structure, for loops, while loops, midpoint break loops.

### Unit-IV

Manipulate matrices, extract data from matrices, solve problems with two matrix variables of different sizes, special matrices, Matrix Operations and Functions, Solutions of Systems of Linear Equations.

### Unit -V

Two-Dimensional Plots, Subplots, Other Types of Two-Dimensional Plots, Three Dimensional Plotting, Editing Plots from the Menu Bar, Creating Plots from the Workspace Window, Saving Your Plots,

### List of Experiments

1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
7. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.
8. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart.

### Text Book

1. Holly Moore, “MATLAB for Engineers”, Pearson
2. Bansal R.K, Goel A.K., Sharma M.K., “*MATLAB and its Applications in Engineering*”, Pearson Education, 2012.

### References

1. Amos Gilat, “*MATLAB-An Introduction with Applications*”, Wiley India, 2009.
2. Stephen.J.Chapman, “*Programming in MATLAB for Engineers*”, Cengage Learning, 2011.



## **E-Business & ERP**

### **CSE-E04T**

**L - P**

**4 - 0**

#### **Unit-I**

Basics of E-Business, The Digital Era, History of the Internet, Evolution of E-Business, Rise of E-Business, The Emergence of Infomediaries, Principles of E-Business, E-Business infrastructure Organisation Culture for E-Business, E-Business Models. Network Infrastructure: (Switches, Multilayer Switching, Bridges, Routers, Virtual LAN, LAN, WAN.) Enterprise Network: (Internet, Extranet, Intranet.) Data Storage (Direct Attached Storage, Network Attached Storage, Storage Area Networks) Integration Tools for E-Business: (Middleware, Message Oriented Middleware, Remote Procedure Calls, Data Integration Middleware)

#### **Unit-II**

Reference Architecture, Components, Logical Architecture, Layered Architecture, Application Services Platform Criteria, Technology Architecture, Organizational Architecture, Ownership, Support & Development, Skills Audit. E-Business Technologies

#### **Unit-III**

E-Business Applications: Conventional Payment Systems, Electronic Payment Systems (Payment Clearing System, Notational Funds transfer, Digital Currency Payments, Properties & Specifications of Digital Currencies, Evaluation & Policy Issues, Digital Currencies & Governments.) Electronic Data Interchange (Benefits of EDI, EDI Applications in Business.) E- Business Applications in various Businesses Brokerage Model, Advertising Model, Infomediary Model, Merchant Model etc.)

#### **Unit-IV**

E-Security: Cryptography, Public Key Infrastructure (PKI Products, Security Instruments, Digital Certificates & Certification Authorities, Digital Signatures, Secure Channels.) Stored Account Payment System (First Virtual, Cyber Cash, Secure Electronic Transaction.) Stored Value Payment System (E-Cash, Smart Cards.). Acceptable Use Policy, Security Threats, E-mail Threats, Risk in using Wireless Devices, Protection Against Identity Threat (Phishing, Pharming.)

#### **Unit-V**

ERP: An Overview Rationale for ERP, Enterprise Architecture Planning, Implementing ERP, Effect of ERP on the Company, Overview of ERP modules, ERP Market-Indian Scenario, Emerging trends in the ERP Industry, Future of ERP Applications.

#### **Books Recommended:**

1. S.Sadagopan, "ERP" Tata McGrawHill.
2. Alex Leon, "ERP Tata McGrawHill.
3. E- Business fundamentals by Peter Eckersley.
4. E- Business fundamentals by Lisa Haris.

## **Multimedia Technology** **CSE-E05T**

**L-P**  
**4-0**

### **Unit-I: Introduction**

Introduction to Multimedia, Multimedia Information, Multimedia Objects, Multimedia in business and work. Convergence of Computer, Communication and Entertainment products

### **Stages of Multimedia Projects**

Multimedia hardware, Memory & storage devices, Communication devices, Multimedia software's, presentation tools, tools for object generations, video, sound, image capturing, authoring tools, card and page based authoring tools.

### **Unit-II: Multimedia Building Blocks**

Text, Sound MIDI, Digital Audio, audio file formats, MIDI under windows environment Audio & Video Capture.

### **Unit-III: Data Compression**

Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding Higher Order Modelling. Finite Context Modelling, Dictionary based Compression, Sliding Window Compression, LZ77, LZW compression, Compression, Compression ratio loss less & lossy compression.

### **Unit-IV: Speech Compression & Synthesis**

Digital Audio concepts, Sampling Variables, Loss less compression of sound, loss compression & silence compression.

### **Unit-V: Images**

Multiple monitors, bitmaps, Vector drawing, lossy graphic compression, image file format, animations Images standards, JPEG Compression, Zig Zag Coding, Multimedia Database. Content based retrieval for text and images,

**Video:** Video representation, Colours, Video Compression, MPEG standards, MHEG Standard Video Streaming on net, Video Conferencing, Multimedia Broadcast Services, Indexing and retrieval of Video Database, recent development in Multimedia.

### **Books:**

1. Tay Vaughan "Multimedia, Making IT Work" Osborne McGraw Hill.
2. Buford "Multimedia Systems" Addison Wesley.
3. Agrawal & Tiwari "Multimedia Systems" Excel.
4. Mark Nelson "Data Compression Book" BPB.
5. David Hillman "Multimedia technology and Applications" Galgotia Publications.
6. Rosch "Multimedia Bible" Sams Publishing.
7. Sleinreitz "Multimedia System" Addison Wesley.
8. James E Skuman "Multimedia in Action" Vikas.

**Modelling and Simulation**  
**CSE-E06T**

**L-P**  
**4-0**

**Unit I**

Concepts of Systems, Models, and Simulation. Distributed Lag Model, Cobweb Models, The process of a simulation Study, Exponential Growth Models, Exponential Decay Models,

**Unit II**

Type of simulation, Discrete-Event Simulation: Time-Advance Mechanisms, Components and Organization of a Discrete-Event Simulation Model. Monte Carlo Method. Simulation of Single-Server Queuing System, Simulation of an Inventory System

**Unit III**

Continuous Simulation: Pure-pursuit Problem.

Random Number Generators: Linear Congruential Generators, Other kinds of Generators, Testing Random-Number Generators. Generating Random Variates: General Approaches, Continuous and Discrete distributions.

**Unit IV**

Introduction to GPSS, General Description, GPSS block-diagram, Simulation of a Manufacturing Shop. SNA, Function, Simulation of a Supermarket, GPSS Model of a Simple Telephone System

**Unit V**

Output Data Analysis for a Single System: Transient and Steady-State Behavior of a Stochastic Process, Type of Simulations with regard to output Analysis and Statistical Analysis for Testing Simulation. Verification and Validation of Simulation. An introduction of different types of simulation languages.

**Reference books:**

1. **G. Gordon**, "System Simulation", **Pearson Education**
2. **Law and Kelton**, "Simulation Modeling and Analysis", **McGraw Hill**
3. **N. Deo**, "System Simulation with Digital Computer", **Prentice Hall of India**
4. **Fred Maryanski**, "Digital Computer Simulation", **CBSPD**
5. **James A. Pyne**, "Introduction to Simulation- Programming Techniques and Methods of Analysis", **McGraw Hill**
6. **Zeigler and Kim**, "Theory of Modeling and Simulation", **Academic Press**
7. **Banks et al**, "Discrete event Simulation", **Pearson Education**

**Linux Internals**  
**CSE-E07T/P**

**L – P**  
**3 – 2**

**Unit I - Introduction and Installation**

Linux Distributions –Open source software and GNU- Difference between Windows and Linux, Installing Linux in a server configuration, GNOME and KDE– X window system, Managing software.

**Unit II - Single – Host Administration**

Managing users – User text files –User management tools, Command Line, Boot loaders, File Systems, Core System services, Compiling Linux kernel, Linux Firewall.

**Unit III - Internet Services**

Setting up web server using Apache, DNS, FTP, SMTP – Install postfix server, POP and IMAP, Public key Cryptography and SSH, Creating a secure tunnel.

**Unit IV -Intranet Services**

NFS – enable and configure NFS server and client, NIS, SAMBA – Administration, Printing – Install cups – add and manage print jobs, DHCP, Virtualization.

**Unit V - Linux Process Control & Shell Programming**

Linux process environment – login process – parent child relationship – process variable- process monitoring – Invoking foreground and background process – terminating process - Daemons. Introduction to Shell programming – Shell scripts – executing shell scripts - creating scripts – simple examples.

**Lab details**

1. Installation of Linux distribution (Fedora / Ubuntu) in virtual box.
2. Dual boot installation of Linux distribution and windows.
3. Software management using package managers
4. User management and utilizing password and shadow files
5. Basic commands related to file management and manipulation, pipes, redirection, grep.
6. Introducing basic text editors like vi, nano etc
7. Packet filtering using iptables
8. Installing Apache webserver
9. Installing DNS, DHCP, FTP
10. Creating a secure tunnel using SSH
11. NFS, Samba and CUPS
12. Shell programming

**Text Books**

1. Wale Soyinka, “*Linux Administration A Beginners Guide*”, 5th edition, Tata McGraw-Hill, 2009.
2. Mc Kinnon, Mc Kinnon, “*Installing and Administrating Linux*“, 2nd edition, Wiley, 2004.
3. Steven Graham, Steve Shah, “*Linux Administration A Beginners Guide*”,3rd edition, Dreamtech press , 2003.

**References**

1. Richard Petersen, ”*Linux:The Complete Reference*”, 6th edition, Tata McGraw-Hill, 2007.
2. Mark G. Sobell. ”*Practical Guide to Fedora and Red Hat Enterprise Linux*”, 6th Edition, Prentice Hall, 2011.
3. Christopher Negus, “*Red Hat Linux 9 Bible* “, Wiley Dreamtech India Pvt Ltd.2002
4. [www.linuxhomenetworking.com](http://www.linuxhomenetworking.com)
5. [www.linux.org](http://www.linux.org)
6. [www.linux.com](http://www.linux.com)
7. <http://www.oreillynet.com/linux/cmd/>
8. <https://help.ubuntu.com/community>

**Software Testing and Quality Assurance**  
**CSE-E08T**

**L – P**  
**4 - 0**

**Unit-I**

**Software Testing:** Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Software Testing Principles, Tester Role in Software Development, Artefacts of testing (Faults, Errors, and Failures), Limitations of Testing, Challenges in Software Testing, Testing and debugging, Verification, Validation, Test levels.

**Software Quality:** Software Quality, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality.

**Unit-II**

Different Testing Techniques, Differences between testing techniques

**Black Box Testing:** Requirements based testing techniques, Boundary value analysis, Equivalence partitioning, Decision table, State/Graph based testing

**White Box Testing:** Static testing techniques, Static analysis tools, Unit/Code functional testing, Control flow testing, Code complexity testing, Data flow testing.

**Unit-III**

**Integration, System And Acceptance Testing:** Integration testing approaches, System testing, Scenario Testing, Deployment testing, Non-functional testing techniques,

**Acceptance Testing:** Acceptance criteria, types, test cases selection and execution.

**Unit-IV**

**Quality Assurance:** Quality Planning, Quality plan objectives, Planning process overview, Business Plan and Quality Plan, TQM (Total Quality Management), TQM concepts, Zero defect movement

**Quality Standards:** Quality Models/Standards, Standards and guidelines, Types of Models, ISO Standards, CMM and CMMI, Six Sigma concepts, Quality Challenge, National Quality Awards.

**Unit-V**

Regression testing, Regression test process, Selection of regression tests, Dynamic Slicing, Test Minimization, Tools for regression testing. Test Management and Automation Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of automation, Design & Architecture for automation, Testing tools, Object Oriented Testing.

**Text Books:**

1. Yogesh Singh, "Software Testing", Cambridge University Press, 2011
2. Sagar Naik, Piyu Tripathy, "Software Testing and Quality Assurance", Wiley

**Reference Books:**

1. Effective methods for Software Testing William Perry, Wiley
2. Aditya P. Mathur, "Foundation of Software Testing", Pearson Education.
3. Milind Limaye, "Software Quality Assurance, McGraw-Hill publication.
4. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Auerbach Publications, 2008.

**XML and Web Services**  
**CSE-E09T**

**L-P**  
**4-0**

**Unit –Introduction**

Role of xml - xml and the web - xml language basics - soap - web services - revolutions of xml - service oriented architecture (SOA).

**Unit –II**

**XML Technology**

XML - Name Spaces - Structuring with Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure.

**Unit –III**

**SOAP**

Overview Of SOAP - HTTP - XML-RPC - SOAP: Protocol - Message Structure - Intermediaries - Actors - Design Patterns And Faults - SOAP With Attachments.

**Unit –IV**

**Web Services**

Overview - Architecture - Key Technologies - UDDI - WSDL - ebXML - SOAP And Web Services In E-Com - Overview Of .NET And J2EE.

**Unit –V**

**XML Security**

Security Overview - Canonicalization - XML Security Framework - XML Encryption - XML Digital Signature - XKMS Structure - Guidelines For Signing XML Documents - XML In Practice.

**Text Books:**

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

**References:**

1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers, 2005.

