REGULATION 2015

B. TECH - COMPUTER SCIENCE AND ENGINEERING CURRICULUM-SYLLABUS

SEMESTER -I

SUB. CODE	Subject Name	L	T	P	C
Theory					
BEN101	English-I	3	1	0	3
BMA101	Mathematics-I	3	1	0	3
BPH101	Engineering Physics-I	3	0	0	3
BCH101	Engineering Chemistry-I	3	0	0	3
BCS101	Fundamentals of Computing and Programming	3	0	0	3
BFI101	Foreign Indian Languages	3	0	0	3
BME102	Engineering Graphics	1	0	3	3
BEE101	Basic Electrical and Electronics Engineering	2	0	0	2
Practical					
BCS1L1	Computer Practice Laboratory	0	0	3	1
BEE1L1	Basic Electrical and Electronics Engineering Practices Laboratory	0	0	3	1
				Total Credits – **25**	

SEMESTER -II

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BEN 201	English-II	3	0	0	3
BMA 201	Mathematics-II	3	1	0	3
BPH 201	Engineering Physics-II	3	0	0	3
BCH 201	Engineering Chemistry-II	3	0	0	3
BCS 201	Internet Programming	2	0	0	2
BBA201	Personality Development	2	0	0	2
BBT202	Biology for Engineers	2	0	0	2
BME 203	Basic Mechanical Engineering	2	0	0	2
BCE201	Basic Civil Engineering	2	0	0	2
Practical					
BCS 2L1	Internet Practices Lab	0	0	3	1
BCM 2L1	Basic Civil and Mechanical Engineering Practices Laboratory	0	0	3	1
BPC 2L1	Physics and Chemistry Laboratory	0	0	3	1

	***Total Credits* – 25**

SEMESTER -III

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BMA 301	Mathematics- III	3	1	0	4
BCS301	Data Structures	3	0	0	3
BCS302	System Modeling and Simulation	3	0	0	3
BCS303	Computer Organization and Architecture	3	0	0	3
BCS304	Digital Computer Fundamentals	3	0	0	3
BEC305	Electronic Circuits	3	0	0	3
Practical					
BCS3L1	Data Structures Lab	0	0	4	2
BEC3L2	Electronics Lab	0	0	4	2
BCS3L2	Object Oriented Programming using C++ Lab	0	0	4	2
BCS3S1	Technical Seminar – I	0	0	2	1
					***Total Credits* – 26**

SEMESTER –IV

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BMA402	Numerical methods	3	1	0	4
BCS401	Database Management System	3	0	0	3
BCS402	Design and analysis of algorithm	3	1	0	4
BCS 403	Computer Networks	3	0	0	3
BCE406	Environmental Studies	3	0	0	3
BCS405	Operating Systems	3	0	0	3
Practical					
BCS4L1	DBMS Laboratory	0	0	4	2
BCS4L2	Operating System Lab	0	0	4	2
BCS4L3	Computer Graphics and Multimedia Lab	0	0	4	2
BCS4S1	Technical Seminar-II	0	0	2	1
					***Total Credits* – 27**

SEMESTER -V

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BMA 503	Mathematics - IV	3	1	0	4
BCS 501	Software Engineering	3	0	0	3
BEC 501	Microprocessors and its applications	3	0	0	3
BCS503	Distributed Computing	3	0	0	3
BBA 501	Principles of Management	3	0	0	3
BCS 5E1	Elective-I	3	0	0	3
Practical					
BCS 5L1	Programming in Java Lab	0	0	4	2
BCS 5L2	Software Engineering Laboratory	0	0	4	2
BEC5L2	Microprocessor Laboratory	0	0	4	2
BCS5S1	Industrial Training	0	0	3	1
					***Total Credits* – 26**

SEMESTER -VI

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BCS605	Data Warehousing and Data Mining	3	0	0	3
BCS602	Object Oriented Analysis and Design	3	0	0	3
BCS603	Grid and Cloud Computing	3	0	0	3
BCS604	Artificial Intelligence& Expert System	3	1	0	4
BCS606	Principles of Compiler Design	3	1	0	4
BCS6E2	Elective-II	3	0	0	3
Practical					
BCS6L3	Data Warehousing and Data Mining Laboratory	0	0	4	2
BCS6L2	C # and .Net Laboratory	0	0	4	2
BCS6L1	Networking Laboratory	0	0	4	2
BCS6P1	Mini Project – I	0	0	3	1
					***Total Credits* – 27**

SEMESTER –VII

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BCS701	Big Data Analytics	3	0	0	3
BCS702	Mobile and Pervasive Computing	3	0	0	3
BCS703	Web Technology	3	0	0	3
BSE701	Linux Internals	3	0	0	3
BCS7E3	Elective III	3	0	0	3
BCS7E4	Elective IV	3	0	0	3
Practical					
BCS7L1	Big Data Analytics Laboratory	0	0	4	2
BCS7L2	Web Technology Laboratory	0	0	4	2
BSE7L1	Linux Internals Lab	0	0	4	2
BCS7P1	Project work Phase – I	0	0	6	3
					Total Credits – 27

SEMESTER –VIII

SUB.CODE	SUBJECT NAME	L	T	P	C
Theory					
BCS8E5	Elective V	3	0	0	3
BCS8E6	Elective VI	3	0	0	3
BCS8E7	Elective VII	3	0	0	3
Practical					
BCS8P1	Project Work and Viva Voce	0	0	18	6
					Total Credits – 15

TOTAL CREDITS FOR THE PROGRAMME: 198

LIST OF ELECTIVES

SUB.CODE	SUBJECT NAME	L	T	P	C
BCS 001	Software Reliability and Software Testing	3	0	0	3
BCS 002	Fuzzy and genetic algorithm	3	0	0	3
BCS 003	Natural Language Processing	3	0	0	3
BCS 004	Speech Technology	3	0	0	3
BCS 005	Soft computing	3	0	0	3
BCS 006	Parallel Computing	3	0	0	3
BCS 007	Real Time Systems	3	0	0	3
BCS 008	Distributed Operating System	3	0	0	3
BCS 009	Embedded Systems	3	0	0	3
BCS 010	Middleware Technologies	3	0	0	3
BCS 011	Unified Modeling Language	3	0	0	3
BCS 012	Software Architecture	3	0	0	3
BCS 013	Software Quality Management	3	0	0	3
BCS 014	Software Project Management	3	0	0	3
BCS 015	Component Based System Design	3	0	0	3
BCS 016	TCP / IP Principles and Architecture	3	0	0	3
BCS 017	Performance Evaluation of Computer Systems & Networks	3	0	0	3
BCS 018	Advanced Computer Networks	3	0	0	3
BCS 019	Mobile Communication	3	0	0	3
BCS 020	High Speed networks	3	0	0	3
BCS 021	Neural Networks	3	0	0	3
BCS 022	Virtual Reality	3	0	0	3
BCS 023	E-Commerce	3	0	0	3
BCS 024	Object Oriented Database Design	3	0	0	3
BCS 025	PHP Programming	3	0	0	3
BCS026	Management Information Systems	3	0	0	3
BCS 027	Advanced Web Design	3	0	0	3
BCS 028	Advanced Databases	3	0	0	3
BCS 029	Human Computer Interaction	3	0	0	3
BBA 014	Entrepreneurship Development	3	0	0	3
BBA 024	Engineering Economics and Financial Accounting	3	0	0	3
BBA 025	Professional Ethics in Engineering	3	0	0	3
BCS 030	Special Elective	3	0	0	3

BEN101 **ENGLISH - I**

L	T	P	C
3	0	0	3

OBJECTIVES:

- To make the students learn the basics of communication in order to talk fluently, confidently and vividly.
- Students will be able to use strategies before, during, and after reading to aid in the construction and enhancement of meaning
- Students will be able to respond in discussions and in writing, using personal, literal, interpretative, and evaluative stances, to works of fiction and/or non-fiction.
- Students will be able to identify and explain the function of essential short story elements in the writer's craft (i.e. character, setting, conflict, plot, climax, resolution, theme, tone, point of view).

Course Outcomes:

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

CO1: To make them master the techniques of professional communication so that they become employable after completing the course

CO2: Students will be able to engage in informal writing assignments (i.e. reader response, free writing, focused free writing, prediction, response journals, dialectical notebook entries, and other pieces of writing that they do not take through the entire writing process).

CO3: Students will be able to engage in formal writing assignments that require utilization of all stages of the writing process.

CO4: Students will be able to choose and use a relevant pre-writing strategy that will help them to prepare for the assignment.

CO5: Students will be able to write several rough drafts of a paper to revise clarity and depth of content or to edit style and mechanics.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT I **9+3**

Parts of speech - Active and passive voices - Subject verb agreement - Writing about School life, Hobbies, Family and friends – Word formation with prefixes and suffixes - Tenses - Concord - Summarizing - Note-making

UNIT II **9+3**

Cause and effect relations – Punctuations –Differences between verbal and nonverbal communication -E - mail communication – Homophones - Etiquettes of E mail communication, Interpreting graphic representation - Flow chart and Bar chart.

UNIT III **9+3**

Degrees of comparison – Positive, Comparative, Superlative - wh questions - SI units -Lab reports - Physics, chemistry, workshop and Survey report for introducing new product in the market.

UNIT IV **9+3**

Writing project proposals - Presentation skills - Prefixes and suffixes - If conditions - Writing a review- Preparing minutes of the meeting, Agenda, official circulars.

UNIT V **9+3**

Accident reports (due to flood and fire) - Hints development - Imperatives - Marking the stress Connectives , prepositional relatives.

TOTAL NO OF PERIODS: 60

Text Book:

1. Department of humanities and social sciences division, Anna University, oxford university press, 2013.

Reference:

1. S.P.Danavel, English and Communication for Students of Science and engineering, Orient Blackswan, Chennai, 2011.

2. Rizvi, M.Asharaf, Effective Technical Communication, New Delhi, Tata McGraw Hill Publishibg Company, 2007. Murali Krishna and Sunitha Moishra, Communication Skills for Engineers. Pearson, New Delhi, 2011.

BMA101 MATHEMATICS -I

L	T	P	C
3	0	0	3

OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few numerical methods and Give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- Recognize that mathematics is an art as well as a powerful foundational tool of science with limitless applications.
- Demonstrate an understanding of the theoretical concepts and axiomatic underpinnings of mathematics and an ability to construct proofs at the appropriate level.

Course Outcomes:

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

CO1: Solve a set of algebraic equations representing steady state models formed in engineering problems

CO2: Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables

CO3: Find the trend information from discrete data set through numerical differentiation and summary information through numerical integration

CO4: Predict the system dynamic behavior through solution of ODEs modeling the system

CO5: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

CO6: Have the necessary proficiency of using MATLAB for obtaining the above solutions

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT-1 Matrices **9+3**

Characteristic equations-Eigen values and Eigen vector soft real matrix-Properties- Cayley - Hamilton theorem (Excluding proof) - Orthogonal transformation of a symmetric matrix to diagonalform-Quadraticform-Reductionofquadraticformtocanonicalformby orthogonal transformation.

UNIT-II Three Dimensional Analytical Geometry **9+3**

Equation of a Sphere- Plane section of a sphere- Tangent plane-Equation of cone- Right circular cone- Equation of a cylinder- Right circular cylinder.

UNIT-III Differential Calculus **9+3**

Curvature in Cartesian coordinates- Centre and radius of curvature- Circle of curvature-Evolutes-Envelopes-Applications of Evolutes and Envelopes.

UNIT-1V FunctionsofSeveral Variables **9+3**

Partialderivatives-Euler'stheoremforhomogeneousfunctions-Totalderivatives- Differentiation of implicit functions- Jacobians- Taylor's expansion- Maxima and Minima- Method of Lagrangian multipliers.

UNIT-V Multiple Integrals **9+3**

Double integration-Cartesian and Polar coordinates-Change of order of integration- Change of variables between Cartesian and Polar coordinates-Triple integration in Cartesian coordinates-Area as double integral-Volume as triple integral.

TOTAL NO OF PERIODS: 60

TEXTBOOKS:

1. Ravish R.SinghandMukkulBhatt,"EngineeringMathematics-I"FirstReprint,Tata McGraw Hill PubCo., NewDelhi.2011.
2. Grewal.B.S, "Higher Engineering Mathematics", 40thEdition, Khanna Publications, Delhi. 2007.

REFERENCES:

1. Ramana.B.V."Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, NewDelhi,2007.
2. GlynJames,"AdvancedEngineeringMathematics",7thEdition,PearsonEducation,2007.

BPH 101 ENGINEERING PHYSICS -I

L	T	P	C
3	0	0	3

OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few basic science technology and give procedures occurring in engineering and technology.
- Identify a problem and generate equivalent statements of a problem
- Apply fundamental statistical methods to analyze data

Course Outcomes:

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

CO1: To make a bridge between the physics in school and engineering courses.

CO2: To impart a sound knowledge on the basic concepts of modern sciences like engineering applications of Ultra-Sonics, lasers, fundamentals of crystal physics and utility of solar energy.

CO3: Draw sound conclusions from the results of data analysis.

CO4: Produce precise and clear expository written material about physics

CO5: Produce well-organized and clear oral presentations of physics material.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry

4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT-I Ultra Sonics **9**

Introduction – Production- Magnetostriction Effect- Magnetostriction Generator- Piezoelectric Effect- Piezoelectric generator- Detection of ultrasonic waves- Properties- Cavitation- Acoustic grating -Industrial applications- Drilling, Welding, Soldering, Cleaning and SONAR- Velocity measurement- - Non-Destructive Testing (NDT) – Pulse-Echo System through transmission and reflection modes- A, B And C Scan Display methods- Important medical applications- Sonogram--problem.

UNIT-II LASER **9**

Introduction- Principle of spontaneous emission and stimulated emission- Einstien's A &B Coefficients-Derivation-Condition for producing a laser beam- Population inversion- Pumping-Resonance cavity- Types Of Lasers- ND-YAG- He-Ne- Co2 Lasers-Industrial applications-Heat treatment- Welding-Cutting-Medical applications-Laser surgery- Advantages & disadvantages-problem.

UNIT-III Quantum Physics **9**

Drawbacks with classical physics- Blackbody radiation: Max Planck theory and concept of energy quantization, deduction of Wien's displacement law, Raleigh-Jeans law – Matter waves- de Broglie wave length-photoelectric effect – Schrödinger equation (time-independent, and time-dependent equations)- wave functions and energy spectrum- application to particle in box-problem.

UNIT – IV Electromagnetic Theory **9**

Electric charges- Coulomb's law of inverse squares- Electric field and its calculations- field lines-Gauss's law-applications of Gauss law. Magnetism - Magnetic field- Magnetic field lines-Magnetic flux- Motion of charged particles in magnetic field- Magnetic field of a moving charge. Electromagnetic wave- speed of electromagnetic wave and its quantitative deduction -group velocity- energy in electromagnetic waves- electromagnetic waves in matters- problems.

Unit-V Crystal Physics **9**

Lattice- Unit Cell- Bravais Lattice- Lattice Plane- Miller Indices- d-Spacing in cubic lattices-Calculation of number of atoms per unit cell- Atomic radius- Coordination number- Packing Factor- SC,BCC, FCC, HCP Structures- Polymorphism and Allotropy- Crystal defects- point, line and surface defects- Burger's vector- problems.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Sears.F.W., Zemansky.M.W.,Young.H.D,;'University Physics; Narosa Publishing House.
2. Avadhanulu. M.N.; Engineering Physics-Vol-1; S.Chand And Company Ltd, 2010.

REFERENCE BOOKS:

1. Rajendran.V, And Marikani. A, 'Engineering Physics' Tata Mcgraw Hill Publications Ltd, 3rd Edition, New Delhi (2004).
2. Sears. Zemansky.,,Young.;'College Physics; Addison Wesley Publishing Company.
3. Mukundan. A, Usha.S., Lakshmi.V; 'Engineering Physics' Scitech Publications (India) Pvt.Ltd., Chennai, 2006.
4. Resnick, R., and Halliday, D. and Walker, J.; Fundamental of Physics; John Wiley and Sons.

BCH 101 ENGINEERING CHEMISTRY -I

L	T	P	C
3	0	0	3

OBJECTIVES:

- To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.
- To prepare graduates for employment as chemists, for graduate study in chemistry, or for acceptance to medical or dental school.
- To prepare graduates with the skills to critically assess and solve problems requiring the application of chemical principles.

Course Outcomes:

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

CO1: To make the student to be conversant with the principles, water characterization and treatment for portable and industrial purposes.

CO2: To impart knowledge on the essential aspects of Principles of polymer chemistry and engineering applications of polymers

CO3: To impart knowledge on the essential aspects of Principles electrochemistry, electrochemical cells, emf and applications of emf measurements

CO4: To make the students understand the Principles of corrosion and corrosion control

CO5: To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							

CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT I Water Technology **9**

Introduction-Characteristics : Hardness of water – types - temporary and permanent hardness - estimation by EDTA method Alkalinity – types of alkalinity - Phenolphthalein and Methyl orange alkalinity - determination –Domestic water treatment – disinfection methods (Chlorination, ozonation , UV treatment) Boiler feed water – requirements – disadvantages of using hard water in boilers Internal conditioning (Calgon Conditioning method) – External conditioning – Demineralization process – Desalination and Reverse osmosis.

UNIT II Polymers **9**

Introduction-Polymers- definition – polymerization – degree of polymerisation - types of polymerisation – Addition polymerization and Condensation polymerization – Mechanism of Polymerisation - free radical polymerization mechanism only, Plastics: Classification – thermoplastics and thermosetting plastics – difference between thermoplastics and thermosetting plastics - preparation, properties and uses of PVC, Teflon, nylon-6,6, PET, Rubber :Types – drawbacks of natural rubber -vulcanization of rubber - properties and uses of vulcanized rubber Synthetic rubbers – butyl rubber and SBR

UNIT III Electrochemistry **9**

Introduction CELLS : Types of Cells : Electrochemical cells , Electrolytic cells – Reversible and Irreversible cells EMF –measurement of emf – Single electrode potential – Nernst equation Reference electrodes : Standard Hydrogen electrode -Calomel electrode Ion selective electrode :Glass electrode and measurement of pH using Glass electrode Electrochemical series – significance Titrations :Potentiometer titrations (redox - Fe^{2+} vs dichromate titrations) Conducto metric titrations (acid-base – HCI vs, NaOHtitrations)

UNIT IV Corrosion and Corrosion Control **9**

Introduction: Chemical corrosion Definition - Chemical Corrosion - Electrochemical corrosion – different types – galvanic corrosion –differential aeration corrosion – mechanism of Chemical and Electrochemical corrosion factors influencing corrosion Corrosion control – sacrificial anode

and impressed cathodic current methods – Protective Coatings: Paints – constituents of the paint and their functions Metallic coatings – electroplating of Gold and electro less plating of Nickel.

UNIT V Non-Conventional Energy Sources and Storage Devices 9

Introduction : Nuclear fission and nuclear fusion reactions – differences between nuclear fission and nuclear fusion reactions – nuclear chain Reactions – nuclear energy critical mass - super critical mass - sub - critical mass 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 :Primary and secondary Batteries – differences between Primary and secondary Batteries Secondary batteries: Lead–acid storage battery –working –uses Nickel–cadmium battery - working –uses Solid – state battery : Lithium battery

TOTAL NO OF PERIODS: 45

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).
3. P. J. Lucia, M. Subhashini, "Engineering Chemistry, Volume 1", Crystal Publications, Chennai, (2007).

REFERENCES:

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

BCS101 FUNDAMENTALS OF COMPUTING AND PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches.
- Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems.
- Graduates will have a solid understanding of the theory and concepts underlying computer science.

Course Outcomes:

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

CO1: To enable the student to learn the major components of a computer system.

CO2: To know the correct and efficient way of solving problem.

CO3: To learn to use office automation tools.

CO4: To learn and write program in "C".

CO5: To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT I: INTRODUCTION TO COMPUTER **9**

Introduction - Characteristics of computer - Evolution of Computers - Computer Generations - Classification of Computers - Basic Computer Organization-Number system. Computer Software: Types of Software—System software-Application software-Software Development Steps

UNIT II: PROBLEM SOLVING AND OFFICE AUTOMATION **9**

Planning the Computer Program – Purpose – Algorithm – Flowcharts– Pseudo code Introduction to Office Packages: MS Word , Spread Sheet, Power Point, MS Access, Outlook.

UNIT III: INTRODUCTION TO C **9**

Overview of C-Constants-Variables-Keywords-Data types-Operators and Expressions - Managing Input and Output statements - Decision making- Branching and Looping statements.

UNIT IV: ARRAYS AND STRUCTURES **9**

Overview of C-Constants, Variables and Data types-Operators and Expressions -Managing Input and Output operators-Decision making-Branching and Looping.

UNIT V: INTRODUCTION TO C++ **9**

Overview of C++ - Applications of C++-Classes and objects-OOPS concepts -Constructor and Destructor- A simple C++ program –Friend classes and Friend Function.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Ashok, N.Kamthane,"Computer Programming", Pearson Education (2012).
2. AnitaGoel and Ajay Mittal,"Computer Fundamentals and Programming in C", Dorling V Kindersley(India Pvt Ltd).,Pearson Education in South Asia,(2011).
3. Yashavant P. Kanetkar, "Let us C",13thEdition, BPB Publications(2013).
4. Yashavant P. Kanetkar,"Let us C++"10th Edition, BPB Publications (2013).

REFERENCES:

1. Pradeep K.Sinha, Priti Sinha "Foundations of Computing", BPB Publications (2013).
2. Byron Gottfried, "Programming with C", 2nd edition, (Indian Adapted Edition), TMH publication.
3. PradipDey,ManasGhosh,Fundamentals of Computing and Programming in 'C' First Edition ,OxfordUniversity Press(2009)
4. The C++ Programming Language,4thEdition, BjarneStroustrop,Addison-Wesley Publishing Company(2013)

BME 102 ENGINEERING GRAPHICS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To develop graphical skills in students for communication of concepts, design ideas of engineering products, and expose them to existing standards related to technical drawings.
- To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches.
- Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems.
- Graduates will have a solid understanding of the theory and concepts underlying computer science.

Course Outcomes:

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

CO1: To visualize and produce two dimensional graphic representation of three dimensional objects and buildings.

CO2: To comprehend and visualize 3D views of objects.

CO3: To understand and generate the different curves used in engineering applications.

CO4: To learn and write program in "C".

CO5: To introduce the fundamental of CAD Graphics used in design.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							

Course Assessment methods

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT-I Basic Curves, Projection of points and Straight lines 9

Conics-construction of ellipse ,parabola and hyperbola by eccentricity method-construction of involutes of square and circle- Drawing often gent and normal to the above curves-Scales-Basic drawing conventions and standards-Orthographic projection principles-Principal planes-First angle projection- Projection of points. Projection of straightlines (only first angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method.

UNIT-II Projections of Planes and Solids 9

Projection of planes (Polygonal and circular surfaces) inclined to both the principal planes. Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method

UNIT-III Orthographic Projections, Isometric Projections and free hand sketching 9

Ortho graphic projection of Simplepartsfrom3Ddiagram-Principlesofisometric projection and isometric view-isometric scale-Isometric projections of simple solids and truncated solids- Prisms, pyramids, cylinders, cones.

UNIT- IV Development of surfaces 9

Sectioning of solid sin simple vertical position when the cutting plane sin clined to the one of the principal planes and perpendicular to the other-obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids-Prisms, pyramids cylinders and cones.

UNIT-V Perspective projection, building drawing and Computer aided drafting 9

Perspective projection of cubes and cylinders by visual ray method. Introduction-components of simple residential or office building-specifications-plan and elevation of different types of Residential buildings and office buildings. Introduction to drafting packages and basic commands used in AUTO CAD. Demonstration of drafting packages.

TOTAL NO OF PERIODS: 45

Text Books:

1. N.D.Bhattand V. M. Panchal,"Engineering drawing",charotar publishing house, 50thedition, 2010.
2. K.V.Natarajan"A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai,2009.

References

1. K.R.Gopalakrishna, "Engineering drawing",(Vol-I & II combined) Subhas stores, Bangalore, 2007.
2. K.Venugopal and V.PrabhuRaja, "Engineering Graphics", Newage International Private limited, 2008.
3. Luzzader, Warren.J., and Duff, John.M.,, "Fundamentals of Engineering Drawing with an introduction to Interactive computer graphics for design and production", Eastern economy edition, Prentice HallofIndiaPvtLtd,NewDelhi,2005.

BEE101 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P	C
2	0	0	2

Course Objective:

- To impart basic knowledge on electrical machines, principles and its operation.
- Be a practicing engineer in fields such as design, research, testing and manufacturing
- Engage in lifelong learning to maintain and enhance professional skills

Course Outcomes:

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

CO1: Outline the basics of electrical machines and analyze the characteristics of DC machines.

