

# **NATIONAL ENGINEERING COLLEGE**

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

**K.R.NAGAR, KOVILPATTI – 628 503**

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

## **REGULATIONS – 2011**



**DEPARTMENT OF**

**COMPUTER SCIENCE AND ENGINEERING**

**CURRICULUM AND SYLLABI OF**

**B.E.- COMPUTER SCIENCE AND ENGINEERING**

**REGULATIONS 2011**

**CURRICULUM AND SYLLABI FOR FULL TIME**

**B.E. COMPUTER SCIENCE AND ENGINEERING**

**SEMESTER – I**

Common to all B.E. / B.Tech. Degree Programmes)

S.No	Course Code	Course Title	L	T	P	C
<b><i>THEORY</i></b>						
1.	BEG101	Technical English – I	3	1	0	4
2.	BMA101	Mathematics – I	3	1	0	4
3.	BPH101	Engineering Physics – I	3	0	0	3
4.	BCY101	Engineering Chemistry – I	3	0	0	3
5.	BCS101	Fundamentals of Computing and Programming	3	0	0	3
6.	BME101	Engineering Graphics	2	3	0	4
<b><i>PRACTICAL</i></b>						
7.	BCS131	Computer Practice Laboratory – I	0	0	3	2
8.	BPC131	Physics and Chemistry Laboratory –I	0	0	3	2
9.	BME131	Engineering Practices Laboratory	0	0	3	2
<b>Total Number of Credits :</b>						<b>27</b>

**SEMESTER – II**

S.No	Course Code	Course Title	L	T	P	C
<b>THEORY</b>						
1.	BEG201	Technical English – II*	3	0	0	3
2.	BMA201	Mathematics – II*	3	1	0	4
3.	BPH201	Engineering Physics – II *	3	0	0	3
4.	BCY201	Engineering Chemistry – II *	3	0	0	3
5. a.	BME201	Engineering Mechanics (For Mechanical & Civil branches)	3	1	0	4
b.	BEE201	Circuit Theory (For EEE & EIE branches)	3	1	0	4
c.	BEC201	Electric Circuits and Electron Devices (For CSE, IT & ECE branches)	3	1	0	4
6. a.	BEE202	Basic Electrical & Electronics Engineering (For Mechanical & Civil branches)	4	0	0	4
b.	BME202	Basic Civil & Mechanical Engineering (For CSE, IT, EEE, EIE & ECE branches)	4	0	0	4
<b>PRACTICAL</b>						
7.	BCS231	Computer Practice Laboratory – II*	0	1	2	2
8.	BPC231	Physics & Chemistry Laboratory – II*	0	0	3	2
9. a.	BME231	Computer Aided Drafting and Modeling Laboratory (For Mechanical & Civil branches)	0	1	2	2
b.	BEE231	Electrical Circuits Laboratory (For EEE & EIE branches)	0	0	3	2
c.	BEC231	Circuits and Devices Laboratory (For ECE, CSE & IT branches)	0	0	3	2
10.	BEG231	English Language Skill Laboratory* (Skill of Listening)	0	0	3	2
<b>Total Number of Credits :</b>						<b>29</b>

- \* Common to all B.E. / B.Tech. Programmes

**SEMESTER – III**

S.No	Course Code	Course Title	L	T	P	C
<b>THEORY</b>						
1.	BMA301	Transforms and Partial Differential Equations	3	1	0	4
2.	BCE301	Environmental Science and Engineering	3	0	0	3
3.	BCS301	Data Structures	3	0	0	3
4.	BCS302	Object Oriented Programming	3	0	0	3
5.	BEI303	Digital Principles and System Design	3	1	0	4
6.	BEC304	Analog and Digital Communication	3	1	0	4
<b>PRACTICAL</b>						
7.	BCS331	Data Structures Laboratory	0	0	3	2
8.	BCS332	Object Oriented Programming Laboratory	0	0	3	2
9.	BEI332	Digital Laboratory	0	0	3	2
10.	BEG331	Communication Skills and Technical Seminar – I	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>12</b>	<b>29</b>

**SEMESTER – IV**

S.No	Course Code	Course Title	L	T	P	C
<b>THEORY</b>						
1.	BCS401	Design and Analysis of Algorithms	3	1	0	4
2.	BCS402	Microprocessors and Microcontrollers	3	0	0	3
3.	BMA402	Probability and Queueing Theory	3	1	0	4
4.	BCS403	Computer Organization and Architecture	3	1	0	4
5.	BCS404	Operating Systems	3	0	0	3
6.	BCS405	Database Management Systems	3	0	0	3
<b>PRACTICAL</b>						
7.	BCS431	Operating Systems Laboratory	0	0	3	2
8.	BCS432	Database Management Systems Laboratory	0	0	3	2
9.	BCS433	Microprocessors Laboratory	0	0	3	2
10.	BEG431	Communication Skills and Technical Seminar –II	0	0	3	2
<b>TOTAL</b>			<b>18</b>	<b>3</b>	<b>12</b>	<b>29</b>

**SEMESTER - V**

S.No	Course Code	Course Title	L	T	P	C
<b>THEORY</b>						
1	BMA501	Discrete Mathematics	3	1	0	4
2	BCS501	Java Programming	3	1	0	4
3	BCS502	Computer Networks	3	0	0	3
4	BCS503	Theory of Computation	3	1	0	4
5	BCS504	Software Engineering Methodologies	3	0	0	3
6	E1	Elective I	3	0	0	3
<b>Practical</b>						
7	BCS531	Java Programming Laboratory	0	0	3	2
8	BCS532	Networks Laboratory	0	0	3	2
			<b>18</b>	<b>3</b>	<b>6</b>	<b>25</b>

**Semester VI**

S.No	Course Code	Course Title	L	T	P	C
<b>Theory</b>						
1	BGE501	Professional Ethics and Human Values	3	0	0	3
2	BCS601	System Software and Compiler Design	3	1	0	4
3	BCS602	Object Oriented Analysis and Design	3	0	0	3
4	BCS603	Artificial Intelligence and Robotics	3	0	0	3
5	BCS604	Web Programming	3	0	2	4
6	E2	Elective II	3	0	0	3
<b>Practical</b>						
7	BCS631	System Software and Compiler Design Laboratory	0	0	3	2
8	BCS632	Object Oriented Analysis and Design Laboratory	0	0	3	2
9	BCS633	Comprehension	0	0	3	1
			<b>18</b>	<b>1</b>	<b>11</b>	<b>25</b>
<b>Total Number of Credits : 25</b>						

### Semester VII

S. No	Course Code	Course Title	L	T	P	C
<b>THEORY</b>						
1	BCS701	Computer Graphics and Visualization	3	0	0	3
2	BCS702	Mobile Application Development	3	0	0	3
3	BIT011	Cloud Computing	3	0	0	3
4	BGE802	Engineering Economics and Financial Accounting	3	0	0	3
5	E3	Elective III	3	0	0	3
6	E4	Elective IV	3	0	0	3
<b>PRACTICALS</b>						
7	BCS731	Computer Graphics and Visualization Laboratory	0	0	3	2
8	BCS732	Mobile Application Development Laboratory	0	0	3	2
			<b>18</b>	<b>0</b>	<b>6</b>	<b>22</b>
<b>Total Number of Credits : 22</b>						

### Semester VIII

S. No	Course Code	Course Title	L	T	P	C
<b>THEORY</b>						
1.	BCS801	Software Testing Techniques	3	0	0	3
2.	BMG601	Principles of Management	3	0	0	3
3.	E5	Elective V	3	0	0	3
4.	E6	Elective VI	3	0	0	3
<b>PRACTICAL</b>						
5.	BCS831	Project Work	0	0	18	12
			12	0	18	24
<b>Total Number of Credits : 24</b>						

### Elective I

S.No	Course Code	Course Title	L	T	P	C
1	BCS001	Advanced Database Technology	3	0	0	3
2	BCS002	Social Networks	3	0	0	3
3	BCS003	Unix Internals	3	0	0	3
4	BCS004	Open Source Systems	3	0	0	3
5	BCS005	C# and .Net Technologies	3	0	0	3

**Elective II**

S.No	Course Code	Course Title	L	T	P	C
1	BCS006	Cryptography and Network Security	3	0	0	3
2	BCS007	Data Warehousing and Data Mining	3	0	0	3
3	BCS008	Advanced Computer Architecture	3	0	0	3
4	BCS009	High Speed Networks	3	0	0	3
5	BCS010	Advanced Java Programming	3	0	0	3

**Elective III**

S. No	Course Code	Course Title	L	T	P	C
1	BCS011	IT Infrastructure Management	3	0	0	3
2	BCS012	Game Theoretical Model and Computation	3	0	0	3
3	BCS013	M-Commerce	3	0	0	3
4	BCS014	Quantum Computing	3	0	0	3
5	BMG004	Resource Management Techniques	3	0	0	3

**Elective IV**

S. No	Course Code	Course Title	L	T	P	C
1	BCS015	Adhoc Networks	3	0	0	3
2	BCS016	Mobile and Pervasive Computing	3	0	0	3
3	BCS017	System Administration and Management	3	0	0	3
4	BCS018	Service Oriented Architecture	3	0	0	3
5	BCS019	Storage Area Networks	3	0	0	3

**Elective V**

S. No	Course Code	Course Title	L	T	P	C
1	BCS020	System Application and Products	3	0	0	3
2	BCS021	Software Quality Management	3	0	0	3
3	BCS022	Mainframe Computing	3	0	0	3
4	BCS023	Cyber Forensics and Ethical Hacking	3	0	0	3
5	BGE003	Intellectual Property Rights	3	0	0	3

**Elective VI**

S. No	Course Code	Course Title	L	T	P	C
1	BCS024	Soft Computing	3	0	0	3
2	BCS025	Green Computing	3	0	0	3
3	BCS026	Knowledge Based Decision Support System	3	0	0	3
4	BCS027	Nature and Bio Inspired Computing	3	0	0	3
5	BCS028	Natural Language Processing	3	0	0	3

**BEG101**

**TECHNICAL ENGLISH – I**

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

**UNIT I**

**12**

General Vocabulary – Changing words from one form to another – Adjectives, Comparative adjectives – Active and Passive voice – Tenses – simple present, present continuous – Nouns – compound nouns – Skimming and scanning – Listening and transfer of information – bar chart, flowchart – Paragraph writing, description – Discussing as a group and making an oral report on the points discussed, Conversation techniques – convincing others.

**Suggested activities:**

1. Matching words & meanings - Using words in context – Making sentences.
  2. Changing sentences from active to passive voice & vice versa.
  3. Skimming, cloze exercises, exercises transferring information from text to graphic form – bar charts, flow charts.
  4. Writing descriptions using descriptive words & phrases, and technical vocabulary.
  5. Role play, conversation exercises, discussions, oral reporting exercises.
- Any other related relevant classroom activity.

**UNIT II**

**12**

Vocabulary – prefixes & suffixes – simple past tense – Spelling and punctuation – ‘wh’ Question forms – Scanning, inference – Listening & note-taking – Paragraph writing – Comparison and contrast – Creative thinking and speaking.

**Suggested Activities:**

1. a. Vocabulary activities using prefixes and suffixes.  
b. Exercises using questions – asking & answering questions.
  2. Scanning the text for specific information.
  3. Listening and note-taking – Writing paragraphs using notes, giving suitable headings and subheadings for paragraphs. Using expressions of comparison and contrast.
  4. Discussion activities and exploring creative ideas.
- Any other related relevant classroom activity.

**UNIT III**

**12**

Tenses – simple past, simple future and past perfect – Reading in Context – Reading & note-making – single line – Definitions – sequencing of sentences – instruction writing – Persuasive speaking.

**Suggested activities:**

1. Providing appropriate context for the use of tenses
  2. Listening and note-taking
  3. (a) Writing sentence definitions and instructions  
(b) Identifying the discourse links and sequencing jumbled sentences.
  4. Speaking exercises, discussions, role play exercises using explaining, convincing and persuasive Strategies.
- Any other related relevant classroom activity.

**UNIT IV**

**12**

Modal verbs and Probability – Concord subject verb agreement (Correction of errors) – Cause and effect expressions – Extended Definition – Speaking about the future plans.

**Suggested activities:**

1. a. Making sentences using modal verbs to express probability  
b. Gap filling using relevant grammatical form of words.
2. Writing extended definitions
3. Speaking – role play activities, discussions, extempore speaking exercises speculating about the future.  
Any other related relevant classroom activity

**UNIT V**

**12**

'If' conditionals – Gerunds – Intensive reading – Speaking – Presentation of problems & solutions – Itinerary – planning for an industrial visit – Formal Letter writing – Letter to the editor, invitation letter, accepting, declining letter and permission letter.

**Suggested activities:**

1. a) Sentence completion exercises using 'If' conditionals.  
b) Gap filling exercises using gerunds and present participle forms
2. Reading comprehension exercises.
3. Role play, discussion, debating and speaking activities for stating, discussing problems and suggesting solutions.
4. Writing letters to officials and to the editor in formal/official contexts.  
Any other related relevant classroom activity.

**TOTAL: 60 PERIODS**

**AREAS TO BE COVERED UNDER DIFFERENT HEADINGS:**

**A) Language focus**

1. Suffixes and Prefixes
2. Transformation of words from one form to another (Derivatives from root words)
3. Matching words & meanings (synonyms)
4. Compound nouns
5. Degrees of comparison
6. Active and passive voice-impersonal passive
7. Tenses: simple present, simple past, simple future, present continuous, past continuous, Present Perfect.
8. Modal verbs
9. 'Wh' Question forms
10. Conditional clause
11. Gerunds and infinitives
12. Expressing Cause and effect
13. Concord
14. Punctuation
15. Writing definitions

**B) Reading**

1. Reading in context
2. Skimming and scanning
3. Scanning the text for specific information
4. Reading and note-making
5. Intensive reading for making inferences
6. Reading comprehension

**C) Listening:**

1. Listening and transfer of information
2. Listening & note taking

**D) Writing:**

1. Transformation of information from graphical data to written form and from written form to graphical Form.
2. Paragraph writing – Description
3. Paragraph Writing – comparison and contrast.
4. Note-making
5. Writing Instructions
6. Jumbled sentences
7. Letter writing – Formal letters (Invitation, Accepting, Declining, Permission Letters) Letters to the editor

**E) Speaking:**

1. Discussing as a group and making oral reports,
2. Role play-Conversation techniques – convincing others
3. Creative thinking and speaking, Exploring creative ideas
4. Persuasive strategies
5. Speaking about the future plans
6. Extempore speech – Speaking exercises speculating about the future
7. Presentation of problems and solutions
8. Debates

**TEXT BOOK:**

1. Department of Humanities & Social Sciences, Anna University, ‘English for Engineers and Technologists’ Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006. Themes 1– 4 (Resources, Energy, Computer, Transport)

**REFERENCES:**

1. Meenakshi Raman and Sangeeta Sharma, ‘Technical Communication English skills for Engineers’, Oxford University Press, 2008.
2. Andrea, J. Rutherford, ‘Basic Communication Skills for Technology’, 2<sup>nd</sup> Edition, Pearson Education, 2007.

***Extensive Reading:***

- A.P.J.Abdul Kalam with Arun Tiwari, ‘Wings of Fire’ An Autobiography, University Press (India) Pvt. Ltd.,1999, 30<sup>th</sup> Impression 2007.



**BPH101**

**ENGINEERING PHYSICS – I**

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

**UNIT I          ULTRASONICS**

**9**

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

**UNIT II          LASERS**

**9**

Introduction – Principle of Spontaneous emission and stimulated emission, Population inversion, pumping, Einsteins A and B coefficients – derivation. Types of lasers – He-Ne, CO<sub>2</sub>, Nd-YAG, Semiconductor lasers (homojunction & heterojunction) Qualitative Industrial Applications - Lasers in welding, heat treatment, cutting – Medical applications – Holography (construction & reconstruction).

**UNIT III          FIBER OPTICS & APPLICATIONS**

**9**

Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – Double crucible technique of fibre drawing – Splicing, Loss in optical fibre – attenuation, dispersion, bending – Fibre optical communication system (Block diagram) – Light sources – Detectors – Fibre optic sensors – temperature & displacement – Endoscope.

**UNIT IV          QUANTUM PHYSICS**

**9**

Black body radiation – Planck's theory (derivation) – Deduction of Wien's displacement law and Rayleigh – Jean's Law from Planck's theory – Compton effect – Theory and experimental verification – Matter waves – Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box – Electron microscope – Scanning electron microscope – Transmission electron microscope.

**UNIT V          CRYSTAL PHYSICS**

**9**

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

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New Delhi (2003)
2. M.N.Avadhanulu and PG Kshirsagar, 'A Text book of Engineering Physics' S.Chand and company Limited, New Delhi, 2005.

**REFERENCES:**

1. Serway and Jewett, 'Physics for Scientists and Engineers with Modern Physics', 6<sup>th</sup> Edition, Thomson Brooks/Cole, Indian reprint (2007)
2. Rajendran, V and Marikani A, 'Engineering Physics' Tata Mc Graw Hill Publications Ltd, III Edition, New Delhi (2004).
3. Palanisamy, P.K., 'Engineering Physics' Scitech publications, Chennai (2007).
4. Jayakumar. S, 'Engineering Physics', R.K. Publishers, Coimbatore (2003).
5. Chitra Shadrach and Sivakumar Vadivelu, 'Engineering Physics', Pearson Education, New Delhi (2007).

**BCY101**

**ENGINEERING CHEMISTRY – I**

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

**UNIT I WATER TECHNOLOGY**

**9**

Characteristics – alkalinity – types of alkalinity and determination – hardness – types and estimation by EDTA method (problems), Domestic water treatment – disinfection methods (Chlorination, ozonation. UV treatment) – Boiler feed water – requirements – disadvantages of using hard water in boilers – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning – demineralization process – desalination and reverse osmosis.

**UNIT II POLYMERS AND COMPOSITES**

**9**

Polymers – definition – polymerization – types – addition and condensation polymerization – free radical polymerization mechanism, Plastics – classification – preparation, properties and uses of PVC, Teflon, polycarbonate, polyurethane, nylon-6,6, PET, Rubber – vulcanization of rubber, synthetic rubbers – butyl rubber, SBR, Composites – definition, types polymer matrix composites – FRP only.

**UNIT III SURFACE CHEMISTRY**

**9**

Adsorption – types – adsorption of gases on solids – adsorption isotherms – Freundlich and Langmuir isotherms – adsorption of solutes from solution – role of adsorbents in catalysis, ion-exchange adsorption and pollution abatement.

**UNIT IV NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES**

**9**

Nuclear energy – fission and fusion reactions and light water nuclear reactor for power generation (block diagram only) – breeder reactor – solar energy conversion – solar cells – wind energy – fuel cells – hydrogen-oxygen fuel cell – batteries – alkaline batteries – lead-acid, nickel-cadmium and lithium batteries.

**UNIT V ENGINEERING MATERIALS**

**9**

Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) – manufacture of alumina, magnesite and zirconia bricks, Abrasives – natural and synthetic abrasives – quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide. Lubricants – mechanism of lubrication, liquid lubricants – properties – viscosity index, flash and fire points, cloud and pour points, oiliness – solid lubricants – graphite and molybdenum sulphide. Nanomaterials – introduction to nanochemistry – carbon nanotubes and their Applications.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. P.C.Jain and Monica Jain, “Engineering Chemistry” Dhanpat Rai Pub.Co., New Delhi (2002).
2. S.S. Dara “A text book of engineering chemistry” S.Chand & Co. Ltd., New Delhi (2006).