**Software Project Management  
CSE E10T**

**L-P  
4-0**

**Unit-I: Introduction and Software Project Planning**

Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

**Unit-II: Project Organization and Scheduling**

Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

**Unit-III: Project Monitoring and Control**

Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

**Unit-IV: Software Quality Assurance and Testing**

Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model (CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

**Unit-V: Project Management and Project Management Tools**

Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

**References:**

1. M. Cotterell, Software Project Management, Tata McGraw-Hill Publication.
2. Royce, Software Project Management, Pearson Education
3. Kieron Conway, Software Project Management, Dreamtech Press
4. S. A. Kelkar, Software Project Management, PHI Publication.

# High Performance Computing

## CSE-E11T

L – P  
4 - 0

### Unit I

Parallel processing: Introduction, Data and Control Parallelism, (concurrency, scalability, speedup, Amolahl's Law), PRAM Model of Parallel Computation, Parallel Algorithm Design.

### Unit II

Multiprocessors and Multicomputer: Processor Organisation. Shared Memory and Message Passing Systems.

### Unit III

Array processing: SIMD Array Processing, Communications, SIMD Interconnection Networks, Algorithms for Array Processing.

Applications: Parallel Algorithms for Matrix Multiplication, Fast Fourier Transform, Linear Systems, Sorting, Numerical Integration, Optimization.

### Unit IV

MPI Commands like: MPI\_Init, MPI\_Finalize, MPI\_Comm\_size, MPI\_Comm\_rank, MPI\_Send, MPI\_Recv, MPI\_Bcast, MPI\_Reduce, MPI\_Barrier, MPI\_Scatter, MPI\_Gather

### Unit V

Basic concepts of NVIDIA GPU and CUDA programming CUDA Library, Using CUDA-GDB to debug CUDA program, Using Multiple GPUs, Combining MPI and CUDA

### Text Book:

1. Georg Hager, Gerhard Wellein, "*Introduction to High Performance Computing for Scientists and Engineers*", Chapman & Hall / CRC Computational Science series, 2011.

### References

1. Charles Severance, Kevin Dowd, "*High Performance Computing*", O'Reilly Media, 2nd Edition, 1998.

2. Kai Hwang, Faye Alaye Briggs, "*Computer Architecture and Parallel Processing*", McGraw Hill, 1984.

3. Pacheco, Peter S., "Parallel Programming with MPI", Morgan Kaufmann Publishers, Inc., California, 1997.

4. Cook, Shane. CUDA programming: a developer's guide to parallel computing with GPUs. Newnes, 2012.



# Object Oriented Software Engineering

## CSE-E12T

L – P  
4 – 0

### Unit I:

**Introduction** – Overview of Object-Orientation; Basic Concepts of Object-Orientation: Data abstraction, Encapsulation, Inheritance, Aggregation, classes, objects, messages, inheritance, polymorphism. Importance of modelling, principles of modelling, Object oriented modelling.

**OO Life cycle** – Object Oriented analysis, modelling and design; Requirement Elicitation. Introduction to Object Oriented Methodologies, Overview of Requirements Elicitation, Requirements Model-Action & Use cases.

### Unit II:

**Architecture:** Introduction, System development is model building, model architecture, requirement model, analysis model, design model, implementation model.

**Analysis:** Introduction, System development based on user requirement, Use case model, interface descriptions, Problem domain objects, interface objects, entity objects, control objects.

**Code Design Improvement:** Refactoring, Anti patterns, Visitor Patterns.

### Unit III:

**Construction:** Introduction, the design model, design model dimensions, block design, working with construction. **Testing:** Introduction, Object Oriented testing process, testing of analysis and design model, testing of classes.

### Unit IV:

**Modelling with UML:** Basic Building Blocks of UML. A Conceptual Model of UML.

**Basic structural modelling:** Classes, interfaces, Dependency, generalization and association relationship, comparison of E-R diagram and UML class Diagram, forward and reverse engineering.

### Unit V

**Basic Behavioural Modelling-** Use case diagram-relationships between use cases- extend, include, and generalize. Activity diagram-Action state, Activity state, Transition (Fork, Merge, Join), State diagram-events, State Diagram states, transitions, Interaction diagrams: Sequence diagram, Collaboration diagram (iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links.)

### Text Books:

1. Ivar Jacobson, “Object Oriented Software Engineering”, Pearson.
2. Grady Booch, James Runbaugh, Ivar Jacobson, “The UML User Guide”, Pearson.

### Reference Books:

1. Rumbaugh et. al, “Object Oriented Modeling and Design”, Pearson.
2. Booch, Maksimchuk, Engle, Young, Conallen and Houston, “Object Oriented Analysis and Design with Applications”, Pearson Education.
3. Object-Oriented Analysis and Design: using UML Mike O'Docherty Wiley Publication.
4. Edwards Yourdon. Carl Argila, “Case Studies in object oriented analysis and design” Prentice Hall.

# **Distributed Computing**

## **CSE-E13**

**L - P**  
**4 - 0**

### **Unit-I**

Introduction to Distributed System: Goals, Hardware concepts, Software concepts, and Client-Server model. Examples of distributed systems. Resource sharing and the web, Challenges arising from the construction of distributed systems

System Models: Architectural models Client-server model, Peer-to-peer model, Variations of the above models, Forms of computing Monolithic, Distributed, Parallel ,Cooperative

### **Unit-II**

Networking and Internetworking, Types of networks, Network principles, Internet protocols, Case studies: Ethernet, WIFI, Bluetooth and ATM

### **Unit-III**

Interposes Communication, The API for the internet protocol, External data representation and marshalling, Client-server communication, Group communication, Remote procedures call, Case study: interposes communication in UNIX

### **Unit-IV**

**Communication:** Layered protocols, Remote procedures call, Remote object invocation, Message-oriented communication, Stream-oriented communication, Processes: Threads, Clients, Servers, Code Migration, Software agent, Naming: Naming entities, locating mobile entities, Removing un-referenced entities.

**Consistency and Replication:** Introduction, Data centric consistency models, Client centric consistency models, Distribution protocols, Consistency protocols.

### **Unit-V**

Distributing Multimedia: DMS, Advanced Distributed Computing Paradigms: Mobile Agents

Security: Introduction, Secure channels, Access control, Security management.

Distributed File System: Sun network file system, CODA files system. Case Study: CORBA, Distributed COM, Comparison of CORBA, DCOM

### **Text Books:**

1. Distributed Computing: Principles and Applications, M. L. Liu, Pearson/Addison-Wesley, ISBN: 0-201-79644-9
2. A. Taunenbaum, Distributed Systems: Principles and Paradigms
3. G. Coulouris, J. Dollimore, and T. Kindberg, Distributed Systems: Concepts and Design, Pearson Education

**Advanced Java  
CSE-E14T**

**L - P  
4 - 0**

**UNIT-I**

**Java Platform, Enterprise Edition :** Java EE Platform Overview, Java EE Platform – Distributed Multi-tiered Applications ,Java EE – Web & Business Components, Java EE Containers – services & types, Java EE Application Assembly & Deployment – Packaging Applications, Java EE modules, Getting Started with Web Applications, Model View Controller (MVC)2 Architecture & Packaging EJB Module

**Application Deployment :**

Web application development and deployment Steps, Configuring Web application – Web application deployment descriptor (web.xml file), Web Application Archive (\*.WAR file) – \*.WAR directory structure, Building & Deploying Applications, Ant build tool

**UNIT-II**

**Java Database Connectivity :** JDBC Product , Types of Drivers ,Two-Tier Client/Server Model, Three-Tier Client/Server Model ,Basic Steps of JDBC , Creating and Executing SQL Statement , The Result Set Object , Working with Database Metadata.

**UNIT-III**

**Enterprise Java Beans:** Types of Enterprise Java beans , Session Bean & Entity Bean , Features of Session Bean ,Life-cycle of Stateful Session Bean , Features of Entity Bean ,Life-cycle of Entity Bean , Container-managed Transactions & ,Bean-managed Transactions , Implementing a container-managed Entity Bean

**UNIT-IV**

**Struts :-** Introduction to the Apache Struts , MVC Architecture , Struts Architecture , How Struts Works? , Introduction to the Struts Controller , Introduction to the Struts Action Class , Using Struts Action From Class ,Using Struts HTML Tags , Introduction to Struts Validator Framework ,Client Side Address Validation in Struts ,Custom Validators Example , Developing Application with Struts Tiles

**UNIT-V**

**Introduction to Hibernate:** ORM Overview, Hibernate Environment, Hibernate Architecture & API, Hibernate Configuration, Hibernate Sessions, Persistent Class & Mapping Files, Building Hibernate application, Hibernate Query Language (HQL), Hibernate O/R Mappings – Collection & Association Mappings- Many-to-One, One-to-One, One-to-Many, Many-to-Many, Implementing Hibernate in Java Web Applications

**References:**

1. Professional Java Server Programming J2EE edition Volume I,II Wrox publications
2. Professional Jakarta Struts James Goodwill, Richard Hightower wrox publication
3. Java for web with Servlets, JSP and EJB by Budi Kurniawan Techmedia publications
4. Java Persistence with Hibernate by Christian Bauer, Gavin Kin.

## **C# and .Net Programming** **CSE-E15T/P**

**L – P**  
**3 - 2**

### **Unit–I: .NET Framework**

Introduction, Common Language Runtime, Common type system, Common language specification, The base class library, the NET class Library intermediate language, Managed code, Just in time compilation, garbage collection, application installation and assemblies.

### **Unit–II: C# Basics**

Introduction, Data types, Identifiers, Variable & constants, operators, Control structures, Methods, Object and classes, Polymorphism, Inheritance, Interfaces, Arrays and Strings, Collections, Delegates and Events, Indexers.

### **Unit–III: C# Using Libraries**

Namespace, Input Output, File System, Implementing windows file system, Multi-Threading, Networking and Sockets, Exception Handling.

### **Unit–IV: Advanced Features Using C#**

Manipulating XML in C#, Unsafe code, Attributes, Reflection, Versioning, Web Services, Windows services, messaging.

### **Unit–V: Applying C#**

Using Visual Studio .NET IDE, Windows forms, Control class, Standard Controls, Graphical Device Interface with C#, Core ADO.NET.

### **Lab details:-**

1. Program to implement C# operators
2. Program to implement C# methods.
3. Program to implement jagged arrays.
4. Program to implement param arrays.
5. Program to implement one dimensional indexers.
6. Program to implement two dimensional indexers.
7. Program to implement single cast delegates.
8. Program to implement multicast delegates.
9. Program to implement events.
10. Program to implement interface inheritance.
11. Program to read and write data in XML file using C#
12. Program to implement ArrayList class.
13. Program to implement HashTable class.
14. Program to implement SortedList class.
15. Program to implement the String class.
16. Create any simple C# window based application and also connect its interface with the database using ADO.NET.

### **Text Book**

1. Shildt, “C#: The Complete Reference”, Tata McGraw Hill, 2002.
2. Christian Nagel et al “Professional C# 4 with .NET 4”, Wiley India, 2010.

### **Reference Books**

1. Shibi Panikkar and Kumar Sanjeev, “Magic of C# with NET Frame Work”, Firewall Media,. 2005.
2. Jeffrey Richter, “Applied Microsoft Net Framework Programming”, Microsoft Press, 2002.
3. Fergal Grimes, “Microsoft Net for Programmers”, Manning Publication, 2002.
4. Tony Baer, Jan D. Narkiewicz, Kent Tegels, Chandu Thota, Neil Whitlow,
5. “Understanding the Net Framework”, Wrox Press, 2002.
6. Balagurusamy, “Programming with C#”, Tata McGraw Hill, 2002.

**Computer Vision**  
**CSE-E16T**

**L – P**  
**4 - 0**

**Unit I**

**Geometric Image Features**

Elements of Differential Geometry, Contour Geometry.

**Analytical Image Features**

Elements of Analytical Euclidean Geometry, Geometric Camera Parameters, Calibration Methods.

**Unit II**

**Linear Filters**

Linear Filters and Convolution, Shift invariant linear systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing.

**Edge Detection**

Estimating Derivatives with Finite Differences, Noise, Edges and Gradient-based Edge-Detectors.

**Unit III**

**Texture**

Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesizing Textures for Rendering, Shape from Texture: Planes and Isotropy.

**Shape from Shading**

Introduction to the concept of Shading From Shading (SFS), Application of SFS (Texture Shop, Image-Based Material Emitting, Optimization Based SFS), Photometric stereo, Spherical Illumination, Displacement Mapping, Feature Mapping.

**Unit IV**

**Affine Structure from Motion**

Elements of Affine Geometry, Affine Structure from Two Images, Affine Structure from Multiple Images, From Affine to Euclidean Images, Affine Motion Segmentation

**Projective Structure from Motion**

Elements of Projective Geometry.

**Text Books:**

1. Computer Vision- A modern Approach, by D. Forsyth and J. Ponce, Prentice Hall
2. Robot Vision, by B.K.P. Horn, McGraw-Hill.

**Reference Books:**

1. Introductory Techniques for 3D Computer Vision by E Trucco and A. Verri, Prentice Hall

**Selected Topics of Recent Trends in Computer Science and Engineering  
CSE-E17T**

**L – P  
4 - 0**

**Unit I**

**Trends in Information Retrieval**

**Recent Trends in IR:** Parallel and distributed IR, multimedia IR, Data Modelling, Web Searching, Characterizing the Web, Search Engines, Browsing , Meta searchers ,Searching using hyperlinks.