CO2: Understand and implement speed control techniques for practical applications.

CO3: Describe the working of transformer and assess its regulation and efficiency on load and no-load.

CO4: Know the working concept of different types of induction motor and analyze the operating

behavior of induction motor using its performance indices.

CO5: Explain the basics of synchronous machines and interpret performance characteristics.

CO6: Relate how different special electrical machines are functioning and have knowledge to choose particular machines for their applications.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S											
CO2	S	M										
CO3	S		M									
CO4	S											
CO5	S		M									
CO6												

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT– I D.C. AND A.C CIRCUITS 6

Ohm's law– Kirchhoff's Laws, V–I Relationship of Resistor(R) Inductor(L) and capacitor(C). Series parallel combination of R,L & C–Current and voltage source transformation– mesh current & node voltage method–super position theorem– Thevenin's and Norton's Theorem- Problems.

UNIT– II ELECTRICAL MACHINES 6

Construction, principle of operation, Basic Equations and applications-D. C. Generators and D.C. Motors**.** -Single phase Induction Motor- Single Phase Transformer.

UNIT– III BASIC MEASURMENT SYSTEMS 6

Introduction to Measurement Systems, Construction and Operating principles of PMMC, Moving Iron, Dynamometer Wattmeter, power measurement by three- watt meter and two watt method – and Energy meter

UNIT - IV – SEMICONDUCTOR DEVICES 6

Basic Concepts of semiconductor devices – PN Junction Diode Characteristics and its Application – HWR, FWR – Zener Diode – BJT (CB, CE, CC) configuration &its characteristics.

UNITV – DIGITAL ELECTRONICS **6**

Number system –Logic Gates– Boolean Algebra– De-Morgan's Theorem– Half Adder & FullAdder –Flip Flops.

TOTAL NO OF PERIODS: 30

TEXT BOOKS:

1. N.Mittle "Basic Electrical Engineering". Tata McGraw Hill Edition, New Delhi,1990.
2. A.K. Sawhney, 'A Course in Electrical &Electronic Measurements &Instrumentation', Dhanpat Raiand Co, 2004.
3. Jacob Millman and Christos C-Halkias, "Electronic Devices and Circuits", TataMcGraw Hill.

REFERENCE BOOKS:

1. EdministerJ.A."TheoryandproblemsofElectricCircuits"Schaum'sOutlineSeries.McGraw HillBook Compay, 2nd Edition, 1983.
2. Hyatt W.Hand KemmerlayJ.E. "Engineering Circuit Analysis", McGraw Hill International Editions,1993.
3. D. P. Kothari and I. J. Nagrath "Electric machines" Tata McGraw-HillEducation,2004
4. Millman and Halkias, "Integrated Electronics", Tata McGraw HillEdition,2004.

BCS1L1 COMPUTER PRACTICES LABORATORY

L	T	P	C
0	0	3	1

OBJECTIVES:

- To develop graphical skills in students for communication of concepts, design ideas of engineering products, and expose them to existing standards related to technical drawings.
- To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches.
- Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems.

Course Outcomes:

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

CO1: To visualize and produce two dimensional graphic representation of three dimensional objects and buildings.

CO2: To comprehend and visualize 3D views of objects.

CO3: To understand and generate the different curves used in engineering applications.

CO4: To learn and write program in "C".

CO5: To introduce the fundamental of CAD Graphics used in design.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	W					M	M		
CO2	S	M	W	W					M	M		
CO3		M							M	M		
CO4	M			W					M	M		
CO5					S				M	M		

Course Assessment methods:

DIRECT		INDIRECT	
1.	Lab Records & Observation Books	**1.**	Students Exit Survey
2.	Model Exam	**2.**	Faculty Survey
3.	End Semester Exam	**3.**	Industry
		4.	Alumni

LIST OF EXPERIMENTS

A) Word Processing **11**

Document creation, Text manipulation with Scientific Notations.
Table creation, Table formatting and Conversion.
Mail merge and Letter Preparation. Drawing-Flow Chart

B) Spread Sheeet **12**

Chart – Line, XY, Bar and Pie.
Formula – Formula Editor.
Spread Sheet-Inclusion of Object, Picture and Graphics, Protecting the document and sheet.
Sorting and Import / Export features.

C) Simple C Programming * **11**

Data types, Expression Evaluation, Condition Statements.
Arrays
Structures and Unions
Functions

D) Simple C++ Programming **11**

Classes and Objects

Constructor and Destructor

*For Programming exercises Flow chart and Pseudo code are essential

TOTAL NO OF PERIODS: 45

BEE1L1	BASIC ELECTRICAL AND ELECTRONICSENGG. PRACTICES LABORATORY	L	T	P	C
		0	0	3	1

Course Objective:

- To impart basic knowledge on electrical machines, principles and its operation.
- Be a practicing engineer in fields such as design, research, testing and manufacturing
- Engage in lifelong learning to maintain and enhance professional skills

Course Outcomes:

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

CO1: Outline the basics of electrical machines and analyze the characteristics of DC machines.

CO2: Understand and implement speed control techniques for practical applications.

CO3: Describe the working of transformer and assess its regulation and efficiency on load and no-load.

CO4: Know the working concept of different types of induction motor and analyze the operating behavior of induction motor using its performance indices.

CO5: Explain the basics of synchronous machines and interpret performance characteristics.

CO6: Relate how different special electrical machines are functioning and have knowledge to choose particular machines for their applications.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M			M					M	M		
CO2	M		W						M	M		
CO3	M		W						M	M		
CO4	M		M						M	M		

Course Assessment methods:

DIRECT		INDIRECT	
1.	Lab Records & Observation Books	**1.**	Students Exit Survey
2.	Model Exam	**2.**	Faculty Survey
3.	End Semester Exam	**3.**	Industry

		4.	Alumni

LIST OF EXPERIMENTS

I - List of Experiments for Electrical Engineering Lab

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

I - List of Experiments for Electronics Engineering Lab

1. Study of electronic components and equipments.
   A. Resistor colour coding using digital multi-meter.
   B. Assembling electronic components on bread board.
2. Measurement of a signal parameters using cathode ray oscilloscope and function generator.
3. Soldering and desoldering practice.
4. Verification of logic gates (OR, AND, OR, NOT, NAND, EX-OR).
5. Implementation of half adder circuit using logic gate

BEN201 ENGLISH II

L	T	P	C
3	1	0	3

Objective:

To make them master the techniques of professional communication so that they become employable after completing the course

Course Outcomes:

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

CO1: To make them master the techniques of professional communication so that they become employable after completing the course

CO2: Students will be able to engage in informal writing assignments (i.e. reader response, free writing, focused free writing, prediction, response journals, dialectical notebook entries, and other pieces of writing that they do not take through the entire writing process).

CO3: Students will be able to engage in formal writing assignments that require utilization of all stages of the writing process.

CO4: Students will be able to choose and use a relevant pre-writing strategy that will help them to prepare for the assignment.

CO5: Students will be able to write several rough drafts of a paper to revise clarity and depth of content or to edit style and mechanics.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT I Orientation **9 + 3**

Numerical adjectives - Meanings in context - Same words used as different parts of speech - Paragraph writing - Non- verbal communication - Regular and Irregular verbs.

UNIT II Oral Skill **9 + 3**

Listening to audio cassettes - C.Ds , News bulletin - Special Lectures, Discourse - Note taking - Sentence patterns - SV, SVO, SVC, SVOC, SVOCA - Giving Instructions - Reading Comprehension and answering questions, Inferring meaning.

UNIT III Thinking Skill **9 + 3**

Self- introduction - Describing things - Group Discussion – Debate - Role play – Telephone etiquette – Recommendations and suggestions – Sequencing jumbled sentences to make a paragraph - advertisement and notices, designing or drafting posters, writing formal and informal invitations and replies.

UNIT IV Writing Skill **9 + 3**

Definitions - Compound nouns - Abbreviations and acronyms - business or official letters(for making enquiries, registering complaints, asking for and giving information, placing orders and sending replies): (b) letters to the editor(giving suggestions on an issue) .

UNIT V Formal Information **9 + 3**

Editing – Prepositions - Articles - Permission letter for undergoing practical training , Essay writing - Application for a job , letter to the principal authorities regarding admissions, other issues, requirement or suitability of course etc.

TOTAL NO OF PEROIDS: 60

TEXT BOOKS:

1. Meenakshi Raman, Sangeetha Sharma , Technical English for Communication: Principle and Practice, OUP, 2009.

REFERENCES:

1. Sumanth , English for engineers, Vijay Nicole , Imprints pvt ltd.2013.
2. Meenakshi Raman and Sangeetha Sharma , Technical Communication Principles and Practice, Oxford University Press, 2009
3. Sangeetha Sharma, Binodmishra , Communication skills for engineers and scientists , PHI Learning Pvt Ltd, New Delhi, 2010.

BMA201 MATHEMATICS -II

L	T	P	C
3	0	0	3

OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology.
- Recognize that mathematics is an art as well as a powerful foundational tool of science with limitless applications.
- Demonstrate an understanding of the theoretical concepts and axiomatic underpinnings of mathematics and an ability to construct proofs at the appropriate level.

Course Outcomes:

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

CO1: Solve a set of algebraic equations representing steady state models formed in engineering problems

CO2: Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables

CO3: Find the trend information from discrete data set through numerical differentiation and summary information through numerical integration

CO4: Predict the system dynamic behavior through solution of ODEs modeling the system

CO5: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

CO6: Have the necessary proficiency of using MATLAB for obtaining the above solutions

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT I Ordinary Differential Equation 9+3

Higher order linear differential equations with constant coefficients –Method of variation of parameters –Cauchy's and Legendre's linear equations-simultaneous first order linear equations with constant coefficients.

UNIT II Vector Calculus 9+3

Gradient, divergence and curl–Directional derivatives –Irrotational and solenoid vector fields– vector integration– Green's theorem in a plane , Gauss divergence theorem and Stokes theorem (without proofs) – simple applications in solving cubes and rectangular parallelepipeds.

UNIT III Analytic Functions 9+3

Functions of a complex variable– Analytic functions– Necessary conditions, Cauchy-Riemann equation and sufficient conditions(without proofs)–Harmoni can dorthogonal properties of analytic functions– Harmonic conjugate– construction of analytic functions– conform alma ping: W= Z+C,CZ, 1/Zandbi linear transformation.

UNIT IV Complex Integration **9+3**

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

UNITV Statistics **9+3**

Mean Median, Mode– Moments– Skewness and Kurtosis– Correlation– Rank Correlation– Regression– Chisquaretest for conting encytables.

TOTAL NO OF PERIODS: 60

TEXTBOOKS:

1. R.M.KannanandB.Vijayakumar"EngineeringMathematics– II "2ndEdition, SRBPublication, Chennai2007.
2. Bali.N.PandManishGoyal, "EngineeringMathematics", 3rdEdition, LaxmiPublications(p) Lltd,2008.
3. Grewal.B/S"HigherEngineeringMathematics", 40thEditon, KhannaPublications, Delhi, 2007.

REFERENCES:

1. Ramana.B.V, "HigherEngineeringMathematics", TataMcGrawHillPublishingCompany, NewDelhi, 2007.
2. Gupta S C, and V K .Kapoor, "Fundamentals Mathematical Statistics", 11thedition, Sultan ChandSons, NewDelhi, 2014.

BPH 201 **ENGINEERING PHYSICS -II**

L	T	P	C
3	0	0	3

OBJECTIVES:

- This course aims at providing the necessary basic concepts of a few basic science technology and give procedures occurring in engineering and technology.
- Identify a problem and generate equivalent statements of a problem
- Apply fundamental statistical methods to analyze data

Course Outcomes:

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

CO1: To make a bridge between the physics in school and engineering courses.

CO2: To impart a sound knowledge on the basic concepts of modern sciences like engineering applications of ultra-Sonics, lasers, fundamentals of crystal physics and utility of solar energy.

CO3: Draw sound conclusions from the results of data analysis.

CO4: Produce precise and clear expository written material about physics
CO5: Produce well-organized and clear oral presentations of physics material.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT – I Conducting Materials **9**

Classical Free Electron Theory of Metals- Drawback of Classical Theory–Wiedemann Franz Law- Density of States- Fermi-Dirac Statistics- Calculation of Fermi Energy and Its Importance- High Resistivity Alloys– Super Conductors– Properties and Applications–Magnetic Levitation, SQUIID, Cryotron.

UNIT – II Semiconducting Materials **9**

Elemental and Compound Semiconductors and Their Properties-Carrier Concentrations (Electrons and Holes) In Intrinsic Semiconductors- Carrier Concentration sin N- Type and P-Type Semiconductors– Variation of Fermi Level and Carrier Concentration With Temperature-Variation of Conductivity With Temperature– Band Gap Determination– Hall Effect – Experimental Arrangement- Application.

UNIT-III Magnetic and Dielectric Materials **9**

Different Type of Magnetic Material and Their Properties– Hard And Soft Magnetic Material– Domain Theory Of Ferromagnetism– Hysteresis– Energy Product of Magnetic Materials–Ferrites and Their Applications– Various Polarization Mechanisms In Dielectric– Frequency and Temperature Dependence– Internal Field and Detection of Classius– Mosotti Equation– Dielectric Loss-Dielectric Breakdown.

UNIT- IV New Engineering Material **9**

Shape memory Alloys- Types- General Characteristics- Applications– Metallic Glasses-Properties-Applications– transformer as Core Material– Nano Phase Materials– Properties–Production– Ball Milling Technique– Sol- Gel Method– Chemical Vapour Deposition -Applications.

UNIT-V Optical Materials and Optical Fibers **9**

Light Interaction with Solids- Classification of Optical Material–Optical Properties of Metals, Insulator and Semiconductors– Traps– Colour Centers– Luminescence– phosphorescence– LED– LCD– Construction and Working– Advantages and Disadvantages– Applications. Principle and Propagation of Light In Optical Fibers- Numerical Aperture and Acceptance Angle-Types Optical Fibers (Material, Refractive Index, Mode based)- Double Crucible Technique of Fiber Drawing.

TOTAL NO OF PERIODS: 60

TEXTBOOKS:

1. "Science of engineering materials", by Dr. A. Mukunthan and S. Usha–Sci Tech publications (india) Pvt Ltd; chennai, (2007).

2. Charless Kittel 'introduction to solid state physics', john wiley & sons, 7th edition, singapore

REFERENCEBOOKS

1. Material science by r.suresh, v. jayakumar– lakshmi publications; arapakkam (2006).
2. Material science by Dr. P. K. Palanisamy– Scie tech publications (india) Pvt Ltd, Chennai (2006).
3. RajendranVand Marikania, 'material science' tata mcgraw hill publications Ltd,3rd edition, newdelhi (2004).
4.M.Arumugam,'material science', anuradha publications, kumbakonam(2006).

BCH 201 ENGINEERING CHEMISTRY -II

L	T	P	C
3	0	0	3

Objectives:

- To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.
- To prepare graduates for employment as chemists, for graduate study in chemistry, or for acceptance to medical or dental school.

- To prepare graduates with the skills to critically assess and solve problems requiring the application of chemical principles.

Course Outcomes:

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

CO1: To make the student to be conversant with the principles, water characterization and treatment for portable and industrial purposes.

CO2: To impart knowledge on the essential aspects of Principles of polymer chemistry and engineering applications of polymers

CO3: To impart knowledge on the essential aspects of Principles electrochemistry, electrochemical cells, emf and applications of emf measurements

CO4: To make the students understand the Principles of corrosion and corrosion control

CO5: To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT- I Surface Chemistry **9**

Introduction**:** Adsorption, absorption, desorption, adsorbent, adsorb ate and sorption–(definition only) Differences between adsorption and absorption Adsorption of gases on solids–factors affecting adsorption of gases on solids– Adsorption isotherms– Frendlich adsorption isotherm and Langmuir adsorption isotherm Role of adsorbents in catalysis, Ion- exchange adsorption and pollution abatement.

UNIT-II Phase Rule and Alloys **9**

Introduction**:** Statement of Phase Rule and explanation of term sin solved– one component system – water system– Construction of phase diagram by thermal analysis- Condensedphaserule [Definition only] Two Component System :Simple eutectic systems (lead- silver system only)–eutectic temperature– eutectic composition– Pattin sons Process of desilverisation of Lead Alloys: Importance, ferrous alloys– nichrome and stainless steel– 18/8 stainless steel- heat treatment of steel– annealing–hardening– tempering- normalizing– carburizing- nit riding. Non-ferrous alloys: Brass and Bronze.

UNIT-III Analytical Techniques **9**

Introduction: Type of Spectroscopy -Atomic spectroscopy – molecular spectroscopy - Explanation I spectroscopy– principles– instrumentation (block diagram only)– applications- finger print region UV- visible spectroscopy— principle– instrumentation (block diagram only)– Beer- Lambert's law—estimation of iron by colorimetric– Atomic absorption spectroscopy- principle- instrumentation (block diagram only)- estimation of Nickel by Atomic absorption spectroscopy Flame photometry–principles– instrumentation (block diagram only)- estimation of sodiumion by Flame photometry.

UNIT-IV Fuels **9**

Introduction**:** Calorific value– types of Calorific value- gross calorific value– net calorific value Analysis of Coal– Proximate and ultimate analysis– hydrogenation of coal- Metallurgical coke– manufacture by Otto- Hoffmann method Petroleum processing and fractions– cracking–catalytic cracking– types– fixed bed catalytic cracking method- Octane number and Cetane number (definition only) Synthetic petrol– Bergius processes– Gaseous fuels- water gas, producer gas, CNG and LPG (definition and composition only) Flue gas analysis– importance- Orsatapparatus.

UNIT-V Engineering Materials **9**

Introduction: Refractories– classification– acidic, basic and neutral refractories–properties (refractoriness, refractor in essunder load, dimensional stability, porosity, thermal spalling) Manufacture of Refractories: alumina bricks and Magnesite bricks, Abrasives– natural and synthetic abrasives Natural type: Siliceous- quartz: Non– siliceous– diamond Synthetic Abrasives: silicon carbide and boron carbide. Lubricants: Liquid lubricants- Properties–viscosity index, flash and fire points, cloud and pour points, oilyness) Solid lubricants– graphite and molybdenum sulphide.

TOTAL NO OF PERIODS:45

TEXTBOOKS:

1. P.C.JainandMonicaJain,"EngineeringChemistry"DhanpatRaiPub,Co.,NewDelhi(2002).
2. S.S.Dara"AtextbookofEngineeringChemistry"S.Chand&Co.Ltd.,NewDelhi(2006).
3. P.J. Lucia, M. Subhashini,"EngineeringChemistry,Volume1", CrystalPublications,Chennai,(2007).

REFERENCES:

1. B.Sivasankar"EngineeringChemistry"TataMcGraw-HillPub.Co.Ltd, NewDelhi(2008).
2. B.K.Sharma"EngineeringChemistry"KrishnaPrakasanMedia (P) Ltd., Meerut(2001)

BCS 201 INTERNET PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches.
- Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems.
- Graduates will have a solid understanding of the theory and concepts underlying computer science.

Course Outcomes:

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

CO1: To enable the student to learn the major components of a computer system.
CO2: To know the correct and efficient way of solving problem.
CO3: To learn to use office automation tools.
CO4: To learn and write program in "C".
CO5: To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M		M	W							
CO2	M		M	M	S							
CO3	S	M		S	M							
CO4	S	M		M	M							
CO5	S	M		M	S							
CO6	S		M	M	S							

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni

5.	Online Test		
6.	End Semester Exam		

UNIT – I BASIC INTERNET CONCEPTS **6**

Internet principles-I Pad dressing- Internet Service Provider (ISP) - URL- Basic web concepts- World Wide Web (WWW)- Intranet and Extranet-Internet Protocols: HTTP, TCP, UDP, FTP, Telnet- Domain Name System (DNS)- E mail- Next generation internet.

UNIT-II WEB DESIGN BASICS **6**

Introduction to HTML– Structure of HTML Document– Tags- Headings– Links– Images – Lists – Tables– Forms– Frames- Style sheets and its types.

UNIT-III DYNAMIC HTML **6**

Introduction to Dynamic HTML- Object model and collections- Event model- Filters and transition- Data binding- Data control- Activex control.

UNIT-IV CLIENT AND SERVER SIDE PROGRAMMING **6**

VBScript & JavaScript: Introduction- Operators– Data type- Control structures- Looping– Classes and Objects– Arrays- Functions- Events- Example programs.

UNIT-V INTERNET APPLICATIONS **6**

Online database- functions of online database- Merits and Demerits- Internet Information Systems(IIS)- EDI applications in business and its types- Internet commerce- Types and Applications.

TOTAL NO OF PERIODS : 30

TEXT BOOKS:

1. Deitel, Deitel and Nieto, ‘’Internet and World Wide Web- How to program’’, Pearson Education Publishers, 5th edition, 2008.
2. Elliotte Rusty Harold, ‘’Java Network Programming’’, O’Reilly Publishers, 2010
3. Java Script: A Beginners Guide John Pollock 4thEdition, TMH Edition (2013)
4. VB Script Beginners Guide, Jyoti B.Giramkar, Create Space Independent Publishing (2014)

REFERENCES:

1.Krishnamoorthy & S.Prabhu, ‘’Internet and Java Programming’’, New Age International Publishers, 2010.
2.Thomno A.Powell, ’’The Complete Reference HTML and XHTML’’, fourth edition, Tata McGraw Hill, 2001
3. E Commerce Kamlesh K.Bajaj, DebjaniNag, Tata McGraw Hill, Second edition, 2010.

BBT102 BIOLOGY FOR ENGINEERS

L	T	P	C
2	0	0	2

Course Objectives:

The Students will be able to

- To understand the fundamentals of living things, their classification, cell structure and biochemical constituents.
- To apply the concept of plant, animal and microbial systems and growth in real life situations.
- To comprehend genetics and the immune system.
- To know the cause, symptoms, diagnosis and treatment of common diseases.
- To give a basic knowledge of the applications of biological systems in relevant industries.

Course Outcomes:

CO1: Student will understand the fundamentals of living things and their Classification.

CO2: Able to apply biological concept in real life situation.

CO3: basic knowledge in application of biological system in relevant industries.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S											
CO2		W	S		M							
CO3		M		S								

Course Assessment Method

Direct	Indirect
Internal Test	Student Exit Survey
Assignments	Faculty Survey
Seminar	Industry
Quiz	Alumni
Online Test	
End Semester Examination	

UNIT-I Introduction to Life **7**

Characteristics of living organisms-Basic classification-cell theory-structure of prokaryotic and eukaryotic cell-Introduction to biomolecules: definition-general classification and important

functions of carbohydrates-lipids-proteins-nucleic acids vitamins and enzymes-genes and chromosome.

UNIT-II Biodiversity **6**

Plant System: basic concepts of plant growth-nutrition-photosynthesis and nitrogen fixation-Animal System: elementary study of digestive-respiratory-circulatory-excretory systems and their functions-Microbial System: history-types of microbes-economic importance and control of microbes.

UNIT-III Genetics and Immune System **5**

Evolution: theories of evolution-**Mendel's** cell division**–**mitosis and meiosis-evidence of e **laws of inheritance**-variation and speciation- nucleic acids as a genetic material-central dogma immunity-antigens-antibody-immune response.

UNIT-IV Human Diseases **4**

Definition- causes, symptoms, diagnosis, treatment and prevention of diabetes, cancer, hypertention, influenza, AIDS and Hepatitis.

UNIT-V Biology and its Industrial Application **8**

Transgenic plants and animals-stem cell and tissue engineering-bioreactors-biopharming-recombinant vaccines-cloning-drug discovery-biological neural networks-bioremediation-biofertilizer-biocontrol-biofilters-biosensors-biopolymers-bioenergy-biomaterials-biochips-basic biomedical instrumentation.

TOTAL NO OF PERIODS: 30

TEXT BOOKS:

1. A Text book of Biotechnology, R.C.Dubey, S. Chand Higher Academic Publications, 2013.
2. Diseases of the Human Body, Carol D. Tamparo and Marcia A. Lewis, F.A. Davis Company, 2011.
3. Biomedical instrumentation, Technology and applications, R. Khandpur, McGraw Hill Professional, 2004.

REFERENCE:

1. Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis, 2011.

BME203 BASIC MECHANICAL ENGINEERING

L	T	P	C
2	0	0	2

Course Objectives:

- The program educational objectives (PEOs) for the mechanical-engineering program are to educate graduates who will be ethical, productive, and contributing members of society.

- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

Course Outcomes:

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

CO1: Ability to apply knowledge of mathematics, science, and engineering

CO2: Ability to design and conduct experiments, as well as to analyze and interpret data.