**REFERENCES:**

1. B.K.Sharma “Engineering chemistry” Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. B. Sivasankar “Engineering Chemistry” Tate McGraw-Hill Pub.Co.Ltd., New Delhi (2008).

**BCS101 FUNDAMENTALS OF COMPUTING AND PROGRAMMING L T P C**  
**3 0 0 3**

**UNIT I INTRODUCTION TO COMPUTERS 9**

Introduction – Characteristics of Computers – Evolution of Computers – Computer Generations – Classification of Computers – Basic Computer Organization – Number Systems.

**UNIT II COMPUTER SOFTWARE 9**

Computer Software – Types of Software – Software Development Steps – Internet Evolution – Basic Internet Terminology – Getting connected to Internet – Applications.

**UNIT III PROBLEM SOLVING AND OFFICE AUTOMATION 9**

Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudocode –Application Software Packages – Introduction to Office Packages (not detailed commands for examination).

**UNIT IV INTRODUCTION TO “C” 9**

Overview of “C” – Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making –Branching and Looping.

**UNIT V FUNCTIONS AND POINTERS 9**

Handling of Character Strings – User-defined functions – Definitions – Declarations – Call by reference – Call by value – Structures and Unions – Pointers – Arrays – The Preprocessor – Developing a “C” Program : Some Guidelines.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Ashok.N.Kamthane, “Computer Programming”, Pearson Education (India) (2008).
2. Behrouz A.Forouzan and Richard.F.Gilberg, “A Structured Programming Approach Using C”, Second Edition, Brooks-Cole Thomson Learning Publications (2007).

**REFERENCES:**

1. Pradip Dey and Manas Ghoush, “Programming in C”, Oxford University Press (2007).
2. Byron Gottfried, “Programming with C”, 2<sup>nd</sup> Edition, (Indian Adapted Edition), TMH publications (2006). (Unit II, III, IV, and V).
3. Stephen G.Kochan, “Programming in C”, 3<sup>rd</sup> Edition, Pearson Education India (2005).
4. Brian W.Kernighan and Dennis M.Ritchie, “The C Programming Language”, Pearson Education Inc. (2005).
5. E.Balagurusamy, “Computing fundamentals and C Programming”, Tata McGRaw-Hill Publishing Company Limited (2008).
6. S.Thamarai Selvi and R.Murugan, “C for All”, Anuradha Publishers (2008).



7. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi (2008).

**BCS131**

**COMPUTER PRACTICE LABORATORY – I**

**L T P C**

**0 0 3 2**

## **LIST OF EXERCISES**

### **I. MS Office**

#### **a) WORD PROCESSING**

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - Flow Chart.

#### **b) SPREAD SHEET**

1. Chart - Line, XY, Bar and Pie.
2. Formula - formula editor.
3. Spread sheet - inclusion of object, picture and graphics, protecting the document and sheet.
4. Sorting and Import / Export features.

### **II SIMPLE C PROGRAMMING**

1. Data types, Expression evaluation, Conditional statements.
2. Arrays.
3. Structures and Unions.
4. Functions.

**TOTAL: 45 PERIODS**

For programming exercises Flow chart and pseudocode are essential.

### **HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 60 STUDENTS**

#### **HARDWARE**

- LAN System with 66 nodes (OR) Standalone PCs – 66 Nos.
- Printers – 3 Nos.

#### **SOFTWARE**

- OS – Windows / UNIX Clone
- Application Package – Office suite
- Compiler – "C"

**BPC131            PHYSICS AND CHEMISTRY LABORATORY – I**

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

**PHYSICS LABORATORY – I**

**LIST OF EXPERIMENTS**

1.     (a) Particle size determination using Diode Laser.  
       (b) Determination of Laser parameters – Wavelength and angle of divergence.  
       (c) Determination of acceptance angle in an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
4. Determination of wavelength of mercury spectrum – spectrometer grating.
5. Determination of thermal conductivity of a bad conductor – Lee’s Disc method.
6. Determination of Hysteresis loss in a ferromagnetic material.

**B. CHEMISTRY LABORATORY – I**

**LIST OF EXPERIMENTS**

1. Estimation of hardness of Water by EDTA method.
2. Estimation of Copper in brass by EDTA method.
3. Determination of DO in water (Winkler’s method)
4. Estimation of Chloride in Water sample (Argentometric)
5. Estimation of alkalinity of Water sample
6. Determination of molecular weight and degree of polymerization using viscometry.

**BME131 ENGINEERING PRACTICES LABORATORY**

**L T P C**

**0 0 3 2**

**GROUP A (CIVIL & MECHANICAL)**

**I CIVIL ENGINEERING PRACTICE**

**BUILDINGS:**

- (a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

**PLUMBING WORKS:**

- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- (a) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise:  
Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
- (e) Demonstration of plumbing requirements of high-rise buildings.

**CARPENTRY USING POWER TOOLS ONLY:**

- (a) Study of the joints in roofs, doors, windows and furniture.
- (b) Hands-on-exercise:  
Wood work, joints by sawing, planing and cutting.

**II MECHANICAL ENGINEERING PRACTICE**

**WELDING:**

- (a) Preparation of arc welding of butt joints, lap joints and tee joints.
- (b) Gas welding practice.

**BASIC MACHINING:**

- (a) Simple Turning and Taper turning.
- (b) Drilling Practice.

**SHEET METAL WORK:**

- (a) Forming & Bending:
- (b) Model making – Trays, funnels, etc.
- (c) Different type of joints.

**MACHINE ASSEMBLY PRACTICE:**

- (a) Study of centrifugal pump.
- (b) Study of air conditioner.

**DEMONSTRATION ON:**

- (a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
- (b) Foundry operations like mould preparation for gear and step cone pulley.
- (c) Fitting – Exercises – Preparation of square fitting and vee – fitting models.

## **GROUP B (ELECTRICAL & ELECTRONICS)**

### **III ELECTRICAL ENGINEERING PRACTICE**

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

### **IV ELECTRONICS ENGINEERING PRACTICE**

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

**TOTAL: 45 PERIODS**

### **REFERENCES:**

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

**BEG201 TECHNICAL ENGLISH – II**  
(Common to all branches)

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

**AIM**

To encourage students to actively involve in participative learning of English and to help them acquire communication skills.

**OBJECTIVES**

1. To help the students to develop listening skills for academic and professional purposes.
2. To help the students to acquire the ability of effective speaking in English in real-life situations.
3. To inculcate reading habit and to develop effective reading skills.
4. To help the students to improve their active and passive vocabulary.
5. To familiarize the students with different rhetorical functions of scientific English.
6. To enable the students to write letters and reports effectively in formal and business situations.

**UNIT I**

**10**

Technical Vocabulary – meanings in context, sequencing words, Articles – Prepositions, intensive reading and predicting content, Reading and interpretation, extended definitions, process description.

**Suggested activities**

1. Exercises on word formation using the prefix ‘self’ – Gap filling with preposition Exercises – Using sequence words
2. Reading comprehension exercise with questions based on inference – Reading heading and predicting the content – reading advertisements and interpretation
3. Writing extended definitions – Writing description of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future

**UNIT II**

**10**

Phrases / structure indicating cause/purpose – Adverbs – Skimming – Non-verbal communication – Listening – correlating verbal and non-verbal communication – speaking in group discussion – Formal Letter writing – Writing analytical paragraphs.

**Suggested Activities**

1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) – Reading comprehension exercises with texts including graphic communication – Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categories data in tables.
3. Writing formal letters – quotations, placing orders, clarification, and complaint, Letter seeking permission for industrial visits, writing analytical paragraphs on different debatable issues.

**UNIT III**

**10**

Cause and effect expressions – Different grammatical forms of the same word – speaking – stress and intonation, Group Discussions – reading – critical reading – listening – writing – using connectives, report writing – types, structure, data collection, content, form, recommendations.

**Suggested Activities**

1. Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different

- grammatical forms of the same word.
2. Speaking exercises involving the use of stress and intonation – Group discussions – analysis of problems and offering solutions.
  3. Reading comprehension exercises with critical questions, multiple choice questions.
  4. Sequencing of jumbled sentences using connectives – Writing different types of reports like industrial accident report and survey report – writing recommendations.

#### **UNIT IV**

**10**

Numerical adjectives – Oral instructions – Descriptive writing – Argumentative paragraphs – Letter of application – content, format (CV/Bio-data) – instructions, imperative forms – preparing checklists, Yes/No question form – Email communication

#### **Suggested Activities**

1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking – Role Play – group discussions – Activities giving oral instructions.
5. Writing descriptions, expanding hints – writing argumentative paragraphs – Writing formal letters – writing letter of application with CV/Bio-data – Writing general and safety instructions – Preparing checklists – Writing e-mail messages

#### **UNIT V**

**5**

Speaking – Discussion of problems and solutions – Creative and critical thinking – writing an essay, Writing a proposal.

#### **Suggested Activities**

1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements

**TOTAL 45 periods**

#### **AREAS TO BE COVERED UNDER DIFFERENT HEADINGS**

##### **A. Language Focus**

1. Technical vocabulary
2. Sequencing words
3. Articles
4. Prepositions
5. Word formation using prefixes
6. Phrases / Structure indicating purpose
7. Adverbs
8. Cause and effect expressions
9. Tense forms
10. Different grammatical forms of the same word
11. Numerical adjectives
12. Extended definitions

##### **B. Reading**

1. Intensive reading and predicting content

2. Reading and interpretation
3. Skimming
4. Critical reading
5. Reading comprehension exercises

#### **C. Listening**

1. Correlating verbal and non-verbal communication
2. Listening comprehension

#### **D. Speaking**

1. Group Discussions
2. Stress and intonation
3. Role plays and giving oral instructions
4. Discussion of problems and solutions

#### **E. Writing**

1. Process description
2. Formal letter writing
3. Writing analytical paragraphs
4. Report Writing
5. Descriptive writing
6. Argumentative paragraphs
7. Letter of application
8. Instructions
9. Recommendations
10. Checklists preparation
11. Email Communication
12. Writing critical essays
13. Writing proposals

#### **TEXT BOOK:**

1. 'English for Engineers and Technologists' Combined Edition (Volumes 1 & 2), Department of Humanities & Social Sciences, Anna University, Chennai: Orient Longman Pvt. Ltd., 2006. Themes 5 – 8 (Technology, Communication, Environment, Industry)

#### **REFERENCES:**

- Mark Abbot son, "Technical English for professionals" (2009).
- P.K. Dutt, G. Rajeevan and C.L.N Prakash, 'A Course in Communication Skills', Cambridge University Press, India 2007.
- Krishna Mohan and Meera Banerjee, 'Developing Communication Skills', Macmillan India Ltd., (Reprinted 1994 – 2007).
- Edgar Thorpe, Showick Thorpe, 'Objective English', Second Edition, Pearson Education, 2007.
- Rodney Huddleston and Geoffrey Pullum, 'A students introduction to English Grammar', Cambridge University Press, 2007.
- Jack C.Richards, Jonathan Hull and Susan Protor, 'English for International Communication', Third Edition, Cambridge University Press, 2004.

#### **Extensive Reading:**

- Robin Sharma, 'The Monk Who Sold His Ferrari', Jaico Publishing House, 2007

*Note:* The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.



**BPH201      ENGINEERING PHYSICS – II      L T P C**  
*(Common to all branches)*      **3 0 0 3**

**UNIT I      CONDUCTING MATERIALS      9**

Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

**UNIT II      SEMICONDUCTING MATERIALS      9**

Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration – compound semiconductors – Hall effect – Determination of Hall coefficient – Applications.

**UNIT III      MAGNETIC AND SUPERCONDUCTING MATERIALS      9**

Origin of magnetic moment – Bohr magneton – Dia and para magnetism – Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – anti-ferromagnetic materials – Ferrites – applications – magnetic recording and readout – storage of magnetic data – tapes, floppy and magnetic disc drives. Superconductivity – Properties – Types of super conductors – BCS theory of superconductivity (Qualitative) - High T<sub>c</sub> superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

**UNIT IV      DIELECTRIC MATERIALS      9**

Electrical susceptibility – dielectric constant – electronic, ionic, orientational and space charge polarization – frequency and temperature dependence of polarisation – Internal field – Clausius-Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer) – ferro electricity and applications.

**UNIT V      MODERN ENGINEERING MATERIALS      9**

Metallic glasses: preparation, properties and applications. Shape Memory Alloys (SMA): Characteristics, properties of Ni-Ti alloy, application, advantages and disadvantages of SMA. Nanomaterials: synthesis – plasma arcing – chemical vapour deposition – sol-gels – electrodeposition – ball milling – properties of nanoparticles and applications. Carbon nanotubes: fabrication – arc method – pulsed laser deposition – chemical vapour deposition – structure – properties and applications.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. Charles Kittel 'Introduction to Solid State Physics', John Wiley & sons 7<sup>th</sup> Edition, Singapore (2007)
2. Charles P. Poole and Frank J.Ownen, 'Introduction to Nanotechnology', Wiley India (2007) (for Unit V)

**REFERENCES:**

1. G.Senthil Kumar, 'Engineering Physics – II' VRB Publishers Pvt Ltd., Chennai (2010)
2. B.N.Sankar and S.O.Pillai, 'Engineering Physics', New Age International Publishers (2008) New Delhi.
3. Jayakumar .S. 'Materials Science', R.K. Publishers, Coimbatore (2008).
4. Palanisamy.P.K, 'Materials Science', Scitech publications (India) Pvt. Ltd., Chennai, 2<sup>nd</sup> Edition (2007).
5. M. Arumugam, 'Materials Science' Anuradha Publications, Kumbakonam (2006).
6. Rajendran.V and Marikani.A, 'Materials Science' Tata McGraw Hill publications, New Delhi (2004).

**BCY201      ENGINEERING CHEMISTRY – II      L T P C**  
*(Common to all branches)*      **3 0 0 3**

**AIM**

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

**OBJECTIVES**

1. The student should be conversant with the principles of electrochemistry, electrochemical cells, emf and applications of emf measurements.
2. Principles of corrosion control.
3. Chemistry of Fuels and combustion.
4. Industrial importance of Phase rule and alloys.
5. Analytical techniques and their importance.

**UNIT I      ELECTROCHEMISTRY      9**

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometric titrations (redox  $\text{Fe}^{2+}$  vs dichromate and precipitation –  $\text{Ag}^+$  vs  $\text{Cl}^-$  titration) and conductometric titrations – acid-base (HCl vs NaOH) titrations.

**UNIT II      CORROSION AND CORROSION CONTROL      9**

Chemical corrosion – Pilling-Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed current cathodic methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating.

**UNIT III      FUELS AND COMBUSTION      9**

Calorific value – classification – Coal – proximate and ultimate analysis – metallurgical coke – manufacture by Otto-Hoffmann by product oven method – Petroleum processing and fractions – cracking – catalytic cracking and methods. knocking – octane number and cetane number – synthetic petrol – Fischer Tropsch and Bergius processes – Gaseous fuels- water gas, producer gas, CNG and LPG – Flue gas analysis – Orsat apparatus – theoretical air for combustion.

**UNIT IV      PHASE RULE AND ALLOYS      9**

Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

**UNIT V      ANALYTICAL TECHNIQUES      9**

Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (problem) (block diagram only) – estimation of iron by Colorimetry. flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry. atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

**TOTAL: 45 PERIODS**

**TEXT BOOKS:**

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub. Co., New Delhi, 15<sup>th</sup> Edition (2009).
2. S.S.Dara "A text book of Engineering Chemistry" S.Chand & Co.Ltd., New Delhi (2006)

**REFERENCES:**

1. A Text book of Physical Chemistry by A.S.Negi & S.C. Anand, New Age International Pvt. Ltd., New Delhi (2009)
2. B.Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd., New Delhi (2008)
3. Principles of Physical Chemistry, AR Puri, LR Sharma, M.S. Pathania, Vishal Publication, (2005)
4. B.K.Sharma "Engineering Chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2001)



1. Rajasekaran.S, Sankarasubramanian.G., “Fundamentals of Engineering Mechanics”, Vikas Publishing House Pvt. Ltd., 3<sup>rd</sup> Edition (2010).
2. Hibbeler, R.C., “Engineering Mechanics”, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 12<sup>th</sup> Edition (2010).
3. Irving H. Shames, “Engineering Mechanics – Statics and Dynamics”, IV Edition – Pearson Education Asia Pvt. Ltd., (2003).
4. Ashok Gupta, “Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM)”, Pearson Education Asia Pvt., Ltd., (2002).
5. Palanichamy.M.S., Nagam, S., “Engineering Mechanics – Statics & Dynamics”, Tata McGraw-Hill (2001).

(b) **BEE201** **CIRCUIT THEORY** **L T P C**  
**(For EEE & EIE Branches)** **3 1 0 4**

**UNIT I BASIC CIRCUITS ANALYSIS** **12**  
 Ohm's Law – Kirchoffs laws – DC and AC Circuits – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis for D.C and A.C. circuits.

**UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS** **12**  
 Network reduction: voltage and current division, source transformation – star delta conversion. Thevenins and Norton Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

**UNIT III RESONANCE AND COUPLED CIRCUITS** **12**  
 Series and parallel resonance – their frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

**UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS** **12**  
 Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. input (Sinusoidal).

**UNIT V ANALYSING THREE PHASE CIRCUITS** **12**  
 Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4- wire circuits with star and delta connected loads, balanced & unbalanced loads – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, (2007).
2. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill publishers, 6<sup>th</sup> edition, New Delhi, (2002).

**REFERENCES:**

1. John Bird "Electrical Circuit Theory and Technology" Fourth Edition, Newnes Publications (2010)
2. Charles K.Alexander, Mathew N.O.Sadik, "Fundamentals of Electric circuits", 2<sup>nd</sup> Edition, McGraw Hill (2003).
3. Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series, Tata McGraw-Hill, New Delhi (2001).
4. Paranjothi SR, "Electric Circuits Analysis," New Age International Ltd., New Delhi, (1996).
5. Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi (1999).

(c) **BEC201 ELECTRIC CIRCUITS AND ELECTRON DEVICES** **L T P C**  
**(For ECE, CSE and IT Branches)** **3 1 0 4**

**UNIT I CIRCUIT ANALYSIS TECHNIQUES 12**

Kirchoff's current and voltage laws – series and parallel connection of independent sources – R, L and C – Network Theorems – Thevenin, Superposition, Norton, Maximum power transfer and duality – Star-delta conversion.

**UNIT II TRANSIENT & RESONANCE IN RLC CIRCUITS 12**

Basic RL, RC and RLC circuits and their responses to pulse and sinusoidal inputs – frequency response – Parallel and series resonances – Q factor – single tuned and double tuned circuits.

**UNIT III SEMICONDUCTOR DIODES 12**

Review of intrinsic & extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitances – Effect of temperature and breakdown mechanism – Zener diode and its characteristics.