**Unit II**

**Cluster Analysis:** Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, hierarchical methods, density based methods, grid based methods.

**Unit III**

**High Performance Computing**

**Introduction:** Need of high speed computing, increase the speed of computers, history of parallel computers and recent parallel computers; solving problems in parallel, temporal parallelism, data parallelism, comparison of temporal and data parallel processing, data parallel processing with specialized processors, inter-task dependency.

**Unit IV**

**Grid Computing**

**IT Infrastructure Evolution:** Introduction, Technologies, Global Internet Infrastructure, World Wide Web and Web Services, Open-Source Movement. Productivity Paradox and Information Technology: Productivity Paradox, Return on Technology Investment, Information Technology Straightjacket, Consolidation, Outsourcing, Toward a Real-Time Enterprise, Operational Excellence.

**Unit V**

**BIG DATA Analysis using Hadoop**

Database evolution, Big data and Hadoop overview, Hadoop Distributed File System (HDFS), Map Reduce, Hadoop Streaming and Compression.

**Text Books:**

1. Ricardo Baeza-Yates, Berthier Ribeiro-Neto, “Modern Information Retrieval”, Addison Wesley, 1999.
2. V. Rajaraman and C. Siva Ram Murthy, “Parallel Computers – Architecture and Programming”, Prentice-Hall of India, 2003.

**Reference Books:**

1. Joshy Joseph and Craig Fellenstein, “Grid Computing”, Pearson Education, 2003.
2. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schutze, “Introduction to Information Retrieval”, Cambridge University Press, 2008.
3. Hadoop in Practice, Holmes Wiley
4. Chuck Lam “Hadoop in Action” Wiley India.
5. Selim G. Akl, “The Design and Analysis of Parallel Algorithms”, Prentice-Hall of India, 1999.

**Data Mining and Business Intelligence**  
**CSE-E18T**

**L – P**  
**4 - 0**

**Unit - I**

Introduction to Data Warehousing: Overview, Difference between Database System and Data Warehouse, The Compelling Need for data warehousing, Data warehouse - The building Blocks: Defining Features, data warehouses and data marts, overview of the components, Three tier architecture, Metadata in the data warehouse. Data pre-processing: Data cleaning, Data transformation ETL Process. ETL tools.

**Unit - II**

Defining the business requirements: Dimensional analysis, information packages - a new concept, requirements gathering methods, requirements definition: scope and content.

Principles of Dimensional Modelling: Objectives, From Requirements to data design, Multi-Dimensional Data Model, Schemas: the STAR schema, the Snowflake schema, fact constellation schema.

**Unit -III**

OLAP in the Data Warehouse: Demand for Online Analytical Processing, limitations of other analysis methods- OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, hyper cubes.

**OLAP Operations:** Drill-down and roll-up, slice-and-dice , pivot or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, the DOLAP model, ROLAP versus MOLAP, OLAP implementation considerations. Query and Reporting, Executive Information Systems (EIS), Data Warehouse and Business Strategy.

**Unit - IV**

Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process (KDD Process), Data Mining Applications- The Business Context of Data Mining, Data Mining for Process Improvement, Data Mining as a Research Tool, Data Mining for Marketing, Benefits of data mining, Major Data Mining Techniques: Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, KNN Algorithm.

**Unit - V**

Cluster detection, K- means Algorithm, Outlier Analysis, memory-based reasoning, link analysis, Mining Association Rules in Large Databases: Association Rule Mining, genetic algorithms, neural networks. Data mining tools.

**Text Books:**

1. Paul Raj Poonia, “Fundamentals of Data Warehousing”, John Wiley & Sons, 2004.
2. Kamber and Han, “Data Mining Concepts and Techniques”, Hart Court India P. Ltd. Elsevier Publications Second Edition, 2001

**Reference Books:**

1. W. H. Inmon, “Building the operational data store”, 2<sup>nd</sup> Ed., John Wiley, 1999.
2. “Data Warehousing”, BPB Publications, 2004.
3. Pang- Ning Tan, Michael Steinbach, Viach, Vipin Kumar, Introduction to Data Mining, Pearson.
4. Shmueli, “Data Mining for Business Intelligence : Concepts, Techniques and Applications in Microsoft Excel with XLMiner”, Wiley Publications.

## **Web Technologies** **CSE-E19T/P**

**L – P**  
**3 - 2**

### **Unit I**

XML: Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX, Overview of, XPath, XQuery, and XSLT. Ajax Improving web page performance using Ajax, Programming in Ajax.

### **Unit II**

Introduction to J2EE architecture: Single Tier Two Tier Three Tier N Tier.  
J2EE Containers: Container Types, Container Services.

### **Unit III**

JAVA servlets: Introduction to Web Programming, Advantages of Servlets, Servlet Lifecycle, Request Dispatching, Session Tracking.

### **Unit IV**

JAVA SERVER PAGES (JSP) & JSTL: JSP Architecture, JSP Objects, Custom Tags, JSP Elements, Using tags of JSTL ,expression languages

### **Unit V**

Overview of MVC, Implementing Model-View-Controller, The Struts Model, Deploying Action Servlet, Action Form, Action Mapping and Action Errors, Relational Data.

### **List OF Practical's**

- 1) Create XML file that contains details of the books, name of the book, The ISBN of the book, the first and last name of the author of the book and price of the book.
- 2) Create an XML Schema to validate the data store about product. The product Details must be stored in a consistence format. Restriction must be placed on the Kind of data that can be saved in the data store to ensure consistency. The product details comprise the name of the product, a brief description about it, the price of the product, and the quantity available .The price must always be greater than Zero.
- 3) Create attribute in an xml schema. A shop sells two categories of products, books and toys The product details comprise the name of the product, a brief description, the price and the quantity available. The price of the product always be greater than zero. In additions to these details, you also need to store the category and product Id.
- 4) Create an XSLT style sheet for formatting data.The book details that have to be displayed are book ID,title,and rate of books. The book details must be displayed in the ascending order of rate and book ID.
- 5) Simple exercises to learn the concept of Servlets,JSP
- 6) Servlet-based implementation of Airline Reservation system
- 7) Implementation of Mail Server
- 8) Implementation of Quiz Server
- 9) Implementation of ATM
- 10)Implementation of Online Shopping System
- 11)Implementation of matrimonial System
- 12)Implementation of MVC design pattern using struts framework.

### **Books Recommended**

1. Deitel and Deitel, Goldberg, “Internet and World Wide Web – How to Program”, Pearson Education Asia, 2001.
2. Professional Jakarta Struts James Goodwill, Richard Hightower wrox publication
3. Mathew Eernisse, “Build Your Own AJAX Web Applications”, SitePoint, 2006.
4. JavaScript: The Definitive Guide, Fourth Edition By David Flanagan O'Reilly Media
5. Professional Java Server Programming J2EE edition Volume I,II Wrox publications
6. 'Beginning XML' by David Hunter and David Gibbons wrox publication
7. “Using HTML 4, XML and JAVA”, Eric Ladd, Jim O’ Donnel, Prentice Hall of India.
8. Web Programming, building internet applications, Chris Bates, WILEY Dreamtech
9. Programming world wide web-Sebesta, Pearson
10. Java for web with Servlets, JSP and EJB by Budi Kurniawan Techmedia publications



**Digital Image Processing**  
**CSE E20T**

**L-P**  
**4 -0**

**UNIT- I:**

**Introduction and Digital Image Fundamentals:** The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbours, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

Image Enhancement in the Spatial Domain: Some basic Grey Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothing and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

**UNIT- II:**

**Filtering in the Frequency Domain:** Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

**Image Restoration:** A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

**UNIT- III:**

**Image Compression:** fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods

**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

**UNIT- IV:**

**Representation and Description:** Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

**Text Books:**

1. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3Rd edition, Pearson, 2002.
2. A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

**Reference Books:**

1. Bernd Jahne, "Digital Image Processing", 5th Ed., Springer, 2002.
2. William K Pratt, "Digital Image Processing: Piks Inside", John Wiley & Sons, 2001.

## **Operation Research MTH E01T**

**L – P  
3 – 0**

### **Unit I: Introduction**

Introduction to operation Research, Linear Programming problem à €. Formulation of LPP, Graphical solution of LPP, simplex method, artificial variables, big-M method.

### **Unit II: Transportation Problems**

Formulation, solution of balanced transportation problem. Finding initial basic feasible solutions à €. North-west corner rule, least cost method and Vogoles approximation method.

### **Unit III: Assignment Model and Hungarian method**

Assignment Model Formulation, Hungarian method for optimal solution; solving unbalanced problems; travelling salesman problem and assignment.

### **Unit IV: Sequencing Models**

Solution of sequencing problem à €; processing n jobs through two machines, à € processing n jobs through three machines à €; Processing two jobs through m machines.

### **Unit V: Dynamic Programming**

Introduction to Dynamic programming problems, Characteristics and applications of Dynamic Programming, Mathematical formulation and optimal Solution of Dynamic Programming problems.

### **Books recommended:**

1. P. Sankaralyer, à € Operations Research, Tata McGraw Hill 2008
2. A.M. Natarajan, P.Balasubramani, A. Tamilarasi, à € Operations, Pearson Education, 2005.

## Pattern Recognition CSE-E21T

L – P  
4 - 0

### Unit I- Pattern Recognition Overview

Pattern recognition, Classification and Description- Patterns and feature Extraction with Examples—Training and Learning in PR systems- Pattern recognition Approaches - Statistical pattern recognition – Syntactic pattern recognition – Neural pattern recognition – other approaches to PR

### Unit II- Statistical Pattern Recognition

Introduction to statistical Pattern Recognition - supervised Learning using Parametric and Non Parametric Approaches. Linear Discriminant Functions Introduction—Discrete and binary Classification problems—Techniques to directly Obtain Linear Classifiers

### Unit III- Syntactic Pattern Recognition

Overview of Syntactic Pattern Recognition— Syntactic recognition via parsing and other Grammars—Graphical Approaches to syntactic pattern recognition—learning via grammatical Inference.

### Unit IV- Neural Pattern Recognition

Introduction to Neural networks—Feedforward Networks and training by Back Propagation— Content Addressable Memory Approaches and Unsupervised Learning in Neural PR.

### Unit V- Applications and Case Studies

Web Applications – Audio and Video Analysis – Medical Applications – Image processing – Financial Applications - Related case studies

### Text Book

1. Robert Schalkoff, “*pattern Recognition: statistical, structural and neural approaches*”, JohnWiley & sons, Inc, 2007.

### References

1. Chen C H, “*Handbook of pattern recognition and computer vision*”, 4th edition world scientific co, Pvt. Ltd., 2010.
2. Christoper M Bishop, “*Neural Network for pattern recognition*”, Oxford university press, 2008.
3. Earl Gose, Richard Johnsonbaugh, Steve Jost, “*Pattern Recognition and Image Analysis*”, Prentice Hall of India, Pvt Ltd, 1996.
4. R.O. Duda, P.E. Hart & D.G Stork, “*Pattern Classification 2nd Edition*”, J.Wiley Inc, 2001.
5. Geoff Dougherty, “*Pattern Recognition and classification: An introduction*”, Springer 2013.

## **Advanced Computer Architecture CSE-E22T**

**L-P  
4-0**

### **Unit I-Parallel Computer Models**

The state of computing, Classification of parallel computers, Multiprocessors and multicomputer, Multivector and SIMD computers.

### **Unit II-Program and Network Properties**

Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms.

### **Unit III-Pipelining**

Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

### **Unit IV-Arithmetic for Computers:**

Signed and unsigned Numbers, Addition and Subtraction, Multiplication, Division, Floating Point. CPU Performance and Its factors, evaluating performance of CPU.

### **Unit V-Memory Hierarchy:**

Introduction, The basics of Cache, Measuring and Improving of Cache Performance, Virtual Memory, Common framework for memory hierarchies Case study of PIV and AMD opteron memory hierarchies

### **Text Books:**

1. Kai Hwang, "Advanced computer architecture"; TMH. 2000
2. D. A. Patterson and J. L. Hennessey, "Computer organization and design", Morgan Kaufmann, 2nd Ed.2002

### **Reference Books:**

1. M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing. 1998
2. J.P.Hayes, "computer Architecture and organization"; MGH. 1998
3. Harvey G.Cragon,"Memory System and Pipelined processors"; Narosa Publication. 1998
4. Kai Hwang and Zu, "Scalable Parallel Computers Architecture", MGH. 2001
5. Stalling W, "Computer Organisation & Architecture", PHI. 2000
6. D.Sima, T.Fountain, P.Kasuk, "Advanced Computer Architecture-A Design space Approach,"Addison Wesley, 1997.
7. D.A.Patterson, J.L.Hennessy, "Computer Architecture :A quantitative approach"; Morgan Kauffmann feb, 2002.
8. Hwan and Briggs, "Computer Architecture and Parallel Processing"; MGH. 1999

**Robotics**  
**CSE-E23T**

**L-P**  
**4-0**

**Unit I - Microcontroller in Robots**

Support components - Memory and device programming – Interrupts - Built in peripherals - Interfacing the controller to robots.