CO3: To provide basic Knowledge of basic manufacturing process.

CO4: Ability to function on multi-disciplinary teams

CO5: Ability to identify, formulate, and solve engineering problems

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S			M								
CO2		S	M									
CO3	M		W									
CO4	M											
CO5	S		M									

Course Assessment methods:

DIRECT		INDIRECT	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT-I Energy Resources and Power Generation **6**

Renewable and Non- renewable resources-solar, wind geothermal, steam, nuclear and hydel power plants- Layout, major components and working. Importance of Energy storage, Environmental constraints of power generation using fossil fuels and nuclear energy.

UNIT-II IC Engines **6**

Classification, Working principles of petrol and diesel engines-two stroke and four stroke cycles, functions of main components of IC Engine. Alternate fuels and demission control.

UNIT-III Refrigeration and Air-Conditioning System **6**

Terminology of Refrigeration and Air-Conditioning, Principle of Vapour Compression& Absorption system- Layoutoftypicaldomesticrefrigerator-window&Splittyperoomairconditioner.

UNIT-IV Manufacturing Processes **6**

Brief description of Mould is making and casting process, Metal forming, Classification types of forging, forging operations, Brief description of extrusion, rolling, sheet forging, and drawing. Brief description of welding, brazing and soldering. Principal metal cutting processes and cutting tools, Brief description of Centre lathe and radial drilling machine.

UNIT-V Mechanical Design **6**

Mechanical properties of material-Yield strength, ultimate strength, enduran celimit etc., Stress-Strain curves of materials. Stresses induced in simple elements. Factor of safety-Design of Shafts and belts. Types of bearings and its applications. Introduction to CAD/ CAM/ CIM & Mechatronics. **TOTAL NO OF PERIODS : 30**

TEXTBOOK:

1.T. J. Prabhuetal, "Basic Mechanical Engineering", Sci tech Publications (p) Ltd, 2000

REFERENCES:

1. NAGPAL, G. R, "Power plant Engineering", Khanna Publishers, 2004.
2. RAO.P. N, "Manufacturing Technology", Tata Mc Graw- Hill Education, 2000.
3. Kalpakjian, "Manufacturing Engineering and Technology", Adisso Wesley publishers, 1995.
4. Ganesan.V, "Internal combustion engines", Tata Mc Graw- Hill Education, 2000.
5. C. P. Arora, "Refrigeration and Air Conditioning", Tata McGraw- Hill Education, 2001.
6. V. B. Bhandari, "Design of Machine elements", Tata McGraw- Hill Education, 2010.

BCE201 BASIC CIVIL ENGINEERING

L	T	P	C
2	0	0	2

Course Objective:

- To impart basic knowledge on electrical machines, principles and its operation.
- Fulfilling lives by pursuing professional licensure, advanced studies, or alternate career paths.
- Meaningful work by applying their strong Civil Engineering, business, leadership, and communication skills to meet the expectations of their employers.
- Responsible citizenship by serving the Civil Engineering profession and their community locally, nationally, and internationally.

Course Outcomes:

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

CO1: Ability to apply knowledge of mathematics, science, and engineering
CO2: Ability to design and conduct experiments, as well as to analyze and interpret data
CO3: Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
CO4: Ability to function on multidisciplinary teams.
CO5: Ability to identify, formulate, and solve engineering problems.
CO6: Understanding of professional and ethical responsibility

CO/PO Mapping												
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S											
CO2	S	M										
CO3	S		M									
CO4	S											
CO5	S		M									
CO6												

Course Assessment methods:

DIRECT		**INDIRECT**	
1.	Internal Test	**1.**	Students Exit Survey
2.	Assignment	**2.**	Faculty Survey
3.	Seminar	**3.**	Industry
4.	Quiz	**4.**	Alumni
5.	Online Test		
6.	End Semester Exam		

UNIT-I Basic Curves, Projection of points and Straight lines 9

Conics –construction of ellipse, parabola and hyperbola bye centricity method-construction of involutes of square and circle-Drawing of tangent and normal to the above curves-Scales-Basic drawing conventions and standards-Orthographic projection principles- Principal planes- First angle projection-Projection no points. Projection of straight lines(only first angle projections) inclined to both the principal planes- Determination of true lengths and true inclinations by rotating line method.

UNIT-II Projections of Planes and solids 9

Projection of planes(Polygonal and circular surfaces) in clined to both the principal planes. Projection of simple solids like prisms, pyramids, cylinder, and cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method

UNIT-III Ortho graphic Projections, Isometric projections & Freehand sketching 9

Ortho graphic projection of Simplepartsfrom3Ddiagram-Principlesofisometric projection and isometric view-isometric scale-Isomer trice projections of simple solids and truncated solids-Prisms, pyramids, cylinders, cones.

UNIT-IV Projection of Sectioned solids and development of surfaces 9

Sectioning of solids in simple vertical position when the cutting plane is in cloned to the one of the principal planes and perpendicular to the other-obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids-Prisms, pyramids cylinders and cones.

UNIT-V Perspective projection, building drawing and Computer aided drafting 9

Perspective projection of cubes and cylinders by visual ray method .Introduction- components of simple residential or office building-specifications-plan and elevation of different types of Residential building sand office buildings. Introduction to drafting packages and basic commands used in AUTO CAD. Demonstration of drafting packages.

TOTAL NO OF PERIODS:45

TEXTBOOKS:

1.N.D.BhattandV.M.Panchal,"Engineeringdrawing",charotarpublishinghouse,5th edition.

2.K.V.Natarajan"ATextbookofEngineeringGraphics",DhanalakshmiPublishers,Chennai,2009.

REFERENCES:

1. K.R.Gopala krishna,"Engineering drawing",(Vol-I&II combined)Subhasstores,Bangalore,2007.

2. .VenugopalandV.PrabhuRaja,"EngineeringGraphics",NewageInternationalPrivatelimited,2008.

3. Luzzader, Warren.J.,and Duff, John.M.,, "Fundamentals of Engineering Drawing with an introduction to Interactive computer graphics for design and production", Eastern economy edition, Prentice Hall of India PvtLtd,NewDelhi,2005.

BCS2L1 INTERNET PRACTICES LABORATORY

L	T	P	C
0	0	3	1

Objectives:

- To impart a sound knowledge on the principles of computers involving the different application oriented topics required for all engineering branches.
- Graduates will demonstrate the ability to apply knowledge of mathematics to develop and analyze computing systems.
- Graduates will have a solid understanding of the theory and concepts underlying

computer science.

Course Outcomes:

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

CO1: To enable the student to learn the major components of a computer system.

CO2: To know the correct and efficient way of solving problem.

CO3: To learn to use office automation tools.

CO4: To learn and write program in "C".

CO5: To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices

CO/PO Mapping												
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	W					M	M		
CO2	S	M	W	W					M	M		
CO3		M							M	M		
CO4	M			W					M	M		
CO5					S				M	M		

Course Assessment methods:

DIRECT		**INDIRECT**	
1.	Lab Records & Observation Books	**1.**	Students Exit Survey
2.	Model Exam	**2.**	Faculty Survey
3.	End Semester Exam	**3.**	Industry
		4.	Alumni

LIST OF EXPERIMENTS

1. HTML (Hypertext Mark-up Language):

Basics of HTML.

How to create HTML Document

Steps for creating a simple HTML Program.

a) Favorite Personality b) Resume Preparation

2. Advanced HTML: Advanced Topics of HTML

a) Time Table

b) Table Creation

3. JavaScript:

Script Basics.
Incorporating JavaScript into Web page.
a) Star Triangle
b) Temperature Converters

4. VBScript:
VBScript Basics.
Incorporating VBScript into HTML.
a) Changing Background Color
b) Simple Calculator

5. Web Design:
Inserting External Media in the Web Page.
a) Forms and Links
b) Frames with Links and Lists
To export a Dream weaver Document as XML File, checking entries, working in frames, window control, the jav
URL.

TOTAL NO OF PERIODS: 30

BCM2L1 BASIC CIVIL AND MECHANICALENGG. PRACTICES LAB

L	T	P	C
0	0	3	1

CO5: Ability to identify, formulate, and solve engineering problems

Course Objectives:

- The program educational objectives (PEOs) for the mechanical-engineering program are to educate graduates who will be ethical, productive, and contributing members of society.
- The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- The ability to apply principles of engineering, basic science, and mathematics to design and realize physical systems, components, or processes

Course Outcomes:

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

CO1: Ability to apply knowledge of mathematics, science, and engineering
CO2: Ability to design and conduct experiments, as well as to analyze and interpret data.
CO3: To provide basic Knowledge of basic manufacturing process.
CO4: Ability to function on multi-disciplinary teams

CO/PO Mapping												
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M			M					M	M		
CO2	M		W						M	M		
CO3	M		W						M	M		
CO4	M		M						M	M		
CO5	M		M	S					S	S		

Course Assessment Method			
DIRECT		**INDIRECT**	
1.	Lab Records & Observation Books	**1.**	Students Exit Survey
2.	Model Exam	**2.**	Faculty Survey
3.	End Semester Exam	**3.**	Industry
		4.	Alumni

LIST OF EXPERIMENTS

I. CIVILENGINEERING

PRACTICE Buildings:

Study of plumbing and carpentry components of residential and industrial buildings Safety aspects.

Plumbing Works:

a) Study of pipeline joint, its location and functions: valves,taps, couplings, unions, reducers, elbows in house hold fittings.
b) 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 connection of PVC pipes &G.I. Pipes–Mixed pipe material connection–Pipe connections with different joining components.
e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Hand tools and Power tools:

a) Study of the joints in roofs, doors, windows and furniture.
b) Hands-on-exercise: Wood work, joints by sawing, planning and cutting. c) Preparation of half joints, Mortise and Tenon joints.

II MECHANICALENGINEERINGPRACTICE

Welding:

Preparation of butt joints, lap joints and tee joints by arc welding.

Basic Machining:

a) SimpleTurningandTaperturning
b) Drilling Practice

Sheet Metal Work:

a) Forming&Bending:
b) Model making–Trays,funnels,etc.
c) Different type of joints.
d) Preparation of air-conditioning ducts.

Machine assembly practice:

a) Assembling, dismantling and Study of centrifugal pump
b) Assembling, dismantling and Study of air conditioner
c) Assembling, dismantling and Study of lathe.

TOTAL NO OF PERIODS :45

BPC2L1

PHYSICS AND CHEMISTRY LABORATORY

L	T	P	C
0	0	3	1

OBJECTIVES:

- To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.
- To prepare graduates for employment as chemists, for graduate study in chemistry, or for acceptance to medical or dental school.
- To prepare graduates with the skills to critically assess and solve problems requiring the application of chemical principles.

Course Outcomes:

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

CO1: To make the student to be conversant with the principles, water characterization and treatment for portable and industrial purposes.

CO2: To impart knowledge on the essential aspects of Principles of polymer chemistry and engineering applications of polymers

CO3: To impart knowledge on the essential aspects of Principles electrochemistry, electrochemical cells, emf and applications of emf measurements

CO4: To make the students understand the Principles of corrosion and corrosion control

CO5: To impart knowledge about the Conventional and non-conventional energy sources and energy storage devices.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M			M					M	M		
CO2	M		W						M	M		
CO3	M		W						M	M		
CO4	M		M						M	M		

Course Assessment methods:

DIRECT		INDIRECT	
1.	Lab Records & Observation Books	**1.**	Students Exit Survey
2.	Model Exam	**2.**	Faculty Survey
3.	End Semester Exam	**3.**	Industry
		4.	Alumni

LIST OFEXPERIMENTS– PHYSICS

1. Determination of particle size using laser
2. Determination of wavelength of laser light
3. Determination of numerical aperture and acceptance angle of an optical fiber
4. Study of photo electric effect
5. Determination of velocity of sound and compressibility of liquid-ultrasonic
6. Determination of wavelengths of mercury spectrum-spectrometer grating

II. LIST OFEXPERIMENTS– CHEMISTRY

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

BMA 301 MATHEMATICS – III

L	T	P	C
3	1	0	4

Course Objectives:

- Where and how PDEs arise in applications
- Fundamental concepts of PDE theory.
- Analytical methods for solving PDEs.
- Determine the existence, uniqueness, and well-posedness of solution of PDEs.
- Solve linear second order PDEs using canonical variables for initial-value problems, Separation of Variables and Fourier series for boundary value problems

Course outcomes:

CO1. Apply the fundamental concepts of Ordinary Differential Equations and Partial Differential Equations and the basic numerical methods for their resolution.

CO2. Solve the problems choosing the most suitable method.

CO3. Understand the difficulty of solving problems analytically and the need to use numerical approximations for their resolution.

CO4. Use computational tools to solve problems and applications of Ordinary Differential Equations and Partial Differential Equations.

CO5. Formulate and solve differential equation problems in the field of Industrial Organization Engineering.

CO6. Use an adequate scientific language to formulate the basic concepts of the course.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								M
CO2	S	S		S								M
CO3	S	M		S						S		M
CO4	S	S		S								M
CO5	S	S		M								M
CO6	S	M		S								M

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I

PARTIAL DIFFERENTIAL EQUATIONS **12**

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

UNIT-II

FOURIER SERIES **12**

Dirchlet's conditions - General Fourier Series - Half Range and Cosine series - Parseval's identity - Harmonic Analysis

UNIT-III

BOUNDARYVALUE PROBLEMS **12**

Classification of second order linear partial differential equations – Solutions of cone - Dimensional wave equations, one-dimensional heat equations

UNIT-IV

LAPLACE TRANSFORM **12**

Transforms of simple functions - Basic operational properties - Transforms of derivatives and integrals - Initial and Final value theorems - Inverse transforms - Convolution theorem - Periodic functions - Applications of Laplace Transforms for solving linear ordinary differential equations up to second order with constant coefficients and simultaneous equations for first order with constant coefficients

UNIT-V

FOURIER TRANSFORMS **12**

Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms - Properties - Transforms of simple functions -Convolution theorem - Parseval's identity.

TOTAL NO OF PERIODS: 60

TEXT BOOKS:

1. Kreyszig. E, "Advanced Engineering Mathematics", 8th Edition, John Wiley and Sons (Asia) Pvt. Ltd., Singapore 2000.
2. Grewat B.S., "Higher Engineering Mathematics", 35th Edition, Khanna Publishers, Delhi 2000.

REFERENCES:

1. Kandasamy P, Thilgavathy K. and Gunavathy K, "Engineering Mathematics, Vol. II and III", 4th Revised Edition, S. Chand & Co., New Delhi 2001.
2. Narayanan S, Manicavachagam Pillay, T.K, Ramanaiah G, "Advanced Mathematics for Engineering Students, Vol. II and III", 2nd Edition, S, Viswanathan Printers & Publishers Pvt Ltd, 1992.
3. Venkataraman M. K., "Engineering Mathematics, Vol. III - A & B", 13th Edition, 1998.

BCS301 **DATA STRUCTURES**

L	T	P	C
3	0	0	3

Course Objectives:

This course demonstrates familiarity with major algorithms and data structures and analyzes performance of algorithms. It is used to choose the appropriate data structure and algorithm design method for a specified application and determine which algorithm or data structure to use in different scenarios

Course Outcomes:

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

CO1: Explain the basic data structures and its operations.
CO2: Explain the concept of time complexity and space complexity.
CO3: Identify an appropriate data structure for a problem.
CO4: Make use of basic data structures to solve problems.
CO5: Summarize various searching and sorting algorithms.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		S								
CO3	S	M		S						S		
CO4	S	S		S								
CO5	S	S		M								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION: Data objects and structures- The linear list data structure-Array Representation- Vector Representation – Performance analysis- Space complexity – Time complexity.

UNIT II **9**

DATA REPRESENTATION: Singly linked list– Circular lists- Doubly liked list – Stacks – Abstract Data Type – Array Representation – Linked representation – Queues.

UNIT III **9**

BINARY AND OTHER TREES: Trees – Binary trees – Properties of binary trees – Representation of binary trees – Binary tree traversal – Priority queues- Linear lists – Heap –

Binary search tree- Binary search tree implementations –AVL trees -Graph – Graph search methods.

UNIT IV **9**

THE GREEDY METHOD: Optimization problems – Greedy method – Applications – Divide and conquer - The method – Applications – Lower bounds on complexity.

UNIT V **9**

DYNAMIC PROGRAMMING: The method – Applications – Backtracking - The method – Applications – Branch and bound - The method – Applications.

TEXT BOOK:

1. SartajSahni, "Data Structures, Algorithms and Applications in C++", Second Edition, Universities Press.2005.

REFERENCES:

1. Horowitz, Sahni, Mehta, "Fundamentals of Data Structures in C++", 2nd Edition, Universities Press, 2007.
2. A.V.Aho, Hopcroft, Ullman, "Data Structures & Algorithms", Pearson Education, 2005.

BCS302 SYSTEM MODELLING AND SIMULATION

L	T	P	C
3	0	0	3

Course Objectives:

The overall aim of the course is to provide an understanding of methods, techniques and tools for modeling, simulation and performance analysis of complex systems such as communication and computer networks.

Course Outcomes:

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

CO1: Define basic concepts in modeling and simulation (M&S)

CO2: Classify various simulation models and give practical examples for each category

CO3: Construct a model for a given set of data and motivate its validity

CO4: Generate and test random number varieties and apply them to develop simulation models

CO5: Analyze output data produced by a model and test validity of the model

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	M	S	S								

CO3	S	S		S								
CO4	S	S	M	M								
CO5	S	S		S								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION TO SIMULATION

Advantages and disadvantages of simulation, areas of application, System environment, Components of a system. Discrete and continuous systems, model of a system. Types of models. Steps in a simulation study, simulation examples: simulation of queuing systems, simulation of inventory systems. Discrete event simulation, general principles and computer simulation languages. FORTRAN, SIMSCRIPT, GPSS.

UNIT-II **9**

STATISTICAL MODELS IN SIMULATION

Review of terminology and concepts. Useful statistical models, discrete distributions, continuous distributions. Poisson process, Empirical distributions, Queuing models: Characteristics of queuing systems, queuing notations. Transient and steady state behaviour of queues, steady-state behaviour of infinite population, Markovan models, Steady state behaviour of finite population models.

UNIT-III **9**

INVENTORY SYSTEMS

Measures of effectiveness, inventory policies, deterministic systems probabilistic systems, simulation in inventory analysis. Random number generation. Properties of random numbers. Generation of pseudo-random numbers. Tests for random numbers. Random variate generation: Inverse transform technique, Direct transform for the normal distribution, convolution method. Acceptance-Rejection technique.

UNIT-IV **9**

INPUT DATA ANALYSIS

Data Collection, Identifying the distribution, Parameter estimation, Goodness-of-fit tests, Verification and validation of simulation models: Models Building, calibration and validation of models.

UNIT-V **9**

OUTPUT ANALYSIS FOR A SINGLE MODEL

Stochastic nature of 0/1 data, types of simulations with respect to O/P analysis, Measures of performance and their estimation, O/P analysis for terminating simulations, O/P analysis for steady-state simulations.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1) Jerry Banks, Carson. J.S., and Nelson B.L., "Discrete Event System Simulation", Prentice Hall of India, New Delhi, 2006.

2) Karian, Z. A., Dudewicz, E. J. (112121), "Modern statistical systems, and GPSS simulation: the first course", W. H. Freeman and Company, New York, 2005.

REFERENCES

1.System Modelling and Simulation , V.P.Singh, New Age International Publishers,2009

BCS303 **COMPUTER ORGANIZATION AND ARCHITECTURE**

L	T	P	C
3	0	0	3

Course Objectives:

- To have a thorough understanding of the basic structure and operation of a digital computer. To discuss in detail the operation of the arithmetic unit including the algorithms & implementation of fixed-point and floating-point addition, subtraction, multiplication & division.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.
- To study the hierarchical memory system including cache memories and virtual memory.

Course Outcomes:

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

CO1: Explain the organization and working principle of computer hardware components.

CO2: Explain the hierarchical memory system and data transfer with in a digital computer.

CO3: Outline the operation of arithmetic unit

CO4: Summarize the execution sequence of an instruction through the processor
CO5: Explain the ways of communication between a processor and I/O devices.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S			S					S		
CO2	S	M			S					M		
CO3	S	S			S					S		
CO4	S	S			M					S		
CO5	S	S			S					S		

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I
ARCHITECTURE FUNDAMENTALS **9**
Functional units – CPU Registers–CPU Organization-Different Types of Memory-Memory Hierarchy- Memory operations –Instruction Format – Addressing modes – Basic I/O operations-Evaluating CPU Performance.

UNIT-II
CPU ARCHITECTURE **9**
Instruction sets of different machines –Parallel Processing- Flynn's Classification- Pipelining-Arithmetic Pipeline-Instruction Pipeline- -Pipelining Hazards- CISC Vs RISC - Super Scalar Architecture.

UNIT-III
MEMORY SYSTEM **9**
Basic concepts – Semiconductor RAMs – ROMs – Speed – size and cost –Cache Memory-Mapping Techniques-Virtual memory-Evaluating Memory Performance-Secondary Storage-Multiprocessor.

UNIT-IV
I/O ORGANIZATION **9**

Input-Output, Interface-I/O Performance Measures-I/O Modes of Transfer-Direct Memory Access-Input Output Processor-Interfacing to different types of I/O devices.

UNIT-V

PARALLEL ARCHITECTURE **9**

Data flow –Static Dataflow-Dynamic Dataflow-Dataflow Graph-Vector Processors – CRAY-1 Vector Processor-EPIC.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.David A. Patterson and John L. Hennessy, "Computer Architecture-A Quantitative Approach", Elsevier, a division of reed India Private Limited, 5thedition, 2012

2. M. Mano, "Computer System Architecture", Third Edition, Pearson Education,2008.

REFERENCE BOOKS:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, "Computer Organization",McGraw-Hill, 5th Edition, Reprint 2012
2. Ghosh T. K., "Computer Organization and Architecture", Tata McGraw-Hill,3rd Edition, 2011
3. John P. Hayes, "Computer Architecture and Organization", Tata McGraw Hill,3rd Edition, 1998
4. BehroozParahami, "Computer Architecture", Oxford University Press, 8th Impression,2011

BCS304	DIGITAL COMPUTER FUNDAMENTALS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVE:

- To get a basic understanding of how circuits and systems are designed with digital electronic circuit elements.
- To be able to analyze and design circuits and systems made from digital electronic circuit elements such as gates and flip-flops.
- To master basic design and programming of simple computers

Course Outcomes:

CO1: Perform arithmetic operations in any number system.

CO2: Simplify the Boolean expression using K-Map and Tabulation techniques.

CO3: Use Boolean simplification techniques to design a combinational hardware circuit.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		S								
CO3	S	M		S						S		

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I

NUMBER SYSTEMS AND CODES **9**

Review of binary, octal and Hexa decimal representations of numbers and their conversion, Binary arithmetic; conversion algorithms. Weighted binary codes. Non weighted binary codes error-detecting and error-correcting codes-Alphanumeric codes.

UNIT-II

BOOLEAN ALGEBRA **9**

Introduction to Boolean algebra- The AND, OR and not operations. Laws of Boolean algebra. Minimization of Boolean expressions. Boolean expressions and logic diagrams. Universal building blocks. Negative logic.

COMBINATIONAL LOGIC

Truth tables and maps. Sum of products and product of sums; Map reduction hybrid functions. Incompletely specified functions. Multiple- Output minimization. Variable- Entered maps. Tabular minimization. analysis of logic schematics. Synthesis of combinational functions.

UNIT-III

LOGIC FUNCTION RELIZATION WITH MSI CIRCUITS **9**

Multiplexers, De-multiplexers, Decoders and code converters. Arithmetic circuits, Adder, Number complements. Subtracting positive binary numbers with adders. Signed number addition and subtraction

UNIT-IV

SYNCHORONOUS SEQUENTIAL CIRCUITS **9**

Basic latch circuits, De-bouncing switch. Flip-flops, truth table and excitation table. Shift registers. Asynchronous and synchronous counters. Shift counters.

UNIT-V

ASYNCHRONOUS SEQUENTIAL CIRCUITS **9**

Analysis and Design of Asynchronous Sequential Circuits , Reduction of State and Flow Tables ,Race-free State Assignment, Hazards.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. T. L Floyd & Jain, "Digital fundamentals", Pearson Education,3rd edition,2011.

2. Morris Mano M., "Digital Logic and Computer Design", Pearson Education,2010.

REFERENCE BOOKS:

1. Heiser Man, "Digital IC applications", Pearson Education,2007.

2. Raj Kamal, "Digital Systems Principles and Design", Pearson Education, First Edition, 2007.

3.CharlesH.Roth, Jr. and Larry L. Kinney, "Fundamentals of Logic Design", CL Engineering, 7th Edition, 2013.