**UNIT IV TRANSISTORS 12**

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

**UNIT V SPECIAL SEMICONDUCTOR DEVICES (Qualitative Treatment only) 12**

Tunnel diodes, PIN diode, varactor diode – SCR characteristics and two transistor equivalent model – UJT – Diac and Triac – Laser, CCD, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD.

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. Joseph A. Edminister, Mahmood, Nahri, "Electric Circuits" – Shaum series, Tata McGraw Hill (2001)
2. Salivahanan, N. Suresh kumar and A.Vallavaraj, "Electronic Devices and Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition (2008).
3. David A. Bell, "Electronic Devices and Circuits", Oxford University Press, 5<sup>th</sup> Edition (2008).

**REFERENCES:**

1. William H. Hayt, J.V. Jack, E. Kemmebly and Steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill (2011.)
2. A.Sudhakar, Shyammohan S Palli, "Circuits and Networks-Analysis and Synthesis", Tata McGraw Hill, 4<sup>th</sup> edition (2010)
3. Robert T.Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, 7<sup>th</sup> Education (2008).
4. J.Millman & Halkins, Satyabranta Jit, "Electronic Devices & Circuits", Tata McGraw Hill, 2<sup>nd</sup> Edition (2008).
5. William H. Hayt, J.V. Jack, E. Kemmebly and Steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 6<sup>th</sup> Edition (2002).

(a) **BEE202 BASIC ELECTRICAL & ELECTRONICS ENGINEERING** **L T P C**  
**(For Mechanical & Civil Branches)** **4 0 0 4**

**UNIT I ELECTRICAL CIRCUITS & MEASUREMENTS 12**

Ohm's Law – Kirchoff's Laws – Steady State Solution of DC Circuits – Introduction to AC Circuits – Waveforms and RMS Value – Power and Power factor – Single Phase and Three Phase Balanced Circuits. Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters.

**UNIT II ELECTRICAL MACHINES 12**

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single Phase Transformer, Single Phase Induction Motor.

**UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 12**

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier

**UNIT IV DIGITAL ELECTRONICS 12**

Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion (simple concepts)

**UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 12**

Types of Signals: Analog and Digital Signals – Modulation and Demodulation: Principles of Amplitude and Frequency Modulations. Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

**TOTAL: 60 PERIODS**

**TEXT BOOKS:**

1. R.S. Sedha, "Applied Electronics" S. Chand & Co., 2006.
2. V.N. Mittle "Basic Electrical Engineering", Tata McGraw Hill Edition, New Delhi, 1990.

**REFERENCES:**

1. Gnanavadeivel, C. Senthilkumar, A. Vijaykumar, S. Joseph Gladwin, "Basic Electrical and Electronics Engineering", Anuradha Publishers (2011).
2. Muthusubramanian, R, Salivahanan, S and Muraleedharan, K.A, "Basic Electrical, Electronics and Computer Engineering", Tata McGraw Hill, Second Edition (2006).
3. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press (2005).
4. Premkumar N, "Basic Electrical Engineering", Anuradha Publishers (2003).
5. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum Outline Series, McGraw Hill (2002).
6. Mehta V K, "Principles of Electronics", S.Chand & Company Ltd., (1994).

(b)	<b>BME202 BASIC CIVIL &amp; MECHANICAL ENGINEERING</b>	<b>L T P C</b>
	<b>(For CSE, ECE, EEE, EIE &amp; IT branches)</b>	<b>4 0 0 4</b>

### **A – CIVIL ENGINEERING**

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

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

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

#### **UNIT II BUILDING COMPONENTS AND STRUCTURES 15**

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

**Superstructure:** Brick masonry – stone masonry – Beams – Columns – Lintels – Roofing – Flooring – Plastering – Mechanics – Internal and external forces – stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Landscaping.

**TOTAL: 30 PERIODS**

### **B – MECHANICAL ENGINEERING**

#### **UNIT III POWER PLANT ENGINEERING 10**

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

#### **UNIT IV IC ENGINES 10**

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

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

Terminology of Refrigeration and Air Conditioning: Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

**TOTAL: 30 PERIODS**

#### **REFERENCES:**

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



**BPC231      PHYSICS AND CHEMISTRY LABORATORY – II**  
*(Common to all branches)*

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

**PHYSICS LABORATORY – II**

**LIST OF EXPERIMENTS**

1. Determination of Young's modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
4. Determination of viscosity of liquid – Poiseuille's method.
5. Spectrometer dispersive power of a prism.
6. Determination of Young's modulus of the material – uniform bending.
7. Torsional pendulum – Determination of rigidity modulus.

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

**CHEMISTRY LABORATORY – II**

**LIST OF EXPERIMENTS**

1. Conductometric titration (Simple acid base)
2. Conductometric titration (Mixture of weak and strong acids)
3. Conductometric titration using  $\text{BaCl}_2$  Vs  $\text{Na}_2\text{SO}_4$
4. Potentiometric Titration ( $\text{Fe}^{2+}$  Vs  $\text{K}_2\text{Cr}_2\text{O}_7$ )
5. pH Titration (Acid & Base)
6. Determination of water of crystallization of a crystalline salt ( $\text{CuSO}_4$ )
7. Estimation of Ferric ion by spectrophotometry.

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

**(a) BME231 COMPUTER AIDED DRAFTING AND MODELING LABORATORY L T P C**  
**(For Mechanical & Civil Branches) 0 1 2 2**

**List of Exercises using software capable of Drafting and Modeling**

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
9. Drawing isometric projection of simple objects.
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

**Note: Plotting of drawings must be made for each exercise and attached to the records written by students.**

**List of Equipments for a batch of 30 students:**

1. Pentium IV computer or better hardware, with suitable graphics facility – 30 Nos.
2. Licensed software for Drafting and Modeling – 30 Licenses
3. Laser Printer or Plotter to print / plot drawings – 2 Nos.

**(b) BEE231 ELECTRICAL CIRCUITS LABORATORY**

(For EEE & EIE branches)

**L T P C**

**0 0 3 2**

**LIST OF EXPERIMENTS**

- Verification of ohm's laws and kirchoff's laws.
- Verification of Thevenin's and Norton's Theorem
- Verification of superposition Theorem
- Verification of maximum power transfer theorem.
- Verification of reciprocity theorem
- Measurement of self inductance of a coil
- Verification of mesh and nodal analysis.
- Transient response of RL and RC circuits for DC input.
- Frequency response of series and parallel resonance circuits.
- Frequency response of single tuned circuits.

**TOTAL: 45 PERIODS**

(c) **BEC231 CIRCUITS AND DEVICES LABORATORY**  
(For ECE, CSE & IT branches)

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

- Verification of KVL and KCL
- Verification of Thevenin and Norton Theorems.
- Verification of superposition Theorem.
- Verification of Maximum power transfer and reciprocity theorems.
- Frequency response of series and parallel resonance circuits.
- Characteristics of PN and Zener diode
- Characteristics of CE configuration
- Characteristics of CB configuration
- Characteristics of UJT and SCR
- Characteristics of JFET and MOSFET
- Characteristics of Diac and Triac.
- Characteristics of Photodiode and Phototransistor.

**TOTAL: 45 PERIODS**

**BEG231 ENGLISH LANGUAGE SKILL LABORATORY (Skill of Listening) L T P C**  
*(Common to all branches)* **0 0 3 2**

**UNIT I (Micro Skills I) 4**

**Tasks (Type I): Lexical word identification**

- A. Identifying the homophones/words with silent letters/often mispronounced words
- B. Identifying the missing words in native speech (Native accent)

**Tasks (Type II): Decompressing structures**

- A. Expanding sound units into word clusters (Ex: verbs with multiple auxiliaries/contracted forms)
- B. Identifying the constituent words in collocations/compound words/idiomatic phrases

**UNIT II (Micro Skills II): Identifying tonal variations for meaning making 6**

**Tasks:**

- A. Punctuating the script after listening to it.
- B. Marking word chunks/tone groups in transcript after listening to it.
- C. Marking syllable stress in words.
- D. Identifying tonal variations expressing rhetorical questions/ information seeking Questions / Exclamations / General statements.

**UNIT III Content Comprehension and Making Inferences 12**

**Tasks:**

- A. Listening and filling in the chart
- B. Multiple choice questions (Negative/factual)
- C. True/False questions
- D. Questions with multiple answers (choosing two/three correct answers)
- E. Matching information
- F. Filling the blanks (not more than three words)
- G. Comprehending the text organization

**UNIT IV Listening and act 8**

**Tasks:**

- A. Locating spots in a map following the given directions
- B. Transferring data to graphs/diagrams/flow charts
- C. Diagram/Picture completing tasks
- D. Finding the answer through the process of elimination

**TOTAL: 30 PERIODS**

**BMA301      TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS      L T P C**  
**(Common to all branches)      3 1 0 4**

**OBJECTIVES**

The course objective is to develop the skills of the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.

**UNIT I    FOURIER SERIES      (9L+3T)**

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

**UNIT II    FOURIER TRANSFORMS      (9L+3T)**

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

**UNIT III    PARTIAL DIFFERENTIAL EQUATIONS      (9L+3T)**

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

**UNIT IV    APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS      (9L+3T)**

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

**UNIT V    Z - TRANSFORMS AND DIFFERENCE EQUATIONS      (9L+3T)**

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

**Lectures: 45    Tutorials: 15    Total: 60 Periods**

**TEXT BOOK**

1. Grewal, B.S, "*Higher Engineering Mathematics*", 40<sup>th</sup> Edition, Khanna publishers, Delhi, (2007)

**REFERENCES**

1. Bali.N.P and Manish Goyal, "*A Textbook of Engineering Mathematics*", 7th Edition, Laxmi Publications(P) Ltd. (2007)
2. Ramana.B.V., "*Higher Engineering Mathematics*", Tata Mc-GrawHill Publishing Company limited, New Delhi (2007).
3. Glyn James, "*Advanced Modern Engineering Mathematics*", 3rd Edition, Pearson Education (2007).
4. Erwin Kreyszig, "*Advanced Engineering Mathematics*", 8th edition, Wiley India (2007).

**BCE301 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C**  
(Common to 3<sup>rd</sup> Sem – Civil, CSE, IT, EEE and EIE 3 0 0 3  
5<sup>th</sup> Sem – Mechanical, 7<sup>th</sup> Sem - ECE)

**AIM**

The aim of this course is to create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional endeavour that they participates.

**OBJECTIVE**

At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

**UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14**

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) –Introduction to biodiversity 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. Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river, hill slopes, etc.

**UNIT II ENVIRONMENTAL POLLUTION 8**

Definition – causes, 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 municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

**UNIT III NATURAL RESOURCES 10**

Forest resources: Use and over-exploitation, deforestation, case studies – timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over – utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies – 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. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

**UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7**

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 – role of nongovernmental organization – 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 – enforcement machinery involved in environmental legislation – central and state pollution control boards- Public awareness.

**UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6**

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.

**TOTAL: 45**

**TEXT BOOKS:**

1. Gilbert M.Masters, “Introduction to Environmental Engineering and Science”, 2<sup>nd</sup> Edition, Pearson Education, 2008.
2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, 2006.

**REFERENCES:**

1. R.K. Trivedi, “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Enviro Media, BS Publications, 2004.
2. Cunningham, W.P. Cooper, T.H. Gorhani, “Environmental Encyclopedia”, Jaico Publishing House, Mumbai, 2001.
3. Dharmendra S. Sengar, “Environmental Law”, Prentice Hall of India (P) Ltd., New Delhi, 2007.
4. Rajagopalan R, “Environmental Studies from Crisis to Cure”, Oxford University Press, 2005.







**BEC304 ANALOG AND DIGITAL COMMUNICATION**

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

**UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9+3**

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

**UNIT II DIGITAL COMMUNICATION 9+3**

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

**UNIT III DIGITAL TRANSMISSION 9+3**

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

**UNIT IV DATA COMMUNICATIONS 9+3**

Introduction – History of Data communications, Standards Organizations for data communication – data communication circuits – data communication codes – Error control – Error Detection – Error correction – Data communication Hardware – serial and parallel interfaces – data modems – Asynchronous modem – Synchronous modem – low-speed modem – medium and high speed modem – modem control.

**UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9+3**

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

**LECTURE: 45 TUTORIAL: 15 TOTAL: 60**

**TEXT BOOKS**

1. Wayne Tomasi, “Advanced Electronic Communication Systems”, 6<sup>th</sup> Edition, Pearson Education, 2007.
2. Simon Haykin, “Communication Systems”, 4<sup>th</sup> Edition, John Wiley & Sons, 2001.

**REFERENCES**

1. H.Taub,D L Schilling ,G Saha , “Principles of Communication”, 3<sup>rd</sup> Edition, Tata Mc Graw-Hill, 2007.
2. B.P.Lathi, “Modern Analog and Digital Communication systems”, 3<sup>rd</sup> Edition, Oxford University Press, 2007.
3. Blake, “Electronic Communication Systems”, Thomson Delmar Publications, 2002.
4. Martin S.Roden, “Analog & Digital Communication System”, 3<sup>rd</sup> Edition, PHI, 2002.
5. B.Sklar, “Digital Communication Fundamentals and Applications”, 2<sup>nd</sup> Edition, Pearson Education, 2007.

**BCS331 DATA STRUCTURES LABORATORY**

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

**AIM:**

To develop programming skills in design and implementation of data structures and their applications.

**LIST OF EXPERIMENTS**

1. Implement singly and doubly linked lists.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
3. Implement stack and use it to convert infix to postfix expression
4. Implement a double-ended queue (dequeue) where insertion and deletion operations are possible at both the ends.
5. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.
6. Implement binary search tree.
7. Implement insertion in AVL trees.
8. Implement priority queue using binary heaps
9. Implement hashing with open addressing.
10. Implement Prim's algorithm using priority queues to find MST of an undirected graph.

**TOTAL : 45**

**LIST OF EQUIPMENTS AND COMPONENTS FOR A BATCH OF 30 STUDENTS  
(PER BATCH)**

**HARDWARE:**

- 30 Personal Computers
- Processor – Pentium III or Pentium IV
- RAM – 256 MB or higher
- Hard disk – 40 GB or higher

**SOFTWARE:**

- Turbo C (freeware) – to be installed in all PC's
- OS- Windows 2000/ Windows XP/ NT.

**BCS332                      OBJECT ORIENTED PROGRAMMING LABORATORY                      L T P C**  
**(Common to 3<sup>rd</sup> Sem – CSE & IT, 5<sup>th</sup> Sem – EIE, 6<sup>th</sup> Sem – EEE)                      0 0 3 2**

### **OBJECTIVES**

- To provide fundamental knowledge and skills to practice C++ programming.
- To develop ability to solve real-time problems using OOPs concepts.
- To have an understanding and hands-on practice in advanced concepts of C++

### **LIST OF EXPERIMENTS**

1. Design C++ classes with static members, methods with default arguments, friend functions. (For example, design matrix and vector classes with static allocation, and a friend function to do matrix-vector multiplication)
2. Implement complex number class with necessary operator overloading and type conversions such as integer to complex, double to complex, complex to double etc.
3. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.
4. Overload the new and delete operators to provide custom dynamic allocation of memory.
5. Develop a template of linked-list class and its methods.
6. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.
7. Design stack and queue classes with necessary exception handling.
8. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, \*, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read, and write the result to another file (one per line).

**TOTAL: 45**

### **LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 30 STUDENTS**

#### **HARDWARE:**

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

#### **SOFTWARE:**

- Turbo C (freeware) – to be installed in all PC's.
- OS - Windows 2000/ Windows XP/ NT

**BEI332            DIGITAL LABORATORY**  
(Common to CSE & IT)

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

**LIST OF EXPERIMENTS**

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices.
4. Design and implementation of parity generator / checker using basic gates and MSI Devices.
5. Design and implementation of magnitude comparator.
6. Design and implementation of application using multiplexers/ demultiplexers.
7. Design and implementation of Shift registers.
8. Design and implementation of Synchronous and Asynchronous counters.
9. Simulation of combinational circuits using Hardware Description Language (VHDL / Verilog HDL software required).
10. Simulation of sequential circuits using HDL (VHDL/ Verilog HDL software required)

**TOTAL: 45**

**List of equipments and components for a batch of 30 students**

S.No	Name of equipment/ component	Quantity Reqd	Remarks
1	Dual power supply/ single mode power supply	15/30	+12/-12V
2	IC Trainer	15	10 bit
3	Bread Boards	15	
4	Multimeter	5	
6	IC 7400	60	
7	IC7402	60	
8	IC 7404	60	
9	IC 7486	60	
10	IC 7408	60	
11	IC 7432	60	
12	IC 7483	60	
13	IC74150	60	
14	IC74151	40	
15	IC74147	40	
16	IC7445	40	
17	IC7476	40	
18	IC7491	40	
19	IC555	40	
20	IC7494	40	
21	IC7447	40	
22	IC74180	40	
23	IC7485	40	
24	IC7473	40	
25	IC74138	40	
26	IC7411	40	
27	IC7474	40	
28	Computer with HDL software	30	
29	Seven segment display	40	
30	Assembled LED board/LEDs	40/200	
31	Wires Single strand		Single Strand

**BEG331 COMMUNICATION SKILLS AND TECHNICAL SEMINAR – I** **L T P C**  
*(Common to all branches)* **0 0 3 2**

(To be conducted as a Practical Paper by the Depts of English for 3 hrs per week)

**OBJECTIVES:**

- To improve the learners' oral fluency in English
- To help the learners acquire the readiness to speak in English
- To develop the sub-skills required for paper presentations and group discussions
- To help the learners improve their vocabulary related to specific fields of technology
- To facilitate the development of the learners' proficiency in meaningful interaction
- To provide them linguistic support for managing vital sub-functions of Communication

**COURSE CONTENT:**

**A) Phonetic practice (7 hrs)**

- English phonemes with special emphasis on the diphthongs
- Stress patterns for words that end with specific suffixes.  
(*'ion'*, *'ic'* *'ical'* *'ious'*, *'ate'*, *'ise/-ize'*, *'fy'*, *'logy'*, *'ity'*)

**B) Speech practice (8 hrs)**

- Speaking on the themes by developing the hints provided.

The themes are:

1. Cloning
2. Artificial satellites
3. Renewable sources
4. Telecommunication
5. Cyber Revolution
6. Space research
7. Polythene pollution
8. Fossil fuels
9. Climate change
10. Ecological threats
11. Water resources
12. Nuclear technology
13. Scientific farming
14. Thermal power plants
15. Natural calamities
16. Robotics
17. Artificial intelligence
18. Role of Fibre Optics
19. Exploration of Mars
20. Gas turbines

**C) Group Quiz on technical aspects related to the themes (4hrs)**

**D) Language Functions (8 hrs)**

1. comparing and contrast
2. reporting the conversation of others.
3. talking about future plans and intentions
4. giving reasons
5. expressing preferences
6. quantifying
7. expressing certainty and uncertainty
8. expressing opinions and impressions

9. making suggestions
10. expressing assumptions
11. evaluating options
12. hypothesising/deducing
13. defending a point of view

**E) Seminar presentation on the themes allotted (18 hrs)**

**PROCEDURE:**

**A) Phonetic practice**

All the speech sounds should be taught. The learners should be given drills in the pronunciation of at least 30 words for each sound. While practicing stress patterns, they should be encouraged to identify as many words as possible for each suffix endings.