**Unit II- Development Process**

Managing Design Process: Introduction – Organizational Design to Support Usability – Four Pillars of Design – Development Methodologies – Ethnographic Observation – Participatory Design – Scenario Development – Evaluating Interface Design: Expert Reviews – Usability Testing and Laboratories – Survey Instruments – Acceptance Test – Evaluation During Active Use – Controlled Psychologically Oriented Experiments.

**Unit III - Manipulation and Virtual Environments**

Introduction-Examples of Direct Manipulation Systems –Discussion of Direct Manipulation-3D Interfaces – Teleoperation – Virtual Augmented Reality – Menu Selection, Form Fill-in, and Dialog Boxes: Task-Related Menu organization –Single Menus – Combinations of Multiple Menus – Form Fill-in, Dialog Boxes, and Alternatives – Command and Natural Languages: Command –Organization Functionality, Strategies, and Structure – Naming and Abbreviations – Natural Language in Computing.

**Unit IV - Interaction Devices**

Introduction – Keyboards and Keypads – Pointing Devices – Speech and Auditory Interfaces – Small and Large Displays – Collaboration and Social Media Participation: Goals of Collaboration and Participation – Asynchronous Distributed Interfaces – Synchronous Distributed Interfaces – Face to Face Interfaces -Balancing Function and Fashion: Error Messages – Nonanthropomorphic Design –Display Design –Web Page Design – Window Design – Color.

**Unit V - User Documentation and Information Search**

Introduction- Online Versus Paper Documentation – Reading from Paper Versus Reading from Displays – Shaping the Content of the Documentation – Accessing the Documentation – Online Tutorials and Animated Demonstrations – Online Communities for User Assistance – The Development Process- Information Search: Searching in Textual Documents and Database Querying – Multimedia Document Searches – Advanced Filtering and Search Interfaces – Information Visualization: Data Type by Task Taxonomy – Challenges for Information Visualization.

**References**

1. Michael Slater, “Microprocessor – based design: A comprehensive Guide to Effective Hardware Design”, Prentice Hall, 1989.
2. Myke Predko, “Programming and customizing the 8051- micro-controller”, Tata McGraw-Hill, New Delhi, 2000.
3. Kenneth J. Ayala, “The 8051 micro-controller architecture, programming and applications”, Penram International publishers, Mumbai, 1996.
4. Murphy Robin R, ” Introduction to AI Robotics”, MIT Press, 2000.
5. Siegwart R and Nourbakhsh I.R, “Introduction to Autonomous mobile Robots”, Prentice Hall India, 2005.

## **Big Data CSE-E24T**

**L – P  
3 - 2**

### **Unit I - Introduction**

Big Data Overview, Introduction to the Big Data problem. Current challenges, trends, and applications, Algorithms for Big Data analysis. Data sets, Mining and learning algorithms that deal with large datasets Technologies for Big Data management.

### **Unit II**

Big Data technology and tools, special consideration made to the Map-Reduce paradigm and the Hadoop ecosystem. Data Sciences, The rising and importance of data sciences, Big data analytics in industry verticals, Data Analytics Lifecycle and methodology, Data Understanding, Data Preparation.

### **Unit III- Modelling**

Evaluation, Communicating results, Deployment, Data exploration & pre-processing.

### **Unit IV- Measures and Evaluation**

Data Analytics: Theory & Methods, Supervised learning, Linear/Logistic regression, Decision trees, Naïve Bayes, Unsupervised learning, K-means clustering, Association rules

### **Unit V- Unstructured Data Analytics**

Technologies & tools, Text mining, Web mining, Operationalizing an Analytics project, Data Visualization Techniques, Creating final deliverables  
Term project: Using Amazon AWS, BlueMix, Cognos, Biginsights.

### **Text Books:**

1. Big Data: A Revolution That Will Transform How We Live, Work, and Think by Viktor Mayer-Schönberger, Kenneth Cukier.
2. Hadoop: The Definitive Guide by Tom White (Goodreads Author), Doug Cutting , oreily Publiactions.
3. Real-Time Big Data Analytics: Emerging Architecture [Kindle Edition], Mike Barlow

## **Ethical Hacking** **CSE-E25T**

**L - P**  
**4 - 0**

### **UNIT I – Introduction to Security & Hacking**

Types of Data Stolen From the Organizations, Vulnerability, Threat, Exploit, Risk, Elements of Information Security, Threats to Goals of Security, Security Challenges, Effects of Hacking, Hacker – Types of Hacker, Role of Security and Penetration Tester, Malicious Software (Malware), Types of Malware, Protection Against Malware, Key Loggers and Backdoors, Phases of Hacking, Intruder Attacks on Networks and Computers.

### **UNIT II - Foot Printing and Social Engineering**

Web Tools for Foot Printing, Conducting Competitive Intelligence, Google Hacking, Scanning–Types, Enumeration, Trojans & Backdoors, Virus & Worms, Denial of Service, Sniffer, Social Engineering – shoulder surfing, Dumpster Diving, Piggybacking.

### **UNIT III - Data Security and System Hacking**

Physical Security – Attacks and Protection, Steganography – Methods, Attacks and Measures, Cryptography – Methods and Types of Attacks, Penetration Testing Methodology, Introduction to Kali Linux, Metasploit, Password Cracking, Windows Hacking, Linux Hacking, Wireless Hacking.

### **UNIT IV- Network Vulnerabilities & Web Application Attacks**

Networking & Computer Attacks, Network Sniffing –Types, IP Spoofing, ARP Poisoning, DNS Spoofing, Session Hijacking, Web Server, Web Hacking and Web Application Attacks, SQL Injection, Cross Site Scripting, Cross Site Request Forgery, Buffer Overflow, Email Hacking, Incident Handling & Response, Bluetooth Hacking, Mobiles Phone Hacking.

### **UNIT V - Network Protection System & Ethical Hacking Laws**

Routers, Firewall & Honeypots, Intrusion Detection System & Intrusion Prevention System, Proxy & Packet Filtering, Web Filtering, Introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking, ethical responsibilities, Appropriate use of the tools and techniques associated with ethical hacking, Computer Crime, IT Act.

### **Text Books**

1. Michael T. Simpson, Kent Backman, James E. “Corley, Hands -On Ethical Hacking and Network Defense”, Second Edition, CENGAGE Learning, 2010.
2. Rafay Baloch, “Ethical Hacking and Penetration Testing Guide”, CRC Press, 2015.

### **References**

1. Steven DeFino, Barry Kaufman, Nick Valenteen, “Official Certified Ethical Hacker Review Guide”, CENGAGE Learning, 2009-11-01.
2. Patrick Engebretson, “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy”, Syngress Basics Series –Elsevier, August 4, 2011.
3. Whitaker & Newman, “Penetration Testing and Network Defense”, Cisco Press, Indianapolis, IN, 2006.
4. Kimberly Graves, “Certified Ethical Hacker Study Guide”, Wiley Publishing,Inc. 2010.
5. Kevin Beaver, “Hacking for Dummies”, Wiley Publishing,Inc. 2013.

## **Cloud Computing** **CSE-E26T**

**L - P**  
**4 - 0**

### **Unit I - Cloud Introduction**

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing, usage scenarios and Applications , Business models around Cloud –Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus – Open Nebula, CloudSim.

### **Unit II - Cloud Services And File System**

Types of Cloud services: Software as a Service - Platform as a Service –Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services. Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

### **Unit III - Collaborating With Cloud**

Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing databases: Storing and Sharing Files- Collaborating via Web-Based Communication Tools, Evaluating Web Mail Services, Collaborating via Social Networks, Collaborating via Blogs and Wikis.

### **Unit IV - Virtualization for Cloud**

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties -Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM ,VMWare, Virtual Box, Hyper-V.

### **Unit V - Security, Standards, And Applications**

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging –Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

### **Text Books**

1. Bloor R., Kanfman M., Halper F. Judith Hurwitz “Cloud Computing for Dummies” (Wiley India Edition), 2010.
2. John Rittinghouse & James Ransome, “Cloud Computing Implementation Management and Strategy”, CRC Press, 2010.
3. Antohy T Velte ,Cloud Computing : “A Practical Approach”, McGraw Hill,2009
4. Michael Miller, Cloud Computing: “Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.
5. James E Smith, Ravi Nair, “Virtual Machines”, Morgan Kaufmann Publishers,2006.
6. [http://cloud-standards.org/wiki/index.php?title=Main\\_Page](http://cloud-standards.org/wiki/index.php?title=Main_Page)

### **References**

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 Pty Limited, July 2008.



# **Internet of Things**

**CSE-E27T**

**L – P**

**4 – 0**

## **Unit I - Introduction to IoT**

Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

## **Unit II - IoT & M2M**

Machine to Machine, Difference between IoT and M2M, Software define Network, Building an architecture, Main design principles and needed capabilities.

## **Unit III - IoT Architecture**

An IoT architecture outline, standards considerations, Reference Model and architecture, IoT reference Model.

IoT Reference Architecture- Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

## **Unit IV - Challenges in IoT**

Design challenges, Development challenges, Security challenges, Other challenges

## **Unit V - Applications of IoT**

Home automation, Industry applications, Surveillance applications, Other IoT applications

## **Reference Books:**

1. Vijay Madiseti and Arshdeep Bahga, “Internet of Things (A Hands-on-Approach)”, 1st Edition, VPT, 2014
2. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013
3. Cuno Pfister, Getting Started with the Internet of Things, O’Reilly Media, 2011, ISBN: 978-1-44939357-1

**Natural language processing**  
**CSE-E35T**

**L – P**  
**4 – 0**

**Unit I**

Language Processing and Python - Human languages, models, ambiguity, processing paradigms, Computing with Language, Texts and Words, Automatic Natural Language Understanding. Introduction to Python.

**Unit II**

Accessing Text Corpora and Lexical Resources: Introduction to corpus, elements in balanced corpus, Tree Bank, Prop Bank, WordNet, Verb Net etc. Resource management with XML

Processing Raw Text Accessing, Text from the Web and from Disk, Text Processing at the Lowest Level Text Processing with Unicode, Regular Expressions for Detecting Word Patterns, Useful Applications of Regular Expressions, Normalizing Text, Regular Expressions for Tokenizing Text, Segmentation.

**Unit III**

Categorizing and Tagging Words Using a Tagger, Tagged Corpora, Automatic Tagging, N-Gram Tagging, Transformation-Based Tagging, How to Determine the Category of a word, Learning to Classify Text Supervised Classification, Decision Trees, Naive Bayes Classifiers.

**Unit IV**

Information Extraction, Chunking, Developing and Evaluating Chukers, Recursion in Linguistic Structure, Named Entity Recognition, Relation Extraction, Analysing Sentence Structure, Some Grammatical Dilemmas, Context-Free Grammar, Parsing with Context-Free Grammar, Grammar Development, Grammatical Features, Processing Feature Structures.

**Unit V**

Applications of NLP- Spell-checking, Summarization, Information Retrieval- Vector space model, term weighting, homonymy, polysemy, synonymy, improving user queries. Overview.

**Reference Book**

1. Steven Bird, Ewan Klein, Edward Loper, "Natural Language Processing in Python" O'Reilly.
2. Jurafsky, D. and J. H. Martin, Speech and Language Processing, Prentice-Hall.
3. C. D. and H. Schutze, Foundations of Statistical Natural Language Processing, Manning, The MIT Press.
4. Allen,J, Natural Language Understanding, The Benajmins Cummings Publishing Company Inc.
5. Cover,T. M. and J.A.Thomas, Elements of Information Theory, Wiley.
6. Charniak, E, Statistical Language Learning, The MIT Press.

## **Agile Software Development**

### **CSE-E36T**

**L – P**  
**4 – 0**

#### **UNIT-I**

**Fundamentals of Agile:** The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing, Agile Tools

#### **UNIT-II**

**Agile Scrum Framework:** Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team, Scrum case study, Tools for Agile project management.

#### **UNIT-III**

**Agile Testing:** The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.

#### **UNIT IV**

**Agile Software Design and Development:** Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Li'skov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control.

#### **Unit V**

Industry Trends, Market scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on Cloud, Balancing Agility with Discipline, Agile rapid development technologies.

#### **References:**

1. Agile Software Development with Scrum By Ken Schwaber, Mike Beedle Publisher: Pearson
2. Agile Software Development, Principles, Patterns and Practices By Robert C. Martin Publisher: Prentice Hall
3. Agile Testing: A Practical Guide for Testers and Agile Teams By Lisa Crispin, Janet Gregory Publisher: Addison Wesley
4. Agile Software Development: The Cooperative Game By Alistair Cockburn Publisher: Addison Wesley
5. User Stories Applied: For Agile Software By Mike Cohn

## **Biometric Technologies**

**CSE-E37T**

**L – P**

**4 – 0**

### **UNIT I**

**BIOMETRIC FUNDAMENTALS AND STANDARDS:** Definition, Biometrics versus traditional techniques, Characteristics, Key biometric processes: Verification - Identification - Biometric matching, Performance measures in biometric systems, Assessing the privacy risks of biometrics - Designing privacy sympathetic biometric systems, Different biometric standards, Application properties.