4.WilliamH.Gothmann, "Digital electronics: an introduction to theory and practice",Prentice-Hall,2006 .

BEC305 ELECTRONIC CIRCUITS

L	T	P	C
3	0	0	3

Course Objectives:

- An understanding of basic EE abstractions on which analysis and design of electrical and electronic circuits and systems are based, including lumped circuit, digital and operational amplifier abstractions.
- The capability to use abstractions to analyze and design simple electronic circuits.
- The ability to formulate and solve the differential equations describing time behavior of circuits containing energy storage elements.

Course Outcomes:

CO1: Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistor

CO2: Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, and the node method

CO3: Appreciate the consequences of linearity, in particular the principle of superposition.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	M		S						S		
CO3	S	S	M	S								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I
INTRODUCTION **9**
Electronic Devices-Semi conductor- PN junction diode -BJT-FET IC fabrication.

UNIT II
AMPLIFIER CIRCUITS AND SYSTEMS **9**
Basic amplifier stages of Low frequencies - Frequency response of amplifiers-Concept of feedback-Properties of negative feedback amplifiers.

UNIT III
OPERATIONAL AMPLIFIER **9**
Architecture and characteristics - Parameters-Basic Operational amplifier applications- BIFET - BIMOS and MOS operational amplifier.

UNIT IV
WAVE FORM GENERATOR AND WAVE SHAPING **9**
Sinusoidal Oscillators-Crystal Oscillators - Multivibrators - Comparators-Schmitt Trigger-square wave and triangular wave generation-Pulse generation-555 IC timer-Modulation of a square wave-Series regulator- Monolithic Voltage regulator.

UNIT V
SIGNAL CONDITIONING AND DATA CONVERSION **9**

Signals and signal processing-Sample and Hold systems-Analog MUX and DEMUX-D/A converter-A/D converters-Integrator and Differentiator-Electronic Analog computations-Active RC filter- Butterworth and Chebyschev filter-Analog multiplier.

TEXT BOOKS:

1. Milman and Halkias, "Integrated Electronics", McGraw Hill, 2010.
2. Electronic Devices and Circuits by Anil K.Maini,VarshaAgarwal,Wiley Publications,2009
3. Allen Mottershed, "Electronic Devices and Circuits ", Prentice-Hall of India,1996.

REFERENCE:

1. Electronic Fundamentals: Circuits,Devices and its Application by Thomas L.Floyd,United states Edition,2006.

BCS3L1 DATA STRUCTURES LABORATORY

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

CO1: Implement various basic data structures and its operations.
CO2: Implement various sorting and searching algorithms.
CO3: Implement various tree operations.
CO4: Implement various graphs algorithms.
CO5: Develop simple applications using various data structures.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							
CO2		S	S		S							
CO3		S	S		S							
CO4		S	S		S							
CO5		S	S		S							

Course Assessment methods:

Direct	Indirect
1.Observation book 2.Record book	1.Students Exit Survey 2.Faculty Survey

3.Model exam 4.End Semester exam	3.Industry 4.Alumni

List of Experiments:

1. Simple C++ programs -Control Structures -Functions - Aggregate data types-File handling
2. Implementation of-Lists, Stacks, Queues (Using Arrays, linked lists)-Trees - Searching and Sorting algorithms

TOTAL NO OF PERIODS: 30

BEC3L2 ELECTRONICS LABORATORY

L	T	P	C
0	0	4	2

Course Outcomes:

CO1: Able to make comprehensive use of the technical knowledge gained from previous courses.

CO2: Able to function as a mock laboratory technician in the electronics industry who is expected to design, builds, and test electronic circuitry.

CO3: Able to apply project management skills (scheduling work, procuring parts, and documenting expenditures and working within the confines of a deadline).

CO4: Able to develop and demonstrate troubleshooting ability in electronic technology.

CO5: Able to communicate technical information by means of written and oral reports.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	M		S						S		
CO3	S	S	M	S								

Course Assessment methods:

Direct	Indirect
1.Observation book	1.Students Exit Survey

2.Record book 3.Model exam 4.End Semester exam	2.Faculty Survey 3.Industry 4.Alumni

LIST OF EXPERIMENTS:

1.Verification of Boolean Theorems-Implementation of Boolean Function - Adders/ Subtractors - Decoders -Encoders - Multiplexers -Demultiplexers - Comparators - Parity Checker/ Generator.

2. Registers - Counters - Shift Registers - General purpose shift registers - Data transmission.
3. Project - A mini project involving clocked sequential networks design.

TOTAL NO OF PERIODS: 30

BCS3L2 OBJECT ORIENTED PROGRAMMING LAB

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

CO1: Demonstrate class object concepts by using C++.
CO2: Develop programs using inheritance and polymorphism.
CO3: Demonstrate the significance of constructors and destructor.
CO4: Implement function and operator overloading using C++.
CO5: Construct generic classes using template concepts.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							
CO2		S	S		S							
CO3		S	S		S							
CO4		S	S		S							
CO5		S	S		S							

Course Assessment methods:

Direct	Indirect

1.Observation book 2.Record book 3.Model exam 4.End Semester exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

1. Programs Using Functions
- Functions with default arguments
- Implementation of Call by Value, Call by Address and Call by Reference
2. Simple Classes for understanding objects, member functions and Constructors
- Classes with primitive data members
- Classes with arrays as data members
- Classes with pointers as data members – String Class
- Classes with constant data members, Classes with static member functions
3. Compile time Polymorphism
- Operator Overloading including Unary and Binary Operators, Function Overloading
4. Runtime Polymorphism
- Inheritance ,Virtual functions
- Virtual Base Classes, Templates
- File Handling-Sequential access, Random access

TOTAL NO OF PERIODS: 30

BCS 3S1 TECHNICAL SEMINAR-I

L	T	P	C
0	0	2	1

TOTAL NO OF PERIODS: 15

BMA402 NUMERICAL METHODS

L	T	P	C
3	1	0	4

Course Objectives:

- To explore complex systems, physicists, engineers, financiers and mathematicians require computational methods since mathematical models are only rarely solvable algebraically
- Linear algebra underlying systems of equations, ordinary differential equations to simulate systems, and stochastic simulation under random influences.

- Explicit schemes to solve ordinary differential equations; random numbers; stochastic system simulation.

Course Outcomes:

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

CO1: Solve a set of algebraic equations representing steady state models formed in engineering problems

CO2: Fit smooth curves for the discrete data connected to each other or to use interpolation Methods over these data tables.

CO3: Find the trend information from discrete data set through numerical differentiation and Summary information through numerical integration.

CO4: Predict the system dynamic behavior through solution of ODEs modeling the system.

CO5: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

CO6: Have the necessary proficiency of using MATLAB for obtaining the above solutions.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	**Programme Outcomes(POs)**											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		M								S
CO2	S	S										
CO3		S		S								
CO4	S			S								S
CO5	M			S								
CO6	S											S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT – I **12**

SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS

Linear interpolation methods (method of false position) – Newton's method – Statement of

fixed point theorem – Fixed point iteration: x=g(x) method – Solution of linear system by Gaussian elimination and Gauss-Jordon methods - Iterative methods: Gauss Jacobi and Gauss-Seidel methods - Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method.

UNIT -II **12**

INTERPOLATION AND APPROXIMATION

Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton's forward and backward difference formulas.

UNIT- III **12**

NUMERICAL DIFFERENTIATION AND INTEGRATION

Derivatives from difference tables – Divided differences and finite differences –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulas – Double integrals using trapezoidal and Simpsons's rules.

UNIT-IV **12**

INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS

Single step methods: Taylor series method – Euler and modified Euler methods – Fourth order Runge – Kutta method for solving first and second order equations – Multistep methods: Milne's and Adam's predictor and corrector methods.

UNIT- V **12**

BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

TOTAL NO OF PERIODS: 60

TEXT BOOKS:

1. C.F. Gerald and P.O. Wheatley, 'Applied Numerical Analysis', Sixth Edition, Pearson Education Asia, New Delhi, 2002.

2. E. Balagurusamy, 'Numerical Methods', Tata McGraw Hill Pub.Co.Ltd, New Delhi, 1999.

REFERENCE BOOKS:

1. P. Kandasamy, K. Thilagavathy and K. Gunavathy, 'Numerical Methods', S.Chand Co. Ltd., New Delhi, 2003.

2. R.L. Burden and T.D. Faires, 'Numerical Analysis', Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.

BCS401 DATABASE MANAGEMENT SYSTEM

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- Most of the organizations depend on databases for storing the data and to share the data among different kinds of users for their business operations
- Persistent storage required and several users must be able to safely access the same data concurrently.
- Hence this course discusses about the problems with the file processing system and how it can be handled effectively in Database Systems through various design tools, design techniques and algorithms.

COURSE OUTCOMES:

CO1: Define the fundamental elements of database management systems.

CO2: Explain the basic concepts of relational data model and entity-relationship model.

CO3: Outline relational database design, relational algebra and database language SQL.

CO4: Explain the basic concepts of query processing, transaction management and file storage.

CO5 Develop a database for a given problem.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									S
CO2		M	M									S
CO3		S	S									M
CO4												
CO5			S									M

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION

Introduction – Database System Applications-Purpose of Database Systems- View of Data- Data Abstraction- Instances and Schemas- Data Models-Database Languages -Relational Databases- Database Design- The Entity-Relationship Model - Data Storage and Querying - Transaction Management - Database Architecture -Database Users and Admininistrators.

UNIT-II **9**

RELATIONAL DATABASES

Introduction to Relational model - Structure of Relational Databases - Database Schema - Keys - Schema Diagrams - Relational Query Languages - Relational Operations -Relational algebra - Introduction to SQL - Overview of the SQL Query Language - SQL Data Definition - Basic Structure of SQL Queries - Formal Relational Query Languages- The Relational Algebra- Relational calculus- Relational database design-Normal Forms- Functional dependency.

UNIT-III

DATA STORAGE AND QUERYING **9**

Storage and File Structure - File Organization - Indexing and Hashing- Ordered Indices- Static Hashing- Dynamic Hashing- Query Processing- Overview- Measures of Query Cost-Selection-Sorting- Join Operation- Evaluation of Expressions- Query Optimization- Overview-Transformation of Relational Expressions- Estimating Statistics of Expression Results- Choice of Evaluation Plans.

UNIT-IV

TRANSACTIONS **9**

Transactions-Transaction Concept-A Simple Transaction Model-Storage Structure-Transaction Atomicity and Durability-Transaction Isolation-Serializability-Transaction Isolation and Atomicity-Transaction Isolation Levels-Transactions as SQL Statements-Concurrency Control-Lock-Based Protocols-Deadlock Handling-Multiple Granularity-Time Stamp-Based Protocols-Validation Based Protocols-Hierarchical model - Basic Concepts - Data-Structure Diagrams-Network model.

UNIT-V

OBJECT-BASED DATABASES **9**

Overview-Complex Data Types-Structured Types and Inheritance in SQL-Table Inheritance-Array and Multiset Types in SQL-Object-Identity and Reference Types in SQL-Implementing O-R Features- Persistent Programming Languages-Object-Relational Mapping-Object-Oriented versus Object-Relational - Data warehousing and Data Mining - Decision-Support Systems-Data Warehousing- Data Mining-Classification-Association Rules-Other Types of Associations-Clustering-Other Forms of Data Mining.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Abraham Silberschatz, Henry. F. Korth and S. Sudharshan, “Database System Concepts”, 6th Edition, Tata McGraw Hill, 2011.

2. RamezElmasri, Shamkant B. Navathe, “Fundamentals of Database Systems", 6th Edition, Addison-Wesley,2010.

REFERENCE BOOKS:

1.PakhiraMalay.K, “Database Management System”,PHI publication,2012.
2.NarainGehani, “The Database Book – Principles and Practice Using MySQL”, Universities Press,2008.
3. Hector Garcia - Molina, Jeff Ullman and Jennifer Widom, “Database systems: The Complete Book” 2nd Edition, Pearson Education,2008.
4. C. J. Date, A. Kannan and S. Swamynathan, “An Introduction to Database Systems”, Pearson Education, 8thEdition,2006.

BCS402 DESIGN AND ANALYSIS OF ALGORITHM

L	T	P	C
3	1	0	4

COURSE OBJECTIVES:

- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.

COURSE OUTCOMES:

CO1: Explain the basic concepts of time and space complexity, divide-and-conquer Strategy, dynamic programming, greedy and approximate algorithms.
CO2: Describe the methodologies of how to analyze an algorithm
CO3: Describe the data structures of graph coloring and back tracking
CO4: Design a better algorithm to solve the problems.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		M								
CO3	S	S		M								
CO4	S	M	S									

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **12**

ANALYZING ALGORITHMS

Introduction: Efficiency of algorithms – average and worst case asymptotic notation – the order of - other asymptotic notations. Analysis of Algorithms: Analyzing control structures – solving recurrences – homogeneous recurrences – inhomogeneous recurrences.

UNIT II **12**

DIVIDE AND CONQUER METHOD

Divide And Conquer Method: Binary search – merge sort – quick sort – strassen's matrix multiplication. Greedy Method: Knapsack problem – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm – Huffman trees.

UNIT III **12**

DYNAMIC PROGRAMMING

Dynamic Programming: Principle of optimality – computing binomial co-efficient – Warshall's and Floyd's algorithms – optimal binary search tree – knapsack problem – traveling salesman problem.

UNIT IV **12**

BACKTRACKING

Backtracking: n queen's problem – sum of subsets – graph coloring – Hamiltonian cycle – knapsack problem.

UNIT V **12**

TRAVELLING SALESMAN PROBLEM

Branch and Bound: Knapsack problem – traveling salesman problem – assignment problem Introduction to NP Completeness: easy vs. hard – the class NP – NP complete problems**.**

TOTAL NO OF PERIODS: 60

TEXT BOOKS

1. Anany Levitin, Introduction to Design and Analysis of Algorithms, Pearson Education Inc., 2005.

2. Ellis Horowitz, SartajSahni and S. Rajasekaran, Fundamentals of Computer Algorithms , Galgotia Publications, 2nd Edition, New Delhi, 2003.

REFERENCE BOOKS

1. Aho.A.V, Hopcroft.J.E and Ullman.J.D, Design and analysis of Algorithms, Pearson education, 3rd edition, 2000.
2. Mark Allen Weiss, Data structures and algorithm analysis in C, Pearson Education, 2nd Edition, 2003
3. Thomas.H.Cormen, Charles E. Leiserson, Ronald L.Rivest, Introduction to Algorithms, Prentice Hall of India Pvt. Ltd,3rd Edition,2009.

BCS 403 COMPUTER NETWORKS

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

Computer Networking is the vital part of any organization these days. This course provides a foundation to understand various principles, protocols and design aspects of Computer Networks and also helps to achieve the fundamental purpose of computer networks in the form of providing access to shared resources

COURSE OUTCOMES:

CO1: Explain data communication system, components and the purpose of layered architecture.

CO2: Illustrate the functionality of each layer of OSI and TCP/IP reference model

CO3: Explain the data link layer and network layer protocols.

CO4: Outline the functions of transport layer protocols.

CO5: Summarize application layer protocols.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S	S								
CO2			S	S								
CO3	M		M	S								
CO4	M		S	S								
CO5	M		M	M								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION TO NETWORKS

Introduction: The uses of computer networks - Network hardware - Network software - Reference models - Example of networks- Network standardization.

The Physical Layer: The theoretical basis for data communication – Guided Transmission media - Wireless transmission – PSTN - Mobile telephone - Communication satellite.

UNIT II **9**

DATALINK LAYER

The Data Link Layer: Data link layer design issues - Error detection and correction - Elementary data link protocols - Sliding window protocols - Example of data link protocols- ETHERNET – 802.11, 802.16, Bluetooth- Data link layer Switching.

UNIT III **9**

NETWORK LAYER

The Network layer: Network layer design issues - Routing algorithms - Congestion control algorithms -Approaches to Congestion Control-Traffic-Aware Routing-Admission Control-Traffic Throttling-Load Shedding - Internetworking- Network layer in Internet.

UNIT IV **9**

TRANSPORT LAYER

The Transport layer: Transport layer design issues-Addressing, Connection Establishment-Connection Release-Error Control and Flow Control - Transport protocols - Simple transportprotocol - Internet transport protocols UDP, TCP.

UNIT V **9**

APPLICATION LAYER

The Application layer: Domain name system - Electronic mail - World wide web-Architectural Overview-Static Web Pages-Dynamic Web Pages and Web Applications-HTTP—The Hyper Text Transfer Protocol-The Mobile Web-Web Search – Multimedia – Cryptography, Digital signature- Communication Security.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Andrew S. Tanenbaum, "Computer Networks", Pearson Education, 5th edition 2010.
2. Behrouz A. Forouzan, "Data and Computer Communications", 4th Edition, McGraw Hill,2007.

REFERENCE BOOKS:

1. William Stallings, "Data and Computer Communications", 8th Edition, Pearson Education,2006

3. Douglas E. Comer, "Internetworking with TCP/IP, Volume-I", 6th Edition, Pearson Education, 2013.

BCE406 ENVIRONMENTAL STUDIES (COMMON TO ALL BRANCHES)

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

- To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution.
- To understand the treatment of wastewater and solid waste management.
- To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence.
- To be aware of the national and international concern for environment for protecting the environment

Course Outcomes:

CO1: Play an important role in transferring a healthy environment for future generations

CO2: Analyse the impact of engineering solutions in a global and societal context

CO3: Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems

CO4: Ability to consider issues of environment and sustainable development in his personal and Professional undertakings

CO5: Highlight the importance of ecosystem and biodiversity

CO6: Paraphrase the importance of conservation of resources

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						S	S	S				S
CO2						S	S	M				M

CO3							M	S				S
CO4							S	S				S
CO5						S	S	M				M
CO6							S	S				S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

THE MULTI-DISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, scope and importance, Need for public awareness.

NATURAL RESOURCES:

RENEWABLE AND NON-RENEWABLE RESOURCES

Nature resources and associated problems

a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effect on forests and tribal people.

b) Water resources, use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources; Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources, case studies

f) Land resources: Land as a resources, Land degradation, man induced landslides, soil erosion and desertification

- Role of an individual in conservation of natural resources,
- Equitable use of resources for sustainable lifestyles.

UNIT -II **9**

ECOSYSTEMS

Concepts of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT -III

BIODIVERSITY AND ITS CONSERVATION 9

Introduction Definition genetic, species and ecosystem diversity, Bio-geographically 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, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation biodiversity In-situ and Ex-situ conservation of biodiversity.

ENVIRONMENTAL POLLUTION

Definition, Causes, effects and control measures of:- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solids waste Management: Causes, effects and control measures of urban and Industrial wastes Role of an individual in prevention of pollution, Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

UNIT- IV

SOCIAL ISSUES AND THE ENVIRONMENT 9

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation rain water harvesting, watershed management, Resettlement and rehabilitation of people its problems and concerns Case studies. Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion nuclear accident and holocaust, Case studies, Wasteland reclamation, Environment Protection Act, Air {Prevention and Control of pollution) Act, Water (prevention and control of Pollution) Act, Wildlife protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness".

UNIT- V

HUMAN POPULATION AND THE ENVIRONMENT 9

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 NO OF PERIODS: 45

TEXT BOOK:

1. E nvironmental Studies. Dr. Benny Joseph, TATA McGraw Hill

REFERENCES:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
2. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd.,Ahmedabad – 380 013, India, Email:mapin@icenet.net (R),1989.
3. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
4. Clark R.S., Marine Pollution, Clanderson Press Oxford (TB),2001.
5. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
6. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
7. Jadhav, H &Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
8. Mckinney, M.L. & School, R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition. 639p.
9. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
10. Rao M N. &Datta, A.K. 1987. Waste Water treatment. Oxford & IBH PublCo. Pvt. Ltd. 345p.
11. Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut.

L	T	P	C
3	0	0	3

BCS405 OPERATING SYSTEMS

COURSE OBJECTIVES:

Every computer professional should have a basic understanding of how an operating system controls the computing resources and provide services to the users. This course provides an introduction to the operating system functions, design and implementation.

COURSE OUTCOMES:

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

CO1: Illustrate the operating system concepts and its functionalities.

CO2: Apply various CPU scheduling algorithms for problems.

CO3: Outline the needs and applications of process synchronization.

CO4: Identify the issues in deadlock and memory management.

CO5: Illustrate various file and disk management strategies.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M		S			S						S
CO2	S	S	S			M						S
CO3	S					S						S
CO4	M	M	S	S		S						S
CO5	M	M	S			M						S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION TO OPERATING SYSTEM

Introduction: What operating systems do? – Computer System Organization - Computer System Architecture – Single processor systems - Multiple processor systems – Clustered Systems – Operating System Structure – Operating System Operations – Special purpose systems: Real Time Embedded Systems, Multimedia Systems and Handheld Systems. Operating System Services: System Calls – System Programs –Virtual Machines - Operating System Design and Implementation.

UNIT II **9**

PROCESS MANAGEMENT

Process Management: Process Concept – Process Scheduling – Operation on Process – Cooperating Processes and Inter-process Communication. Threads: Overview – Multithreading Models. Process Synchronization: The Critical Section Problem – Synchronization Hardware – Semaphores – Classical Problems of Synchronization. Deadlocks: System Model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection –Recovery from Deadlock.

UNIT III **9**

CPU SCHEDULING

CPU Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms. Memory Management: Background – Swapping –Contiguous Memory Allocation –Paging -

Segmentation – Segmentation with paging. Virtual Memory: Demand paging – Page Replacement – Thrashing – Allocation of Frames.

UNIT IV FILE HANDLING **9**

File Systems: File Concepts - Access Methods – Directory Structure – File System Mounting – File Sharing – Protection. File System Structure – File System Implementation – Allocation Methods - Free-Space Management – Directory implementation – Recovery.

UNIT V LINUX **9**

Secondary Storage Management: Disk Structure – Disk Scheduling – Disk Management – Swap Space managementCase Study: Linux System – Components of Linux Systems – Process Management – Process Scheduling – Security.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Silberschatz, Galvin, Gagne, "Operating System Concepts", 8thedition, John Wiley & Sons, Inc., 2009.
2. William Stallings, "Operating Systems", Pearson Education, 6th Edition. 2006.

REFERENCE BOOKS:

1. D.M.Dhamdhere, "Operating Systems: A Concept-Based Approach", 2nd Edition, Tata McGraw Hill, 2006.
2. Andrew S. Tanenbaum, "Modern Operating Systems", Pearson Education, 3rd Edition.2005.

BCS4L1 DBMS LABORATORY

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

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

CO1: Develop database modeling for a problem.

CO2: Design a database using normalization.

CO3: Implement a data base query language.

CO4: Develop GUI using front end tool.

CO5: Develop a connection between frontend and database.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1		S	S	M	S							S
CO2		S	S		S							
CO3		S	S	M	M							M
CO4		M	S		S							S
CO5		S	M		M							

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

List of experiments

1. Data Definition, Manipulation of base tables and views
2. High level programming language extensions.
3. Front end tools.
4. Forms-Triggers-Menu Design.
5. Reports.
6. Database Design and implementation
7. An exercise using Open Source Software like MySQL

TOTAL NO OF PERIODS: 30

L	T	P	C
0	0	4	2

BCS4L2 OPERATING SYSTEM LABORATORY

COURSE OUTCOMES:

CO1: Demonstrate Unix / Linux commands.
CO2: Implement various commands using shell programming.
CO3: Implement various CPU scheduling algorithms.
CO4: Implement various disk scheduling algorithms.
CO5: Implement memory management techniques.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							S
CO2		S	S		S							
CO3		S	S		M							M
CO4		M	S		S							S
CO5		S	M		M							

Course Assessment methods:

Direct	Indirect
1.Observation book	1.Students Exit Survey
2.Record book	2.Faculty Survey
3.Model exam	3.Industry
4.End Semester exam	4.Alumni

List of experiments

1. Working with basic Unix/ Linux commands.
2. Shell Programming.
3. Programs using the following system callsofUnix / Linux operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir
4. Programs using the I/O system calls of UNIX operating system (open, read, write)
5. Simulations of Unix / Linux commands like ls, grep, etc.
6. Simulation of scheduling algorithms (CPU and Disk).
7. Implementation of synchronization problems using Semaphore.
8. Simulation of basic memory management schemes.
9. Simulation of virtual memory management schemes.
10. Simulation of file systems.

TOTAL NO OF PERIODS:30

BCS4L3 COMPUTER GRAPHICS AND MULTIMEDIA LABORATORY

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

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

CO1: Explain line drawing using programming language.

CO2: Explain 2D and 3D transformations.

CO3: Demonstrate simple 2D animations using animation software.