**B) Speech practice**

Every student should be allowed to choose one theme to specialize in. (However not more than 4 students in a section can choose the same theme). The teacher has to prepare at least 4 hints development tasks on each theme and should provide chance to each learner to speak on those hints related to his/ her theme (5 minutes). The hints may be supplied to the students in advance. When a student speaks, the class should be encouraged to ask questions as well as note down the words related to the different fields.

**C) Group Quiz on technical phrases related to the themes.**

The class should be divided into groups that specialize on a particular theme. Each group should conduct a quiz (question & answer session) which will be answered by the other groups.

**D) Language Functions**

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

**E) Seminar presentation on the themes allotted**

Each student should collect materials from books, journals and newspapers for his/her theme and prepare a short seminar paper. The presentation should be for 10 minutes. It should be followed 'open house' during which others should come forward to question, clarify, supplement or evaluate.

**RECORD LAY OUT:**

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

- First page containing learner details and the topic of specialization.
- Twenty words for each phoneme
- Twenty words with stress marks for each suffix ending
- Vocabulary list (technical words and compound words) related to the 20 themes identified for this semester.
- Three news paper items, two journal items and three internet sources related to the special theme selected by the student. (To be pasted on the pages)
- The Quiz questions of the group with expected answers.
- The seminar paper presented by the learner with details about the open house.
- Notes of observation. ( Details about any three seminar paper presentations by others)
- The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practicals.

**P = 45 Total = 45**



<b>BCS402</b>	<b>MICROPROCESSORS AND MICROCONTROLLERS</b> (Common to CSE & IT)	<b>L T P C</b> <b>3 0 0 3</b>
<b>UNIT I</b>	<b>8085 MICROPROCESSORS</b> 8085 Microprocessor architecture – Addressing modes – Instruction set – Programming the 8085.	<b>9</b>
<b>UNIT II</b>	<b>8086 SOFTWARE ASPECTS</b> Intel 8086 microprocessor – Architecture – Signals – Instruction Set – Addressing Modes – Assembler Directives – Assembly Language Programming – Procedures – Macros – Interrupts And Interrupt Service Routines – BIOS function calls.	<b>9</b>
<b>UNIT III</b>	<b>MULTIPROCESSOR CONFIGURATIONS</b> Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –8087 Numeric Data Processor – Architecture – Data Types – 8089 I/O Processor – Architecture – Communication between CPU and IOP.	<b>9</b>
<b>UNIT IV</b>	<b>I/O INTERFACING</b> Memory interfacing and I/O interfacing with 8085 – parallel communication interface –serial communication interface – timer-keyboard/display controller – interrupt controller –DMA controller (8237) – applications – stepper motor – temperature control.	<b>9</b>
<b>UNIT V</b>	<b>MICROCONTROLLERS</b> Architecture of 8051 Microcontroller – signals – I/O ports – memory – counters and timers – serial data I/O – interrupts-Interfacing -keyboard, LCD,ADC and DAC.	<b>9</b>
		<b>TOTAL: 45</b>

**TEXT BOOKS:**

1. Ramesh S. Gaonkar , “Microprocessor – Architecture, Programming and Applications with the 8085”, 5<sup>th</sup> Edition, Penram International Publisher, 2006.
2. Yu-cheng Liu, Glenn A. Gibson, “Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design”, 2<sup>nd</sup> Edition, Prentice Hall of India , 2006.
3. Kenneth J. Ayala, “The 8051 Microcontroller Architecture, Programming and Applications”, 2<sup>nd</sup> Edition, Penram International Publisher, 2004.

**REFERENCES:**

1. Douglas V. Hall, “Microprocessors and Interfacing: Programming and Hardware”, 2<sup>nd</sup> Edition , Tata McGraw Hill , 2006.
2. A.K. Ray and K.M Bhurchandi, “Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing”, Tata Mc Graw Hill, 2006.
3. Peter Abel, “IBM PC Assembly language and programming”, 5<sup>th</sup> Edition, Prentice Hall of India pvt. Ltd, 2007.
4. Mohamed Ali Mazidi, Janice Gillispie Mazidi, “The 8051 Microcontroller and embedded systems: using Assembly and C”, 2<sup>nd</sup> Edition, Pearson Education, 2007.





**BCS404**

**OPERATING SYSTEMS**  
(Common to 4<sup>th</sup> Sem – CSE & IT 6<sup>th</sup> Sem - ECE)

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

- To aware about OS services that assist system users
- To expose several aspects of OS design including: process scheduling, synchronization, deadlocks and File systems.
- To become familiar with the kinds of abstractions provided by general purpose OS.
- To learn the internal policies and mechanisms implemented in the kernel part of operating systems.
- To analyze the tradeoffs inherent in operating system design and performances.

**UNIT I PROCESSES AND THREADS** **9**

Introduction to operating systems – review of computer organization – operating system structures – system calls – system programs – system structure – virtual machines. Processes: Process concept – Process scheduling – Operations on processes – Cooperating processes – Interprocess communication – Communication in client-server systems. Case study: IPC in Linux. Threads: Multi-threading models – Threading issues. Case Study: Pthreads library.

**UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION** **10**

CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor scheduling – Real time scheduling – Algorithm Evaluation. Case study: Process scheduling in Linux. Process Synchronization: The critical-section problem – Synchronization hardware – Semaphores – Classic problems of synchronization – critical regions – Monitors. Deadlock: System model – Deadlock characterization – Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance – Deadlock detection – Recovery from deadlock.

**UNIT III STORAGE MANAGEMENT** **9**

Memory Management: Background – Swapping – Contiguous memory allocation –Paging – Segmentation – Segmentation with paging. Virtual Memory: Background – Demand paging – Process creation – Page replacement – Allocation of frames –Thrashing. Case Study: Memory management in Linux.

**UNIT IV FILE SYSTEMS** **9**

File-System Interface: File concept – Access methods – Directory structure – File system mounting – Protection. File-System Implementation: Directory implementation –Allocation methods – Free-space management – efficiency and performance – recovery– log-structured file systems. Case studies: File system in Linux – File system in Windows XP.

**UNIT V I/O SYSTEMS** **8**

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem –streams – performance. Mass-Storage Structure: Disk scheduling – Disk management –Swap-space management – RAID – disk attachment – stable storage – tertiary storage. Case study: I/O in Linux.

**TOTAL: 45**

**TEXT BOOK:**

1. Silberschatz, Galvin, and Gagne, “Operating System Concepts”, 6<sup>th</sup> Edition, Wiley India Pvt Ltd, 2003.

**REFERENCES:**

1. Andrew S. Tanenbaum, “Modern Operating Systems”, 2<sup>nd</sup> Edition, Pearson Education, 2004.
2. Gary Nutt, “Operating Systems”, 3<sup>rd</sup> Edition, Pearson Education, 2004.
3. Harvey M. Deital, “Operating Systems”, 3<sup>rd</sup> Edition, Pearson Education, 2004.



**BCS431 OPERATING SYSTEMS LABORATORY**  
(Common to CSE & IT)

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

(Implement the following on LINUX or other UNIX like platform. Use C for high level language implementation)

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
3. Write C programs to simulate UNIX commands like ls, grep, etc.
4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)
5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time (2 Sessions).
6. Developing Application using Inter Process communication (using shared memory, pipes or message queues)
7. Implement the Producer – Consumer problem using semaphores (using UNIX system calls).
8. Implement some memory management schemes – I
9. Implement some memory management schemes – II
10. Implement any file allocation technique (Linked, Indexed or Contiguous)

**Example for exercises 8 & 9:**

Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

**TOTAL: 45**

**HARDWARE AND SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS**

**HARDWARE:**

- 30 Personal Computers

**SOFTWARE:**

- **Linux:** Ubuntu / OpenSUSE / Fedora / Red Hat / Debian / Mint OS Linux could be loaded in individual PCs.

**(OR)**

- A single server could be loaded with Linux and connected from the individual PCs.



**BCS433            MICROPROCESSORS LABORATORY**  
(Common to CSE & IT)

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

**AIM:**

To learn the assembly language programming of 8085, 8086 and 8051 and also to give a practical training of interfacing the peripheral devices with the processor.

**OBJECTIVES:**

- To implement the assembly language programming of 8085, 8086 and 8051.
- To study the system function calls like BIOS/DOS.
- To experiment the interface concepts of various peripheral device with the processor.

**EXPERIMENTS IN THE FOLLOWING:**

1. Programming with 8085.
2. Programming with 8086 - experiments including BIOS/DOS calls: Keyboard control, Display, File Manipulation.
3. Interfacing with 8085/8086-8255, 8253.
4. Interfacing with 8085/8086-8279, 8251.
5. 8051 Microcontroller based experiments for Control Applications.
6. Mini- Project.

**TOTAL: 45**

**LIST OF EQUIPMENTS/COMPONENTS FOR 30 STUDENTS (2 PER BATCH)**

1. 8085 Trainer Kit with onboard 8255, 8253, 8279 and 8251 – 15 nos.
2. TASM/MASM simulator in PC (8086 programs) – 30 nos.
3. 8051 trainer kit – 15 nos.
4. Interfacing with 8086 – PC add-on cards with 8255, 8253, 8279 and 8251 – 15 nos.
5. Stepper motor interfacing module – 5 nos.
6. Traffic light controller interfacing module – 5 nos.
7. ADC, DAC interfacing module – 5 nos.
8. CRO's – 5 nos.

**BEG431 COMMUNICATION SKILLS AND TECHNICAL SEMINAR – II** **L T P C**  
**(Common to all branches)** **0 0 3 2**

(To be conducted as a Practical Paper by the Depts of English for 3 hrs per week)

**OBJECTIVES:**

1. To improve the learners' oral fluency in English
2. To help the learners acquire the readiness to speak in English
3. To develop the sub-skills required for paper presentations and group discussions
4. To help the learners improve their vocabulary related to specific fields of technology
5. To facilitate the development of the learners' proficiency in meaningful interaction
6. To provide them linguistic support for managing vital sub-functions of communication.

**COURSE CONTENT:**

**A) Phonetic practice ( 7 hrs)**

All the English phonemes with special emphasis on the following

1. /ae/ and /ei/
2. /e/ and /i/
3. First syllable and second syllable stress
4. Three different ways of pronouncing 'ed' past tense endings eg. '*played*', '*walked*', '*wanted*'
5. Correct pronunciation of commonly used words ( A list of 1000 words will be suggested by the university)
6. Silent letters

**B) Speech practice ( 8 hrs)**

Speaking on the themes by developing the hints provided.

The themes are:

1. Indian space missions
2. Converting agricultural wastes for useful purposes
3. Developments in transportation
4. Technology and agriculture
5. Impact of global warming
6. Desalination of water
7. Technology for national security
8. Industrial development and ecological issues
9. Applications of nano technology
10. Hazards of e-waste

**C) Preparation of power point frames on the given topic (2 hrs)**

(Only pictures, graphs, equations should be given through power point and not the text of the presentation as such)

**D) Language Functions (14 hrs)**

- Reporting the conversation of others
- Using the third conditional
- Expressing agreement and disagreement
- Numerical expressions
- Describing manner and frequency
- Evaluating different standpoints
- Developing an argument
- Describing daily routines, events, and weather

**D) Seminar presentation on the themes allotted using power point frames (14 hrs)**

**PROCEDURE:**

**A) Phonetic practice**

The learners should be given drills in the pronunciation of at least 30 words for each sound. While practicing stress patterns, they should be encouraged to identify as many words as possible for each pattern.

**B) Speech practice**

Every student should be allowed to choose one theme to specialize in. (However not more than 7 students in a section can choose the same theme).The teacher has to prepare at least 4 hints development tasks on each theme and should provide chance to each learner to speak on those hints related to his/ her theme (5 minutes).The hints may be supplied to the students in advance. When a student speaks, the class should be encouraged to ask questions as well as note down the words related to the different fields.

**C) Language Functions**

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

**D) Seminar presentation on the themes allotted**

Each student should collect materials from books, journals and newspapers for his/her theme and prepare a short seminar paper. The presentation should be for 10 minutes using power point frames. It should be followed by an 'open house' during which others should come forward to question, clarify, supplement or evaluate.

**RECORD LAY OUT:**

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

- First page containing learner details and the topic of specialization.
- Twenty words for each phoneme /ae/, /ei/, /i/ and /e/
- Fifty words with first syllable stress and fifty for second syllable stress (The learner will be required to pronounce some of these words during the practical exam)
- Vocabulary list (technical words and compound words) related to the 10 themes identified for this semester.
- Three newspaper items, two journal items and three internet sources related to the special theme selected by the student.(To be pasted on the pages)
- The seminar paper presented by the learner with a soft copy of the power point frames.
- Notes of observation. ( Details about any two seminar paper presentations by others)
- The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practicals.

**P = 45 Total = 45**

<b>BMA501</b>	<b>DISCRETE MATHEMATICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**OBJECTIVES**

At the end of the course, the students would

- Have knowledge of the concepts needed to test the logic of a program.
- Have an understanding in identifying structures on many levels.
- Be aware of a class of functions which transform a finite set into another finite which relates to input output functions in computer science.
- Be aware of counting principles.
- Be exposed to concepts and properties of Lattices.

**UNIT I LOGIC AND PROOFS 9+3**

Propositions and Logical operators – Truth table-Propositions generated by a set-Equivalence and implication –Basic laws - Some more connectives — Functionally complete set of connectives-Normal forms-Proofs in Propositional calculus.

**UNIT II SETS, RELATIONS AND FUNCTIONS 9+3**

Basic Definitions-Set operations –Laws of set theory-Partitions-Relations –Properties of relations-Matrices of relations - Closure operations on relations – Functions: Injective, Surjective and Bijective functions.

**UNIT III COMBINATORICS 9+3**

The basics of counting –The pigeonhole principle-Permutations and combinations –Recurrence relation - Solving Linear recurrence relations – Generating functions -Principles of inclusion and exclusion.

**UNIT IV LATTICE THEORY 9+3**

Partial ordering – Posets - Lattices as Posets - Properties of lattices –Lattices as Algebraic systems-Sub lattices –Direct product and Homomorphism- Some Special lattices.

**UNIT V GRAPH THEORY 9+3**

Graphs and graph models-Graph terminology and special types of graphs –Representing graphs and graph isomorphism-connectivity - Euler and Hamiltonian graphs.

**TOTAL: 60**

**TEXT BOOKS**

1. Kenneth H.Rosen, “Discrete Mathematics and its Applications (with Combinatorics and Graph Theory)”, 6<sup>th</sup> Edition, Tata McGraw-Hill, 5<sup>th</sup> Reprint 2008.
2. Tremblay J.P and Manohar.R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw-Hill, 35<sup>th</sup> Reprint 2008.

**REFERENCES**

1. Ralph.P.Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, 4<sup>th</sup> Edition, Pearson Education, 2002.
2. A.Tamilarasi, A.M.Natarajan, “Discrete Mathematics and its Applications”, 3<sup>rd</sup> Edition, Khanna Publishers, 2008.
3. T.Veerarajan, “Discrete Mathematics with Graph Theory and Combinatorics”, Tata McGraw-Hill, 2007.

**BCS501** **JAVA PROGRAMMING** **L T P C**  
**3 1 0 4**

**OBJECTIVES**

- To understand the basics of java
- To understand the concepts of inheritance, interfaces, packages, strings and exception handling in java
- To learn the concepts of file handling and threads
- To develop simple application programs using applets and event handling

**UNIT I JAVA FUNDAMENTALS 9+3**

The Genesis of Java -An Overview - Simple java program - Keywords - Identifiers and constants - Data types - Type Conversions and Casting – Arrays - Operators - Control statements.

**UNIT II JAVA CLASSES 9+3**

Class fundamentals - Declaring Objects- Assigning Object Reference Variables - Introducing methods - constructors - Invoking constructors - Method overriding - Abstract Classes - this keyword - garbage Collection - Finalize method - Overloading methods - Overloading Constructors objects as parameters - Returning objects - Access control - Static - Final keyword - Nested classes - Inner classes - Classes with command line arguments - Argument passing.

**UNIT III INHERITANCE, STRINGS AND EXCEPTION HANDLING 9+3**

Inheritance - Packages and Interface - Access Protection - Importing a Package - Special String Operations - Character Extraction - Exception Handling - using Try Catch - Multiple Catch - Nested Try – Throw - String Comparison - Modifying a string - String Buffer.

**UNIT IV FILE HANDLING AND THREADS 9+3**

Input output : Files - Thread concepts - Multithreaded programming - I/O Basis - Reading console input - Writing console output - Reading and Writing files - Using Exceptions - Stream Class - Byte streams - Character streams - Serialization - Networking.

**UNIT V APPLETS AND EVENT HANDLING 9+3**

Applet Architecture - Skeleton - Simple Applet Display Methods - HTML APPLET tag - Passing Parameters to the Applet - The Applet class - Event Handling – Introducing AWT: Working with Windows -Graphics and Text –Using AWT controls - Image Handling in Java.

**TOTAL: 60**

**TEXT BOOKS**

1. D.Norton, Herbert Schildt, “Java 2 The Complete Reference” 5<sup>th</sup> Edition, Tata McGraw Hill, 2011.
2. Paul. Deitel, Harvey Deitel, “Java How To Program” 7<sup>th</sup> Edition, Prentice Hall Publications, 2011.

**REFERENCES**

1. Paul Deitel, Harvey M. Deitel, “Java for Programmers”, 1<sup>st</sup> Edition, Pearson Education, 2010.
2. Elliotte Rusty Harold, “Java Network Programming” 4<sup>th</sup> Edition, O’Reilly Publishers, 2004.
3. Ken Arnold, James Gosling, “The JAVA language”, 2<sup>nd</sup> Edition, Addison Wesley, 2009.

<b>BCS502</b>	<b>COMPUTER NETWORKS</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To study the concepts of communications and network architecture.
- To understand the network classifications and design principles.
- To study about the switching concepts and routing protocols.
- To learn about the various layering protocols.

**UNIT I INTRODUCTION 9**

Communication model - Data communications networking - Data transmission concepts and terminology - Transmission media - Data encoding - Data link control.

**UNIT II NETWORK FUNDAMENTALS 9**

Protocol architecture - Protocols - OSI - TCP/IP - LAN architecture - Topologies - MAC - Ethernet, Fast Ethernet, Token ring, FDDI, Wireless LANs - Bridges.

**UNIT III NETWORK LAYER 9**

Network layer - Switching concepts - Circuit switching networks - Packet switching - Routing - Congestion control - X.25 - Internetworking concepts and X.25 architectural models - IP - Unreliable connectionless delivery - Datagram - Routing IP datagram - ICMP.

**UNIT IV TRANSPORT LAYER 9**

Transport layer - Reliable delivery service - Congestion control - Connection establishment - Flow control - Transmission Control Protocol - User Datagram Protocol.

**UNIT V APPLICATION LAYER 9**

Applications - Sessions and presentation aspects - DNS, Telnet - rlogin - FTP - SMTP - WWW - Security - SNMP.

**TOTAL: 45**

**TEXT BOOKS**

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", 4<sup>th</sup> Edition, Morgan Kauffmann Publishers Inc., 2007.
2. William Stallings, "Data and Computer Communications", 8<sup>th</sup> Edition, Pearson Education, 2007.