### **UNIT II**

**PHYSIOLOGICAL BIOMETRICS:** Facial scan, Ear scan, Retina scan, Iris scan, Finger scan, Automated fingerprint identification system, Palm print, Hand vascular geometry analysis, DNA, Dental.

### **UNIT III**

**BEHAVIOURAL BIOMETRICS:** Signature scan, Keystroke scan, Voice scan, Gait recognition, Gesture recognition, Video face, Mapping the body technology.

### **UNIT IV**

**USER INTERFACES:** Biometric interfaces: Human machine interface - BHMI structure, Human side interface: Iris image interface - Hand geometry and fingerprint sensor, Machine side interface: Parallel port - Serial port - Network topologies, Case study: Palm Scanner interface.

### **UNIT V**

**BIOMETRIC APPLICATIONS:** Categorizing biometric applications, Application areas: Criminal and citizen identification – Surveillance - PC/network access - E-commerce and retail/ATM, Costs to deploy, Issues in deployment, Biometrics in medicine, cancellable biometrics.

### **REFERENCES:**

1. Anil K Jain, Patrick Flynn and Arun A Ross, “Handbook of Biometrics”, Springer, USA, 2010.
2. John R Vacca, “Biometric Technologies and Verification Systems”, Elsevier, USA, 2007.
3. Samir Nanavati, Michael Thieme and Raj Nanavati, “Biometrics – Identity Verification in a Networked World”, John Wiley & Sons, New Delhi, 2003.
4. Paul Reid, “Biometrics for Network Security”, Pearson Education, New Delhi, 2004
5. Ruud M. Bolle et al, “Guide to Biometrics”, Springer, USA, 2003.
6. David D Zhang, “Automated Biometrics: Technologies and Systems”, Kluwer Academic Publishers, New Delhi, 2000

# Mobile Application Development

CSE-E38T

L – P

3 – 2

## UNIT I

INTRODUCTION: Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

## UNIT II

BASIC DESIGN: Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

## UNIT III

ADVANCED DESIGN: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

## UNIT IV

TECHNOLOGY I – ANDROID: Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

## UNIT V

TECHNOLOGY II – iOS: Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace. Swift: Introduction to Swift, features of swift.

## REFERENCES:

1. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012
2. AnubhavPradhan , Anil V Despande Composing Mobile Apps,Learn ,explore,apply
3. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012
4. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
5. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013.

# Object Oriented Analysis and Design

CSE-E39T

L – P

4 – 0

## UNIT I

Introduction to object oriented systems, Classes, Objects, Abstraction, Inheritance, Polymorphism, Encapsulation, Message Sending, Association, Aggregation, Iterative development and the Unified Process (UP), UP phases: Inception, Elaboration, Construction and Transition, Object-oriented metrics

## UNIT II

Introduction to UML, Use Cases and functional requirements, Identifying and writing Use Cases, Decomposition of use cases, Modeling System Workflows using Activity Diagrams, Modeling a System's Logical Structure using Classes and Class Diagrams, Modeling Interactions using Sequence Diagrams and Communication Diagrams, Timing Diagrams, Interaction Overview Diagrams, Component Diagram, Package diagram, State Machine Diagrams, Deployment Diagrams.

## UNIT III

Introduction to Patterns, GoF Patterns, Creational Patterns, Structural Patterns, Behavioral Patterns, Software Architectural patterns, The Observer Pattern, The Template Method Pattern , Factory Patterns: Factory Method and Abstract Factory , The Singleton Pattern , The Iterator Pattern , The Composite Pattern , The Facade Pattern , The State and Strategy patterns , Command Pattern , The Adapter Pattern , The Proxy Pattern , The Decorator Pattern, The Visitor Pattern , AntiPatterns, Patterns for Assigning Responsibilities: GRASP Patterns

## UNIT-IV

Domain modeling, assigning responsibility using sequence diagrams, mapping design to code, CASE tools, Unit, Cluster, and System-level testing of Object-oriented programs, Aspect- oriented and Service-oriented software.

## UNIT-V

OOAD Case Studies: Applying OOAD in different contexts.

## References:

1. Grady Booch, James Rumbaugh, Ivar Jacobson ,“The Unified Modeling Language User Guide”, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, “UML 2 Toolkit”, WILEY-Dreamtech India Pvt. Ltd.
3. Meilir Page-Jones,“Fundamentals of Object Oriented Design in UML”, Pearson Education.
4. Pascal Roques, “Modeling Software Systems Using UML2”, WILEY- Dreamtech India Pvt. Ltd
5. Atul Kahate, “Object Oriented Analysis & Design”, The McGraw-Hill Companies. 6
6. John W. Satzinger, Robert B Jackson and Stephen D Burd, “Object-Oriented Analysis and Design with the Unified Process”, Cengage Learning
7. Gamma, et. al., Design Patterns - Elements of Reusable Object-Oriented Software, , Addison-Wesley. (1994) 8. Craig Larman, Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and iterative development, Pearson Education. (1998)

**Soft Computing**  
**CSE-E40T**

**L – P**  
**4 – 0**

**UNIT-I**

**Neural Networks:**

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithms perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

**UNIT-II**

**Fuzzy Logic:**

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations.

**UNIT-III**

**Fuzzy Arithmetic:**

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, Uncertainty based Information: Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

**UNIT-IV**

**Introduction of Neuro-Fuzzy Systems:**

Architecture of Neuro Fuzzy Networks.  
Application of Fuzzy Logic:  
Medicine, Economics etc.

**UNIT –V**

**Genetic Algorithm and Particle Swarm Optimization:**

An Overview to GA and PSO, GA/PSO in problem solving, Implementation of GA/PSO.

**Text Books:**

1. Hertz J. Krogh, R.G. Palmer, “Introduction to the Theory of Neural Computation”, Addison-Wesley, California, 1991.
2. G.J. Klir & B. Yuan, “Fuzzy Sets & Fuzzy Logic”, PHI, 1995.
3. Melanie Mitchell, “An Introduction to Genetic Algorithm”, PHI, 1998.
4. F. O. Karray and C. de Silva, “Soft computing and Intelligent System Design”, Pearson, 2009.

**Reference Books:**

1. “Neural Networks-A Comprehensive Foundations”, Prentice-Hall International, New Jersey, 1999.
2. Freeman J.A. & D.M. Skapura, “Neural Networks: Algorithms, Applications and Programming Techniques”, Addison Wesley, Reading, Mass, (1992).

# Evolutionary Computing

## CSE-E41T

L – P

4 – 0

### UNIT-I

Genetic Algorithms: GA concepts – encoding, fitness function, population size, selection, crossover and mutation operators, along with the methodologies of applying these operators. Binary GA and their operators, Real Coded GA and their operators.

### UNIT-II

Particle Swarm Optimization: PSO Model, global best, Local best, velocity update equations, position update equations, velocity clamping, inertia weight, constriction coefficients, synchronous and asynchronous updates, Binary PSO.

### UNIT-III

Memetic Algorithms: Concepts of memes, Incorporating local search as memes, single and multi memes, hybridization with GA and PSO, Generation Gaps, Performance metrics.

### UNIT-IV

Discrete optimization: Use of evolutionary computation to solve travelling salesman problem; Time Table problem, Vehicle routing problem

Constrained optimization: Methods based on rejection strategies, repair strategies, specialized operators and penalty functions.

### UNIT-V

Multi-Objective Optimisation: Linear and nonlinear multi-objective problems, convex and non-convex problems, dominance-concepts and properties, Pareto-optimality, Use of Evolutionary computations to solve multi objective optimization, bi level optimization, Theoretical Foundations.

### REFERENCES

1. Recent Advances in Memetic algorithms, W.E. Hart, N.Krasnogor, J.E Smith, Springer Berlin Heidelberg, New York.
2. Multi-Objective Optimization using Evolutionary Algorithms, K.Deb, John Wiley and sons, New Delhi.
3. Evolutionary Algorithms for solving Multi objective problems, C.A.Coello Coello, D.A.Van Veldhuizen, and G.B Lamont, Kluwer.
4. Genetic Algorithms and Engineering Design, M.Gen, and R.Cheng, Wiley, New York
5. Optimization for engineering Design Algorithms and examples, K.Deb, Prentice Hall of India, New Delhi
6. Genetic Algorithms+Data Structures= Evolution Programs, Z.Michalewicz, Springer-Verlag, 3<sup>rd</sup> London, UK



## **B-Tech Computer Science & Engineering**

### **List of Compulsory Foundation to Other Departments**

<b>Course Code</b>	<b>Course Title</b>	<b>Dept.</b>	<b>L – P</b>	<b>Credit</b>
<b>CSE-101T</b>	Computer Fundamental	Food Tech.	4 - 0	4
<b>CSE-102P</b>	Computer Fundamental Lab	Food Tech.	0 - 2	1
<b>CSE-201T</b>	C Programming	ECE/CIV/ELE	4 - 0	4
<b>CSE-202P</b>	C Programming Lab	ECE/CIV/ELE	0 - 2	1
<b>CSE-103T/P</b>	Computer Fundamental	AFM	2 - 2	3
<b>CSE-104T/P</b>	Computer Fundamental and C Programming	AFM	2 - 2	3

**Computer Fundamentals**  
**CSE 101T**

**L – P**  
**4 - 0**

**UNIT I**

**INTRODUCTION:**

Introduction to computers, A Simple Computer Model, Hardware and Software essentials of a computer, Need of computer in present world, Characteristics of Computers, Evolution of Computers, Basic Operations of a computer System.

**UNIT II**

**BASIC COMPUTER ORGANIZATION:**

Input / Output Units: Defining input and output units, types and description of Input –Output devices, Printing devices.

Storage: Primary memory, Memory Cell, Memory organization, ROM, RAM and its types, Secondary storage devices and its types.

**UNIT III**

Processor: Description of Processor, its components, ALU, CU, Processor Registers, Basic Architectures, Processor generations.

Number System ( Binary, octal, hexadecimal) and there conversion.

**UNIT IV**

**SOFTWARE, OPERATING SYSTEM AND INTERNET:**

System Software and utilities, Application Software, Licensed and open source softwares, Need of Operating Systems, Types of Operating Systems, World Wide Web, How internet works, Benefits and drawbacks of using internet, LAN, WAN, MAN.

**UNIT V**

**DOS COMMANDS & MS Office**

Internal and External commands in detail, Microsoft office (MS Word, MS Excel, MS Powerpoint)

**Text Books :**

1. Introduction to computers by Peter Norton, Tata McGraw Hill.

**Reference Books:**

2. Computer Fundamentals by V. Rajaraman, Pearson Education.
3. Unix concepts and applications, Sumitabha Das, Tata McGraw Hill.

**Computer Fundamentals Lab  
CSE 101T**

**L – P  
0 - 2**

**List of Experiments:**

1.	Identify the different parts of a computer system, Know how each and every parts of a computer system works, Learn how different parts of the computers work together to produce a good output.
2.	Create a document using a suitable word processing package, with at least three paragraphs and perform editing operations.
3.	Document creation, Text manipulation with Scientific Notations.
4.	Create a formal letter using a suitable word processing package, to place a purchase order for procurement of books. Use mail merge feature
5.	Table creation, Table formatting and Conversion. Use tables for list of books.
6.	Create a Spreadsheet and enter the marks of a student, calculate total and print grade, if the student has passed in all subjects.
7.	Create a Power-point presentation with at least 6 slides.
8.	Create an advertisement.
9.	Using simple mathematical formulas in excel.
10.	CHARTS – Line, XY, Bar and Pie.

\* Perform the above tasks using Open Office/ MS Office.

## **C Programming** **CSE-201T**

**L – P**  
**4 – 0**

### **Unit I**

Linux Introduction : History, Difference between Linux and Windows, GNU, Usage, Various Linux Distributions, Installation of Linux, Architecture of Linux, Basic Commands in Linux, Introduction to Vi Editor, Understanding Files and Directories , Software installation in Linux

### **Unit II:**

Structure of C program, Identifiers, Keywords, Data Types, Constant and Variables, Operators: Precedence and Associativity, Expressions, Statements, Input and Output functions, Storage Classes. type casting, Macros.

### **Unit III**

Control structures: Branching & Looping, One dimensional Array, Multidimensional Array and their applications, String Manipulation.

### **Unit IV**

Library and User defined functions, Formal and Actual parameters, function prototypes, Parameter passing (Call-by-value,), Recursion, Structures, Unions

### **Unit V**

Pointer variable, Pointer Arithmetic, passing parameters by reference, pointer to pointer, pointers to functions, dynamic memory allocation., pointer to structure & pointer to union, Pointers to Multidimensional Arrays. Declaration of file pointer, opening and closing files, Working with text files.