CO4: Prepare simple scenes using image editing software.

CO5: Explain the linking between web and multimedia.
CO6: Model a simple multimedia application.
CO7: Demonstrate team work towards the development of multimedia applications.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							S
CO2		S	S		S							
CO3		S	S		M							M
CO4		M	S		S							S
CO5		S	M		M							
CO6		S	S		S							S
CO7		S	M		S							M

Course Assessment methods

Direct	**Indirect**
1.Observation book 2.Record book 3.Model exam 4.End Semester exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

PROGRAMS

1. To implement Line, Circle and ellipse Attributes
2. To implement line drawing algorithms DDA line algorithm, Bresenham's line algorithm
3. To perform 2D and 3D transformations
4. To perform animation using any Animation software (Create Frame by Frame Animations using multimedia authoring tools)
5. To perform basic operations on image using any image editing software
6. To develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.
7. To create a Jpeg image that demonstrates the various features of an image editing tool.

TOTAL NO OF PERIODS: 30

BCS4S1 TECHNICAL SEMINAR-II

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

TOTAL NO OF PERIODS: 30

BMA503 MATHEMATICS - IV

L	T	P	C
3	1	0	4

Course Objectives:

- Reason mathematically about basic data types and structures (such as numbers, sets, graphs, and trees) used in computer algorithms and systems
- Distinguish rigorous definitions and conclusions from merely plausible ones; synthesize elementary proofs, especially proofs by induction.
- Model and analyze computational processes using analytic and combinatorial methods.

Course Outcomes:

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

CO1: Understand the theory and techniques of logic, graphs and trees, and algebraic systems

CO2: Apply the knowledge and skills obtained to investigate and solve a variety of discrete mathematical problems

CO3: Communicate mathematical ideas.

CO4: Make effective use of appropriate technology.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								M
CO2	S	S		S								M
CO3	S	M		S						S		M
CO4	S	S		S								M

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

6. End Semester Exam	

UNIT-I

LOGIC **12**

Statements - Truth Tables - Connectives - Normal forms - Properties calculus - Inference theory for statement Calculus and Predicate Calculus.

UNIT-II

COMBINATORIES **12**

Review of Permutation and Combination - Mathematical Induction - Pigeon hole Principle - Principle of inclusion and exclusion - Generating function -Recurrence relations.

UNIT-III

GROUPS **12**

Semigroups- Monoids-Groups-Permutation group-Consets-Lagrange's theorem - Group homomorphism- Kernal - Rings and Fields (Definitions and Examples only)

UNIT-IV

LATTICES **12**

Partial ordering - Posets - Hasse diagram - Lattices - Properties of Lattices - Sub Lattices - Special Lattices - Boolean, Algebra

UNIT-V

GRAPHS **12**

Introduction of Graphs - Graph terminology - Representation of Graphs - Graph Isomorphism- Connectivity- Euler and Hamilton Paths

TOTAL NO OF PERIODS: 60

TEXT BOOKS:

1. Tremblay J.P and Manohar R, "Discrete Mathematical Structures with Application to Computer Science", McGraw Hill Book Company, International Edition, 1987, Sections 1-2,1 to 1-2,4; 1-2, 6 to 1-2,14; 1-3,1 to 1-3,5; 1-4,1 to 1-4,3; 1-5,- to 1-5,5:1-6, 4 and 1-6,5 for logic. Section 3:- 1,1 to 3-2, 3; 3-5,1 to 3-5, 5 for Groups Rings and Fields. Sections: 2, 3-8 and 2-3, 9; 4-1, 1 to 4-2, 2 for Lattices.

2. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill Book Company 1999, Section 3, 3, 4, 3, 6, 1, 6, 2, 6, 4, 6, 5, 7, 1-7, 5, 8, 1-8, 5

REFERENCE BOOKS:

1. Ralph P., Grimaldi, "Discrete and Combinatorial Mathematics", Pearson Education, Fifth Edition,2008

2. Venkataraman M.K, Discrete Mathematics", The National Publishing Company 2000.

3. Iyengar S. N, Chandrasekaran V. M, Venkatesan K.A. and Arunachalam PS., "Discrete Mathematics", Vikas Publishing House Pvt. Ltd,2003.

L	T	P	C
3	0	0	3

BCS 501 SOFTWARE ENGINEERING

Course Objectives:

This course is intended to provide the students with an overall view over Software Engineering discipline and with insight into the processes of softwaredevelopment.

Course Outcomes:

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

CO1: Outline the features of different lifecycle models.

CO2: Explain the principles involved in gathering and validating software requirements

CO3: Make use of suitable models through analysis of requirements and arrive at an appropriate software design

CO4: Appreciate the quality assurance procedures during software development

CO5: Explain software project management and software maintenance practices

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S								
CO2	S	S	S	M								
CO3	S	M	S	S						S		
CO4	S	S	M	S							M	
CO5	S	S	S	S							S	

Course Assessment methods:

Direct	Indirect
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I

INTRODUCTION **9**

Software Engineering Process paradigms - Project management - Process and Project Metrics – software estimation - Empirical estimation models - Planning - Risk analysis - Software project scheduling.

UNIT II

REQUIREMENTS ANALYSIS **9**

Requirement Engineering Processes – Feasibility Study – Problem of Requirements – Software Requirement Analysis – Analysis Concepts and Principles – Analysis Process – Analysis Model – Software Prototyping – Selecting the Prototyping Approach – Prototyping Methods and Tools – Specification – Software Requirement Specification – Specification Review.

UNIT III

SOFTWARE DESIGN **9**

Software design - Abstraction - Modularity - Software Architecture - Effective modular design - Cohesion and Coupling - Architectural design and Procedural design - Data flow oriented design.

UNIT IV

USER INTERFACE DESIGN AND REAL TIME SYSTEMS **9**

User interface design - Human factors - Human computer interaction - Human - Computer Interface design - Interface design - Interface standards. Programming languages and coding - Language classes – Code documentation - Code efficiency - Software Configuration Management.

UNIT V **9**

SOFTWARE QUALITY AND TESTING

Software Quality Assurance - Quality metrics - Software Reliability - Software testing - Path testing – Control Structures testing - Black Box testing - Integration, Validation and system testing - Software Maintenance - Reverse Engineering and Re-engineering. CASE tools - projects management, tools - analysis and design tools - programming tools - integration and testing tool - Case studies.

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. Roger Pressman S., “Software Engineering: A Practitioner's Approach”, 7th Edition, McGraw Hill, 2010.

REFERENCE BOOKS:

1. I. Sommerville, “Software Engineering”, Eighth Edition, Pearson Education, 2007

2. Pfleeger, “Software Engineering-Theory & Practice”, 3rd Edition, Pearson Education, 2009

3. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals of Software Engineering”, Pearson Education, 2003.

BEC501 MICROPROCESSORS AND ITS APPLICATIONS

L	T	P	C
3	0	0	3

Course Objectives:

- Become proficient in the functional and technological characteristics of microprocessor architectures
- Understand and write assembly language programs
- Learn about memory components, peripheral support devices and their interface logic.

Course Outcomes:

CO1: Identify the basic functions of a microprocessor and explain the instruction sets of 8085 and 8086 microprocessors.

CO2: Make use of the instruction set of 8085 microprocessor and develop assembly code to solve problems.

CO3: Illustrate the use of various general purpose interfacing devices.

CO4: Develop skills to write programs using 8086 processor development tools.

CO5: Compare the architecture of 8085, 8086 and 8051 microcontroller.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S									
CO2	S	M	S									
CO3	S		S									
CO4	S	M	S									
CO5	S	M	S									

Course Assessment methods:

Direct	Indirect
1 Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT- I **9**

INTRODUCTION TO MICROPROCESSOR:

Evolution of microprocessors-Comparison of many computers with mini and large computers-Advantages and limitations of microprocessors based system design. Architecture and Organization: CPU-Registers-ALU Decoders-Bus system- Tri-state logic-Data Flow-Intel architecture 8085 microprocessor-Function of various block and signals- Organization of a micro-computer-Brief Introduction to Z80, MC 6800 and Intel 8086.***UNIT-II***

INSTRUCTION SET:

The origin of software-program execution - Addressing modes-Instruction format- and classifications - Intel 8085 Instruction set- Stack and subroutine-Instruction-Timing and operation status.

UNIT-III

BASIC PATTERNS OF MEMORY SYSTEMS: 9

Memory devices: ROM, RAM, EPROM-Interfacing memory sections-Methods of data transfer - Programmed data transfer schemes and DMA method of transfer-8257 programmable DMA controller-Parallel I/O interfacing-Interfacing of ADC and DAC-Intel 8085 I/O-structure.

UNIT-IV

INTERRUPT STRUCTURES: 9

Need for interrupt structures-Handling of specific sources of interrupts-Software interrupts-hardware interrupt – Multiple interrupt -polling and vectoring-8259 programmable interrupt controller - 8255 programmable peripheral interface-8253/8254 programmable interval timer-Interfacing of 7 segment display.

UNIT-V

ASSEMBLY LANGUAGES PROGRAMMING: 9

Assembly Language programming-Mnemonics-Assemblers-Simple programs-List of arrays-Arithmetic character manipulation-Flow chart-Subroutines –Debugging-Testing-Typical programs using Intel 8085-Applications to temperature control and speed control of stepper motor-Traffic light control-Microprocessor based data acquisition systems.

TOTAL NO OF PERIODS:45

TEXT BOOKS:

1.RameshS.Gaonkar, “Microprocessor Architecture, Programming and Applications with the 8085”,6th edition, Penram International Publishing (India) Pvt. Ltd., 2013

REFERENCE BOOKS:

1. A.P.Mathur, “Introduction to Microprocessors”, Third Edition, Tata McGraw Hill,2006

2. Rafiquzzaman, “Microprocessors and Microcomputer Development Systems: Designing Microprocessor-Based Systems”, John Wiley & Sons Inc,2005

3. N.K. Srinath, “8085 Microprocessor: Programming and Interfacing”, PHI Learning, 2010.

BCS 503 DISTRIBUTED COMPUTING

L	T	P	C
3	0	0	3

Course Objectives:

- The differences among: concurrent, networked, distributed, and mobile.
- Resource allocation and deadlock detection and avoidance techniques.
- Distributed Transaction Processing system
- Cryptography and Domain Name system.

Course Outcomes:

CO1: Explain the distributed environment.
CO2: Explain the functionalities of file management system.
CO3: Organize processes in distributed systems.
CO4: Demonstrate the access of remote objects for the service.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M										S
CO2	S	M										S
CO3	M	M										S
CO4	S	S										S

Course Assessment methods:

Direct	Indirect
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT- I
INTRODUCTION **9**

Characterization of Distributed Systems – Examples – Resource Sharing and the Web – Challenges – System Models – Architectural and Fundamental Models – Networking and Internetworking – Types of Networks – Network Principles – Internet Protocols – Case Studies

UNIT -II **9**

PROCESSES AND DISTRIBUTED OBJECTS

Inter–process Communication – The API for the Internet Protocols – External Data Representation and Marshalling – Client –Server Communication – Group Communication – Case Study – Distributed Objects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and Notifications – Java RMI – Case Study

UNIT- III **9**

OPERATING SYSTEM ISSUES

The OS Layer – Protection – Processes and Threads – Communication and Invocation – OS Architecture – Security – Overview – Cryptographic Algorithms – Digital Signatures – Cryptography Pragmatics – Case Studies – Distributed File Systems – File Service Architecture – Sun Network File System – The Andrew File System

UNIT- IV

DOMAIN NAME SYSTEM AND LOCKS **9**

Name Services – Domain Name System – Directory and Discovery Services – Global Name Service – X.500 Directory Service – Clocks – Events and Process States – Synchronizing Physical Clocks – Logical Time And Logical Clocks – Global States – Distributed Debugging – Distributed Mutual Exclusion – Elections – Multicast Communication Related Problems.

UNIT -V **9**

DISTRIBUTED TRANSACTION PROCESSING

Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery – Overview of Replication And Distributed Multimedia Systems.

TEXT BOOKS

1. George Coulouris, Jean Dollimore and Tim Kindberg, “Distributed Systems Concepts and Design”, 3rd Edition, Pearson Education, 2002.
2. Andrew S. Tanenbaum, Maartenvan Steen, Distributed Systems, “Principles and Pardigms”, Pearson Education, 2002.

TOTAL NO OF PERIODS:45

REFERENCES

1.SapeMullender, “Distributed Systems”, 2nd Edition, Addison Wesley, 1993.

2.Albert Fleishman, Distributes Systems, “Software Design and Implementation”, Springer, Verlag, 1994.

3.M. L. Liu, “Distributed Computing Principles and Applications”, Pearson Education, 2004.

4.MugeshSinghal, Niranjan ,G Shivaratri, “Advanced Concepts in Operating Systems”, Tata McGraw Hill Edition, 2001.

BBA501 PRINCIPLES OF MANAGEMENT

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

This course is designed to be an overview of the major functions of management. Emphasis is on planning, organizing, controlling, directing, and communicating. Upon Completion, students should be able to work as contributing members of a team utilizing these functions of management.

COURSE OUTCOMES:

CO1: Understand the concepts of management, administration and the evolution of management thoughts.

CO2: Understand and apply the planning concepts.

CO3: Analyze the different organizational structures and understand the staffing process.

CO4: Analyze the various motivational and leadership theories and understand the communication and controlling processes.

CO5: Understand the various international approaches to management

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S					S	M		S	S
CO2			S					S	M		S	S
CO3		M	S					S			S	S
CO4		M	S					S			M	S
CO5			S					S	M		S	S

Course Assessment methods:

Direct	Indirect
Internal Tests 2. Assignments 3. Seminar	1.Students Exit Survey 2.Faculty Survey 3.Industry

4.Quiz 5.Online Test 6. End Semester Exam	4.Alumni

UNIT-I **9**

INTRODUCTION TO MANAGEMENT

Nature of Management – Definition - Theory and practice - effective management - Management: Science or Art - Management in India-Development of Management thoughts - Taylor's - Henry Fayol - Hawthorne experiment - Barnard & Social system - Herbert Simon - Peter Drucker-Various approaches -Management Thoughts.

UNIT-II **9**

BUSINESS ETHICS

Management Process and coordination - Functions of management -Managers and environment - external and internal. Business Ethics- Planning- Fundamentals - Definitions & Features - Steps in planning - Types of planning. Objectives-Concepts and features-Hierarchy of objectives- role - Process of MBO. Policy & Strategy - Decision making - process - Individual Vs group decisions.

UNIT-III **9**

MANPOWER PLANNING

Organizing - Theory & approach - Organization Structure - Authority & Responsibility - Delegation - Centralization & Decentralization. Line & Staff Relationship - Staffing - Fundamentals - systems approach - manpower planning - Recruitment & selection - Training and Development - Performance appraisal - Direction - fundamentals - motivation - theories of motivation -Maslow's, Herzberg's, MaClelland's, Theory X, Y&Z. Leadership-Theories and Styles- Communication - Types - Controlling - System and Process.

UNIT-IV **9**

ORGANIZATIONAL BEHAVIOUR

Organisationalbehaviour- Definition - Organization-Managerial Role and Functions - Organisational Approaches, individual Behaviour - Causes -Environmental effect - Behaviour and performance, Perception -Organizational implications, Personality - contributing Factors - Dimension, Motivation - Need Theories - Process Theories - Job satisfaction. Learning and Behaviour - Learning curves, Work design and Approaches.

UNIT-V **9**

GROUP BEHAVIOUR

Group Behavior - Groups - Contributing factors - group norms, types- causes - Intergroup relations - conflict and resolution - Change process - Resistance to change

TOTAL NO OF PERIODS: 45

TEXT BOOK:

1. L. M. Prasad, "Principles and Practice of Management",8th edition.2012

REFERENCES:

1. Ties AF, Stoner and R. Edward Freeman, "Management", 6th Edition, Pearson Education, 2005.

2. Joseph I. Massie, "Essentials of Management", Prentice Hall of India Pvt., Ltd., NewDelhi 110011. 1985.

3. Principles of Management,P.C.Tripathi and P.N.Reddy Kindle Press,5th Edition,2012.

BCS 5L1 PROGRAMMING IN JAVA LABORATORY

L	T	P	C
0	0	4	2

Course Outcomes:

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

CO1: Identify classes, objects, members of a class and the relationships among them for a Specific problem.

CO2: Develop programs using appropriate packages for Inter –thread Communication and Synchronization.

CO3: Develop GUI applications to handle events.

CO4: Develop client server based applications.

CO5: Design, develop, test and debug Java programs using object-oriented principles in conjunction with development tools including integrated development environments.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							
CO2		S	S		S							
CO3		S	S		S							
CO4		S	S		S							
CO5		S	S		S							

Course Assessment methods:

Direct	Indirect
1.Observation book	1.Students Exit Survey

2.Record book 3.Model exam 4.End Semester exam	2.Faculty Survey 3.Industry 4.Alumni

JAVA PROGRAMS USING FOLLOWING CONCEPTS

1. Classes& Objects.
2. Constructors & Destructors.
3. Methods Overloading.
4. Inheritance.
5. Interface.
6. Multithreading.
7. Package.
8. Creating Java Applets.

TOTAL NO OF PERIODS: 30

BEC5L2 MICROPROCESSOR LABORATORY

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

CO1: Make use of the microprocessor trainer kit to execute 8085 programs.
CO2: Develop assembly language program for 8085to solve simple programs.
CO3: Make use of interfacing devices for a specified application.
CO4: Develop simple assembly language program for 8086.
CO5: Develop assembly language program for 8086 using BIOS/DOS Calls.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							
CO2		S	S		S							
CO3		S	S		S							
CO4		S	S		S							
CO5		S	S		S							

Course Assessment methods:

Direct	Indirect
1.Observation book 2.Record book 3.Model exam 4.End Semester exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

EXPERIMENTS ON 8085:

1. Study of 8085 Microprocessor Simulator
2. 8 bit Addition, Subtraction, Multiplication
3. 16 bit Addition, Subtraction, Multiplication and Division.
4. BCD to Hex and Hex to BCD code Conversion.

EXPERIMENTS USING MASM-8086 PROGRAMS

TOTAL NO OF PERIODS: 30

BCS 5L2 SOFTWARE ENGINEERING LABORATORY

L	T	P	C
0	0	4	2

Course Outcomes:

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

CO1: Analyze the problem and do project planning.

CO2: Identify project scope, objectives, and perform data modeling.

CO3: Identify the deliverables in various phases of SDLC.

CO4: Implement solutions using modern tools.

CO5: Explain test plan, perform validation testing, coverage analysis.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							
CO2		S	S		S							
CO3		S	S		S							
CO4		S	S		S							
CO5		S	S		S							

Course Assessment methods:

Direct	Indirect
1.Observation book	1.Students Exit Survey
2.Record book	2.Faculty Survey
3.Model exam	3.Industry
4.End Semester exam	4.Alumni

1. Problem Analysis and Project Planning

Thorough study of the problem – Identify project scope, Objectives, infrastructure

2. Software Requirement Analysis

Describe the individual Phases/ modules of the project, Identify deliverables

3. Data Modeling

Use work products – data dictionary, use case diagrams and activity diagrams, build and test lass diagrams, sequence diagrams and add interface to class diagrams.

4. Software Developments and Debugging

5. Software Testing

Prepare test plan, perform validation testing, coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.

LIST OF EXPERIMENTS

1. Library System
2. Course Registration System
3. Quiz System
4. Student marks analyzing system
5. Online ticket reservation system
6. Stock maintenance

TOTAL NO OF PERIODS: 30

BCS 5S1 INDUSTRIAL TRAINING

L	T	P	C
0	0	3	1

BCS 605 DATA WAREHOUSING AND DATA MINING

L	T	P	C
3	0	0	3

DATA WAR

Course Objectives:

- Dramatic advances in data capture, processing power, data transmission, and storage capabilities are enabling organizations to integrate their various databases into data warehouses.

- Data mining is primarily used by the companies with a strong consumer focus. It enables these companies to determine the factors such as price, product positioning, or staff skills, and economic indicators, competition, and customer demographics.

Course Outcomes:

CO1: Provide efficient distribution of information and easy access to data

CO2: Create user friendly reporting environment.

CO3: Find the unseen pattern in large volume of historical data that helps to manage an organization efficiently

CO4: Understand the concepts of various data mining Techniques.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M		S									S
CO2	M		S			M						S
CO3			S	M					S		S	S
CO4	M		S			M						S

Course Assessment methods:

Direct	Indirect
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I

DATAWAREHOUSE **9**

Data Warehouse Roles and Structures – What is a Data Warehouse? – Multi Dimensional Data Model- Data Stores, Warehouses and Marts - The Data Warehouse Environment – Data Warehouse Characteristics - The Data Warehouse Architecture – Meta Data, Metadata Extraction - Implementing the Data Warehouse - OLAP Engine - Data Warehouse Backend Process – Data Warehouse Project Success Factors.

UNIT II

INTRODUCTION TO DATA MINING **9**

Basic Data Mining Tasks, Data Mining versus Knowledge Discovery in Data Bases, Data Mining Issues, Data Mining Metrics. Social Implications of Data Mining.Data Mining from a Database Perspective.
Data Mining Techniques - Introduction – A Statistical Perspective on Data Mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNITIII
CLASSIFICATION **9**
Introduction - Statistical Based Algorithms- Distance Based Algorithms – Decision Tree Based Algorithms - Neural Networks Based Algorithms – Rule Based Algorithms – Combining Techniques.

UNITIV
ASSOCIATION RULES **9**
Introduction-Large Itemsets- - Methods to Discover Association Rules - Apriori Algorithm - Partition Algorithm.
Clustering Techniques
Introduction – Outliers – Clustering Paradigms –Hierarchical Algorithms, Partitional Algorithms - Clustering Large Databases.

UNITV **9**
Web Mining
Introduction-Web Mining – Web Content Mining –Crawlers,Harvest System,Virtual Web View -Web Structure Mining –Page Rank, Web Usage Mining-Preprocessing, Data Structures , Pattern Discovery and Pattern Analysis.

TOTAL NO OF PERIODS: 45

TEXT BOOKS
1. ArunK.Pujari.,"Data Mining Techniques", Universities Press,2013.
2. Margaret H. Dunham ,S.Sridhar, "Data Mining Introductory and Advanced Topics", Pearson Education,2006.
3. K.P.Soman,ShyamDiwakar,V.Ajay,"*Data Mining*: *Theory And Practice" ,* PHI Learning Pvt. Ltd., 2006.
REFERENCE BOOKS
1. "Express Learning - Data Warehousing and Data Mining", ITL ESL,Pearson Education, 2012.
2. N.Venkatesan,S.Prabhu,"Data Mining and WareHousing", New Age International (P) Limited, 2010.
3. George M. Marakas, "Modern Data Warehousing, Mining and Visualization: Core concepts", Pearson Education,2003.

BCS 602 Object Oriented Analysis and Design

L	T	P	C
3	0	0	3

OBJECT OI

Course Objectives:

- Develop a working understanding of formal object-oriented analysis and design processes.
- Develop an appreciation for and understanding of the risks inherent to large-scale software development.

Course Outcomes:

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

CO1: Explain fundamental concepts of object-oriented analysis and design approach.

CO2: Explain models for object-oriented system development.

CO3: Identify system development design patterns

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M						M	M
CO2		S	S	S	S						S	
CO3	S	S	S	S	S							

Course Assessment methods:

Direct	**Indirect**
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

OBJECT ORIENTED METHODOLOGIES

Introduction to System Concepts - Managing Complex Software — Properties – Object Oriented Systems Development – Object Basics – Systems Development Life Cycle - Rumbaugh Methodology - Booch Methodology - Jacobson Methodology – Unified Process

UNIT II **9**

UML

Unified Approach – Unified Modeling Language – Static behavior diagrams – Dynamic behavior diagrams – Object Constraint Language

UNIT III **9**

DESIGN CONCEPTS

Inception – Evolutionary Requirements – Domain Models – Operation Contracts - Requirements to Design – Design Axioms – Logical Architecture - Designing Objects with Responsibilities – Object Design – Designing for Visibility

UNIT IV **9**

DESIGN PATTERNS

Patterns – Analysis and Design patterns – GoF Patterns - Mapping designs to code – Test Driven development and refactoring – UML Tools and UML as blueprint

UNIT V **9**

ARCHITECTURE ANALYSIS

More Patterns – Applying design patterns – Architectural Analysis – Logical Architecture Refinement – Package Design – Persistence framework with patterns

TOTAL NO OF PERIODS: 45

TEXT BOOKS

*1.*Booch, Grady. Object Oriented Analysis and Design. 2nd edition, Pearson Education. 2000.

2.AliBahrami, " Object Oriented Systems Development", Tata McGraw Hill, 1999.