**REFERENCES**

1. James F. Kuross, Keith W. Ross, "Computer Networking, a Top-Down Approach Featuring the Internet", 3<sup>rd</sup> Edition, Addison Wesley, 2004.
2. Nader F. Mir, "Computer and Communication Networks", Pearson Education, 2007.
3. Comer, "Computer Networks and Internets with Internet Applications", 4<sup>th</sup> Edition, Pearson Education, 2003.
4. Andrew S. Tanenbaum, "Computer Networks", 4<sup>th</sup> Edition, Prentice Hall PTR, 2003.

<b>BCS503</b>	<b>THEORY OF COMPUTATION</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**OBJECTIVES**

- To have an understanding of finite state and pushdown automata.
- To have a knowledge of regular languages and context free languages.
- To know the relation between regular language, context free language and corresponding recognizers.

**UNIT I AUTOMATA 7+3**

Introduction to formal proof - Additional forms of proof - Inductive proofs - Finite Automata (FA) - Deterministic Finite Automata (DFA) - Non-deterministic Finite Automata (NFA) - Finite Automata with Epsilon transitions.

**UNIT II REGULAR EXPRESSIONS AND LANGUAGES 10+3**

Regular Expression - FA and Regular Expressions - Proving languages not to be regular - Closure properties of regular languages - Equivalence and minimization of Automata.

**UNIT III CONTEXT-FREE GRAMMARS AND LANGUAGES 10+3**

Context-Free Grammar (CFG) - Parse Trees - Ambiguity in grammars and languages - Definition of the Pushdown Automata - Languages of a Pushdown Automata - Equivalence of Pushdown Automata and CFG - Deterministic Pushdown Automata.

**UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES 9+3**

Normal forms for CFG - Pumping Lemma for CFL - Closure Properties of CFL – Turing Machines - Programming Techniques for TM.

**UNIT V UNDECIDABILITY 9+3**

A language that is not Recursively Enumerable (RE) - An un-decidable problem that is RE- Undecidable problems about Turing Machine - Post's Correspondence Problem - The classes P and NP.

**TOTAL: 60**

**TEXT BOOK**

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", 2<sup>nd</sup> Edition, Pearson Education, 2007.

**REFERENCES**

1. Thomas A. Sudkamp, "An Introduction to the Theory of Computer Science, Languages and Machines", 3<sup>rd</sup> Edition, Pearson Education, 2007.
2. J. Martin, "Introduction to Languages and the Theory of computation", 3<sup>rd</sup> Edition, Tata McGraw Hill, 2007.
3. H.R. Lewis, C.H. Papadimitriou, "Elements of the theory of Computation", 2<sup>nd</sup> Edition, Pearson Education, 2003.
4. Raymond Greenlaw, H.James Hoover, "Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.
5. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

<b>BCS504</b>	<b>SOFTWARE ENGINEERING METHODOLOGIES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To provide the basic knowledge and principles in software engineering.
- To learn various techniques required for efficient development of software.

**UNIT I INTRODUCTION TO SOFTWARE ENGINEERING 9**

Introduction: Definition of terms - The Evolving role of software - Software characteristics-Software applications - Software myths. The Software process: A generic view of process. Process models: Prescriptive Models- Water fall model-Incremental process model-Specialized process models-The Unified process- Agile process models.

**UNIT II SOFTWARE PROJECT ANALYSIS 9**

Software engineering practice-Communication Practices-Planning practices-Modeling practices-Deployment. System engineering: Computer based system-system engineering hierarchy-Business process engineering-Product engineering-System modeling. Requirements engineering: Requirements engineering tasks- Initiating the requirements engineering process- Eliciting requirements-Developing use case-Building analysis model-Negotiating and validating requirements. Analysis modeling: Analysis modeling approaches-Data modeling concepts-Object Oriented Analysis-Scenario based modeling-Flow oriented modeling-Class based modeling-Behavioral model.

**UNIT III SOFTWARE DESIGN CONCEPTS 9**

Design engineering: Design in the context of software engineering-Design process and design quality-Design concepts-Design model-Pattern-based software design. Creating architectural design: Software architecture-Data design-Architectural styles and patterns-Architectural design. Modeling Component level design: Component-Designing class-based components-Conducting component design-Designing conventional components. User Interface design: Golden rules-UI analysis and design.

**UNIT IV SOFTWARE IMPLEMENTATION AND TESTING 9**

Implementation issues: Introduction - Structured coding techniques - Coding style - Standards and guidelines - Documentation guidelines - Modern programming languages features - PL characteristics. Testing strategies: Strategic approach to software testing- Strategic issues-Test strategies for conventional software-Validation testing-System testing-Art of debugging. Testing tactics: White-box testing-Basic path testing-Control structure testing-Black-box testing.

**UNIT V MANAGEMENT AND MAINTENANCE OF SOFTWARE PROJECTS 9**

Project management: Management spectrum-The people-The product-The project-W<sup>3</sup>HH principle-Critical practices. Estimation: Observations on estimation-Project planning process-Software scope and feasibility-Resources-Software project estimation-Decomposition techniques-Empirical estimation models. Project scheduling: Basic concepts-Project scheduling-Defining a task set for software project. Risk Management: Risk mitigation, monitoring and management. Change management: Software Configuration Management-SCM repository and process. Software maintenance: Types of software maintenance-Enhancing maintainability during development - Managerial aspects of software maintenance.

**TOTAL: 45**

**TEXT BOOK**

1. Roger S.Pressman, “Software Engineering: A Practitioner's Approach”, 6<sup>th</sup> Edition, Tata McGraw Hill Edition, 2010.

**REFERENCES**

1. Shari Lawrence Pfleeger and Joanne M.Atle, “Software Engineering: Theory and Practice”, Pearson Education, 4<sup>th</sup> Edition, 2010.
2. Waman S Jawadkar, “Software Engineering: Principles and Practice”, Tata McGraw Hill Edition, 2008(Reprint).

<b>BCS531</b>	<b>JAVA PROGRAMMING LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**OBJECTIVES**

- Creating classes and objects using Java;
- Implementing constructors and constructor overloading;
- Solving problems using Inheritance and Polymorphism;
- Create your own package and interface;
- Handling exceptions arising in programs;
- Use of multithreading in programs.
- Work on strings.
- Use GUI components in your programs;

**LIST OF EXERCISES**

1. Programs illustrating various data types in Java.
2. Programs illustrating class, objects and methods.
3. Programs to manipulate strings.
4. Programs illustrating Overloading in Java.
5. Programs illustrating Overriding methods in Java.
6. Programs illustrating Exception Handling.
7. Programs illustrating the implementation of various forms of Inheritance (Single, Hierarchical, Multilevel).
8. Programs illustrating Interfaces in Java.
9. Programs to create Packages in Java.
10. Programs illustrating applications of threads in Java.
11. Programs illustrating Applet development in Java.
12. Program using AWT packages: Windows, controls and layout managers.
13. Reading and writing text files.
14. Reading image files and manipulating them using image related classes and methods.

**BCS532**

**NETWORKS LABORATORY**

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

**OBJECTIVES**

- Learn TCP and UDP socket programming.
- Simulation of various protocols
- Study and Implement Routing Algorithms
- Study of NS2, Qualnet network simulators

**LIST OF EXERCISES**

1. Implementation of date and time server using TCP Sockets.
2. Implementation of echo server using TCP Sockets.
3. Programs using UDP Sockets (like simple DNS)
4. Programs using raw sockets (like packet capturing and filtering).
5. Programs using RPC.
6. Simulation of sliding window protocol.
7. Implementation of routing protocol using BGP.
8. Implementation of OSPF routing protocol based on the cost.
9. Implementation of ARP and RARP Protocol.
10. Experimental study of application protocols such as HTTP, FTP, SMTP, using network packet sniffers and analyzers such as Ethereal.
11. Experiments with packet sniffers to study the TCP protocol. Using OS (netstat, etc) tools to understand TCP protocol FSM, retransmission timer behavior and congestion control behavior.
12. Setting up a small IP network - configure interfaces, IP addresses and routing protocols to set up a small IP network. Study dynamic behaviour using packet sniffers.
13. Experiments with NS2 or Qualnet to study behaviour (especially performance) of link layer protocols such as Ethernet and 802.11 wireless LAN.

**SUGGESTED SOFTWARE TOOLS**

- C/C++/JAVA
- NS2/Qualnet
- Ethereal (network packet sniffer)

<b>BGE501</b>	<b>PROFESSIONAL ETHICS AND HUMAN VALUES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<i>(Common to 5<sup>th</sup> Sem – EEE, EIE, Civil &amp; IT 6<sup>th</sup> Sem – CSE &amp; ECE)</i>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### OBJECTIVES

- To create an awareness on Engineering Ethics and Human Values.
- To instill Moral and Social Values and Loyalty.
- To appreciate the rights of others.

### UNIT I HUMAN VALUES 10

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

### UNIT II ENGINEERING ETHICS 9

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

### UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9

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

### UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

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

### UNIT V GLOBAL ISSUES 8

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

**TOTAL: 45**

### TEXT BOOKS

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

### REFERENCES

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

<b>BCS601</b>	<b>SYSTEM SOFTWARE AND COMPILER DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

### OBJECTIVES

- To learn the design and implementation of assemblers, linkers and loaders.
- To study about the phases of compiler, code generation, optimization techniques.

### UNIT I ASSEMBLERS 9+3

System software and machine architecture – The Simplified Instructional Computer (SIC) - Basic assembler functions - A simple SIC assembler - Assembler algorithm and data structures - Machine dependent assembler features - Program relocation - Machine independent assembler features - Literals - Symbol - defining statements - Expressions - One pass assemblers and Multi pass assemblers.

### UNIT II LOADERS AND LINKERS 9+3

Basic loader functions - Design of an Absolute Loader - A Simple Bootstrap Loader - Machine dependent loader features - Relocation - Program Linking - Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search - Loader Options - Loader design options - Linkage Editors - Dynamic Linking - Bootstrap Loaders - Implementation example - MS DOS linker.

### UNIT III COMPILER AND LEXICAL ANALYZER 9+3

Introduction to Compiler: Compilers and Translators - The Structure of a Compiler - Compiler Writing Tools - Lexical Analysis: The role of the lexical analyzer - implementation of a lexical analyzer.

### UNIT IV PARSERS 9+3

Syntax Analysis - Shift reduce parsing - operator precedence parsing - top down parsing - predictive parsers - LR parsers - The canonical collection of LR(0) Items - Constructing SLR parsing tables - Constructing canonical LR parsing tables.

### UNIT V CODE GENERATION AND OPTIMIZATION 9+3

Syntax-Directed Translation: Syntax directed translation schemes - Implementation of syntax directed translators - Intermediate code - Postfix notation - Parse trees and syntax trees - Three address code, quadruples and triples. Code Generation: Object programs - Problems in code generation - A machine model - A simple code generator - Peephole optimization. Introduction to Code Optimization: The principal sources of optimization - Loop optimization - The DAG representation of basic blocks.

**TOTAL: 60**

### TEXT BOOKS

1. Leland L. Beck, “System Software - An Introduction to Systems Programming”, 3<sup>rd</sup> Edition, Pearson Education Asia, 2006.
2. Alfred V. Aho, Ravi Sethi and Jeffrey D. Ullman, “Compilers - Principles, Techniques and Tools”, Pearson Education Asia, 2007.

### REFERENCES

1. David Galles, “Modern Compiler Design”, Pearson Education Asia, 2007.
2. D. M. Dhamdhare, “Systems Programming and Operating Systems”, 2<sup>nd</sup> Edition, Tata McGraw-Hill, 2000.
3. John J. Donovan, “Systems Programming”, Tata McGraw-Hill, 46<sup>th</sup> Reprint, 2009.
4. John R. Levine, “Linkers & Loaders”, Morgan Kaufmann Publishers, 2000.  
Steven S. Muchnick, “Advanced Compiler Design & Implementation”, Morgan Kaufmann Publishers, 2000.

<b>BCS602</b>	<b>OBJECT ORIENTED ANALYSIS AND DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to CSE &amp; IT)</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### OBJECTIVES

- To learn basic object oriented analysis and design skills through an elaborate case study.
- To understand and use the UML diagrams for analysis and design.
- To apply the appropriate design patterns and frameworks.

### UNIT I INTRODUCTION 9

An Overview of Object Oriented Systems Development - Object Basics - Object Oriented Systems Development Life Cycle.

### UNIT II UNIFIED MODELLING LANGUAGE 9

Unified Modeling Language - Use case - class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram - State Diagram - Activity Diagram - Component and Deployment Diagrams.

### UNIT III OBJECT ORIENTED METHODOLOGIES 9

Rumbaugh Methodology - Booch Methodology - Jacobson Methodology – Patterns Frameworks - Unified Approach.

### UNIT IV OBJECT ORIENTED ANALYSIS 9

Identifying use cases - Object Analysis - Classification - Identifying Object relationships - Attributes and Methods.

### UNIT V OBJECT ORIENTED DESIGN 9

Design axioms - Designing Classes - Access Layer - Object Storage – Object Interoperability.

**TOTAL: 45**

### TEXT BOOK

1. Ali Bahrami, “Object Oriented System Development”, Tata McGraw Hill International Edition, 2008.

### REFERENCES

1. Grady Booch, James Rumbaugh and Ivar Jacobson, “The Unified Modeling Language User Guide”, Addison Wesley, 2005.
2. Craig Larman, “Applying UML and Patterns: An Introduction to object-oriented Analysis and Design and Iterative Development”, 3<sup>rd</sup> Edition, Pearson Education, 2008.
3. Tom Pender, “UML 2.0 Bible”, Wiley India (P) Ltd., Reprint 2008.



<b>BCS604</b>	<b>WEB PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>2</b>	<b>4</b>

**OBJECTIVES**

- To understand the evolution of the Internet and the WWW.
- To understand important components of HTML documents.
- To be able to markup data using XML.
- To execute servlets with the Apache Tomcat server.
- To be able to create and deploy JSP and J2ME.
- To construct programs using PHP, that interacts with MySQL databases

**UNIT I HTML PROGRAMMING 9**

Introduction to the internet and World Wide Web - World Wide Web Consortium (W3C) - History of the internet - History of the World Wide Web - Introduction to Hyper Text Markup Language - Editing HTML - HTML common tags- List, tables, images, forms, frames; Cascading style sheets, Introduction to java scripts, objects in java script, Dynamic HTML with java script, Cascaded style sheet (CSS).

**UNIT II XML PROGRAMMING 9**

Creating markup with XML -Parsers and well-formed XML documents -Parsing an XML document with MSXML - Document type definition(DTD) - Document type declaration - Element type declarations - Attribute declarations - Document object model – DOM implementations – DOM components - path - XSL: Extensible style sheet language transformations (XSLT).

**UNIT III SERVLET PROGRAMMING 9**

AWT programming - Introduction to Swing: JApplet, Handling Swing controls like icons - labels – buttons – text boxes – combo boxes – tabbed pains – scroll pains – trees – tables - Differences between AWT controls & Swing controls - Developing a Home page using Applet & Swing. Servlets: The javax.servelet HTTP package - Handling HTTP Request and Responses, using Cookies - Session tracking - Security issues.

**UNIT IV WEB SERVER PROGRAMMING 9**

Introduction to JSP: The problem with servlets - The anatomy of a JSP page - JSP processing. JSP application design with MVC architecture. JSP application development: Generating dynamic content, using scripting elements. Implicit JSP objects, Conditional processing – Displaying values using an expression to set an attribute, declaring variables and methods - Error handling and debugging - Sharing data between JSP pages – Requests - Users passing control and Date between Pages – Sharing Session and Application data – Memory usage considerations.

**UNIT V WEB DATABASE PROGRAMMING 9**

Database programming using JDBC, studying Javax.sql.\*package, accessing a Database from a JSP page, application – Specific database actions - Future of the Web: Semantic Web – Resource Description Framework (RDF) – Rich internet applications: AJAX – DOJO – Silverlight – Ruby on rails

**PRACTICAL HOURS:15 TOTAL: 60**

**TEXT BOOKS**

1. Chris Bates, “Web Programming: Building Internet Applications”, 3<sup>rd</sup> Edition, WILEY Dream Tech, 2006.
2. Patrick Naughton and Herbert Schildt., “The Complete Reference Java 2”, 5<sup>th</sup> Edition, McGraw-Hill, 2002.
3. P. J. Deitel and H. M. Deitel, “Internet & World Wide Web How to Program”, Pearson Education India, 4<sup>th</sup> Edition, 2008.

## REFERENCES

1. H. M. Deitel, P. J. Deitel, T. M. Linn, Tem R. Nieto and P.Sadhu, “XML: How to Program”, 1<sup>st</sup> Edition, Pearson Education, 2008.
2. Hans Bergsten, “Java Server Pages”, 3<sup>rd</sup> Edition, O’Reilly Media, 2003.
3. Marty Hall and Larry Brown, “Core Servlets and Java Server Pages-Volume 1: Core Technologies”, 2<sup>nd</sup> Edition, Prentice Hall, 2003.

<b>BCS631</b>	<b>SYSTEM SOFTWARE AND COMPILER DESIGN LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### **OBJECTIVES**

- To explore the development of assembler, macro processor, direct linking loader modules for a subject of assembly language and macro instructions of typical machine.
- To study the direct linking loader module for a subset of assembly language and macro instructions of a typical machine.
- To edify the lexical analyzing tools like LEX/YACC.

### **LIST OF EXERCISES**

1. Implement a Symbol Table with the following operations: Creation, Insertion, Modification, Searching and displaying the contents.
2. Implement a two pass Assembler.
3. Implement an Absolute Loader.
4. Implement pass one of a direct Linking Loader.
5. Implement Lexical Analyzer.
6. Implement a parser for the given Grammar.
7. Design a DAG for the given mathematical expression.
8. Implement Recursive Descent Parser for an Expression Grammar that generates Arithmetic Expressions with Digits, + and \*.
9. Implement the Front end of a Compiler that generates the Three Address Code for a Simple Language with: One Data Type Integer, Arithmetic Operators, Relational Operators, Variable Declaration Statement, One Conditional Construct, One Iterative Construct and Assignment Statement.
10. Implement the Back end of the Compiler which takes the Three Address Code as an Input and Produce the 8086 Assembly Language Instruction that may be assembled and run using 8086 Assembler. The target Assembly Instructions may be simple Move, Add, Sub, and Jump.

### **SUGGESTED SOFTWARE TOOLS**

- C/C++
- LEX/YACC
- MASM Assembler

<b>BCS632</b>	<b>OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY (Common to CSE &amp; IT)</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### **OBJECTIVES**

- To impart working knowledge of UML, source control, and project management.
- To inculcate deep knowledge of the technologies for implementing their project.
- Ability to present their work in a professional manner.
- To design and implement complex software solutions using state of the art software engineering techniques.

### **ACTIVITIES TO BE PERFORMED**

- To develop a problem statement.
- Develop SRS document, risk management and project plans.
- Identify Use Cases and develop the Use Case diagrams.
- Identify the business activities and develop UML Activity diagrams.
- Identify the conceptual classes and develop UML Class diagrams.
- Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
- Draw the State Chart diagrams.
- Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
- Implement the Technical services layer.
- Implement the Domain objects layer.
- Implement the User Interface layer.
- Draw Component and Deployment diagrams.