### **Text Books**

1. Programming in ANSI C – E. Balaguruswami, Sixth Edition, TMH
2. Programming in C – Byron Gottfried, Third Edition, 2010, TMH
3. Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, Second Edition, 2013, OXFORD University Press
4. The ‘C’ programming language , Ritchi, Kernighan, Second Edition, 2012  
D.M.Ritchie, PHI
5. C The Complete Reference - H.Sohildt, Fourth edition,2000 TMH
6. Let us C - Y. Kanetkar, Twelfth Edition, 2012, BPB Publications
7. Computer Science - A Structured Programming Approach using C – B.A. Forouzan & R.F. Gillberg, Third Edition, 2007, Cengage Learning
8. Introduction to computers by Peter Norton, Tata McGraw Hill.
9. Richard Petersen, ”*Linux:The Complete Reference*”, 6th edition, Tata McGraw-Hill, 2007.
10. 2. Mark G. Sobell. ”*Practical Guide to Fedora and Red Hat Enterprise Linux*”, 6th Edition, Prentice Hall, 2011

## C Programming Lab

CSE 202P

L – P

0 – 2

### Lab Details

1. Programs to understand the basic data types.
2. Program for looping and decision statements.
3. Programs to generate odd, even, fibnoccii, lucas and other common series using loops.
4. Programs using built-in math functions.
5. Programs on arrays.
6. Program to implement linear search.
7. Programs on two dimension array.
8. Program to add and multiply two Matrices.
9. Program to find transpose of a Matrix
10. Program to read and display array using functions
11. Programs on string manipulations
12. Write functions for finding sum, difference, product and remainder between two numbers and return the result.
13. Programs on functions.
14. Write a function to find factorial using recursion.
15. Programs on structures and unions.
16. Programs on pointers
17. Write a function to swap two numbers using call by reference?
18. Write a function to find minimum of an array using pointers.?
19. Write a function to reverse a string using pointers?
20. Programs on basic file operations.
21. Small project as Assignment.

**Computer Fundamentals**  
**CSE 103T/P**

**L – P**  
**2 - 2**

**UNIT I**

Introduction to computers, A Simple Computer Model, Hardware and Software essentials of a computer, Need of computer in present world, Characteristics of Computers, Evolution of Computers, Basic Operations of a computer System.

**UNIT II**

Input / Output Units: Defining input and output units, types and description of Input –Output devices, Printing devices.

Storage: Primary memory, Memory Cell, Memory organization, ROM, RAM and its types, Secondary storage devices and its types.

**UNIT III**

System Software and utilities, Application Software, Licensed and open source software's, Need of Operating Systems, Types of Operating Systems, World Wide Web, How internet works, Benefits and drawbacks of using internet, LAN, WAN, MAN.

**UNIT IV (LAB)**

Microsoft office (MS Word, MS Excel, MS Powerpoint), Introduction to Linux operating system.

**Text Books :**

1. Introduction to computers by Peter Norton, Tata McGraw Hill.

**Reference Books:**

2. Computer Fundamentals by V. Rajaraman, Pearson Education.
3. Unix concepts and applications, Sumitabha Das, Tata McGraw Hill.

**Computer Fundamentals  
and C Programming  
CSE 104T/P**

**L – P  
2 – 2**

**Unit I**

Computer components, characteristics & classification of computers, hardware & software, peripheral devices, system software, application software, utility program, compiler, interpreter, Assemblers. Evolution of programming languages.

**Unit II**

Linux Introduction : History, Difference between Linux and Windows, GNU, Usage, Various Linux Distributions, Installation of Linux, Architecture of Linux, Basic Commands in Linux, Introduction to Vi Editor, Understanding Files and Directories , Software installation in Linux.

**Unit III**

Structure of C program, Identifiers, Keywords, Data Types, Constant and Variables, Operators: Precedence and Associativity, Expressions, Statements, Input and Output functions, Storage Classes.

**Unit IV**

Control structures: Branching & Looping, One dimensional Array, Multidimensional Array and their applications, Library and User defined functions.

**Text Books**

1. Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, Second Edition, 2013, OXFORD University Press
2. Programming in ANSI C – E. Balaguruswami, Sixth Edition, TMH
3. Programming in C – Byron Gottfried, Third Edition, 2010, TMH
4. Richard Petersen, "*Linux: The Complete Reference*", 6th edition, Tata McGraw-Hill, 2007.
5. Mark G. Sobell. "*Practical Guide to Fedora and Red Hat Enterprise Linux*", 6th Edition, Prentice Hall, 2011

## B-Tech Computer Science & Engineering

### List of Core to Other Departments

Course Code	Course Title	Dept.	L – P	Credit
MTH-111T	Mathematics-I	ECE/CIV/ELE	4 - 0	04
MTH-211T	Mathematics-II	ECE/CIV/ELE	4 - 0	04
MTH-312T	Probability and Statistics	CIV	4 - 0	04
MTH-313T	Laplace, Fourier and Complex Analysis	ECE/ELE	4 - 0	04
MTH-411T	Probability and Statistics	ELE	4 - 0	04
MTH-412T	Numerical Methods	CIV	4 - 0	04
MTH-511T/P	Numerical Methods	ELE	3 - 1	04



**Mathematics-I**  
**MTH-111T**

**L – P**  
**4 – 0**

**Unit-I**

Introduction to differential calculus, Leibnitz's Theorem for  $n^{\text{th}}$  derivative, Taylor's theorem, Tangent and Normal, Partial Differentiation, Euler's theorem, Double points, asymptotes, curvature and tracing of curves.

**Unit-II**

Limit, continuity and differentiability of functions of several variables, Chain rule, Jacobi theorem. Taylor's theorem of one and two variables, extrema of functions, two or more variables using method of Lagrange's multipliers.

**Unit-III**

Ordinary differential equations: Exact ordinary differential Equations and Ordinary differential equations reducible to exact differential equations. Linear differential equations and equations reducible to linear form. Linear Differential equations of second and higher order with constant and variable coefficients. Applications of Ordinary Differential Equations

**Unit-IV**

Series solutions of Ordinary Differential Equations

**Unit-V**

Algebraic Equation, Elements of the theory of polynomial equations. Fundamental theorem of Algebra, Relation between the roots and the coefficients of an equation, Solution of cubic & bi-quadratic equations

**Books Recommended**

1. Differential calculus, Shanti Narayan, S.Chand
2. A text Book on Engineering Mathematics by Bali, N.P, Luxmi Publications
3. Ordinary and Partial Differential equation, M.D.Raisinghania, S.Chand and Co

**Reference Books**

1. Advanced Engineering Mathematics by Jain, R.K. and Iyengar SRK, Narosa, 2001
2. Advanced Engineering Mathematics, Kreyszig, J.Wiley
3. Linear Algebra, Hoffmann & Kunze, Prentice-Hall
4. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
5. Engineering mathematics Vol I-II, Sastry, Prentice Hall of India

**Mathematics-II**  
**MTH 211T**

**L – P**  
**4 – 0**

**Unit-I:**

Non-linear differential equation of first order, Simultaneous differential equation, Simultaneous differential equation of the form  $dx/P = dy/Q = dz/R$ , Applications of ordinary differential equations,

Differential Equation: Partial differential equations of first order, Lagrange linear equation Standard form, Charpit's Method to solve non-linear partial differential equation.

**Unit-II:**

Partial differential equations of second and higher, Homogeneous Partial Differential equations with constant coefficients, vibration of stretched flexible string, heat flow equation. Wave equation, solutions by the method of separation of variables.

**Unit-III:**

Fourier Series :Fourier Series, Integral Calculus: Differential under the sign of integration. Double and triple integrals, change of variables, Beta and Gamma functions

**Unit-IV:**

Matrices: Review of algebra of matrices, Orthogonal and unitary matrices, partitioning of Matrices, Trace of Matrices, Triangular matrices, Rank of a matrix. elementary transformations, Inverse by Elementary Transformation.

**Unit-V:**

Normal Form of a Matrix, solution of simultaneous equation by elementary operation, Cayley-Hamilton theorem, Eigen values, and Eigen vectors of a matrix., Quadratic Form.

**Books Recommended:**

1. Advanced Engineering Mathematics by E.Kreyszig
2. Differential equations and its applications, H.T.Piaggio, Prentice-Hall
3. Applied Mathematics for Engineers by P.N.Wartikar
4. Advanced Engineering Mathematics, 2/e by Greenberg, Pearson education, 2004
5. Ordinary and partial Differential equation, M.D.Raisingania, S.Chand and Co
6. Linear Algebra, Hoffmann & Kunze, Prentice-Hall
7. Mathematical Analysis by S.C.Malik & Savita Arora New Age international Limited
8. Integral Calculus by Shanty Narayan.

**Probability and Statistics**  
**MTH 312T**

**L P**  
**4 0**

**Unit-I:**

Statistics: Measures of central tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Moment generating functions, problems.

**Unit-II:**

Probability: Random experiment, sample space, events, classical, statistical and axiomatic definitions of probability. Statements and proof of theorems on addition and multiplication of probabilities, problems.

**Unit-III:**

Conditional Probability: Bayes theorem on conditional probability. Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases. Laws of expectation problems. Problems.

**Unit-IV:**

Standard Distributions: Binomial, Poisson and Normal Distributions, Beta and Gamma Distribution, t Distribution, F-Distribution, Chi-square Distribution and their applications.

**Unit-V:**

Method of Least Squares & Correlation: Methods of least squares, fitting of straight line and parabola of degree 'p'. Regression and Correlation. Multiple and Partial Correlation. Problems

**Books Recommended:**

1. Fundamentals of Mathematical Statistic by S.C.Gupta and V.K. Kapoor, Sulltan Chand & Sons New Delhi, Latest edition.
2. Statistical Theory and Methodology in Science & Engineering by Brownlee, John Wiley & Sons.
3. Introduction to Mathematical Statistics by R.E.Walpole 3<sup>rd</sup> edition New York Macmillan publication.
4. Data Analysis for Scientists & Engineers by Meyer, John Wiley & Sons.

## Laplace, Fourier transforms and Complex Analysis

### MTH 313T

L – P

4 – 0

#### Unit-I:

Laplace transform, Shifting theorem, Laplace transforms of different functions, Heaviside's unit function, Dirac Delta function and its Laplace transforms, Heaviside's expansion theorem. Inverse Laplace transforms, Initial and final value theorems, convolution theorem and applications

#### Unit-II:

Use of Laplace transforms in the solution of linear differential equations.

Z -Transform, Inverse Z-Transform & Applications of Z Transform to Difference Equations.

#### Unit-III:

Bessel's functions, Recurrence relations, modified Bessels function of first kind.

Legendre polynomials, Rodrigues formula, Recurrence relations.

#### Unit-IV:

Definition of Fourier transform, Fourier Sine and Cosine transform, Fourier integral formula.

#### Unit-V:

Introduction to complex variables, analytic functions, harmonic conjugate, conformal transformation of some simple functions. Cauchy's Theorem and Cauchy's integral formula, Taylor's and Laurant's Theorems with classification of Singularities, Cauchy's Residue Theorem (Applications only).

#### Recommended Books:

1. Laplace Transforms by Spiegel (Schaum Series)
2. The use of Integral Transforms by Iam.N.Snedden, Tata McGraw Hill
3. Integral Transforms by Loknath Debnath, C.R.C. Press, New York.
4. Complex variables and applications by R.V. Churchill, McGraw Hill International Book Company
5. Advance Engineering Mathematics by R.K.Jain & S.R.K. Iyengen-Norosa-2001.
6. Higher Engineering mathematics, BS Grewal, Khanna Publishers, Delhi.

**Probability and Statistics**  
**MTH 411T**

**L P**  
**4 0**

**Unit-I:**

Statistics: Measures of central tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Moment generating functions, problems.

**Unit-II:**

Probability: Random experiment, sample space, events, classical, statistical and axiomatic definitions of probability. Statements and proof of theorems on addition and multiplication of probabilities, problems.

**Unit-III:**

Conditional Probability: Bayes theorem on conditional probability. Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases. Laws of expectation problems. Problems.

**Unit-IV:**

Standard Distributions: Binomial, Poisson and Normal Distributions, Beta and Gamma Distribution, t Distribution, F-Distribution, Chi-square Distribution and their applications.

**Unit-V:**

Method of Least Squares & Correlation: Methods of least squares, fitting of straight line and parabola of degree 'p'. Regression and Correlation. Multiple and Partial Correlation. Problems

**Books Recommended:**

1. Fundamentals of Mathematical Statistic by S.C.Gupta and V.K. Kapoor, Sulltan Chand & Sons New Delhi, Latest edition.
2. Statistical Theory and Methodology in Science & Engineering by Brownlee, John Wiley & Sons.
3. Introduction to Mathematical Statistics by R.E.Walpole 3<sup>rd</sup> edition New York Macmillan publication.
4. Data Analysis for Scientists & Engineers by Meyer, John Wiley & Sons.

## Numerical Methods

MTH 412T

L P  
4 0

### Unit-I:

**Finite Difference and Interpolation:** Difference Table and its usage. The difference operators  $\Delta$ ,  $\nabla$  and the operator E. Interpolation with equal intervals, Newton's advancing difference formula. Newton's backward difference formula. Interpolation with unequal intervals. Newton's divided difference formula. Lagrange's interpolation formula.

### Unit-II:

**Central Differences and Inverse interpolation:** The central difference operator  $\delta$  and the overranging operator  $\mu$ . Relations between the operators. Gauss forward and backward interpolation formula, Stirling's, Bessel's, Laplace and Everett's formulae.