REFERENCES

1. Craig Larman. "Applying UML and Patterns – An introduction to Object-Oriented Analysis and Design and Iterative Development", 3rd edition, Pearson Education, 2005.
2. Fowler, Martin. UML Distilled. 3rd edition. Pearson Education. 2004.
3. Michael Blaha and James Rumbaugh, "Object-oriented modeling and design with UML", Prentice-Hall of India, 2005.

BCS603 GRID AND CLOUD COMPUTING

L	T	P	C
3	0	0	3

Course Objectives:

- Identify the technical foundations of cloud systems architectures.
- Analyze the problems and solutions to cloud application problems.
- Apply principles of best practice in cloud application design and management.
- Identify and define technical challenges for cloud applications and assess their importance.

Course Outcomes:

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

CO1: Understand the fundamental principles of distributed computing

CO2: Understand how the distributed computing environments known as Grids can be built from lower level services.

CO3: Understand the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

Cos	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S							M	
CO2	S	S		S			S				M	S
CO3	S	S		S			S					S

Course Assessment methods:

Direct	Indirect
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT- I GRID COMPUTING **9**

Introduction - Definition and Scope of grid computing, Computational and Data Grids, Current Grid Activities – Overview of Grid Business Areas, Grid Applications, Grid Computing Anatomy- Concept of Virtual Organization, Grid Architecture- Fabric layer, Connectivity layer, Resource Layer, Collective Layer, Application Layer, Layered Grid Architecture

UNIT-II CLOUD ARCHITECTURE AND MODEL **9**

Technologies for Network Based system-System Models for Distributed and Cloud Computing-NIST Cloud Computing Reference ArchitectureCloud models: Characteristics-Cloud Services-Cloud Models (IaaS, PaaS, SaaS)-Public vs. Private Cloud-Cloud Solutions-Cloud ecosystem-Service Management-Computing on demand.

UNIT-III CLOUD INFRASTRUCTURE **9**

Architectural Design of compute and Storage Clouds-Layered Cloud Architecture Development-Design Challenges-Inter Cloud Resource Management-Resource Provisioning and Platform Deployment-Global Exchange of Cloud Resources.

UNIT-IV PROGRAMMING MODEL **9**

Parallel and Distributed Programming Paradigms-Map Reduce-Twister and Iterative Map Reduce-Hadoop Library from Apache-Mapping Applications-Programming Support-Google App Engine, Amazon AWS-Cloud Software Environments-Eucalyptus, Open Nebula, Open Stack, Aneka, CloudSim.

UNIT-V SECURITY IN THE CLOUD **9**

Security Overview-Cloud Security Challenges and Risks-Software-as-a-Service-Security Security Governance-Risk Management-Security Monitoring-Security Architecture Design-Data Security-Application Security-Virtual Machine Security-Identity Management and Access Control-Autonomic Security.

TOTAL NO OF PERIODS: 45

TEXTBOOKS:

1**.** Joshy Joseph & Craig Fellenstein, "Grid Computing", PHI, PTR-2003(UNIT I)

2.Kai Hwang, Geoffrey C Fox,Jack G Dongarra "Distributed and Cloud Computing ,From parallel processing to the Internet of Things" Morgan Kaufmann Publishers,2012(Unit-II to Unit-V)

REFERENCE BOOKS:

1. John W.Rittinghouse and James F.Ransome, "Cloud Computing Implementation, Management and Security", CRC Press, 2010

2. Toby Velte, Anthony Velte, Robert Elsenpeter,"Cloud Computing, A Practical Approach", TMH, 2009.

3. Kumar Saurabh,"Cloud Computing –Insights into New-Era Infrastructure ", Wiley India, 2011

4. George Reese, "Cloud Applications Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly.

BCS 604 ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

L	T	P	C
3	1	0	4

Course Objectives:

The purpose of this course is to impart concepts of Artificial Intelligence and Expert System.

Course Outcomes:

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

CO1: Describe the modern view of AI as the study of agents that receive percepts from the Environment and perform actions.

CO2: Demonstrate awareness of informed search and exploration methods.

CO3: Explain about AI techniques for knowledge representation, planning and uncertainty Management.

CO4: Develop knowledge of decision making and learning methods.

CO5: Describe the use of AI to solve English Communication problems

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		S		M						
CO3	S	S		S		M	M					
CO4	S	S		S								M
CO5	S	S		S								

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I

PROBLEMS AND SEARCH **12**

What is artificial intelligence? - Problems, problem spaces and search – Searching strategies- Uninformed Search- breadth first search, depth first search, uniform cost seart, depth limited search, iterative deepening search, bidirectional search - Informed Search- Best first search ,Greedy Best first search , A* search – Constraint satisfaction problem , Local searching strategies.

UNIT II **12**

REASONING

Symbolic Reasoning Under Uncertainty- Statistical Reasoning - Weak Slot-And-Filler-Structure - Semantic nets – Frames- Strong Slot-And-Filler Structure-Conceptual Dependency-Scripts- CYC.

UNIT III **12**

KNOWLEDGE REPRESENTATION

Knowledge Representation - Knowledge representation issues - Using predicate logic - Representing Knowledge Using Rules. Syntactic- Semantic of Representation – Logic & slot and filler - Game Playing – Minimal search- Alpha beta cutoffs –Iteratic deepening planning – component of planning system – Goal stack planning

UNIT IV **12**

NATURAL LANGUAGE PROCESSING

Natural Language Processing –Syntactic processing, semantic analysis-Parallel and Distributed AI-Psychological modeling- parallelism and distributed in reasoning systems – Learning - Connectionist Models – Hopfield networks, neural networks

UNIT V

EXPERT SYSTEMS **12**

Common Sense –qualitative physics, commonsense ontologies- memory organization -Expert systems –Expert system shells- explanation – Knowledge acquisition -Perception and Action – Real time search- robot architecture

TOTAL NO OF PERIODS: 60

TEXT BOOKS

1. Elaine Rich, Kevin Knight, "Artificial Intelligence", 3/e, Tata McGraw Hill, 2009.
2. Russell , " Artificial intelligence :A modern Approach , Pearson Education ,3rd edition,2013

REFERENCE BOOKS

1.Artificial Intelligence and Expert system by V.Daniel hunt, Springer press,2011.

2. Nilsson N.J., "Principles of Artificial Intelligence", Morgan Kaufmann.1998.

BCS606 PRINCIPLES OF COMPILER DESIGN

L	T	P	C
3	1	0	4

Course Objectives:

- Understand types of MIS applications in organizations
- Discuss the development of management information systems in organizations.
- Select and design MIS systems appropriate to meet management requirements.

- Critically evaluate MIS contributions to the strategic management of organizations

Course Outcomes:

CO1: Explain various phases of a compiler.
CO2: Design token recognizer using modern tools.
CO3: Design Top-down and Bottom-up parsing Techniques.
CO4: Translate given input to intermediate code.
CO5: Identify various types of optimizations on intermediate code and generate assembly code.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								S
CO2	S	S		S								
CO3	S	S		S								
CO4	S	S		S								
CO5	S	S		S								

Course Assessment methods:

Direct	**Indirect**
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT - I

INTRODUCTION **12**

Compilers: Introduction-Language Processing System –Analysis of the source program – Cousins of compiler-Grouping of phases-Compiler construction tools-computer language representation-Introduction-Elements of a Formal Language Grammar-Derivation-Reduction - Parse Trees.

UNIT - II

LEXICAL ANALYZER **12**

Role of a Lexical Analyzer-Issues in Lexical Analysis-Tokens, Patterns and lexemes – Attributes for Tokens- Error recovery-Specification and Recognition of tokens-finite Automata-Non Deterministic Automata-Deterministic Finite Automata-Conversion of an NFA

into a DFA-Regular Expression to an NFA-Regular Expression to a DFA-Minimizing the number of states of a DFA-Use of a tool for Generating Lexical Analyzer.

UNIT - III

SYNTAX ANALZER **12**

Role of Parser-Error Recovery strategies-Context Free Grammar-Top down Parsing-Recursive descent parser-Predictive parser-Bottom Up Parsing-Stack implementation of shift reduce parsing-Operator precedence parsing-precedence Functions- LR Parser- Parser generator.

UNIT – IV

INTERMEDIATE CODE GENERATION **12**

Intermediate Languages-Intermediate Representations-Implementation of three address statements-Declaration-Declarations in procedure-Declarations in Nested procedures-Assignment Statements-Boolean expressions-Numerical Representation-Control flow translation of Boolean expressions- Flow Control statements-Back Patching.

UNIT - V

CODE GENERATION **12**

Introduction to Optimization Techniques –The principle sources of optimization- Issues in the Design of a Code generator- Run Time Storage Management –Static allocation-Stack allocation- Design of a Simple code generator

TOTAL NO OF PERIODS: 60

TEXT BOOK

1. A. V. Aho, Ravi Sethi, J.D. Ullman, “Compilers: Principles, Techniques & Tools”, Pearson Education, Second Edition. 2008.

REFERENCE BOOKS:

1. Allen I. Holub, “Compiler Design in C”, PHI Learning. 2009
2. Fisher Leblanc, “Crafting a Compiler with C”, Pearson Education.
3. Jean. Paul Trembley & Paul G. Sorenson, “Compiler Writing – Theory and Practice”, B.S. Publications, 2005.

BCS6L3 DATA WAREHOUSING AND DATA MINING LABORATORY

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

CO1: Provide efficient distribution of information and easy access to data
CO2: Create user friendly reporting environment.
CO3: Find the unseen pattern in large volume of historical data that helps to mange an

organization efficiently
CO4: Understand the concepts of various data mining Techniques

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							S
CO2		S	S		S							S
CO3		S	S		S				S			S
CO4		S	S		S							S

Course Assessment methods:

Direct	Indirect
1.Observation book	1.Students Exit Survey
2.Record book	2.Faculty Survey
3.Model exam	3.Industry
4.End Semester exam	4.Alumni

1. Listing applications for mining
2. File format for data mining
3. conversion of various data files
4. Training the given dataset for an application
5. Testing the given dataset for an application
6. Generating accurate models
7. Data pre-processing – data filters
8. Feature selection
9. web mining
10. Text mining
11. Design of fact & dimension tables
12. Generating graphs for star schema.

TOTAL NO OF PERIODS: 30

BCS6L2

L	T	P	C

C# AND .NET LABORATORY

0	0	4	2

COURSE OUTCOMES:

CO1: Display proficiency in C# by building stand-alone applications in the .NET framework using C#.
CO2: Create distributed data-driven applications using the .NET Framework, C#, SQL Server and ADO.NET
CO3: Create web-based distributed applications using C#, ASP.NET, SQL Server and ADO.NET
CO4: Utilize DirectX libraries in the .NET environment to implement 2D and 3D animations and game-related graphic displays and audio.
CO4: Utilize XML in the .NET environment to create Web Service-based applications and components.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S			S			S	
CO2		S	S		S			S			S	
CO3		S	S		S			S			S	
CO4		S	S		S			S			S	

Course Assessment methods:

Direct	Indirect
1.Observation book	1.Students Exit Survey
2.Record book	2.Faculty Survey
3.Model exam	3.Industry
4.End Semester exam	4.Alumni

1. Classes and objects
2. Inheritance
3. Operator overloading
4. Threading
5. Events and delegates
6. Working with windows forms controls

7. Validating data
8. Creating custom dialog box
9. Designing an MDI application with menu
10. Retrieving data from a SQL database
11. Manipulating data in a connected environment
12. Manipulating data in a disconnected environment

TOTAL NO OF PERIODS: 30

BCS6L1 NETWORKING LAB

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

CO1: Develop knowledge to implement client server applications.
CO2: Develop skills in UNIX socket programming.
CO3: Develop skills to use simulation tools.
CO4: Analyze the performance of network protocols.
CO5: Analyze the network traffic.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S	S	S							M
CO2		S		S								
CO3			S	S	S							M
CO4		S	S	S								
CO5		S	S	S	S							

Course Assessment methods:

Direct	Indirect
1.Observation book 2.Record book 3.Model exam 4.End Semester exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

1. Implement a simple TCP client-server where in a server acts as a time and date server.
2. Print a client address at server end.
3. Write a program in which a process is made to handle posix signals.

4. Program a echo UDP Server.
5. Create a daemon.
6. Create a simple Chat Program.
7. Create a simple out of band Sending and Receiving program.
8. Program to capture each packet and examine its checksum field.

TOTAL NO OF PERIODS: 30

L	T	P	C
3	0	0	3

BCS701 BIG DATA ANALYTICS

Course Objectives:

- To understand big data analytics as the next wave for businesses looking for competitive Advantage.
- To understand the financial value of big data analytics.
- To explore tools and practices for working with big data.
- To understand how big data analytics can leverage into a key component.
- To understand how to mine the data.
- To learn about stream computing.
- To know about the research that requires the integration of large amounts of data.

Course Outcomes:

CO1: Identify the need for big data analytics for a domain.
CO2: Use Hadoop, Map Reduce Framework.
CO3: Apply big data analytics for a give problem.
CO4: Suggest areas to apply big data to increase business outcome.
CO5: Contextually integrate and correlate large amounts of information automatically to gain faster insights.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									
CO2		M										
CO3		M										
CO4	M					S						
CO5			M		M							

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I

INTRODUCTION TO BIG DATA

Analytics – Nuances of big data – Value – Issues – Case for Big data – Big data options Team challenge – Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data - Security, Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools – Greenplum – Informatica.

UNIT II

DATA ANALYSIS **9**

Evolution of analytic scalability – Convergence – parallel processing systems – Cloud computing –grid computing – map reduce – enterprise analytic sand box – analytic data sets – Analytic methods –analytic tools – Cognos – Microstrategy - Pentaho. Analysis approaches – Statistical significance –business approaches – Analytic innovation – Traditional approaches – Iterative

UNIT III

STREAM COMPUTING **9**

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window – Real time Analytics Platform(RTAP)applications IBM Infosphere – Big data at rest – Info sphere streams – Data stage – Statistical analysis– Intelligent scheduler – Info sphere Streams

UNIT IV

PREDICTIVE ANALYTICS AND VISUALIZATION **9**

Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models –Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable entry -Mining Frequent item sets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent item sets in a stream – Clustering Techniques –Hierarchical – K- Means – Clustering high dimensional data Visualizations - Visual data analysistechniques, interaction techniques; Systems and applications:

UNIT V

FRAMEWORKS AND APPLICATIONS **9**

IBM for Big Data – Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 -Hadoop Distributed file systems – Hbase – Impala – Analyzing big data with twitter – Big data for Ecommerce– Big data for blogs.

TOTALNO OF PERIODS: 45

TEXT BOOKS:

1. Frank J Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley and SAS BusinessSeries, 2012.
2. Colleen Mccue, "Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis",Elsevier, 2007
3. Michael Berthold, David J. Hand," Intelligent Data Analysis", Springer, 2007.

REFERENCES:

1. AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge UniversityPress, 2012.
2. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams withAdvanced Analytics", Wiley and SAS Business Series, 2012.
3. Paul Zikopoulos, Chris Eaton, Paul Zikopoulos, "Understanding Big Data: Analytics for EnterpriseClass Hadoop and Streaming Data", McGraw Hill, 2011.
4. Pete Warden, Big Data Glossary, O'Reilly, 2011.
5. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier,Reprinted 2008.
6. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007.

BCS702 MOBILE AND PERVASIVE COMPUTING

L	T	P	C
3	0	0	3

MOBILE A

Course Objectives:

This course discuss about knowledge and skills about a new trend in mobile Computing.

Course Outcomes:

CO1: Explain the concepts and features of mobile networks.
CO2: Explain the working of wireless communication protocols.
CO3: Compare the routing protocols of mobile networks.
CO4: Explain the transport and application layer protocols of mobile networks.
CO5: Outline the basics of pervasive computing.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S									
CO2	S		S									
CO3	S		S									
CO4	S		S									
CO5	M		M									

Course Assessment methods:

Direct	Indirect
Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

MOBILE NETWORKS

Cellular Wireless Networks – GSM – Architecture – Protocols – connection establishment – FrequencyAllocation – Routing – Mobility Management – Security – GPRS.

UNIT II **9**

WIRELESS NETWORKS

Wireless LANs and PANs – IEEE 802.11 Standard – Architecture – Services – Network – HiperLAN – BlueTooth- Wi-Fi – WiMAX

UNIT III **9**

ROUTING

Mobile IP – DHCP – AdHoc– Proactive and Reactive Routing Protocols – Multicast Routing.

UNIT IV **9**

TRANSPORT AND APPLICATION LAYERS

Mobile TCP– WAP – Architecture – WWW Programming Model– WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WML Scripts.

UNIT V **9**

PERVASIVE COMPUTING

Pervasive computing infrastructure applications- Device Technology - Hardware, Human machineInterfaces, Biometrics, and Operating systems– Device Connectivity – Protocols, Security, and Device Management- pervasive Web Application architectureAccess from PCs and PDAs - Access via WAP.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.
2. Jochen Burkhardt, Pervasive Computing: Technology and Architecture of MobileInternet A pplications, Addison Wesley Professional; 3rd edition 2007.

REFERENCES:

1.Frank Adelstein, Sandeep KS Gupta, Golden Richard, Fundamentals of Mobile andPervasive Computing, McGraw-Hill 2005

2. Debashis Saha, Networking Infrastructure for Pervasive Computing: EnablingTechnologies, Kluwer Academic Publisher, Springer; 1st edition, 2002

3. Introduction to Wireless and Mobile Systems by Agrawal and Zeng, Brooks/ Cole(Thomson Learning),1st edition, 2002

3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, Principles Of Mobile Computing, Springer, New York, 2003.

BCS 703 WEB TECHNOLOGY

L	T	P	C
3	0	0	3

Course Objectives:

These courses discuss about the Client / server model and basic concepts of Internet principles

Course Outcomes:

CO1: To understand the concepts of common gateway interface programming

CO2: To Learn about socket program

CO3: Implementation of on-line applications

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S							S		
CO2		M	S									

CO3	S	M										S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I

INTRODUCTION **9**

Internet principles – Basic Web concepts – Client/Server model – Retrieving data from Internet – HTML and Scripting Languages – Standard Generalized Markup language-Next Generation Internet - Protocols and applications.

UNIT II

COMMON GATEWAY INTERFACE PROGRAMMING **9**

HTML forms – CGI concepts – HTML tags Emulation – Server-Browser communication – E-mail generation – CGI client side Applets – CGI Server side Applets – Authorization and Security.

UNIT III

SOCKET PROGRAMMING **9**

Streaming – Networking Principles – Sockets – Protocols handlers – Content handlers – Multicasting – Remote method invocation.-Activation-Serialization-Marshal streams.

UNIT IV

SERVER SIDE PROGRAMMING **9**

Dynamic Web content – Cascading Style Sheets, XML – Structuring Data-VRML-Server side includes- communication – Active and Java Server Pages.-Firewalls-Proxy Servers-XML with HTML

UNIT V

ON-LINE APPLICATIONS **9**

Simple applications – On-line Databases – Monitoring user events – Plugins – Database Connectivity-Internet information Systems-EDI application in business-Internet commerce-Customization of Internet commerce.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Paul Deitel, "Internet & World Wide Web: How to Program", Prentice Hall, 4th Edition, 2007.
2. E-Business and E-Commerce Management : S: Strategy, Implementation and Practice by Dave Chaffey, Pearson Education,2013.

REFERENCE BOOKS:

1. Jeff Frantzen and Sobotka, "Java Script", Tata McGraw Hill, 2002.
2. Eric Ladd, Jim O'Donnell, "Using HTML 4, XML and JAVA", Prentice Hall of India – QUE, 1999.
3. N.P.Gopalan&J.Akilandeswari, "Web Technology: A Developer's Perspective", PHI Learning,2008

BSE701 LINUX INTERNALS

L	T	P	C
3	0	0	3

Course Objectives:

To study the basic and administration concepts in Linux

Course Outcomes:

CO1: To introduce Linux server and various distributions.

CO2: To understand user administration and make use of internet and intranetservices.

CO3: To learn Linux process control and shell programming.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S					S			S	S
CO2	S		S					S			S	S
CO3	S		S					S			S	S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I - INSTALLING LINUX AS A SERVER 9

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

UNIT II - SINGLE – HOST ADMINISTRATION 9

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

UNIT III - INTERNET SERVICES 9

DNS, FTP-Mechanics- Installing and customizing the server, setting up webserver using Apache, SMTP - Install, configure and run postfix server, POP andIMAP, SSH - public key cryptography, creating a secure tunnel.

UNIT IV -INTRANET SERVICES 9

NFS – enable and configure NFS server and client, NIS – configuring Master and secondary NIS server and Client -NIS tools, SAMBA – Administration, Printing –Install cups – add and manage print jobs, DHCP, Virtualization.

UNIT V - LINUX PROCESS CONTROL & SHELL PROGRAMMING 9

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

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Wale Soyinka,"*Linux Administration A Beginners Guide"*, 5th edition, TataMcGraw-Hill, 2009.

2. Mc Kinnon, Mc Kinnon, "*Installing and Administrating Linux*", 2nd edition, Wiley, 2004.

REFERENCES:

1. Richard Petersen, "*Linux: The Complete Reference*", 6th edition, TataMcGraw-Hill, 2007.

2.Mark G. Sobell.*"Practical Guide to Fedora and Red Hat Enterprise Linux"*, 6th Edition, Prentice Hall, 2011.

BCS 7L1 BIG DATA ANALYTICS LAB

L	T	P	C
0	0	4	2

Course Objectives:

- To understand big data analytics as the next wave for businesses looking for competitive
  Advantage.

- To understand the financial value of big data analytics.
- To explore tools and practices for working with big data.
- To understand how big data analytics can leverage into a key component.
- To know about the research that requires the integration of large amounts of data.

Course Outcomes:

CO1: Identify the need for big data analytics for a domain.
CO2: Use Hadoop, Map Reduce Framework.
CO3: Apply big data analytics for a give problem.
CO4: Suggest areas to apply big data to increase business outcome.
CO5: Contextually integrate and correlate large amounts of information automatically to gain faster insights.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									
CO2		M										
CO3		M										
CO4	M					S						
CO5			M		M							

Course Assessment methods:

Direct	Indirect
1.Observation book 2.Record book 3.Model exam 4.End Semester exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

LIST OF EXPERIMENT

1. Summary statistics some sense of the data using R tool.
2. Calculate Hypothesis testing for sample dataset using R tool.
3. Visualization of Health care data using Greenplum.
4. Find the K-means clustering for given dataset.
5. Find the missing dataset using hadoop and map reduce.

6. Calculate mean, median, mode for the given dataset using R tool.
7. Classification using Naïve bayes approach.
8. The k-Nearest Neighbor Algorithm Using MapReduce Paradigm.

BCS7L2 WEB TECHNOLOGY LAB

L	T	P	C
0	0	4	2

COURSE OUTCOMES

Demonstrate the role of languages like HTML, DHTML, CSS, XML, Java script, ASP and protocols in the workings of the web and web applications.
CO 2: Develop web pages using HTML, DHTML and Cascading Styles sheets.
CO 3: Develop a dynamic web pages using JavaScript (client side programming).
CO 4: Develop an interactive web applications using ASP.NET.
CO 5: Build and consume web services.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							S
CO2		S	S		S							S
CO3		S	S		S							S
CO4		S	S		S							S
CO5		S	S		S							S
CO6		S	S		S							S

Course Assessment methods:

Direct	Indirect
1.Observation book 2.Record book 3.Model exam 4.End Semester exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

1. Create a HTML page, which has properly aligned paragraphs with image along with it.
2. Write a program to display list of items in different styles.
3. Create both client side and server side image maps.
4. Create your own style sheets and use them in your web page.,
5. Create a form with various fields and appropriate front and validations using any one of the scripting languages.
6. Write a program to store the form fields in a database, use any appropriate Server Slide Scripting.
7. Create a web page using XML.
8. Write a program to connect a XML web page to any database engine.