### **LIST OF EXERCISES**

1. Passport Automation System.
2. Book Bank Management System.
3. Stock Maintenance System.
4. Online Course Registration System.
5. Software Personnel Management System.
6. Credit Card Processing System.
7. Online Shopping.
8. Recruitment System.
9. Foreign Trading System.
10. Conference Management System.
11. ATM Banking.
12. E-Ticketing System.

### **SUGGESTED SOFTWARE TOOLS**

- Rational Suite/ ArgoUML/ Eclipse IDE
- Visual Basic / Visual C++/Java

**BCS633**

**COMPREHENSION**

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

**OBJECTIVES**

- To encourage the students to pursue their higher education.
- To prepare the students to undergo GATE like entrance exams.
- To evaluate the comprehensive knowledge being acquired by the student.

**COURSE CONTENT AND LAYOUT**

- The students will select a particular group of subjects as mentioned below to review their competency level:

**Group A**

- Data Structures and Algorithms
- Compiler Design
- Operating systems
- Web Technology
- Database Management Systems
- Digital logic design

**Group B**

- C and OO Programming
- Theory of Computation
- Computer Networks
- Software Engineering
- Database Management Systems
- Computer Organization and Architecture

- The staff-coordinator per group is responsible for scheduling the session plans, monitoring the activities and recording the continual assessments.
- The technical seminars and group discussions will be assisted by subject experts in the department.
- Each student must participate in all the activities and their performance assessment must be recorded.

**SUGGESTED ACTIVITIES**

- Group Discussion
- Technical Seminars
- Objective type test solving skills
- Mock GATE Examination
- Comprehensive Viva





**BIT011** **CLOUD COMPUTING** **L T P C**  
*(Common to IT & CSE)* **3 0 0 3**

**OBJECTIVES**

- To Understand the fundamentals of cloud computing
- To study about the web based applications in cloud
- To know about the use of cloud computing

**UNIT I UNDERSTANDING CLOUD COMPUTING 9**

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

**UNIT II DEVELOPING CLOUD SERVICES 9**

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

**UNIT III CLOUD COMPUTING FOR EVERYONE 9**

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

**UNIT IV USING CLOUD SERVICES 9**

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

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

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

**TOTAL: 45**

**TEXT BOOKS**

1. Michael Miller, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, Que Publishing, August 2008.
2. 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.

**BGE802 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING L T P C**  
**3 0 0 3**

**OBJECTIVE**

- To learn about the basics of economics and financial accounting related to engineering so as to take economically sound decisions.

**UNIT I INTRODUCTION 9**

Managerial Economics - Relationship with other disciplines – Forms of business organization: Meaning – Types, Formation, Merits and Demerits - Managerial decision making – Process – Types of decision and Decision analysis.

**UNIT II DEMAND & SUPPLY ANALYSIS 9**

Demand - Types of demand - Determinants of demand - Demand function - Demand elasticity - Demand forecasting - Supply - Determinants of supply - Supply function - Supply elasticity.

**UNIT III PRODUCTION AND COST ANALYSIS 9**

Production function - Returns to scale - Production optimization - Least cost input - Isoquants - Managerial uses of production function. Cost Concepts - Cost function – Determinants of cost - Short run and Long run cost curves - Cost Output Decision - Estimation of Cost.

**UNIT IV PRICING AND INVESTMENT ANALYSIS (ELEMENTARY TREATMENT) 9**

Determinants of Price - Pricing under different objectives and different market structures - Price discrimination - Pricing methods in practice - Investments decision analysis - Risks and return evaluation of investment decision - Average rate of return - Payback Period - Net Present Value - Internal rate of return.

**UNIT V FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT) 9**

Financial Accounting – Definition – Accounting Principles – Preparation of Final Accounts- Financial Ratio Analysis – Meaning and Types.

**TOTAL: 45**

**1. TEXT BOOKS**

1. K.L.Maheswari and R.L.Varshney, “Managerial Economics”, Sultan Chand & Sons, 22<sup>nd</sup> Revised Edition, 2014
2. S.P.Jain and Narang, “Cost and Management Accounting”, Kalyani Publishers, 13<sup>th</sup> Edition, 2012.
3. Accounting for management – S.N. Maheshwari and S.K. Maheshwari, Vikas Publication, 2009.

**REFERENCES**

1. Samuelson. Paul A and Nordhaus W.D., “Economics”, Tata Mcgraw Hill Publishing Company Limited, New Delhi, 18<sup>th</sup> Edition, 2005.
2. McGuigan, Moyer and Harris, “Managerial Economics; Applications, Strategy and Tactics”, Thomson South Western, 12<sup>th</sup> Edition, 2011.
3. Paresch Shah, “Basic Financial Accounting for Management”, Oxford University Press, New Delhi, 2007.
4. Salvatore Dominick, “Managerial Economics in a global economy”. Thomson South Western, 7<sup>th</sup> Edition, 2012.
5. Prasanna Chandra, “Fundamentals of Financial Management”, Tata Mcgraw Hill Publishing Limited, 5<sup>th</sup> Edition, 2008.

<b>BCS731</b>	<b>COMPUTER GRAPHICS AND VISUALIZATION LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### OBJECTIVES

- To provide hands-on experience on developing interactive, real-time rendering applications.
- To develop skills for comparing various methods for computer representation of objects.
- To illustrate the use of 3D viewing, rendering models.
- To open up 3D visualization world (architectural, medical, biological, etc).

### LIST OF EXERCISES

1. Implementation of Bresenham's Algorithm – Line, Circle and Ellipse generation.
2. Two Dimensional transformations – Translation, Rotation and Scaling.
3. Two Dimensional Reflection and Shear transformations.
4. Composite 2D Transformations.
5. Cohen Sutherland's 2D Line clipping and Windowing algorithms.
6. Sutherland – Hodgeman's Polygon clipping algorithm.
7. Three dimensional transformations - Translation, Rotation and Scaling.
8. Composite 3D transformations.
9. Drawing three dimensional Objects and Scenes.
10. Create the visual effects using Maya design tool - Animation, Modeling, Lighting, Effect and Rendering.

**TOTAL: 45**

### SUGGESTED SOFTWARE TOOLS

- C/C++ Compiler
- OpenGL
- Maya

<b>BCS732 MOBILE APPLICATION DEVELOPMENT LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**OBJECTIVES**

- Develop a working knowledge of Android application development tool.
- Understand mobile application design principles.
- Describe and apply the different types of application models and architectures used to develop mobile software applications.
- Describe the components and structure of a mobile development frameworks and learn how and when to apply the different components to develop a working system.
- Design, implement and deploy mobile applications using an appropriate software development environment.

**LIST OF EXERCISES**

1. Case Study on setting up mobile application development environment.
2. Develop an Instant Messaging application using Java SE for normal desktop PC for the following theme. Two users should be able to do IM between each other identified through IP address/port.
3. Display Hello World.
4. Add two Edit Text. When a number is entered in Edit Text 1, the square of that number should be displayed in Edit Text 2.
5. Add an Edit Text and a button. When the button is clicked, the text inputted in Edit Text should be retrieved and displayed back to the user.
6. Add two Edit Text and a button. When the button is clicked, the text inputted in Edit Text 1 should be retrieved and displayed in EditText2.
7. Design a calculator using mobile application tools.
8. Create a Module converter for height and weight in the same application. Selection of height/weight can be done using a spinner.
9. Create applications to include Action Bar, Menus, Dialogs and Notifications
10. Create a camera application, where you can click a picture and then save it as the wallpaper.

**TOTAL: 45**

**Mini Project**

- ❖ Installation and demonstration of a Mobile Application Wizard.

**Hardware and Software Requirements for a batch of 30 students:**

**Hardware:**

- 30 Personal Computers

**Software:**

- JDK, Eclipse, Android SDK, Eclipse, Android Emulator, Sqlite-3 and ADT. Install all of these in individual PC.
- XCODE, IOS SDK and virtual box for MAC OSX

**BCS801                      SOFTWARE TESTING TECHNIQUES                      L T P C**  
**3 0 0 3**

**OBJECTIVES**

- To determine software testing objectives and criteria
- To select and prepare test cases
- To identify the various levels and need for testing
- To incorporate testing into the software development life cycle
- To prepare testing policies and standards
- To understand the role of testing aids and tools

**UNIT I                      INTRODUCTION                      8**

Testing as an Engineering Activity – Testing as a Process – testing axioms - Basic Definitions – Software Testing Principles – The Tester’s Role in a Software Development Organization – Origins of Defects – cost of defects - Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support – Defect Prevention Strategies

**UNIT II                      TEST CASE DESIGN                      9**

Test Case Design Strategies – Black Box Approach to Test Case Design: Random Testing – Equivalence Class Partitioning – Boundary Value Analysis – Cause-and-effect graphing - State-Transition testing — Error guessing - White Box Approach to Test design: Test Adequacy Criteria – Coverage and Control Flow Graphs – Covering Code Logic – Role of paths – code complexity testing – Evaluating Test Adequacy Criteria

**UNIT III                      LEVELS OF TESTING                      11**

The Need for Levels of Testing – Unit Test: Planning –Designing the Unit Tests - The Test Harness – Running the Unit tests and Recording results – Integration test: Test strategies for procedure and Functions - Designing Integration Tests – Integration Test Planning - System Testing: Acceptance testing – Performance testing - Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – testing of OO systems – Usability and Accessibility testing – Configuration testing - Recovery testing – Website testing – Role of Use cases

**UNIT IV                      TEST MANAGEMENT                      8**

People and organizational issues in testing – organization structures for testing teams – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – Role of critical groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group

**UNIT V                      TEST AUTOMATION                      9**

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements – project, progress and productivity metrics

**TOTAL: 45**

**TEXT BOOKS**

1. Ilene Burnstein, “Practical Software Testing: A Process-Oriented Approach”, Springer International Edition, 2003.
2. Srinivasan Desikan and Gopalaswamy Ramesh, “Software Testing – Principles and Practices”, 1<sup>st</sup> Edition, Pearson education, 2006.

## REFERENCES

1. Ron Patton, “Software Testing”, 2<sup>nd</sup> Edition, Sams Publishing, Pearson Education, 2007.
2. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.
3. M.G.Limaye, “Software Testing: Principles, Techniques and Tools”, 1<sup>st</sup> Edition, Tata McGraw-Hill, 2009.
4. Aditya P. Mathur, “Foundations of Software Testing – Fundamental algorithms and techniques”, Dorling Kindersley (India) Private Limited, Pearson Education, 2008.

**BMG601 PRINCIPLES OF MANAGEMENT L T P C**  
**3 0 0 3**

**OBJECTIVES**

- To get the skills needed to successfully manage an organization.
- To understand concepts of strategic and tactical organizational planning.
- Implement employee motivational approaches and conflict management skills.
- To describe common performance appraisal processes.
- To understand group and team management, management development, and employee training.
- Describe concepts of controlling and control systems.

**UNIT I FOUNDATIONS 9**

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

**UNIT II MANAGERS AND ENVIRONMENT 9**

Social responsibility–Planning – Objectives – Setting Objectives – Process of Managing through Objectives – Strategies- Policies and Planning Premises- Forecasting – Decision-making.

**UNIT III FUNCTIONAL AREA OF ORGANISATION 9**

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

**UNIT IV MOTIVATION AND DIRECTIONS 9**

Objectives– Human Factors – Creativity and Innovation – Harmonizing Objectives – Leadership – Types of Leadership Motivation – Hierarchy of needs – Motivation theories – Motivational Techniques – Job Enrichment – Communication.

**UNIT V CONTROLLING STRATEGIES 9**

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

**TOTAL: 45**

**TEXT BOOKS**

1. Hellriegel, Slocum & Jackson, “Management – A Competency Based Approach”, Thomson South Western, 10<sup>th</sup> Edition, 2007.  
Harold Koontz, Heinz Weihrich and mark V Cannice, “Management – A global & Entrepreneurial Perspective”, Tata Mcgraw Hill, 12<sup>th</sup> Edition, 2007.  
Andrew J. Dubrin, “Essentials of Management”, Thomson Southwestern, 7<sup>th</sup> Edition, 2007.

**REFERENCES**

1. Stephen P. Robbins and Mary Coulter, “Management”, Prentice Hall of India, 8<sup>th</sup> Edition.
2. Charles W.L Hill, Steven L McShane, “Principles of Management”, Mcgraw Hill Education, Special Indian Edition, 2007.

3. Vijayaraghavan. G.K & Sivakumar. M., “Principles of Management”, Lakshmi Publications, 1<sup>st</sup> Edition, 2011.
4. Ramachandran. S., “Principles of Management”, Air Walk Publications, 1<sup>st</sup> Edition, 2007.

<b>BCS001</b>	<b>ADVANCED DATABASE TECHNOLOGY</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To understand relational data model and its use in Database design.
- To study the concepts of database development and administration.
- To learn the contemporary architecture of database systems.
- To survey the characteristics of various advanced databases.

**UNIT I RELATIONAL MODEL ISSUES 9**

ER Model - Normalization - Query Processing - Query Optimization - Transaction Processing - Concurrency Control - Recovery – Security.

**UNIT II DISTRIBUTED DATABASES 9**

Distributed Database Features - Architecture of distributed databases – DDBS design - Distributed Query Processing - Distributed transactions processing - Concurrency control - Recovery control - Commit Protocols.

**UNIT III OBJECT ORIENTED DATABASES 9**

Object-oriented data models - Object Identity and its implementation – Supporting object modeling in database systems--Database programming and querying in object-oriented databases - ODMG standard, including ODL, OQL – Comparing RDBMS with OODBMS

**UNIT IV ADVANCE DATABASE MODEL 9**

Enhanced Data Models - Web Technology and DBMS - Data Warehousing - OLAP and Data Mining Concepts - Introduction to Information Retrieval and Web Search - Mobile Databases - XML and Web Databases.

**UNIT V CURRENT ISSUES 9**

Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases - Multimedia Data Structures - Multimedia Query languages - Spatial Databases - Temporal Database.

**TOTAL: 45**

**TEXT BOOKS**

1. S.K.Singh, “Database Systems Concepts Design and Applications”, Pearson Education, 3<sup>rd</sup> Impression, 2009.
2. R. Elmasri and S.B. Navathe, “Fundamentals of Database Systems”, 5<sup>th</sup> Edition, Pearson Education, 2006.
3. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, Richard T. Snodgrass, V.S. Subramanian and Roberto Zicari, “Advanced Database Systems”, Morgan Kaufmann Publishers, 1997.

**REFERENCES**

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 5<sup>th</sup> Edition, Tata McGraw Hill, 2006.
2. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, 8<sup>th</sup> Edition, Pearson Education, 2006.
3. Mario Piattini, Oscar Diaz, “Advanced Database Technology and Design”, Artech House Computer Library, 2000.
4. Thomas Connolly, Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, 3<sup>rd</sup> Edition, Pearson Education, 2003.

<b>BCS002</b>	<b>SOCIAL NETWORKS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To expose fluency in the specialized language of social network analysis.
- To improve Skills in communicating Social Network concepts and methods to specialists and laypersons.
- To provide Proficiency in the general social network research process from data collection to reporting.
- To focus, the high level of proficiency in one or more specific domains of network analysis.

**UNIT I INTRODUCTION 9**

Introduction: Motivation - Different Sources of Network Data - Types of Networks - Tools for Visualizing Network Data - Review of Graph Theory Basics.

**UNIT II STRUCTURAL AND LOCATIONAL PROPERTIES 9**

Structural Properties of Networks - Notions of Centrality - Cohesiveness of Subgroups. Roles and Positions - Structural Equivalence - Representation of Network Positions - Block Models.

**UNIT III MARKET AND STRATEGIC INTERACTION IN NETWORK 9**

Matching Market: Bipartite Graphs and Perfect Matching - Prices and Market - Clearing Property. Network Models of Markets with Intermediaries - Price Setting in Market - Social Welfare - Trader Profit. Bargaining and Power in Network - Power in Social Network - Results of Network Exchange Experts - Modeling with Network Exchange - Stable outcomes - Modeling with Network Exchange - Balanced outcomes.

**UNIT IV NETWORK DYNAMICS AND POPULATION MODELS 9**

Information Cascade - Networks Effects - The Economy with Network Effects Industries with Network goods - Advanced Materials for Positive Externalities - Power Laws - The Effect of Search Tools and Recommendations.

**UNIT V INSTITUTION AND AGGREGATE BEHAVIOR 9**

Market and Information: Market with Exogenous Events - Aggregate Beliefs and Wisdom of Asymmetric Information in other Markets. Voting: Group Discussion Making - Voting as an Information Aggregation. Property Rights.

**TOTAL: 45**

**TEXT BOOKS**

1. David Easley, Jon Kleinberg, "Networks, Crowds, and Markets: Reasoning about a Highly Connected World", Cambridge University Press, 2010.
2. Stanley Wasserman, Katherine Faust, "Social Network Analysis: Methods and Applications", Cambridge University Press, 1998.

**REFERENCES**

1. Peter R. Monge, Noshir S. Contractor, "Theories of Communication Networks", Oxford University Press, 2003.
2. Ajith Abraham, "Computational Social Networks: Mining and Visualization", Springer, 2012.

<b>BCS003</b>	<b>UNIX INTERNALS</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To explore the design concepts of UNIX OS
- To understand the functional components of UNIX

**UNIT I OVERVIEW OF UNIX OS 7**

General Review of the System - History - System structure - User Perspective – Operating System Services - Assumptions About Hardware. Introduction to the Kernel – Architecture - System Concepts - Data Structures - System Administration.

**UNIT II KERNEL DATA STRUCTURES 9**

The Buffer Cache - Headers - Buffer Pool - Buffer Retrieval - Reading and Writing Disk Blocks - Advantages and Disadvantages. Internal Representation of Files - Inodes - Structure - Directories - Path Name to Inode - Super Block - Inode Assignment - Allocation of Disk Blocks - Other File Types.

**UNIT III FILE SYSTEM 10**

System Calls for the File System - Open - Read - Write - Lseek - Close - Create - Special file Creation - Change Directory and Change Root - Change Owner and Change Mode - Stat - Fstat - Pipes - Dup - Mount - Unmount - Link - Unlink - File System Abstraction - Maintenance.

**UNIT IV PROCESS MANAGEMENT AND CONTROL 10**

The System Representation of Processes - States - Transitions - System Memory – Context of a Process - Saving the Context - Manipulation of a Process Address Space – Sleep - Process Control - signals - Process Termination – Awaiting process - Invoking other Programs – The Shell - System Boot and the INIT Process - Process scheduling.

**UNIT V MEMORY AND I/O SUBSYSTEM 9**

Memory Management Policies - Swapping - Demand Paging - a Hybrid System - I/O Subsystem - Driver Interfaces - Disk Drivers - Terminal Drivers.

**TOTAL: 45**

**TEXT BOOK**

1. Maurice J. Bach, “The Design of the Unix Operating System”, Pearson Education, 2008.

**REFERENCES**

1. Marshall Kirk McKusick, George V. Neville-Neil, “The Design and Implementation of the FreeBSD Operating System”, Addison-Wesley, 2007.
2. Richard Stevens, “UNIX Network Programming”- Volume I- Pearson Education, New Delhi, 2006.
3. Uresh Vahalia, “UNIX Internals: The New Frontiers”, Prentice Hall, 2000.
4. Daniel P. Bovet, Marco Cesati, “Understanding the Linux Kernel”, O’Reilly Press, 2000.