Inverse interpolation by (i) Lagrange's (ii) Methods of successive approximation & (iii) Methods of elimination of third differences

### Unit-III:

**Numerical solution of algebraic and Transcendental Equations and Numerical differentiation and Numerical Integration:** Graphic Method, Regula-Fast method, Balzano's Process of bisection of intervals, Newton-Raphson Method and its geometrical significance. Numerical differentiation of a function. Differential coefficient of a function in terms of its differences. Numerical Integration, General Quadrature Formula, Trapezoidal rule, Simpson's one-third and three-eighth rules, Weddles' rule, Euler-Maclaurin expansion formula.

### Unit-IV

**Difference Equations and Numerical Solution of ordinary differential equations:** Linear-homogeneous and non-homogeneous difference equations of order n with constant coefficient, and their solution, methods of undetermined coefficient.

Numerical solution of ordinary differential equations, Picard's method. Taylor's series method, Euler's method, Runge-Kutta Method.

### Unit-V

**Numerical solution of simultaneous Equations and Eigen value problem:** Gauss elimination method, Gauss-Jordan method, Gauss-Jacobi and Gauss-Seidel iteration methods, power methods for solving Eigen value problems.

### Books Recommended:

1. Numerical Methods for Scientists and Engineering by M.K.Jain, S.R.Iyengar & R.K. Jain, Wiley Eastern Ltd.
2. Mathematical Numerical Analysis by S.C. Scarborough, Oxford and IBH .
3. Introductory methods in Numerical Analysis by S.S.Sastry, Prentice Hall of India.
4. Numerical Solution of Differential equations by M.K.Jain.
5. Numerical Methods for Science & Engineering by R.G.Stanton.

## Numerical Methods MTH 511T/P

L    P  
3    1

### Unit-I:

**Finite Difference:** Difference Table and its usage. The difference operators  $\Delta$ ,  $\nabla$  and the operator E.

**Interpolation:** Interpolation with equal intervals, Newton's advancing difference formula. Newton's backward difference formula. Interpolation with unequal intervals. Newton's divided difference formula. Lagrange's interpolation formula.

**Central Differences:** The central difference operator  $\delta$  and the overranging operator  $\mu$ . Relations between the operators. Gauss forward and backward interpolation formula, Sterlings, Bessel's, Laplace and Everetts formulae.

### Unit-II

**Inverse interpolation:** Inverse interpolation by (i) Lagrange's (ii) Methods of successive e approximation & (iii) Methods of elimination of third differences

**Numerical solution of algebraic and Transcendental Equations:** Graphic Method, Regula-Fast method, Balzano's Process of bisection of intervals, Newton-Raphson Method and its geometrical significance.

### Unit-III:

**Numerical Integration:** Numerical Integration, General Quadrature Formula, Simpson's one-third and three-eighth rules, Weddles' rule, Hardy's rule, Trapezoidal rule.

**Numerical differentiation :** Numerical differentiation of a function. Differential coefficient of a function in terms of its differences. Applications

### Unit-IV

**Difference Equations:** Linear-homogeneous and non-homogeneous difference equations of order n with constant coefficient, and their solution, methods of undetermined coefficient.

**Numerical Solution of ordinary differential equations:** Numerical solution of ordinary differential equations, Picard's method. Taylor's series method, Euler's method, Runge-Kutta Method.

### Unit-V

**Laboratory:** Writing computer programmes for numerical methods like Simpson's rule, Newton-Raphson method & Runge-Kutta method etc. Running of programme exercises.

### Books Recommended:

1. Numerical Methods for Scientists and Engineering by M.K.Jain, S.R.Iyengar & R.K. Jain, Wiley Eastern Ltd.
2. Mathematical Numerical Analysis by S.C. Scarborough, Oxford and IBH .
3. Introductory methods in Numerical Analysis by S.S.Sastry, Prentice Hall of India.
4. Numerical Solution of Differential equations by M.K.Jain.
5. Numerical Methods for Science & Engineering by R.G.Stanton.

### List of Electives to Other Departments

<b>Course Code</b>	<b>Course Title</b>	<b>L - P</b>	<b>Credits</b>	<b>Pre-requisite</b>	<b>Preferred semester</b>
<b>MTH-E01T</b>	Operation Research	4-0	04	Null	7 <sup>th</sup>
<b>MTH-E02T/P</b>	Numerical Methods	3-1	04	Null	5 <sup>th</sup>
<b>CSE-E03T/P</b>	MATLAB for Engineers	1 – 2	02	Null	3 <sup>rd</sup>
<b>CSE-E36T/P</b>	Data Structure	3-2	04	Null	3 <sup>rd</sup>
<b>CSE-E37T/P</b>	Internet and Web Designing	2– 2	03	Null	3 <sup>rd</sup>
<b>CSE-E38T/P</b>	Computer Network	3-1	04	DS	4 <sup>th</sup>
<b>CSE-E39T/P</b>	Object Oriented Programming	3-2	04	Null	3 <sup>rd</sup>
<b>CSE-E40T/P</b>	Data Base Management System	2-2	03	Null	3 <sup>rd</sup>
<b>CSE-E41T</b>	Network Security	4-0	04	Data Communication OR Computer Network	5 <sup>th</sup>
<b>CSE-E40T/P</b>	Computer Architecture and Organization	4-0	04	Digital Electronics	4 <sup>th</sup>



# Operation Research

## MTH E01T

L – P

4 – 0

### Unit I: Introduction

Introduction to operation Research, Basic definitions, scope , objectives, phases, models and limitations of operations research. Linear Programming problem à €. Formulation of LPP, Graphical solution of LPP, simplex method, artificial variables, big-M method, two phase method, degeneracy and unbound methods.

### UNIT II:Transportation Problems

Formulation, solution, unbalanced transportation problem. Finding basic feasible solutions à €. North-west corner rule, least cost method and Vogel's approximation method. Optimality test; the stepping stone method and MODI method.

### Unit III: Assignment Model and Hungarian method

Assignment Model Formulation, Hungarian method for optimal solution; solving unbalanced problems; travelling salesman problem and assignment.

### UNIT IV:Sequencing Models

Solution of sequencing problem à €; processing n jobs through two machines, à € processing n jobs through three machines à €; Processing two jobs through m machines à €; processing n jobs through n machines.

### UNIT V:Dynamic Programming

Characteristics of Dynamic Programming, Dynamic Programming approach for priority management, employment smoothening, capital budgeting, stage coach/shortest path, cargo loading and reliability problems.

### Books recommended:

1. P. Sankaralyer, à € Operations Research, Tata McGraw Hill 2008.
2. A.M. Natarajan, P.Balasubramani, A. Tamilarasi, à € Operations, Pearson Education, 2005.

## Numerical Methods MTH E02T

L    P  
3    1

### Unit-I:

**Finite Difference:** Difference Table and its usage. The difference operators  $\Delta$ ,  $\nabla$  and the operator E.

**Interpolation:** Interpolation with equal intervals, Newton's advancing difference formula. Newton's backward difference formula. Interpolation with unequal intervals. Newton's divided difference formula. Lagrange's interpolation formula.

**Central Differences:** The central difference operator  $\delta$  and the overranging operator  $\mu$ . Relations between the operators. Gauss forward and backward interpolation formula, Sterlings, Bessel's, Laplace and Everetts formulae.

### Unit-II

**Inverse interpolation:** Inverse interpolation by (i) Lagrange's (ii) Methods of successive e approximation & (iii) Methods of elimination of third differences

**Numerical solution of algebraic and Transcendental Equations:** Graphic Method, Regula-Fast method, Balzano's Process of bisection of intervals, Newton-Raphson Method and its geometrical significance.

### Unit-III:

**Numerical Integration:** Numerical Integration, General Quadrature Formula, Simpson's one-third and three-eighth rules, Weddles' rule, Hardy's rule, Trapezoidal rule.

**Numerical differentiation :** Numerical differentiation of a function. Differential coefficient of a function in terms of its differences. Applications

### Unit-IV

**Difference Equations:** Linear-homogeneous and non-homogeneous difference equations of order n with constant coefficient, and their solution, methods of undetermined coefficient.

**Numerical Solution of ordinary differential equations:** Numerical solution of ordinary differential equations, Picard's method. Taylor's series method, Euler's method, Runge-Kutta Method.

### Unit-V

**Laboratory:** Writing computer programmes for numerical methods like Simpson's rule, Newton-Raphson method & Runge-Kutta method etc. Running of programme exercises.

### Books Recommended:

1. Numerical Methods for Scientists and Engineering by M.K.Jain, S.R.Iyengar & R.K. Jain, Wiley Eastern Ltd.
2. Mathematical Numerical Analysis by S.C. Scarborough, Oxford and IBH .
3. Introductory methods in Numerical Analysis by S.S.Sastry, Prentice Hall of India.
4. Numerical Solution of Differential equations by M.K.Jain.
5. Numerical Methods for Science & Engineering by R.G.Stanton.

**Probability and Statistics**  
**MTH E03T**

**L P**  
**4 0**

**Unit-I:**

Statistics: Measures of central tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Moment generating functions, problems.

**Unit-II:**

Probability: Random experiment, sample space, events, classical, statistical and axiomatic definitions of probability. Statements and proof of theorems on addition and multiplication of probabilities, problems.

**Unit-III:**

Conditional Probability: Bayes theorem on conditional probability. Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases. Laws of expectation problems. Problems.

**Unit-IV:**

Standard Distributions: Binomial, Poisson and Normal Distributions, Beta and Gamma Distribution, t Distribution, F-Distribution, Chi-square Distribution and their applications.

**Unit-V:**

Method of Least Squares & Correlation: Methods of least squares, fitting of straight line and parabola of degree 'p'. Regression and Correlation. Multiple and Partial Correlation. Problems

**Books Recommended:**

1. Fundamentals of Mathematical Statistic by S.C.Gupta and V.K. Kapoor, Sulltan Chand & Sons New Delhi, Latest edition.
2. Statistical Theory and Methodology in Science & Engineering by Brownlee, John Wiley & Sons.
3. Introduction to Mathematical Statistics by R.E.Walpole 3<sup>rd</sup> edition New York Macmillan publication.
4. Data Analysis for Scientists & Engineers by Meyer, John Wiley & Sons.

## **Linear Algebra MTH-E04T**

**L P**  
**4 0**

### **Unit-I Matrices and System of Linear Equations, Determinants:**

Matrix algebra: addition, multiplication; inverse and transpose; symmetric and skew-symmetric matrices. Systems of linear equations and solution. Gaussian elimination and Gauss-Jordan reduction; Solutions of linear systems; rank of matrix. Determinants: definition and computation; inverse, products, and singularity.

### **Unit-II Vector Spaces:**

Vector spaces; Subspaces; span and spanning sets. Linear independence/dependence; basis and dimension; change of basis. Matrices; row and column spaces; basis for row and column spaces using elementary row operations; rank and nullity; Rank-nullity theorem (matrices); implications for linear systems.

### **Unit-III Inner product spaces and orthogonality:**

Inner product spaces; dot product and norm; orthogonality; orthogonal subspaces, projection and basis; orthogonal matrices. Gram-Schmidt orthogonalization; QR-factorization.

### **Unit-IV Linear transformations:**

Linear transformations and operators; range and kernel. Matrix of linear transformation,  $m \times n$  matrices as functions from  $\mathbb{R}^n \rightarrow \mathbb{R}^m$ ; Rank-nullity theorem (Linear transformations).

### **Unit-V Eigenvalues, eigenvectors and Eigen value functions:**

Eigenvalues and eigenvectors; characteristic polynomial; product and sum of eigenvalues; algebraic and geometric multiplicity of eigen-values; eigen-space; orthonormal basis of eigen vectors. Eigen value functions and systems of linear differential equations.

### **Books Recommended:**

1. Schaums outline of linear Algebra, Seymour Lipschutz.
2. Linear Algebra by Kenneth Hoffman and Ray Kunze.
3. Linear Algebra and its applications by Gilbert Strang.
4. Elementary Linear Algebra by, Howard Anton/ Chris Rorres

## **MATLAB for Engineers** **CSE-E03T/P**

**L – P**  
**1 – 2**

### **Unit-I**

Introduction to MATLAB and why it is widely used in engineering and science, advantages and limitations of the student edition of MATLAB, Start the MATLAB program and solve simple problems in the command window, Identify and use the various MATLAB windows, Define and use simple matrices, Name and use variables, difference between scalar, array, and matrix calculations, Express numbers in either floating-point or scientific notation, Adjust the format used to display numbers in the command window, Save the value of variables used in a MATLAB session, Save a series of commands.

### **Unit-II**

Built in functions, elementary math functions (common math functions, rounding functions, discrete mathematics functions, trigonometric functions), data analysis functions (maximum and minimum, mean and median, sums and products), sorting functions, random numbers, complex numbers, Recognize and be able to use the special values and functions built into MATLAB.

### **Unit-III**

Creating Function M-Files, Creating Your Own Toolbox of Functions, Anonymous Functions and Function Handles, Functions, Subfunctions. user defined input, output options, graphical input, Relational and logical operators, Find function, if/else, switch/case structure, for loops, while loops, midpoint break loops.

### **Unit-IV**

Manipulate matrices, extract data from matrices, solve problems with two matrix variables of different sizes, special matrices, Matrix Operations and Functions, Solutions of Systems of Linear Equations.

### **Unit -V**

Two-Dimensional Plots, Subplots, Other Types of Two-Dimensional Plots, Three Dimensional Plotting, Editing Plots from the Menu Bar, Creating Plots from the Workspace Window, Saving Your Plots.