TOTAL NO OF PERIODS: 30

BSE7L1 LINUX INTERNALS LAB

L	T	P	C
0	0	4	2

COURSE OUTCOMES:

CO1: Develop knowledge to implement client server applications.
CO2: Develop skills in UNIX socket programming.
CO3: Develop skills to use simulation tools.
CO4: Analyze the performance of network protocols.
CO5: Analyze the network traffic.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	S		S							S
CO2		S	S		S							S
CO3		S	S		S							S
CO4		S	S		S							S
CO5		S	S		S							S

Course Assessment methods:

Direct	Indirect
1.Observation book 2.Record book	1.Students Exit Survey 2.Faculty Survey

3.Model exam 4.End Semester exam	3.Industry 4.Alumni

1. Basic LINUX commands
2. Shell Programming
3. Grep, sed, awk
4. File system related system calls.
5. Process management – Fork, Exec.
6. Message queues
7. Pipe, FIFO's
8. Signals.
9. Shared memory
10. Semaphores

TOTAL NO OF PERIODS: 30

BCS001 SOFTWARE RELIABILITY AND SOFTWARE TESTING

L	T	P	C
3	0	0	3

Course Objectives:

- The ability to tackle challenging computing problems using a comprehensive knowledge of computer science, while reflecting a commitment to quality, innovation, critical thinking, and continuous improvement.
- The ability of analyzing and solving complex technical problems from a broad perspective of computer science, including business, societal, and regulatory issues

Course Outcomes:

CO1: Apply knowledge of computing and of mathematics appropriate to computer science and analyze a problem, and identify and define the computing requirements appropriate to its solution.

CO2: Design, implement and evaluate a program to meet desired needs and function effectively on multi-disciplinary teams and lead a technical activity.

CO3: Understand professional, ethical, legal, security and social issues and responsibilities in computing and communicate effectively with a range of audiences.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S			S					M	
CO2	S		S			S					S	
CO3	S		S			S		S			S	

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Course & Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION TO RELIABILITY ENGINEERING

Reliability - Repairable and Non Repairable systems - Maintainability and Availability - Designing for higher reliability - Redundancy - MTBF - MTTF MDT - MTTR- k out of in systems.

UNIT II **9**

SOFTWARE RELIABILITY

Software reliability - Software reliability Vs Hardware reliability - Failures and Faults - Classification of Failures - Counting - System Configuration - Components and Operational Models - Concurrent Systems - Sequential Systems - Standby Redundant systems

UNIT III **9**

SOFTWARE RELIABILITY APPROACHES

Fault Avoidance - Passive Fault detection - Active Fault Detection - Fault Tolerance - Fault Recovery - Fault Treatment.

UNIT IV **9**

INTRODUCTION TO SOFTWARE TESTING

Software testing – Role of software testing – A structural approach to testing – Test strategy – methods for developing test strategy Testing methodologies. Test plan – Requirements testing – Walk through test tool – Risk matrix test tool – Testing for requirements phase and design phase – Design renew test tool – Test data and volume test tools.

UNIT V TESTING METHODS **9**

Installation phase testing – Tools for acceptance test – Software acceptance process – Software maintenance – Methodologies for testing – Training and change installation. Tools and techniques – Cost estimate – For testing – Testing phase of life cycle – Point accumulation tracking system – Performance analysis of testing – Inspection plan and test plan documents.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. John D. Musa, "Software Reliability", McGraw Hill, 2004.
2. Patric D. T.O Connor, "Practical Reliability Engineering", 4th Edition, John Wesley & sons, 2003
3. William Perry, “Effective Methods for Software Testing”, 3/e, John Wiley & Sons/ Wiley India, 2006.

BCS002 FUZZY AND GENETIC ALGORITHM

L	T	P	C
3	0	0	3

OBJECTIVES:

Students can understand about Fuzzy logic, Fuzzy set and defuzzification methods.

COURSE OUTCOMES:

CO 1: Learn the unified and exact mathematical basis as well as the general
CO 2: Principles of various soft computing techniques.
CO 3: Provide detailed theoretical and practical aspects of intelligent
CO 4: Modeling, optimization and control of non-linear systems.
CO 5: Prepare the students for developing intelligent systems through case

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	M	S	S								
CO3	M	S		S								
CO4	S	S		S								
CO5	S	S	M	S								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION

Uncertainty and Imprecision-Statistics and Random process - Uncertainty in information - Fuzzy sets and Membership - Chance versus ambiguity, classical Sets and Fuzzy Sets : Classical Sets - Fuzzy sets - Sets as points in hypercube, Classical Relations and Fuzzy Relations Cartesian product -Crisp Relations - Fuzzy Relations - Tolerance and Equivalence Relations - Value Assignments.

UNIT-I I **9**

MEMBERSHIP FUNCTIONS

Membership Functions: Features of Membership function - Standard forms and boundaries - Fuzzification Membership value assignments. Fuzzy to Crisp conversions: Lambda cuts for fuzzy sets - Lambda cuts for fuzzy relations- Defuzzification Methods.

UNIT-III **9**

PRINCIPLES OF FUZZY LOGIC

Fuzzy Arithmetic, Numbers, Vectors and the Extension Principle: Extension Principle- Fuzzy numbers - Internal analysis in arithmetic - Approximate methods of extension. Classical logic and fuzzy logic: Classical predicate logic - Fuzzy logic - Approximate reasoning - Fuzzy Tautologies - Other forms of the implication & composition operation.

UNIT-IV **9**

RULE BASED SYSTEMS

Fuzzy Rule Based Systems: Natural language - Linguistic hedges - Rule based systems - Graphical techniques of inference, Fuzzy Nonlinear Simulation: Fuzzy Relational Equations - Partitioning - Nonlinear Simulation using fuzzy rule based systems – FAMs, Fuzzy decision making.

UNIT-V **9**

FUZZY CLASSIFICATION

Fuzzy Classification: Classification by equivalence relations- Cluster analysis - Cluster validity - Classification metric - Hardening the fuzzy - Partition, Fuzzy Pattern Recognition : Feature

analysis-Partitions of the feature space- Single sample identification - Image processing syntactic recognition.

TOTAL NO OF PERIODS: 45

TEXTBOOKS:

1. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill International Edition 2000.
2. S. Rajasekaran and G.A.V.Pai, ,"Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2011.

REFERENCE:

1. J. Harris," An Introduction to Fuzzy Logic Applications" ,Springer, 2001.

BCS003 NATURAL LANGUAGE PROCESSING

L	T	P	C
3	0	0	3

Course Objectives:

This course is designed to introduce some of the problems and solutions of NLP, and their relation to linguistics and statistics.

Course Outcomes:

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

CO1: Outline Natural Language Processing tasks in syntax, semantics, and pragmatics.
CO2: Explain Morphology and Part of Speech Tagging.
CO3: Show how syntax parsing techniques can be used.
CO4: Explain the use of semantic analysis methods.
CO5: Relate a few applications of NLP.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		S								
CO3	S	S		S								
CO4	S	S		M								
CO5	M	S		S		M						

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION

Introduction - The issues arid difficulties in natural language processing -Linguistics and computational linguistics - Language under- standing and generation - Understanding of spoken, written and textual information.

UNIT-II **9**

PARSING AND GRAMMAR

Syntactic Parsing - English grammar - Structure of the sentence - words and organization of the lexicon - Context free and context sensitive grammar -Transformational grammar-The role of syntax analysis in semantics ATN's - Definite clause grammar and WASP parsers.

UNIT-III **9**

INTERPRETATION

Semantic interpretation - The conceptual dependency model for semantic representation - Semantic network - Frames and scripts - Semantics in the lexicon.

UNIT-IV **9**

SEMANTIC NETWORK

Discourses interpretation - The interconnections between pragmatics -Pragmatics in discourse analysis-Speech acts plan-based Theory of speech acts - Semantic network - Frame and scripts - Semantics in the lexicon.

UNIT-V **9**

CASE STUDY

Generation - Strategies for generation - Planning English referring expressions -KING, a Natural language generation systems. Typical systems - ELIZA - Baseball - GLJS - PARRY - LADDER - SOPGIE & POET current trends in NLP.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. James Alien Benjamin Cummings, "Natural language understanding", 2nd Edition 1995. Benjamin/Cummins Publishing Company.
2. Natural Language Processing by Ela kumar,2011

REFERENCE BOOK

1. Windgrad, "Language as a Cognitive Process; Syntax", Addison Wesley Publication.
2. F Popov, "Talking with Computer in Natural Language", Springer-Verlag, 1986.

BCS004 SPEECH TECHNOLOGY

L	T	P	C
3	0	0	3

Course Objectives:

- To provide knowledge in fundamentals of speech processing
- To get knowledge in speech models.

Course Outcomes:

CO1: The student will gain enough understanding of speech models

CO2: The student will understand and estimate the impact of different digital speech recognition models.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M								S		
CO2		M	S							S		

Course Assessment methods:

Direct	Indirect
1. Internal Tests	1.Students Exit Survey
2. Assignments	2.Faculty Survey
3. Seminar	3.Industry
4.Quiz	4.Alumni
5.Online Test	
6. End Semester Exam	

UNIT- I **9**

FUNDAMENTALS OF SPEECH PROCESSING

Introduction to Speech processing - applications - Fundamentals of speech processing - Analysis tools - z - Fourier - DFT transforms - FIR - IIR filters - sampling.

UNIT -II **9**

SPEECH MODELS

Digital models - Vocal tract analog and digital models - Time Domain models - Useful Performance measures - zero - crossings - voiced - unvoiced - pitch periods - correlation Functions - smoothing.

UNIT -III **9**

DIGITAL REPRESENTATION AND ANALYSIS

Digital representations of speech waveform - Encoding of speech using delta modulation - PCM - differential PCM - other systems - Short-time Fourier analysis - Short term analysis Effects - filter banks - pitch detection - vocoders.

UNIT IV **9**

HOMOMORPHIC SPEECH PROCESSING AND LINEAR PREDICTIVE CODING

Homomorphic speech processing - Cepstrum - pitch detection - formant estimation - vocoders - Linear predictive coding of speech - LPC methods and parameters - relations between speech parameters.

UNIT -V **9**

DIGITAL SPEECH PROCESSING AND RECOGNITION

Digital speech processing for man - machine communication by voice - Speech and speaker recognition - voice response systems.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.L. R. Rabiner& R. W. Schafer, "Digital Processing of Speech Signals", Prentice Hall, 2008.
2.AmyNeustein,"Advances in Speech Recognition"Springer,2010.
3.Claudio,Klucio,"Speech Recognition",Wiley 2008

REFERENCES:

1.Wai C. Chu,,"Speech Coding Algorithms: Foundation and Evolution of Standardized Coders", John Wiley & Sons,2003.
2.JavierRamírez, Juan Manuel Górriz," Recent Advances in Robust Speech Recognition Technology", ,2011.

BCS 005 **SOFT COMPUTING**

L	T	P	C
3	0	0	3

Course Objectives:

- To learn the key aspects of Soft computing.
- To know about the components and building block hypothesis of Genetic algorithm.
- To understand the features of neural network and its applications.
- To study the fuzzy logic components.
- To gain insight onto Neuro Fuzzy modeling and control.
- To gain knowledge in machine learning through Support vector machines.

Course Outcomes:

CO 1: Implement machine learning through neural networks.

CO 2: Gain Knowledge to develop Genetic Algorithm and Support vector machine based machine learning system

CO 3: Write Genetic Algorithm to solve the optimization problem

CO 4: Understand fuzzy concepts and develop a Fuzzy expert system to derive decisions.

CO 5: Able to Model Neuro Fuzzy system for data clustering and classification.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S		S								
CO2	S	S		S								
CO3	S	S		S								
CO4	S	S	S	S								
CO5	S	S		S		M						

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I

INTRODUCTION TO SOFT COMPUTING **9**

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT-II

GENETIC ALGORITHMS **9**

Introduction, Building block hypothesis, working principle, Basic operators and Terminologies like individual, gene, encoding, fitness function and reproduction, Genetic modeling: Significance of Genetic operators, Inheritance operator, cross over, inversion & deletion, mutation operator, Bitwise operator, GA optimization problems, JSPP (Job Shop Scheduling Problem), TSP (Travelling Salesman Problem),Differences & similarities between GA & other traditional methods, Applications of GA.

UNIT-III

NEURAL NETWORKS **9**

Machine Learning using Neural Network, Adaptive Networks – Feed Forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning– Unsupervised Learning Neural Networks – Adaptive Resonance Architectures – Advances in Neural Networks.

UNIT-IV

FUZZY LOGIC **9**

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT-V

NEURO-FUZZY MODELING **9**

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification andRegression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-FuzzyControl – Case Studies.

TOTAL NO OF PERIODS: 45

TEXTBOOKS

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India, 2003

2. Kwang H.Lee, “First course on Fuzzy Theory and Applications”, Springer–VerlagBerlinHeidelberg, 2005.

3. James A. Freeman and David M. Skapura, “Neural Networks Algorithms, Applications, and Programming Techniques”, Pearson Education., 2003.

4. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 2007.

REFERENCES

1.Mitsuo Gen and RunweiCheng,”Genetic Algorithms and Engineering Optimization”, Wiley Publishers 2000.

2.S.N.Sivanandam, S.N.Deepa, “Introduction to Genetic Algorithms”, Springer, 2007.

3. ROSS TIMOTHY J, Fuzzy Logic with Engineering Applications, Wiley India Pvt Ltd, New Delhi, 2010.

BCS006 PARALLEL COMPUTING

L	T	P	C
3	0	0	3

Course Objectives:

- To learn the key aspects of soft computing.
- To know about the components and building block hypothesis of Genetic algorithm.
- To understand the features of neural network and its applications.
- To study the fuzzy logic components.
- To gain insight onto Neuro Fuzzy modeling and control.
- To gain knowledge in machine learning through Support vector machines

Course Outcomes:

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

CO1: Be able to reason about ways to parallelize a problem.
CO2: Be able to evaluate a parallel platform for a given problem.
CO3: Become familiar with programming with MPI and Vector processor.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S	M	S								
CO3	S	M		S								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

PARALLEL COMPUTING MODELS &PROGRAM

The state of computing. Multiprocessors & Multi computers, Multi vector & SIMD Computers, PRAM&VLSI Models, Architectural Development Tracks, Conditions of Paralleling Programming, Partitioning & Scheduling, Programming flow mechanism. System interconnect Architecture.

UNIT-II **9**

PARALLEL COMPUTER PERFORMANCE & HARDWARE TECHNOLOGIES

Performance Metrics & Measures, Parallel Processing Application, Speedup performance laws, Scalability analysis & approaches.Processors & memory hierarchy.Advanced processortechnology. Superscalar & Vector processes, Memory hierarchy technologies. Virtual Memory Technology.

UNIT-III **9**

BUS, CACHE, MEMORY & PIPELINING TECHNIQUES

Backup bus system, Cache memory organization.Shared memory organization, Sequence & Weak consistency models. Linear pipeline processes - nonlinear pipeline processes. Instruction pipeline design, arithmetic pipeline design, Superscalar & Super pipeline design.

UNIT-IV **9**

MULTIPROCESSORS & MULTI COMPUTERS

Multiprocessor system interconnects. Cache coherence & synchronous mechanisms, Three generation of multi computers.Message-passing mechanism.Principles of multithreading, Fine-grained multi' computers, Calable& Multithreaded architecture, Dataflows Hybrid architecture.

UNIT-V **9**

SOFTWARE FOR PARALLEL PROGRAMMING

Parallel programming models, parallel layers & compilers, dependency analysis of data arrays, code optimization & scheduling, Loop parallelization & pipelining, Multiprocessor mix design goals.

TOTAL NO OF PERIODS: 45

TEXTBOOK:

1. Kai Hwang, "Advanced Computer Architecture, Parallel Scalability Programmability"-Tata McGraw Hill,2012.

2. Parallel computing: theory and practice, Michael Quinn, TMH Edition, 2002.

BCS007 REAL TIME SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives:

This course is an introduction to parallel computing and aims at teaching basic models of parallel machines and tools to program them. It is an introduction to parallel programming, how to parallelize programs.

Course Outcomes:

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

CO1:To present the mathematical model of the system.

CO2:To develop real-time algorithm for task scheduling.

CO3:To understand the working of real-time operating systems and real-time database.

CO4:To work on design and development of protocols related to real-time communication.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S								S
CO2	S	M	S	M								S
CO3	S	M	S									S
CO4		S	S	M								S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION

Issues in real-time system.Task classes.Architecture issues.Operating system, Operating system issues. Performance measure for real time systems, Estimating program Runtimes. Classical uniprocessor scheduling algorithm. Uniprocessor scheduling of IRIS tasks. Task assignment, Mode changes. Fault Tolerance scheduling.

UNIT-II **9**

PROGRAMMING LANGUAGES AND TOOLS

Introduction desirable language characteristics, Data typing. Control structure, Facilitation

hierarchical decomposition. Packages, Exception handling, Overloading and generics. Multitasking, Low-level Programming, Task scheduling, timing specification, Programming environments, Run-time support.

UNIT-III **9**

REAL-TIME DATABASE AND COMMUNICATION

Basic definitions.Real time vs. general purpose database.Main memory databases.Transaction priorities. Transaction aborts. Concurrency control issues, Disk scheduling algorithms. Two-phase approach to improve predictability, Maintaining serialization consistency. Database for real-time systems, Communication network topologies.Communication Protocols.

UNIT-IV **9**

FAULT-TOLERANCE TECHNIQUES

Introduction, Failure causes, Fault types, Fault detection, Fault and Error containment. Redundancy, Data diversity, Reversal checks, Malicious or Byzantine failures, Integrated failure handling.

UNIT-V **9**

RELIABILITY AND CLOCK SYNCHRONIZATION

Introduction Obtaining parameter values, Reliability models for hardware redundancy. Software error models, Taking time into account Clock synchronization, Non fault-tolerant synchronization algorithms, Impact of faults, Fault tolerant synchronization in hardware. Synchronization in hardware.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, McGraw Hill, 2010.
2. Jane W. S. Liu, Real-time Systems, Prentice Hall, 2000.

BCS008 **DISTRIBUTED OPERATING SYSTEM**

L	T	P	C
3	0	0	3

CourseObjectives:

- To provide hardware and software issues in modern distributed systems.
- To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
- To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.

Course Outcomes:

CO1:To provide hardware and software issues in modern distributed systems.
CO2:To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems.
CO3:To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S									S
CO2		S	S	M								S
CO3	S	M	S									S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT- I **9**

Modes of communication, System Process, Interrupt Handling, Handling Systems calls, Protection of resources &Resources Management Micro-Kernel Operating System.

UNIT- II **9**

Review of Network Operating System and Distributed Operating System, Issue in the design of Distributed Operating System, Overview of Computer Networks. Inter process communication, Linux, IPC Mechanism, Remote Procedure calls, RPC exception handling, Security issues, RPC in Heterogeneous Environment (case study Linux RPC)

UNIT -III **9**

Clock Synchronization, Logical clocks, Physical clocks, clock synchronization algorithms, Mutual Exclusion, Election Algorithms, Dead locks in Distributed Systems. Thrashing, Heterogeneous DSM, Resource Management (Load Balancing approach, Load Sharing approach), Process Management: process Migration, Thread.

UNIT- IV **9**

Overview of shared memory, consistency model, Page based Distributed Shared Memory, Shared –variable Distributed Memory, Object -based Distributed Memory.

UNIT- V **9**

File models, File access, File sharing, file-caching, File Replication, fault Tolerance, Network File System, (Case study, 8NFS on Linux Directory Services, Security in Distributed File system).

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. M. Beck et al," Linux Kernel Programming",3rd edition, 2002.
2. B.W. Kernighan and R Pide, "The Unix Programming Environment ", Prentice Hall of India-2000.

REFERENCES:

1. Silberschatz, P.B.Garvin, Gagne," Operating System Concepts", 2009.

BCS009 EMBEDDED SYSTEM

L	T	P	C
3	0	0	3

Course Objectives:

- To study the software designing used in embedded systems.
- To study the object oriented analysis and design for real time systems.
- To study the development activities of real time system using UML.

Course Outcomes:

CO1: Apply Object Structure and Behavior analysis in real time design
CO2: Apply the concept of architectural design in practical applications
CO3: Apply objects and classes concepts in real time applications

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S							S				
CO2	S	M		M				S				
CO3	S	M						S				M

Course Assessment methods:

Direct	Indirect

1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT- I **9**

REVIEW OF EMBEDDED HARD WARE

Gates - Timing Diagram - Memory - Microprocessor - Buses - Direct Memory Access - Interrupts - Built ins on the Microprocessor - Convention Used on Schematic - Schematic - Interrupts Microprocessor Architecture - Interrupt Basics - Shared Data Problem - Interrupt Latency.

UNIT- II **9**

MICROCHIP PIC MICRO CONTROLLER

Introduction - CPU Architecture - Registers - Instruction Sets - Addressing Modes - Loop Timing - Timers - Interrupts Timing - I/O Exception - I2 C Bus Operation - Serial EEPROM - Analog to Digital Converter - UART - Baud Rate - Data Handling - Initialization - Special features - Serial Programming - Parallel Slave Port.

UNIT-III **9**

EMBEDDED MICROCOMPUTER SYSTEM

Motorola MC68H11 Family Architecture - Registers - Addressing Modes Programs - Interfacing Methods - Parallel I/O Interface - Parallel Port Interface - Memory Interfacing - High Speed I/O Interfacing - Interrupts- Interrupt Service Routine - Features of Interrupts - Interrupt Vector - Priority - Timing Generation & Measurement - Input capture - Output Compare - Frequency measurement - Serial I/O Devices - RS 232, RS485 - Analog Interfacing - Applications.

UNIT- IV **9**

SOFTWARE DEVELOPMENT

Round Robin - Round Robin with Interrupts - Function - Queue Scheduling Architecture & Algorithms - Introduction to - Assemblers, Compliers, Cross Compliers, Integrated Development environment(IDE) - Object Oriented Interfacing - Recursion - Debugging Strategies - Simulators .

UNIT V **9**

REAL TIME OPERATING SYSTEM

Task & Task States - Tasks & Data - Semaphores & Shared Data - Operating System Services - Message Queues - Timer Functions - Event Memory Management - Interrupt Routines & RTOS Environment - Basic design Using RTOS.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. David E. Simon, "An Embedded Software Primer", Pearson Education, 2004
2. Jonartthan W. Valvano, "Embedded Micro Computer System: Real Time Interfacing", Thomson Learning, 2001.

REFERENCES:

1. Laplante, Ovaska,"Real-Time Systems Design and Analysis: Tools for the Practitioner", 4th Edition,Wiley, 2013.
2. Bruce Schneier, Niels Ferguson, "Practical Cryptography", Wiley Dreamtech India Pvt. Ltd., 2003.

BCS010 MIDDLEWARE TECHNOLOGIES

L	T	P	C
3	0	0	3

Course Objectives:

- The course provides details about the modern component platforms.
- Based on practical examples, details about modern middleware technologies will be analyzed.
- Students get the chance to gain in-depth knowledge about their favorite middleware platform.

Course Outcomes:

CO1: Thoroughly, individually, describe the most important aspects when using middleware technologies

CO2: Be able to, in group, develop a component-based application based on middleware technology.

CO3: Be able to individually judge existing or new middleware frameworks in comparison to historical and today's solutions

CO4: Individually, in detail describe differences and similarities in different middleware platforms.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S			S						
CO2	S	M	S	M		S						

CO3	S	M	S			S						
CO4	S	S	S	M		S						M

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

CLIENT / SERVER CONCEPTS

Client – Server – File Server, Database server, Group server, Object server, Web server .Middleware – General Middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

UNIT II **9**

EJB ARCHITECTURE

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

UNIT III **9**

EJB APPLICATIONS

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

UNIT IV **9**

CORBA

CORBA – Distributed Systems – Purpose - Exploring CORBA alternatives – Architecture overview – CORBA and networking model – CORBA object model – IDL – ORB - Building an application with CORBA.

UNIT V **9**

COM

COM – Data types – Interfaces – Proxy and Stub – Marshalling – Implementing Server / Client – Interface Pointers – Object Creation, Invocation , Destruction – Comparison COM and CORBA – Introduction to .NET – Overview of .NET architecture – Marshalling - Remoting.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002.
2. Tom Valesky,"Enterprise Java Beans", Pearson Education, 2002.

REFERENCES:

1.Jesse Liberty, "Programming C#", 2nd Edition, O'Reilly Press, 2002.
2. Mowbray, "Inside CORBA", Pearson Education, 2002.
3.Jason Pritchard,"COM and CORBA side by side", Addison Wesley, 2000.

BCS011 UNIFIED MODELING LANGUAGE

Course Objectives:

- Create a requirements model using UML class notations and use-cases based on statements of user requirements, and to analyze requirements models given to them for correctness and quality.
- Create the OO design of a system from the requirements model in terms of a high-level architecture description, and low-level models of structural organization and dynamic behavior using UML class, object, and sequence diagrams.
- Comprehend enough Java to see how to create software the implements the OO designs modeled using UML

Course Outcomes:

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

CO1: Implementation of the diagrams in Unified Modeling Language
CO2: The Difference between Static and Dynamic Diagrams
CO3: Create and analyze activity and state diagrams
CO4: Present the transition from business events to use cases

L	T	P	C
3	0	0	3

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S	S				S			S	
CO2	M		S					S			S	
CO3	M		S					S			S	

Course Assessment methods:

Direct	Indirect

1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION

Importance of Modeling, Principles of Modeling, Object Oriented Modeling, Overview of UML, Conceptual Model of UML. Architecture, Software Development Life Cycle, An example. Basic Structural Modeling Classes, Relationships.