<b>BCS004</b>	<b>OPEN SOURCE SYSTEMS</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To address open issues and adapt the Open Source Technologies.
- To ensure competency level of Open Source Software solutions on par with Proprietary solutions.

**UNIT I HISTORY AND OVERVIEW OF LINUX 9**

Overview of Free/Open Source Software (FOSS) – Definition of FOSS and GNU – History of GNU/Linux and Free Software Movement – Advantages of Free Software and GNU/Linux – GNU/Linux OS installation – Detect hardware – Configure disk partitions & file systems and install a GNU/Linux distribution – Basic shell commands – Process management – User and group management – File ownerships and permissions – PAM authentication – Introduction to Common System Configuration Files and Log Files – Basics of TCP/IP Networking.

**UNIT II OPEN SOURCE DATABASE AND BOOT OPERATIONS 9**

MySQL: Introduction – Setting up account – Basics of SQL programs – Record selection technology – Working with strings – Date and Time – Sorting Query Results – Working with meta data – Configuring additional hardware – Understanding the OS boot up process – Detect Display Devices – Installing Software – Setting up Email Servers (SMTP services) – Courier (IMAP & POP3 services) – Squirrel Mail (web mail services) – Setting up web servers (Apache) – Perl programming – Setting up File Services using Samba.

**UNIT III OPEN SOURCE PROGRAMMING LANGUAGES 9**

PHP: Introduction – Programming in Web Environment – Variables – Constants – Data types – Operators – Statements – Functions – Arrays – OOP – String manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP connectivity – Python: Syntax and Style – Python objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and loops – Files – Input and Output – Error and Exceptions – Modules – Classes and OOP – Execution Environment.

**UNIT IV OPEN SOURCE COMPILER 9**

Setting up a firewall – Using net filter and IP tables – Using the GNU Compiler Collection - GNU compiler tools – Pre-processor, C/C++ compiler, GAS assembler – Using source code versioning and Management tools – using CVS to manage source code revisions – patches.

**UNIT V OPEN SOURCE LIBRARIES AND LINKERS 9**

Understanding GNU Libraries and Linker – Linking against Object Archives and Dynamic Shared Object Libraries, Generating Statically Linked Binaries and Libraries, Generating Dynamically Linked Libraries – GNU debugging tools – GDB to debug programs, Graphical Debuggers like DDD, Memory Debugging – Profiling Libraries mpatrol and Valgrind.

**TOTAL: 45**

**REFERENCES**

1. N. B. Venkateshwarlu (Ed), “Introduction to Linux: Installation and Programming”, BS Publication (NRCFOSS), 2006.
2. Carla Schroder, “Linux Cookbook”, 1<sup>st</sup> Edition, O’Reilly Publishers, 2004.
3. Matthias Kalle Dalheimer and Matt Welsh, “Running Linux”, 5<sup>th</sup> Edition, O’Reilly Publishers, 2005.
4. [www.sco.com/skunkware/devtools](http://www.sco.com/skunkware/devtools)

<b>BCS005</b>	<b>C# AND .NET TECHNOLOGIES</b> (Common to CSE & IT)	<b>L T P C</b> <b>3 0 0 3</b>
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**OBJECTIVES**

- To provide an awareness of the .NET Environment.
- To deliver C# program based on the Microsoft .Net Framework including console applications and class libraries.
- To study about the applications of XML in .NET and ADO.NET.

**UNIT I OVERVIEW OF .NET 9**

Building blocks of .Net platform – Type system - Language specification - Type distinction – Runtime deployment - .Net aware programming languages.

**UNIT II CONCEPTS OF C# 9**

Data types – this keyword - Inheritance - Namespace - Polymorphism - Interface and Overloading - Multiple Inheritance - Property - Indexes - Delegates - Events - Operator Overloading -Method Overloading – Exception handling.

**UNIT III FILE I/O AND OBJECTS 9**

Name spaces – Directory and file types – Programming with file I/O – Object serialization – Configuration of objects – Serialization mechanisms.

**UNIT IV ADO .NET 9**

ADO.NET Architecture - ADO.NET Connected and Disconnected layers – Entity frame work – Introducing LINQ to XML.

**UNIT V ASP.NET 9**

Building ASP.NET web pages – ASP.NET web controls – Master pages – Themes – State management: Session data - Cookies.

**TOTAL: 45**

**TEXT BOOKS**

1. Andrew Troelsen, “Pro C# 2010 and the .NET 4 Platform”, 5<sup>th</sup> Edition, A Press, 2010.
2. Stephen C. Perry, “Core C# and .NET”, Pearson Education, 2006.
3. S. Thamarai Selvi and R. Murugesan, “A Textbook on C#”, Pearson Education, 2003.

**REFERENCES**

1. Jesse Liberty and Donald Xie, “Programming C# 3.0”, 5<sup>th</sup> Edition, O’Reilly Press, 2008.
2. Robinson et al, “Professional C#”, 5<sup>th</sup> Edition, Wrox Press, 2002.
3. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw Hill, 2004.
4. Andrew Troelsen, “C# and the .NET Platform”, APress, 2003.
5. Thuan Thai, Hoang Q. Lam, “.NET Framework Essentials”, 2<sup>nd</sup> Edition, O’Reilly Press, 2002.

<b>BCS006</b>	<b>CRYPTOGRAPHY AND NETWORK SECURITY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	(Common to CSE & IT)	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To analyze the various methods of conventional encryption.
- To understand the concepts of public key encryption and number theory.
- To understand Authentication and Hash functions.
- To learn the network security tools and applications.

**UNIT I INTRODUCTION 9**

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

**UNIT II PUBLIC KEY CRYPTOGRAPHY 9**

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

**UNIT III AUTHENTICATION AND HASH FUNCTION 9**

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

**UNIT IV NETWORK SECURITY 9**

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

**UNIT V SYSTEM LEVEL SECURITY 9**

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

**TOTAL: 45**

**TEXT BOOKS**

1. William Stallings, “Cryptography and Network Security - Principles and Practices”, Pearson Education, 4<sup>th</sup> Edition, 2006.
2. Behrouz A. Foruzan and Debdeep Mukhopadhyay, “Cryptography and Network Security”, Tata McGraw-Hill, 2<sup>nd</sup> Edition, 2010.

**REFERENCES**

1. Bruce Schneier, “Applied Cryptography: Protocols, Algorithms and Source Code in C”, Wiley India (P) Ltd., 2<sup>nd</sup> Edition, 2008.
2. Charles P. Pfleeger and Shari Lawrence Pfleeger, “Security in Computing”, 4<sup>th</sup> Edition, Pearson Education, 2011.
3. Wade Trappe, Lawrence C. Washington, “Introduction to Cryptography with Coding Theory”, 2<sup>nd</sup> Edition, Pearson Education, 2007.
4. Wenbo Mao, “Modern Cryptography: Theory and Practice”, Pearson Education, 2007.
5. Thomas Calabrese, “Information Security Intelligence: Cryptographic Principles and Applications”, Thomson Delmar Learning, 2004.

<b>BCS007</b>	<b>DATA WAREHOUSING AND DATA MINING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to CSE &amp; IT)</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To identify data warehouse architecture and necessity for data mining.
- To learn the importance and methods of data preprocessing.
- To understand the concepts of data warehousing and OLAP.
- To understand the data mining techniques and their applications.
- To provide insight on Big data issues.

**UNIT I DATA WAREHOUSE AND OLAP TECHNOLOGY 9**

Introduction to Data Warehousing - Data warehousing Components - Building a Data warehouse - Mapping the Data Warehouse to a Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools - Metadata – Business analysis reporting, Query tools and Applications - Online Analytical Processing (OLAP) - OLAP and Multidimensional Data model.

**UNIT II DATA PREPROCESSING 9**

Data Mining - Data Mining Functionalities - Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

**UNIT III ASSOCIATION RULES 9**

Association Rule Mining: Market Basket Analysis - Frequent pattern mining - Apriori algorithm - Generating Association rules from frequent items - Improving the efficiency of Apriori – mining - Multilevel association rules - Multidimensional association rules - Constraint based association Mining.

**UNIT IV CLASSIFICATION AND CLUSTERING 9**

Classification and Prediction, Issues - Decision Tree Induction - Bayesian Classification - Rule based classification - Other Classification Methods - Prediction - Accuracy and Error Measures - Cluster Analysis - Types of data - Categorization of Clustering methods - Partitioning methods - Hierarchical Methods - Outlier Analysis.

**UNIT V MINING MULTIMODAL DATA 9**

Multidimensional Analysis and Descriptive Mining of Complex Data Objects - Spatial Data mining - Multimedia Data mining - Text Mining – Mining the WWW - Applications and Trends in Data Mining. Big Data: Introduction – Hadoop – Implications – Risks.

**TOTAL: 45**

**TEXT BOOKS**

1. Jiahei Han, Micheline Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann, 2<sup>nd</sup> Edition, 2011.
2. Alex Berson, Stephen J.Smith, “Data Warehousing, Data Mining, & OLAP”, Tata McGraw-Hill Edition, 2004.

**REFERENCES**

1. Margaret H.Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, 2004.
2. Sam Anahory, Dennis Murry, “Data Warehousing in the real world”, Pearson Education, 2003.
3. David Hand, Heikki Manila and Padhraic Symth, “Principles of Data Mining”, Prentice Hall of India, 2004.
4. W.H.Inmon, “Building the Data Warehouse”, 3<sup>rd</sup> Edition, Wiley, 2003.
5. Paulraj Ponniah, “Data Warehousing Fundamentals”, Wiley-Interscience Pub., 2003.
6. Big Data: A Revolution That Will Transform How We Live, Work and Think”, Viktor Mayer-Schonberger, Kenneth Cukier, Houghton Mifflin Harcourt Publication, 2013.

<b>BCS008</b>	<b>ADVANCED COMPUTER ARCHITECTURE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To study the ISA design, instruction pipelining and performance issues.
- To have a detailed study of ILP using dynamic/software approaches.
- To study the multiprocessor and multi-core architectures and related issues.
- To study the Memory and I/O systems and their performance issues.

**UNIT I INSTRUCTION LEVEL PARALLELISM 9**

Pipeline – Pipeline hazards – Pipeline performance - ILP - Concepts and challenges - Hardware and software approaches - Dynamic scheduling - Speculation - Compiler techniques for exposing ILP - Branch prediction.

**UNIT II HARDWARE SUPPORT 9**

VLIW and EPIC - Advanced compiler support - Hardware support for exposing parallelism - Hardware versus software speculation mechanisms - IA64 and Pentium processors - Limits on ILP.

**UNIT III MULTIPROCESSORS AND THREAD LEVEL PARALLELISM 9**

Symmetric and distributed shared memory architectures - Performance issues - Synchronization - Models of memory consistency - Snooping Protocol - Introduction to Multithreading and its various applications – Hyper threading.

**UNIT IV MEMORY AND I/O 9**

Cache performance - Reducing cache miss penalty and miss rate - Cache optimization techniques - Reducing hit time - Main memory and performance - Memory technology. Types of storage devices - Buses - I/O performance measures - Designing an I/O system.

**UNIT V MULTI-CORE ARCHITECTURES 9**

Software and hardware multithreading - SMT and CMP architectures - Design issues - Case studies - Intel Multi-core architecture - SUN architecture - heterogeneous multi-core processors - case study: IBM Cell Processor.

**TOTAL: 45**

**TEXT BOOKS**

1. John L. Hennessey, David A. Patterson, “Computer Architecture A Quantitative Approach”, 4<sup>th</sup> Edition, Morgan Kaufmann, 2007.
2. David E. Culler, Jaswinder Pal Singh, “Parallel computer architecture: A Hardware/Software approach”, Morgan Kaufmann Publishers, 2011.

**REFERENCE**

1. Kai Hwang, ZhiWei Xu, “Scalable Parallel Computing”, 3<sup>rd</sup> Edition, Tata McGraw Hill, 2003.

<b>BCS009</b>	<b>HIGH SPEED NETWORKS</b> (Common to CSE & IT)	<b>L T P C</b> <b>3 0 0 3</b>
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**OBJECTIVES**

- To provide an understanding of the networking standards that can be adopted with the current day requirements of complex and voluminous content transfer over heterogeneous platforms.
- To have a primitive level performance analysis for of traffic with different networking standards and to study the standards adopted for handling high traffic.
- To get a feel of designing a High speed network setup with specialized hardware and optimization approaches like parallelism and pipelining.

**UNIT I HIGH SPEED NETWORKS 9**

Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LANs – Fast Ethernet – Gigabit Ethernet – Fibre Channel – Wireless LAN’s applications, requirements – Architecture of IEEE 802.11.

**UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9**

Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

**UNIT III TCP AND ATM CONGESTION CONTROL 9**

TCP Flow control – TCP Congestion Control – Retransmission – Timer Management – Exponential RTO backoff – KARN’s Algorithm – Window management – Traffic and Congestion control in ATM – Requirements – Attributes – Traffic Management Frame work – Traffic Control – ABR traffic Management – ABR rate control – RM cell formats – ABR Capacity allocations – GFR traffic management.

**UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9**

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline – FQ – PS – BRFQ – GPS – WFQ – Random Early Detection – Differentiated Services.

**UNIT V PROTOCOLS FOR QOS SUPPORT 9**

RSVP – Goals and Characteristics, Data Flow, RSVP operations – Protocol Mechanisms – Multiprotocol Label Switching – Operations – Protocol details – RTP – Protocol Architecture – Data Transfer Protocol – RTCP.

**TOTAL: 45**

**TEXT BOOKS**

1. William Stallings, “High-speed Networks and Internet”, 2<sup>nd</sup> Edition, Pearson Education, 2002. (UNIT I-V)
2. Jean Warland, Pravin Varaiya, “High-performance Communication Networks”, 2<sup>nd</sup> Edition, Jean Harcourt Asia Pvt. Ltd., 2000.

**REFERENCES**

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







**BCS013**

**M-COMMERCE**

**L T P C**

**3 0 0 3**

**OBJECTIVES**

- Recognize the business principles of M-Commerce
- Understand the various technical Support for M-Commerce
- Able to build business models using M-Commerce approaches

**UNIT I INTRODUCTION**

**9**

Electronic Commerce Framework – Electronic Commerce and Media Convergence – Anatomy of E-Commerce Applications – Consumer Application – Electronic Commerce organization application.

**UNIT II NETWORK INFRASTRUCTURE**

**9**

Introduction - Market forces influencing the I-Way - Components of the I-Way - Network access equipment - The Last Mile: Local Roads and Access Ramps - Global information distribution networks - Public policy issues shaping the i-way.

**UNIT III MOBILE COMMERCE TECHNOLOGY**

**9**

NTT Docomo's I-Mode - Towards a Classification Framework for Mobile Location Based Services - Wireless Personal and Local Area Networks - The Impact of Technology Advances on Strategy Formulation in Mobile Communications Networks.

**UNIT IV MOBILE COMMERCE: THEORY AND APPLICATIONS**

**9**

The Ecology of Mobile Commerce - The Wireless Application Protocol - Mobile Business Services - Mobile Portal - Factors Influencing the Adoption of Mobile Gaming Services - Mobile Data Technologies for Small Business Adoption and Diffusion.

**UNIT V BUSINESS-TO-BUSINESS MOBILE E-COMMERCE**

**9**

A perspective on M-Commerce – Location based services: criteria for adoption and solution deployment - MCommerce in the automotive industry making a case for strategic partnerships- Case study: The Role of Mobile advertising in building a brand.

**TOTAL: 45**

**TEXT BOOKS**

1. Ravi Kalakota, B.Andrew Whinston, "Frontiers of Electronic Commerce", Pearson Education, Ninth Impression, 2009.
2. Brian E. Mennecke, Troy J. Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.

**REFERENCES**

1. P. J. Louis, "M-commerce Crash Course", McGraw – Hill Companies, 2001.
2. Paul May, "Mobile Commerce: Opportunities, Applications and Technologies of Wireless Business", Cambridge University Press, 2001.
3. Norman Sadeh, "M-Commerce: Technologies, Services and Business models", John Wiley & Sons, 2003.
4. P.Candace Deans, "E-Commerce and M-Commerce Technologies", Idea Group Inc (IGI), 2005.





**BCS015**

**ADHOC NETWORKS**

**L T P C**

**3 0 0 3**

**OBJECTIVES**

- To impart the trends in emerging field of wireless networking.
- To focus on layered communication modeling, such as the media access control and network layer.
- To address quality of service issues and network reliability for transmission of real-time information.

**UNIT I FUNDAMENTALS**

**9**

Introduction to Wireless Communication Technology – Characteristics of the Wireless Channel – IEEE 802.11a/b Standard – Origin of Adhoc Packet Radio Networks – Architecture of PRNETs – Introduction to Adhoc Wireless Networks – Heterogeneity in Mobile Devices – Introduction to Wireless Sensor Networks – Traffic Profiles – Types of Adhoc Mobile Communications – Adhoc wireless Internet.

**UNIT II ADHOC ROUTING PROTOCOLS**

**9**

Introduction to designing a Routing Protocol – Classifications of Routing Protocols – Destination Sequenced Distance Vector (DSDV) – Wireless Routing Protocol (WRP) – Cluster Switch Gateway Routing (CSGR) – Source-Initiated On-Demand Approaches – Ad hoc On-Demand Distance Vector Routing (AODV) – Dynamic Source Routing (DSR) – Temporally Ordered Routing Algorithm (TORA) – Signal Stability Routing (SSR) – Location-Aided Routing (LAR) – Power-Aware Routing (PAR) – Zone Routing Protocol (ZRP).

**UNIT III MULTICAST ROUTING IN ADHOC NETWORKS**

**9**

Introduction to designing a Multicast Routing Protocol – Operation of Multicast Routing Protocols – Classifications of Multicast Routing Protocols – Tree-Based Multicast Routing Protocols – Mesh-Based Multicast Routing Protocols – Summary of Tree and Mesh based Protocols – Energy-Efficient Multicasting – Multicasting with Quality of Service Guarantees – Application – Dependent Multicast Routing.

**UNIT IV TRANSPORT LAYER-SECURITY PROTOCOLS**

**9**

Introduction to Transport Layer Protocol – Classification of Transport Layer Solutions – TCP over Adhoc Wireless Networks – Security in Adhoc Wireless Networks – Network Security Attacks – Key Management – Secure Routing.

**UNIT V QoS AND ENERGY MANAGEMENT**

**9**

Introduction to QoS in Adhoc Wireless Networks – Classifications of QoS Solutions – MAC Layer Solutions – Network Layer Solutions – Energy Management – Classification of Energy Management Schemes – Transmission Power Management Schemes – System Power Management Schemes.

**TOTAL: 45**

**TEXT BOOK**

1. C. Siva Ram Murthy and B. S. Manoj, “Ad Hoc Wireless Networks Architectures and Protocols”, Prentice Hall, PTR, 2004.

**REFERENCES**

1. C. K. Toh, “Ad Hoc Mobile Wireless Networks Protocols and Systems”, Prentice Hall, PTR, 2002.
2. Charles E. Perkins, “Ad Hoc Networking”, Addison Wesley, 2000.