### **List of Experiments**

1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
7. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.
8. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart.

### **Text Book**

1. Holly Moore, “MATLAB for Engineers”, Pearson
2. Bansal R.K, Goel A.K., Sharma M.K., “*MATLAB and its Applications in Engineering*”, Pearson Education, 2012.

### **References**

1. Amos Gilat, “*MATLAB-An Introduction with Applications*”, Wiley India, 2009.
2. Stephen.J.Chapman, “*Programming in MATLAB for Engineers*”, Cengage Learning, 2011.

**Data Structure**  
**CSE-E28T/P**

**L - P**  
**3 - 2**

**UNIT I:**

Introduction to data structures, classification of Data Structures, Primitive vs. Non Primitive, Linear vs Non Linear, Structure & Problem Solving, Primitive Data Structures Operations, Recursion Function & its Examples.

**UNIT II:**

Singly & Doubly – Linked Lists, Circular Linked List, their Implementation & Comparison, Concept of Stack & Queue, Array Based & Linked List Based Implementation of Stack & Queue & their Applications.

**UNIT III:**

Searching: Sequential & Binary Search on Array-based Ordered Lists, Binary Trees, their Implementation & Traversal, Binary Search Trees.

**UNIT IV:**

Graphs: Definition, Terminology & Representation using Adjacency Matrix & Linked List. Graph Traversals: BFS & DFS algorithms & their Implementations. Spanning Tree, Algorithms for computing minimal Spanning Tree, Shortest Path Algorithms & their Implementations.

**UNIT V:**

Sorting Techniques: Insertion Sort, Selection Sort, Merge Sort, Quick Sort,

**LIST OF PRACTICES**

1. Programs on Recursion.
2. Implementation of single and doubly linked list and various operations on them.
3. Applications of Linked List Polynomial Manipulation.
4. Circular Linked List.
5. Implementation of stack and queue using Array and linked list.
6. Applications of stack like Tower of Hanoi , Conversion of Infix Expression to polish notation, Conversion of Polish Expression to Code.
7. BST and its implementation.
8. BFS and DFS of Graph.
9. Sorting techniques-, Selection Sort ,Insertion Sort, Merge Sort, Quick Sort.

**BOOKS RECOMMENDED:**

1. Shams outline series “Data Structures”
2. Langsam Augenstein Tenenbaum “Data Structures using C and C++”

## **Internet & Web Design** **CSE-E29 T/P**

**L - P**  
**2 - 2**

### **UNIT-1**

HTML for structure, CSS for layout, and JavaScript for client-side programming; Suggestions for learning. Web Site Basics: Dreamweaver, HTML: Elements. Attributes and values. HTML Tables: Table, heading, row, data elements and attributes. Table structure not for page layout. Links and server-side includes: HTML links and anchors. Linking to external files to modularize html, build script libraries, or share styles; Server-side Includes. Standards: W3C, the World Wide Web Consortium: W3C recommendations as standards. HTML rules: Extensible markup languages

### **UNIT-II**

Frames: A glance at a common but deprecated element; advantages and disadvantages; frame and frameset properties. Images: Image types (JPG, GIF, PNG). Inline, embedded, and external styles. Writing Style Rules: Writing CSS selectors and rules to tie style attributes and values to html elements. The cascade: Inheritance, specificity, and the cascade. CSS positioning: Static, relative, and absolute positioning.

### **UNIT-III**

Client-side programming for browsers. Event Handlers. JavaScript Overview: Language characteristics. Variables. Assignment and comparison operators; expressions. HTML Forms: The form element and inputs: textbox, radio buttons, checkbox, textarea.

### **UNIT-IV**

HTML Form Basics, JavaScript, JavaScript Functions: Writing blocks of separate, reusable code, Getting started with developing simple functions for form validators. Form Validation: JavaScript for Simple Form Validation.

### **UNIT-V**

The DOM and JavaScript Object Models: The W3C Document Object Model; using nodes; DHTML: JavaScript + CSS = Dynamic HTML, Advanced form validation: Javascript's innerHTML and dynamic CSS for advanced form validation

### **List of Experiments:**

1. Develop and demonstrate an HTML document using HTML tags.
2. Working with lists and tables.
3. Working with images, multimedia.
4. Working with frames and forms.
5. Develop and demonstrate an HTML that illustrates the use of style sheet, ordered list, table, borders, padding, colour and <spam> tag, navigation bar, page layout
6. Develop an HTML file that includes JAVA script code.
7. Develop an HTML file that includes JAVA script working with event handlers, forms, forms array.
8. To write functions in HTML, validate using regular expressions.
9. Installing and web hosting using popular web servers, IIS, Apache
10. Creating the Web Site

### **Text Books:**

Dietel & Dietel "Internet & Web Designing".

### **Reference Books:**

1. Greenlaw R and Hepp E "Fundamentals of Internet and www".
2. B. Underdahle and K. Underdahle, "Internet and Web Page / WebSite Design", IDG Books India (P) Ltd.
3. D. Comer, "The Internet Book", Prentice Hall of India.

**Computer Networks**  
**CSE-E30T/P**

**L P**  
**3 1**

**Unit I**

**Introduction:** Uses of Computer Networks, Network and Protocol Architecture, Reference Model (ISO-OSI, TCP/IP-Overview)

**UNIT-II**

**Data Link layer** – Design Issues, Elementary and sliding Window data link protocols, Data link layer in HDLC, Point to Point protocol ALOHA, carrier sense multiple access, collision free protocols, IEEE standards –802.3, 802.4, 802.5.

**UNIT-III**

**Network Layer:** IP Addressing, IPv.4 Vs IPv.6, Class C Subnetting, virtual circuit and datagram subnets, Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad-cast, multicast, distance vector routing. Congestion control Algorithms, General principles of congestion prevention policies, Internet working, The Network layer in the Internet.

**UNIT-IV**

**Transport Layer:** Transport services, Elements of Transport protocols, Internet Transport Protocols. TCP, UDP

**UNIT-V**

**Application Layer-** Domain Name system, Electronic Mail, The world Wide Web, DHCP.

**List of Experiments**

8. Identification of guided media (UTP, Fiber ) /Color coding.
9. Network Wire Crimping.
10. To Connect two pc using peer to peer communication/via switch/via router.
11. IP addressing (static and dynamic).
12. Sharing the resources in wired network (software and hardware).

**TEXT BOOKS:**

5. Larry L.Peterson, Peter S. Davie, “*Computer Networks*”, Elsevier, Fifth Edition, 2012.
6. Computer Networks – Third Edition – Andrew S. Tanenbaum, Prentice Hall of India.
7. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.

**References:**

1. U. Black, “Computer Networks-Protocols, Standards and Interfaces”, PHI, 1996.
2. W. Stallings, “Computer Communication Networks”, PHI, 1999.
3. Laura Chappell (ed), “Introduction to Cisco Router Configuration”, Techmedia, 1999.
4. Michael A. Miller, “Data & Network Communications”, Vikas Publication, 1998.
5. William A. Shay, “Understanding Data Communications & Networks”, Vikas Publication, 1999.



## Object Oriented Programming CSE-E31T/P

L - P

3 - 2

### Unit I

**Introduction:** Basic features & concepts of Object Oriented Programming (OOP), Benefits, Languages and Applications of OOPs.

**Tokens, Expressions and Control Structures:** Tokens, Keywords, Identifiers & Constants, Basic Data types, User-defined Data types, Derived Data Types, Memory Management Operators, Manipulators, Expressions, Operator Overloading, Control Structures.

### Unit II

**Functions in C++:** Main function, function prototyping, call by reference, inline functions, default functions, function overloading.

### Unit III

**Classes and Objects:** Specifying a class, defining member functions, private member functions, array within a class, memory allocation for objects, arrays of objects, objects as function arguments, returning objects, pointers to members, local classes.

### Unit IV

**Constructors & Destructors:** Constructors, Parameterized Constructors, Constructors with Default arguments, Dynamic Initialization of objects, Dynamic Constructors & Destructors

**Operator Overloading & Type Conversion:** Definition & Rules of overloading Operators, Overloading Binary & Unary Operators.

### Unit V

**Inheritance:** Definition, single, multilevel, multiple, hierarchical and hybrid inheritance, virtual base classes, abstract classes

**Pointers, Virtual Functions and Polymorphism:** Pointers, Pointers to Objects and derived classes, virtual functions, Pure virtual functions.

### Lab Details

1. Function overloading, default arguments in C++.
2. Simple class design in C++, namespaces, objects creations
3. Class design in C++ using dynamic memory allocation.
4. Destructor, copy constructor
5. Operator overloading, friend functions
6. Overloading assignment operator, type conversions
7. Inheritance, run-time polymorphism

### Books recommended:

1. Object Oriented Programming with C++, E Balagurusamy
2. Object Oriented Programming in Turbo C++, Robert Lafore
3. Teach Yourself C++, Al Stevens
4. A Structured Approach using C++, Farouzan & Gilberg
5. Object Oriented Programming with C++, R S Salaria.

## **Data Base Management System CSE-E32T/P**

**L - P  
2 - 2**

### **Unit 1**

Basic Concepts and Conceptual Database Design: Database Users, Characteristics of the Database, Database Systems, Data Models, DBMS Architecture & Data Independence, Database Languages & Interfaces.

### **Unit II**

Overview of Hierarchical, Network & Relational Data Base Management Systems, Data Modeling Using The Entity-Relationship Model – Entities, Attributes and Relationships, Cardinality of Relationships, Strong and Weak Entity Sets, Generalization, Specialization, and Aggregation, Translating your ER Model into Relational Model.

### **Unit III**

Functional Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal Forms, Lossless Join & Dependency,

### **Unit IV**

Relational Model, Languages & Systems: Relational Data Model, Relational Model Concepts, Relational Model Constraints, , SQL – A Relational Database Language, Data Definition & Manipulation in SQL, View and Queries in SQL, Specifying Constraints and Indexes in SQL.

### **Unit V**

Transaction Management: Transaction Concept and State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability.

### **Lab Details**

1. Extract data from a single table
2. Use predicates and operators
3. Use SQL functions
4. Add, change and remove data in a data base
5. Manage database transactions
6. Create and manage tables and other data base objects
7. Control access to data
8. Join together data items from multiple tables
9. Use sub-queries for selection of data

### **Books Recommended:**

1. R. El. Masri and S. B. Navathe. *Fundamentals of Data Base Systems*, Benjamin Cummings, 1989.
2. H. F. Korth and A. Silberschatz. *Database Concepts*, 2nd Edition, Mcgraw Hill, 1991.
3. J. D. Ullman. *Principles of Database and Knowledge Base Systems*, Vol. I & II, Computer Science Press, 1988.

## **Network Security**

**CSE-E33T**

**L P**

**4 0**

### **Unit I**

Introduction to network security, Secure network services, Attacks, Security, Architecture, Security Mechanism, Introduction to cryptography, Data Encryption Standard, Design and analysis, IDEA (International Data Encryption), RC4

### **Unit II**

Public Key Cryptography and Authentication, Approaches to Message, Authentication, Secure Hash Functions, Message Authentication Codes

Public-Key Cryptography Principles, Public-Key Cryptography Algorithms

### **Unit III**

Web Security Considerations, Secure Socket Layer and Transport Layer Security

Transport Layer Security, HTTPS, Secure Shell (SSH)

### **Unit IV**

Web security, Java, cookies, HTTP/HTTPS, Web objects, DNS security, Smartcards/Biometrics, Privacy, Wireless security

### **Unit V**

Firewall, The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewall Basing, Firewall Location and Configurations

## **REFERENCES**

1. William Stallings, "Cryptography And Network Security – Principles and Practices", Prentice Hall of India, Third Edition, 2003.
2. Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003.
3. Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
4. Charles B. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Third Edition, Pearson Education, 2003.
5. Networking Essentials by William.S.Stallings

# Computer Architecture and Organization

CSE-E34T

L – P

4 - 0

## UNIT-I:

### Register Transfer and Micro-operations

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

## UNIT-II:

### Basic Computer Organization and Design

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Complete Computer Description. Control Memory, Address Sequencing, Micro program Example.

## UNIT-III:

### Central Processing Unit

Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control. Computer Arithmetic: Addition and Subtraction, Decimal Arithmetic Unit.

## UNIT-IV:

### Input-Output Organization

Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access.

## UNIT-V:

### Memory Organization

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.

## Recommended Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “*Computer Organization*”, McGraw-Hill, Fifth Edition, Reprint 2012.
2. Ghosh T. K., “*Computer Organization and Architecture*”, Tata McGraw-Hill, Third Edition, 2011.
3. M Mano, “*Computer System and Architecture*”, PHI.
4. W. Stallings, “*Computer Organization & Architecture*”, PHI.
5. J. P. Hayes, “*Computer Architecture and Organization*”, McGraw Hill
6. J. L Hennessy and D. A. Patterson, “*Computer Architecture: A quantitative approach*”, Morgan Kauffman, 1992.
7. *Computer Systems Organization and Architecture*, John D. Carpinelli, Pearson Education Inc.
8. Andrew S. Tanenbaum “*Structured Computer Organization*” .