**BCS021 SOFTWARE QUALITY MANAGEMENT**

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

**OBJECTIVES**

- To study the concept of Software quality models.
- To learn about Quality plan, implementation and documentation.
- To analyze the need for Quality tools and CASE tools.
- To introduce few International quality standards – ISO, CMM, Six Sigma.

**UNIT I INTRODUCTION TO SOFTWARE QUALITY 9**

Software Quality – Hierarchical Models of Boehm and McCall – Quality Measurement – Metrics Measurement and Analysis – Gilb’s Approach – QM Model.

**UNIT II SOFTWARE QUALITY ASSURANCE 9**

Quality Tasks – SQA plan – Teams – Characteristics – Implementation – Documentation – Reviews and Audits.

**UNIT III QUALITY CONTROL AND RELIABILITY 9**

Tools for Quality – Ishikawa’s Basic Tools – CASE tools – Defect Prevention and Removal – Reliability Models – Rayleigh Model – Reliability Growth Models for quality Assessment.

**UNIT IV QUALITY MANAGEMENT SYSTEM 9**

Elements of QMS – Rayleigh Model Framework – Reliability Growth Models for QMS –Complexity metrics and models – Customer Satisfaction Analysis.

**UNIT V QUALITY STANDARDS 9**

Need for standards – ISO 9000 Series – ISO 9000-3 for Software Development – CMM and CMMI – Six Sigma Concepts.

**TOTAL: 45**

**TEXT BOOKS**

1. Alan C. Gillies, “Software Quality: Theory and Management”, 3<sup>rd</sup> Edition, Thomson Learning, 2011.
2. Stephen H.Kan, “Metrics and Models in Software Quality Engineering”, 2<sup>nd</sup> Edition, Addison Wesley, 2004.

**REFERENCES**

1. Schulmeyer G. Gordon, “Handbook of Software Quality Assurance”, 4<sup>th</sup> Edition, Prentice Hall, 2008.
2. Watts S. Humphery, “Managing the Software Process”, 5<sup>th</sup> Impression, Pearson Education, 2008.
3. Thomas Pyzdek and Paul Keller, “The Six Sigma Handbook, 3<sup>rd</sup> Edition, McGraw-Hill Publication, 2009.





**BGE003 INTELLECTUAL PROPERTY RIGHTS L T P C**  
**3 0 0 3**

**OBJECTIVES**

- To create an awareness on Intellectual Property Rights (IPR)
- To understand patents and copyrights
- To know about application procedures of IPR

**UNIT I TYPES OF PROPERTY 9**

Introduction – Invention and Creativity – Intellectual Property (IP) – Importance – Protection of IPR – Basic types of property (i). Movable Property (ii). Immovable Property and (iii). Intellectual Property.

**UNIT II PATENTS AND APPLICATION PROCEDURES 9**

IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures.

**UNIT III INTERNATIONAL PARTICES 9**

International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities – History – General Agreement on Trade and Tariff (GATT).

**UNIT IV LEGISLATIONS AND POLICY 9**

Indian Position Vs WTO and Strategies – Indian IPR legislations – commitments to WTO-Patent Ordinance and the Bill – Draft of a national Intellectual Property Policy – Present against unfair competition.

**UNIT V CASE STUDIES 9**

Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

**TOTAL: 45**

**TEXT BOOK**

1. Subbaram N.R., “Handbook of Indian Patent Law and Practice”, S.Viswanathan Printers and Publishers Private Limited, 1998.

**REFERENCES**

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1974.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. [www.ipmatters.net/features/000707\\_gibbs.html](http://www.ipmatters.net/features/000707_gibbs.html).

**BCS024**

**SOFT COMPUTING**

**L T P C**

**3 0 0 3**

**OBJECTIVES**

- To impart deep knowledge of soft computing theories and fundamentals.
- To give an understanding on the fundamentals of Nontraditional Technologies and approaches to solving hard real-world problems.
- Fundamentals of Artificial Neural Networks, Fuzzy sets, Fuzzy logic and Genetic algorithms.
- To give an overview of genetic algorithms and machine learning techniques.
- To illustrate the use of ANN, Fuzzy sets to solve hard real-world problems.

**UNIT I INTRODUCTION 9**

Evolution of computing - Soft computing constituents - From conventional AI to computational intelligence - Neural networks - Scope and evolution - Models of neural networks - Feed forward networks - Supervised learning neural networks – Associative degrade networks - Unsupervised learning networks - Special networks.

**UNIT II FUZZY SETS AND FUZZY LOGIC 9**

Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets - Classical Relations and Fuzzy Relations - Membership Functions – Defuzzification.

**UNIT III FUZZY MEASURES AND REASONING 9**

Fuzzy arithmetic and measures - Fuzzy rule base – Fuzzy Approximate reasoning - Categorical, qualitative, syllogistic, dispositional - Fuzzy inference systems - Fuzzy decision making - Fuzzy logic control systems: Architecture, model and application.

**UNIT IV MACHINE LEARNING AND GENETIC ALGORITHM 9**

Machine Learning Techniques - Machine Learning Using Neural Nets - Genetic Algorithms - Simple and general GA - Classification of Genetic algorithm - Messy, adaptive, hybrid, parallel - Holland classifier system.

**UNIT V APPLICATIONS WITH CASE STUDY 9**

Character recognition – Fabric defect identification – Knowledge base Evaluation – Earthquake damage Evaluation – Balancing inverted pendulum – Air conditioner controller – Electrical Load balancing.

**TOTAL: 45**

**TEXT BOOKS**

1. S.N.Sivanandam and S.N.Deepa, “Principles of Soft Computing”, Wiley India Limited, 1<sup>st</sup> Edition, 2007. (Unit I–III)
2. S.Rajasekaran, G.A.Vijayalakshmi, “Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications”, 6<sup>th</sup> Edition, PHI, 2006.

**REFERENCES**

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun and Eiji Mizutani, “Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine Intelligence”, 1<sup>st</sup> Edition, Prentice-Hall of India, 2003.
2. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Education, 2003.

3. Amit Konar, “Artificial Intelligence and Soft Computing: Behavioral and Cognitive Modeling of the Human Brain – Volume I”, 1<sup>st</sup> Edition, CRC Press, 2000.
4. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Pearson Education, 2009.

<b>BCS025</b>	<b>GREEN COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To learn about the importance of the green computing.
- To have a knowledge of the green computing approaches.
- To learn about the architecture of the Green Computing.
- Understanding the applications of green Computing in various domains.

**UNIT I OVERVIEW AND INITIATIVES 9**

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

**UNIT II CONSUMPTION ISSUES 9**

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

**UNIT III GREEN COMPUTING PLATFORMS 9**

Greening process – Datacenter design and redesign – Virtualization.

**UNIT IV GREEN COMPUTING ARCHITECTURE 9**

Rethinking of behavior – paperless communication – Recycling.

**UNIT V GREEN COMPUTING MODELS 9**

Hardware considerations – Case studies: Energy utilities – Universities – Technological Businesses – Other Organizations.

**TOTAL: 45**

**TEXT BOOKS**

1. Toby J.Velte, Anthony T.Velte and Robert Elsenpeter, “Green IT Reduce your Information System’s Environmental impact while Adding to the Bottom Line”, Tata McGraw-Hill, 2008.
2. John Lamb, “The Greening of IT: How Companies can make a Difference for the Environment”, IBM Press, 2009.

**REFERENCE**

1. Jason Harris, “ Green Computing and Green IT Best Practices on Regulations and Industry Initiatives, Virtualization, Power Management, Materials Recycling and Telecommuting”, Lulu Publishers, 2008.

<b>BCS026</b>	<b>KNOWLEDGE BASED DECISION SUPPORT SYSTEM</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### OBJECTIVES

- To understand decision support system features.
- To learn the task of managing knowledge.
- To apply Artificial Intelligence in Knowledge Based Decision Support System development.
- To familiarize Management Support System.

### UNIT I INTRODUCTION 9

Decision making and computerized support: management support systems - Decision making systems modeling - Support.

### UNIT II DECISION SUPPORT SYSTEM DEVELOPMENT 9

Decision making Systems - Modeling and analysis - Business intelligence - Data warehousing, Data acquisition - Data mining - Business analysis – Visualization - Decision support system development.

### UNIT III KNOWLEDGE MANAGEMENT 9

Collaboration – Communication - Enterprise decision support system - Knowledge management - Collaborative computing technologies - Enterprise information system - Group support systems.

### UNIT IV INTELLIGENT SYSTEM DEVELOPMENT 9

Intelligent support systems - AI and Expert systems - Knowledge based systems - Knowledge acquisition – Validation – Representation - Advanced intelligence system - Intelligent software agents.

### UNIT V MANAGEMENT SUPPORT SYSTEMS 9

Implementing MSS in the E-Business era – Integration – Impacts - Advances in Management Support Systems.

**TOTAL: 45**

### TEXT BOOKS

1. Efraim Turban Jay E.Aronson and Ting Peng Liang, “Decision Support Systems and Intelligent Systems”, 7<sup>th</sup> Edition, Prentice Hall, 2005.
2. George M. Marakas, “Decision Support Systems”, 2<sup>nd</sup> Edition, Prentice Hall, 2002.
3. Vicki L. Sauter, “Decision Support Systems for Business Intelligence”, 2<sup>nd</sup> Edition, John Wiley & Sons, 2011.

### REFERENCES

1. V.S. Janakiraman and K. Sarukesi, “Decision Support Systems”, Prentice Hall of India, 2006.
2. Efrem G. Mallach, “Decision Support Systems and Data warehouse Systems”, 1<sup>st</sup> Edition, McGraw-Hill, 2000.
3. Padhy N.P. “Artificial Intelligence and Intelligent Systems”, 4<sup>th</sup> Impression, Oxford University Press, 2007.
4. [Jatinder N.D. Gupta](#), [Guisseppe A. Forgionne](#), [Manuel Mora T.](#), “Intelligent Decision-making Support Systems: Foundations, Applications and Challenges”, Springer, 2007.

<b>BCS027</b>	<b>NATURE AND BIO INSPIRED COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>(Common to CSE &amp; IT)</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### OBJECTIVES

- To acquire in-depth knowledge about the Nature and Bio inspired Computing.
- To introduce the students to biologically inspired computing.
- To uncover the state-of-the-art of present technology.
- To survey relevant theoretical models, reconfigurable architectures and computational intelligence techniques.

### UNIT I INTRODUCTION 9

Natural to Artificial Systems– Behavior of Social Insects: Foraging – Division of Labor – Cemetery Organization and Brood Sorting – Nest Building.

### UNIT II ANT COLONY OPTIMIZATION 9

Ant Behavior – Towards Artificial Ants– Ant Colony Optimization– Combinatorial Optimization– Meta-heuristic – Problem solving using ACO – Extensions of Ant Systems – Local search methods – ACO theoretical considerations – Convergence proofs.

### UNIT III APPLICATIONS 9

Ant Colony Optimization algorithms for NP-hard problems – Routing problems – Assignment problems – Scheduling problems – Subset problems – Machine Learning Problems – ACO for Traveling Salesman problem.

### UNIT IV SWARM INTELLIGENCE 9

Biological foundations of Swarm Intelligence – Swarm Intelligence in Optimization – Particle Swarms for dynamic optimization problems.

### UNIT V COMPUTING PARADIGMS 9

Biological Inspired computing to Natural Computing – Integration of Evolutionary Computation Components in Ant Colony Optimization – Particle Swarm Optimization based on Socio-cognition.

**TOTAL: 45**

### TEXT BOOKS

1. Christian Blum, Daniel Merkle (Eds.), “Swarm Intelligence: Introduction and Applications”, Springer Verlag, 2008.
2. Leandro N.De Castro, Fernando J.Von Zuben, “Recent Developments in Biologically Inspired Computing”, Idea Group Inc., 2005.
3. Marco Dorigo, Thomas Stutzle, “Ant Colony Optimization”, MIT Press, 2004.
4. Eric Bonabeau, Marco Dorigo, Guy Theraulaz, “Swarm Intelligence: From Natural to Artificial Systems”, Oxford University press, 2000.

### REFERENCES

1. James F.Kennedy, James Kennedy, Russell C. Eberhart, “Swarm Intelligence”, Morgan Kaufmann, 2001.
2. Christian Blum, “Theoretical and practical Aspects of Ant Colony Optimization”, IOS press, 2004.

<b>BCS028</b>	<b>NATURAL LANGUAGE PROCESSING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To introduce language processing and morphological parsing
- To understand the rule-based part-of-speech tagging
- To know the features and unifications of structures
- To know the syntactic and semantic meanings with applications

**UNIT I INTRODUCTION 6**

Introduction: Knowledge in speech and language processing – Ambiguity – Models and Algorithms – Language, Thought and Understanding. Regular Expressions and automata: Regular expressions – Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology – Finite-State Morphological parsing.

**UNIT II SYNTAX 10**

Word classes and part-of-speech tagging: English word classes – Tagsets for English – Part-of-speech tagging – Rule-based part-of-speech tagging – Stochastic part-of-speech tagging – Context-Free Grammars for English: Constituency – Context-Free rules and trees – Sentence-level constructions – The noun phrase – Coordination – Agreement – Verb phrase and sub categorization.

**UNIT III FEATURES AND UNIFICATION 10**

Feature structures – Unification of feature structures – Features structures in the grammar – Implementing unification – Parsing with unification constraints – Types and Inheritance. Lexicalized and Probabilistic Parsing: Probabilistic context-free grammar.

**UNIT IV SEMANTIC MEANINGS 11**

Representing Meaning: Computational desiderata for representations – Meaning structure of language – First order predicate calculus – Some linguistically relevant concepts – Related representational approaches - Semantic Analysis: Syntax-Driven semantic analysis – Attachments for a fragment of English – Integrating semantic analysis into the early parser.

**UNIT V APPLICATIONS 8**

Selectional restriction based disambiguation – Robust word sense disambiguation – Information retrieval - Natural Language Generation: Introduction to language generation – Architecture for generation – Surface realization -Machine Translation: Language similarities and differences – The transfer metaphor.

**TOTAL: 45**

**TEXT BOOK**

1. Daniel Jurafsky and James H. Martin, “Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition”, 2<sup>nd</sup> Edition, Pearson Education, 2009.

**REFERENCES**

1. James Allen, “Natural Language Understanding”, Pearson Education, 2003.
2. Christopher D.Manning and Hinrich Schutze, “Foundations of Statistical Natural language processing”, Massachusetts Institute of Technology, 2000.
3. U.S.Tiwary and Tanveer Siddiqui, “Natural Language Processing and information retrieval”, OUP India, 2008.
4. Ela Kumar, “Natural language Processing”, L.K.International Publishing House Private Limited, 2011.

<b>BCS029</b>	<b>COMPUTER SIMULATION AND MODELING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OBJECTIVES**

- To explore the methods for modeling of systems using event simulation.
- To emphasis on modeling and on the use of simulation software.
- To formulate simulation model for a given problem, implement the model in software and perform simulation analysis of the system.

**UNIT I INTRODUCTION TO SIMULATION 9**

Introduction - Simulation terminologies - Application areas - Model classification - Types of Simulation - Steps in a simulation study - Concepts in discrete event simulation - Simulation examples.

**UNIT II MATHEMATICAL MODELS 9**

Statistical Models: Concepts - Discrete distribution - Continuous distribution - Poisson process - Empirical distributions .Queuing models: Characteristics – Notation - Queuing systems - Markovian Models. Properties of random numbers - Generation of Pseudo Random numbers - Tests for random numbers. Random-variate Generation: Inverse transform technique - Acceptance-rejection technique.

**UNIT III ANALYSIS OF SIMULATION DATA 9**

Input Modeling: Identifying distribution with data - Parameter estimation - Goodness-of-fit Tests - Selecting input models without data. Output analysis: Terminating simulations - Steady state simulations.

**UNIT IV VERIFICATION AND VALIDATION 9**

Model Building - Verification of Simulation Models - Calibration and validation of models - Validation of model assumptions - Validating input - Output transformations.

**UNIT V SIMULATION OF COMPUTER SYSTEMS 9**

Simulation tools - Model input - High level computer system simulation – CPU simulation - Memory simulation - Comparison of system designs. Case Study: Simulation of Computer Networks.

**TOTAL: 45**

**TEXT BOOKS**

1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, “Discrete-Event System Simulation”, 5<sup>th</sup> Edition, Pearson Education, 2010. (I-V Units)
2. Geoffrey Gordon, “System Simulation”, 2<sup>nd</sup> Edition, Prentice Hall, 2006.

**REFERENCES**

1. Frank L. Severance, “System Modeling and Simulation: An Introduction”, 1<sup>st</sup> Edition, John Wiley & Sons, 2001.
2. Averill M. Law and W.David Kelton, “Simulation Modeling and Analysis”, 5<sup>th</sup> Edition, McGraw-Hill, 2014.
3. Online Book, Jerry Banks, “Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice”, 1<sup>st</sup> Edition, John Wiley & Sons, 2007. <http://onlinelibrary.wiley.com/book/>

**BCS030 DATA COMMUNICATION AND COMPUTER NETWORKS** **L T P C**  
**3 0 0 3**

**OBJECTIVES**

- To study the concepts of data communications and network architecture.
- To understand the network classifications and design principles.
- To learn about various multiple access techniques used in networking.
- To study about the switching concepts and routing protocols.
- To learn about the various protocols.

**UNIT I DATA COMMUNICATIONS** **9**

Data communications and networking overview - Data transmission –Guided and wireless transmission - Signal encoding - Multiplexing – Spread spectrum.

**UNIT II NETWORK FUNDAMENTALS** **9**

OSI model - TCP/IP protocol suite- Repeaters –Hubs – Bridges – Switches - Routers – Brouters - Topologies – Ethernet - Token ring, FDDI, Wireless LANs.

**UNIT III DATA LINK LAYER** **9**

Link level error control – Checksum – CRC - Flow control mechanisms - Stop and wait ARQ - Go-Back N ARQ - Selective repeat ARQ.

**UNIT IV NETWORK LAYER** **9**

Routing – Distance Vector Routing - Link State Routing - Inter-domain routing – BGP - IP – ARP – RARP – ICMP - IGMP.

**UNIT V TRANSPORT AND APPLICATION LAYER** **9**

TCP - UDP – DNS - Telnet - Rlogin - FTP - SMTP - WWW - HTTP- SNMP.

**TOTAL: 45**

**TEXT BOOKS**

1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, 4<sup>th</sup> Edition, Morgan Kauffmann Publishers Inc., 2007.
2. William Stallings, “Data and Computer Communications”, 8<sup>th</sup> Edition, Pearson Education, 2007.

**REFERENCES**

1. James F. Kuross, Keith W. Ross, “Computer Networking, a Top-Down Approach Featuring the Internet”, 3<sup>rd</sup> Edition, Addison Wesley, 2004.
2. Nader F. Mir, “Computer and Communication Networks”, Pearson Education, 2007.
3. Comer, “Computer Networks and Internets with Internet Applications”, 4<sup>th</sup> Edition, Pearson Education, 2003.
4. Andrew S. Tanenbaum, “Computer Networks”, 4<sup>th</sup> Edition, Prentice Hall PTR, 2003.