UNIT-II **9**

COMMON MECHANISMS AND DIAGRAMS

Common Mechanism concepts.Common Modeling Techniques, Diagrams and Class Diagrams.

U**NIT-III** **9**

ADVANCED STRUCTURAL MODELING

Advanced Classes, Advanced relationships.Interfaces, Types and Roles, Packages, Instances, Object Diagrams.

UNIT-IV **9**

BEHAVIOUAL MODELING

Interactions, Use cases, Use case diagrams. Interaction Diagrams, Activity Diagrams, Events and Signals, State Machines, Processes and Threads, Time space.

UNIT-V **9**

ARCHITECTURAL MODELING

Components, Deployments, Collaborations, Patterns and Frameworks. Component diagrams. Deployment diagrams. System and Models, Applying UML

TOTAL NO OF PERIODS: 45

TEXTBOOKS:

1. Grady Booch, James Rumbaugh, Ivan Jacobson, “The Unified Modeling Language User Guide”, Pearson Education, 2005.
2. Design Patterns by Erich Gamma, Pearson Education, 2014.

REFERENCE BOOK:

1. Satzinger: Object Oriented analysis and Design,2010.

BCS012 SOFTWARE ARCHITECTURE

L	T	P	C
3	0	0	3

Course Objectives:

- The objective of the course is to provide postgraduate students with a sound technical exposure to the concepts, principles, methods, and best practices in software architecture

Course Outcomes:

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

CO1:Design and motivate software architecture for large scale software systems.
CO2: Recognize major software architectural styles, design patterns, and frameworks.
CO3: Describe a software architecture using various documentation approaches
CO4: Use well-understood paradigms for designing new systems.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S					S			S	
CO2			S					S			S	
CO3			S			M		S			S	
CO4									S		S	

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION TO SOFTWARE ARCHITECTURE

The architecture business cycle - where do architectures come from? Software process and architecture business cycle. "Good" Architecture. Software architecture, Architectural styles,

reference models & reference architecture. Other viewpoint, Architectural structures. A-TE : A case study in utilizing Architectural structures.

UNIT-II **9**

QUALITY OF ARCHITECTURE

Creating and Analyzing architecture - Quality attributes, architectures & Quality attributes. Means for achieving Qualities. Moving from Quality to Architecture: Architectural styles, Introduction, Organization, Refinements of styles, Using styles, Achieving Quality goals.

UNIT-III **9**

CASE STUDIES

Unit operations - Introduction, Applications, Ramifications of addressing Quality attributes. The World Wide Web: A case study of Interoperability COBRA: A case study of an Industry standard computing Infrastructure.

UNIT-IV **9**

ANALYSIS

Analyzing development qualities at the architecture level : The software architecture Analysis method. Analyzing software architecture. Overview, Examples of SAAM. Applications, SAAM applied to a financial management system, observations on SAAM architecture reviews Air Traffic Control: A case study in designing for high availability.

UNIT-V **9**

VISION OF SOFTWARE ARCHITECTURE

Moving from architectures to systems.Architecture description languages, Architecture Based development, Reusing Architectures. Product lines: Reusing architectural assets within an organization. Software architecture in the future,

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Software Architecture in Practice - Len Bass, Paul, Elements, Rick Kazman Set Series in Software Engineering, 2007.
2. Essential Skills for Software Architects, Dave Hendrickson, Addison Wesley 1st edition, 2011.

REFERENCES:

1. Taylor R. N, Medvidovic N, Dashofy E. M, “Software Architecture:Foundations, Theory, and Practice”, Wiley, 2009.
2. Len Bass, Paul Clements, Rick Kazman, “Software Architecture in Practice”, 3rd edition Pearson, 2013.

BCS013 SOFTWARE QUALITY MANAGEMENT

L	T	P	C
3	0	0	3

Course Objectives:

- To understand how to choose appropriate quality goals and to select, to plan, and to execute quality assurance activities throughout development and evolution to predictably meet quality and schedule goals.
- To study the software quality engineering metrics and models

Course Outcomes:

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

CO1: Employ software metrics and models in software development

CO2: select the best quality assurance plan during development

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S			M			S		M	
CO2			S			S					S	M

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering - Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

UNIT II **9**

SOFTWARE ENGINEERING PRINCIPLES

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management.

UNIT III **9**

SOFTWARE QUALITY ASSURANCE MODELS

Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Models for Quality Assurance - ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

UNIT IV **9**

SOFTWARE PROCESSES & TESTING

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing - Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

UNIT V **9**

TQM

Total Quality Management - Introduction, Software reuse for TQM, Software testing method for TQM, Defect Prevention and Total Quality Management, Zero Defect Software Development, Clean room Engineering.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1. Allan Gillies, "Software quality Theory & Management ",Thomson international Press,2011
2. AmitavaMitra, "Fundamentals of Quality Control and Improvement" ,Wiley, 2008.

REFERENCES:

1. Roger Pressman, "Software Engineering ", 8th edition, McGraw Hill, 2015.
2. Kim H. Pries, Jon M. Quigley, "Total Quality Management for Software", CRC Press, 2005.

BCS014 SOFTWARE PROJECT MANAGEMENT

L	T	P	C
3	0	0	3

Course Objective:

- To provide students with a clear understanding of the unique risks, issues, and critical success factors associated with technology projects.
- To introduce students to the role and function of project management

Course Outcomes:

CO1: It Enables the students understand what is a product, project and process is.

CO2: It enables students understand the lifecycle for a software project.

CO3: It enables students understand how the quality of a software product is calculated.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S		S				S			
CO2			S			S			M		S	
CO3	M	S				M			S		S	S

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION TO SPM

Exposure to Software Project Management: Software development as a project, Stakeholders in software project, Software product, process, resources, quality, and cost, Objectives, issues, and problems relating to software projects.

UNIT II

PLANNING **9**

Overview of Project Planning: Steps in project planning; Defining scope and objectives; work breakdown structure; Deliverables and other products.

UNIT III **9**

EFFORT AND COST ESTIMATION

Software Effort Estimation: Problem in software estimation; Effort estimation techniques COCOMO model.

Risk Analysis and Management: Nature and categories of risk in software development; risk Identification; Risk assessment; Risk mitigation, monitoring, and management.

UNIT IV **9**

SOFTWARE DEVELOPMENT MODELS

Selection of Appropriate Project Approach: Rapid application development; Waterfall model; V-process model; Spiral model; Prototyping, Incremental delivery.

UNIT V **9**

SOFTWARE QUALITY ASSURANCE

Software Quality Assurance : Planning for quality; Product versus process quality management; Procedural and quantitative approaches; Defect analysis and prevention; Statistical process control; Pareto analysis; Causal analysis; Quality standards; ISO 9000; Capability Maturity Model; Quality audit.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Bob Hughes and Mike Cotterell," Software Project Management", Tata McGraw-Hill Edition,2010
2. Joel Henry ,"Software Project Management" , Pearson Education,2009.
3. Pankaj Jalote ,"Software Project Management in practice" , Pearson Education.2005

REFERENCES:

1. S. A. Kelkar ,"Software Project Management" , ,PHI,2012.
2. Roger S.Pressman, "Software Engineering - A Practitioner's Approach", 7th Edition McGraw Hill, 2010.

L	T	P	C
3	0	0	3

BCS015 COMPONENT BASED SYSTEM DESIGN

Course Objectives:

- To introduce the concept of distributed component architectures, including its relationship to the object-oriented programming paradigm.
- To demonstrate the importance of reusability and focuses on design pattern and frameworks in distribute component architecture.
- To introduce different component frameworks, including Enterprise Java Beans, COM, CORBA, Web Services and discuss interoperability.
- Between applications built in different frameworks using .NET.
- To present primary issues in component frameworks, including events
- Properties, introspection and reflection, persistence, and packaging will be thoroughly reviewed.
- To describe software architecture and its evaluation mechanism for supporting components and theoretical foundations of components

Course Outcomes:

CO1: Fundamentals of Component Based Development
CO2: Design of software components and management
CO3: CORBA, COM, EJB technologies

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S		S				S			
CO2			S		M	S			M		S	
CO3	S				S				S		S	

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4. Online Test 5. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

BASIC CONCEPTS

Software Components - Component models and Component Services-myths in Component Based Technology - Risk Factors - Success Factors, Component Based Software Development.

UNIT- II **9**

COMPONENTS, ARCHITECTURE AND PROCESS

Component Architecture, Component Frameworks, Component Development, Component distribution and acquisition, Component assembly, markets and components.

UNIT-III **9**

DESIGN OF SOFTWARE COMPONENT

Software Components and the UML Component Infrastructures - Business Components - Components and Connectors - Designing Models of Modularity & Integration.

UNIT IV **9**

MANAGEMENT OF COMPONENT BASED SOFTWARE SYSTEMS

Measurement and Metrics for Software Components - Selecting the right Components - Software Component Project Management - Trouble with Testing Components - Configuration Management and Component Libraries - Evolution Maintenance of Management of Component based Systems.

UNIT -V **9**

COMPONENT TECHNOLOGIES

Overview of the Following Component Models: CORBA, COM+, Enterprise Java Beans, Software Agents.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.Clemens Szyperski, "Component Software - Beyond object oriented programming", Pearson Education, 2nd edition, 2004.

2.GeorgeT.Heinemen, William T. Council," Component Based Software Engineering",2001.

REFERENCES:

1. Thomas J..Mowbray, William A.Ruh, "Inside CORBA Distributed Object Standards and Applications", Addison - Wesley, 2001.

2.DaleRojerson, "Inside COM", Microsoft Press, 2001.

3.Andreas Vogel, Keith Duddy "Java Programming with CORBA" John Wiley & Sons,3rd edition,2001.

BCS016 TCP/IP PRINCIPLES AND ARCHITECTURE

L	T	P	C
3	0	0	3

Course objectives:

- To provide a solid foundation for understanding the communication process of the Internet
- Provide exposure to fundamental concepts of computer networking in the context of the TCP/IP model and protocols.

Course Outcomes:

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

CO1: Explain the principles of internetworking protocols.

CO2: Summarize the functions of transport protocols.

CO3: Explain the concepts of routing, sub netting and super netting.

CO4: Get an exposure to various next generation protocols in internetworking.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S					S						
CO2	S	M				S						
CO3	S	M										
CO4	M					M						

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT- I **9**

INTRODUCTION

Protocols and standards - OSI model - TCP/ IP protocol suite - addressing -Version - Underlying technologies.

UNIT -II **9**

IP ADDRESSES, ROUTING, ARP AND RARP

Classful addressing - other issues - Subnetting - Supernetting - classless addressing - routing methods - delivery - table and modules - CIDR - ARP package - RARP.

UNIT-III **9**

IP, ICMP, TGMP AND UDP

Datagram - fragmentation - options - checksum - IP package - ICMP - messages, formats - error reporting - query - checksum - ICMP package - IGMP - messages, operation - encapsulation - IGMP package - UDP - datagram - checksum - operation - uses - UDP package.

UNIT- IV **9**

TCP, UNICAST AND MULTICAST ROUTING PROTOCOLS

Services - flow, congestion and error control - TCP package and operation - state transition diagram - unicast routing protocols - RIP - OSPF - BGP - multicast routing - trees - protocols - MOSPF - CBT - PIM.

UNIT- V **9**

APPLICATION LAYER, SOCKETS

Client server model - concurrency - processes - sockets - byte ordering - socket system calls - TCP and UDP client-server programs - BOOTP -DHCP - DNS - name space, resolution - types of records - concept - mode of operation - Rlogin.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.Behrouz A. Forouzan, "TCP/IP Protocol Suite", 4th edition, McGraw Hill, 2013.

2.Douglas E. Comer, "Internetworking with TCP/IP: principles, protocols and architecture" (Volume1), 6th Edition, PHI Learning, 2013.

REFERENCES:

1. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP, design, implementation and internals Volume 2, 3rdEdition, PHI Learning, 2009.

2. Ed Tittel, Laura Chappell, "TCP/IP", 1st Edition, Cengage Learning, 2008.

3. Dr. SidnieFeit, TCP/IP, architecture, protocols and implementation with IPv6 and IP Security, Tata McGraw-Hill, 2008.

BCS017 PERFORMANCE EVALUATION IN COMPUTER SYSTEMS

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the mathematical foundations needed for performance evaluation of computer Systems
- To understand the metrics used for performance evaluation
- To understand the analytical modeling of computer systems
- To enable the students to develop new queuing analysis for both simple and complex systems
- To appreciate the use of smart scheduling and introduce the students to analytical techniques for evaluating scheduling policies.

Course Outcomes:

CO1: Analyze a given problem for possibilities of parallel computations

CO2: Select algorithms and hardware for the solution of high performance projects

CO3: Program computers with shared and distributed memory architectures

CO4: Use appropriate programming languages efficiently for scientific computations

CO5: Run parallel programs on different hardware architectures and software environments.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S											S
CO2	S	M										
CO3	S	M	M					M	M			
CO4	M											M
CO5	S				M							S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I

OVERVIEW OF PERFORMANCE EVALUATION 9

Need for Performance Evaluation in Computer Systems – Overview of Performance Evaluation Methods – Introduction to Queuing – Probability Review – Generating Random Variables for Simulation – Sample Paths, Convergence and Averages – Little's Law and other Operational Laws – Modification for Closed Systems.

UNIT-II

MARKOV CHAINS AND SIMPLE QUEUES 9

Discrete-Time Markov Chains – Ergodicity Theory – Real World Examples – Google, Aloha – Transition to Continuous-Time Markov Chain – M/M/1 and PASTA.

UNIT-III

MULTI-SERVER AND MULTI-QUEUE SYSTEMS 9

Server Farms: M/M/k and M/M/k/k – Capacity Provisioning for Server Farms – Time Reversibility and Burke's Theorem – Networks of Queues and Jackson Product Form – Classed and Closed Networks of Queues.

UNIT-IV

REAL-WORLD WORKLOADS **9**

Case Study of Real-world Workloads – Phase-Type Distributions and Matrix-Analytic Methods – Networks with Time-Sharing Servers – M/G/1 Queue and the Inspection Paradox – Task Assignment Policies for Server Farms.

UNIT-V

SMART SCHEDULING IN THE M/G/1 **9**

Performance Metrics – Scheduling Non-Preemptive and Preemptive Non-Size-Based Policies - . Scheduling Non-Preemptive and Preemptive Size-Based Policies – Scheduling - SRPT and Fairness.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1. MorHarchol - Balter, "Performance Modeling and Design of Computer Systems – Queueing Theory in Action", Cambridge University Press, 2013.
2. LievenEeckhout, "Computer Architecture Performance Evaluation Methods", Morgan and Claypool Publishers, 2010.

REFERENCE

1. Paul J. Fortier and Howard E. Michel, "Computer Systems Performance Evaluation and Prediction", Elsevier, 2003.

BCS018 ADVANCED COMPUTER NETWORKS

L	T	P	C
3	0	0	3

Course Objectives:

The objective of Advanced Computer Networks is to cover theoretical topics in the areas of advanced networking technologies, distributed computing.

Course Outcomes:

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

CO1: Analyze a given problem for possibilities of parallel computations
CO2: Select algorithms and hardware for the solution of high performance projects
CO3: Program computers with shared and distributed memory architectures
CO4: Use appropriate programming languages efficiently for scientific computations
CO5: Run parallel programs on different hardware architectures and software environments.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S		S									
CO2	S	M	M	S								
CO3	M	M	M	M								
CO4	M		S									M
CO5	S			S	M							

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I

NETWORK ARCHITECTURE **9**

Review of Basic Network Architectures: OSI reference model, TCP/IP reference model, ATM reference model; Applications(WWW, Audio/Video Streaming, Video conference, Networked Games, Client/Server); Traffic Characterization (CBR, VBR); Switching Paradigms; Multiplexing; Error Control; Flow Control, FTH, DTH, PON, ISDN, DSL, CATV, SONET, Optical Networks.

UNIT-II

NETWORK TECHNOLOGIES **9**

Local Area Network Technologies: Fast Ethernet, Gigabit Ethernet, IEEE 802.11 WLAN, Bluetooth, Connecting LANs, VLANS.

UNIT-III

ROUTING AND ITS TYPES **9**

Internetworking: Interdomain Routing, BGP, IPv6, Multicast Routing Protocols, Multi Protocol Label Switching, Virtual Private Networks, High speed transport protocols, Quality of Service Mechanisms, Improving QoS in Internet, DiffServ and IntServ Architectures, RSVP.

UNIT-IV

DOMAIN NAME SYSTEMS **9**

Distributed Systems: Naming, DNS, DDNS, Paradigms for Communication in Internet, Caching, Issues of Scaling in Internet and Distributed Systems, Caching Techniques forWeb,

Protocols to Support Streaming Media, Multimedia Transport Protocols, Content Delivery Networks, Overlay and P2P Networks.

UNIT-V

ATTACKS AND SECURITY IN NETWORK **9**

Applications and Other Networking Technologies: RTP, RTSP, SIP, VoIP, Security Systems, SSH, PGP, TLS, IPSEC, DDoS Attack, Mitigation in Internet, Security in MPLS; Introduction to Cellular, Satellite and Ad hoc Networks.

TOTAL NO OF PERIODS: 45

REFERENCES:

1. Behrouz A. Forouzan, Data Communications and Networking, Fourth Ed., Tata McGraw Hill, 2006.
2. Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Fourth Ed., Morgan Kaufmann, 2007.
3. Markus Hoffmann and Leland R. Beaumont, Content Networking: Architecture, Protocols, and Practice, Morgan Kauffman, 2005.

BCS019 MOBILE COMMUNICATION

L	T	P	C
3	0	0	3

Course Objectives:

This course is designed to all student understand about medium access control (MAC), Wireless LAN, Bluetooth.

Course Outcomes:

CO1: Explain the concepts and features of mobile networks.
CO2: Explain the working of wireless communication protocols.
CO3: Compare the routing protocols of mobile networks.
CO4: DLL and MAC layer protocols for reliable and noisy channels.
CO5: TCP & UDP protocols.
CO6: Radio signal propagation and properties of wireless communication systems.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1	S		S									
CO2	S		S									
CO3	S		S									
CO4	S		S									
CO5	S		S		M							

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT – I

INTRODUCTION **9**

Medium access control – Telecommunication systems – Broadcast systems-SDMA-TDMA-FDMA-TCP/IP-UDP.

UNIT-II **9**

STANDARDS

Wireless LAN: Features-Security standards –Protocol Stack- IEEE 802.11: Standards-Architecture-Frame format-Features –HIPERLAN: Architecture-Standards – Bluetooth and Its Application.

UNIT-III **9**

ADHOC NETWORKS

Characteristics-Performance issues- Routing in mobile hosts-Applications of Ad hoc wireless networks-Issues in Ad hoc networks: Medium Access Scheme-Security-Energy management-Deployment Considerations.

UNIT-IV **9**

NETWORK ISSUES

Mobile IP - DHCP - Mobile transport layer - Indirect TCP - Snooping TCP -Mobile TCP - Transmission time-out freezing - Selective retransmission -Transaction oriented TCP.

UNIT-V **9**

APPLICATION ISSUES

Wireless application protocol - Dynamic DNS - File systems - Synchronization protocol -

Context- aware applications - Security - Analysis of existing wireless network.

TOTAL NO OF PERIODS: 45

TEXTBOOK

1. J. Schiller, "Mobile Communications", 2nd Edition, Pearson Education, 2005.
2. William Stallings, "Wireless Communications and Networks", Pearson Education, 2002

REFERENCES

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", 1st Edition, Pearson Education, 2003.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, 2003.
3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.

BCS020 HIGH SPEED NETWORKS

L	T	P	C
3	0	0	3

Course Objectives:

- This course gives an overview of High speed computer networks and TCP/IP protocols. It also discusses the security and network management aspects.

Course Outcomes:

CO1: To learn High speed networks, Traffic and congestion management.
CO2: To understand resource allocation and service management approaches.
CO3: To study wireless network operations and functions.
CO4: To learn network management and its protocols.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	S	S								
CO2		M	S	S								
CO3			S	S								
CO4			S	S								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments	1.Students Exit Survey 2.Faculty Survey

3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	3.Industry 4.Alumni

UNIT-I

HIGH SPEED NETWORKS **9**

Introduction-frame relay networks –ATM protocol architecture-ATM logical connection – ATM cells-ATM service categories -AAL- high speed LANS: the emergence of high speed LANS-Ethernets-fiber channel-wireless LAN.

UNIT-II

CONGESTION CONTROL **9**

Congestion control in data networks and internets-link level flow and error control TCP Traffic -congestion control in ATM networks- Interior routing protocols.

UNIT-III

QOS AND SWITCHING **9**

Integrated service architecture-queuing discipline -random early detection differentiated services protocol for QOS support- RSVP- Multi portal Label switching - Real time transport protocol- IP v6.

UNIT-IV

WIRELESS LAN **9**

Local broad band and Ad hoc networks. Introduction to wireless LANS-IEEE 802.11 WLAN-WATM-HIPERLAN-Ad hoc networking and WPAN.

UNIT-V

NETWORK MANAGEMENT AND APPLICATION **9**

Network management- choosing a configuration method-MIB-SNMP-XMLCORBA-COPS-VPNS-Mobile IP-voice over IP

TOTAL NO OF PERIODS: 45

TEXTBOOKS:

1. Williams Stallings, ”High Speed networks And Internet Performance and Quality Of Service”, Pearson Second Edition, 2002.
2. Kaven Pahlavan And Prashant Krishnamoorthy, “Principles Of Wireless Network”, Prentice Hall Of India, 2010
3. Adrian Farrel,” The Internet And Its Protocols”, Elsevier Publications, 2011.

REFERNCES:

1. Behrouz A. Forouzan, “Data Communication And Computer Networking”, 4th edition, 2011.
2. Larry L. Peterson and Bruce S.Davie, ”Computer Networks”, Third edition, Elsevier Publications, 2003.

BCS021 NEURAL NETWORKS

L	T	P	C
3	0	0	3

Course Objectives:

- Design a virtual environment and compelling virtual reality experience.
- Create compelling virtual experiences.
- Comprehend and analyze the fundamental issues of virtual reality**.**

Course Outcomes:

CO1: Be able to analyze a problem for NN solution in terms of these methods.
CO2: Have an awareness of the computational theory underlying NN.
CO3: Have a working knowledge of a typical neural network simulation
CO4: Experience in programming NN applications from scratch.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		S								
CO3	S	S		S						S		
CO4	S	S		S								

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

BACK PROPAGATION

Introduction to Artificial Neural systems - Perception - Representation - Linear Separability - Learning - Training algorithm - The back propagation network - The generalized data rule - Practical considerations - BPN applications.

UNIT-II **9**

STATISTICAL METHODS

Hopfield nets - Cauchy training - Simulated annealing-The Boltzmann machine. Associative memory - Bidirectional associative memory -Applications.

UNIT-III **9**

COUNTER PROPAGATION NETWORK & SELF ORGANISATION MAPS

CRN building blocks - CPN data processing. SQM data processing - Applications

UNIT-IV **9**

ART AND SPATIO TEMPORAL PATTERN CLASSIFICATION

ART network description - ART1 - ART2-Application. The formal avalanche -Architecture of station temporal networks - The sequential competitive avalanche field - Applications of STNs.

UNIT-V **9**

NEO-CONGNITRON

Cognitron - Structure & training - The neocognitron architecture - Data processing - Performance - Addition of lateral inhibition and feedback to the neocognitron. Optical neural networks - Holographic correlators.

TOTAL NO OF PERIODS: 45

TEXTBOOKS

1. James Freeman A and David Skapura M. "Neural Networks – Algorithms, Applications & Programming Techniques", Pearson Education, 2005.
2. Yegnanarayana B., "Artificial Neural Networks", Prentice Hall of India Private Ltd, 2003

REFERNCES

1. Neural Network Design, Martin T Hagan , 2nd edition,2014.
2. Principle of neural science, Eric R.Kandel, 5th edition, 2012.

BCS022 **VIRTUAL REALITY**

L	T	P	C
3	0	0	3

Course Objectives:

- Design a virtual environment and compelling virtual reality experience.
- Create compelling virtual experiences.
- Comprehend and analyze the fundamental issues of virtual reality**.**

Course Outcomes:

CO1: Be able to understand about computer graphics and 3 D.
CO2: Be able to familiar with virtual reality hardware.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S	S							
CO2	S	S		S								M

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

VIRTUAL REALITY AND ENVIRONMENTS

Introduction - Computer graphics - Real-time Computer Graphics -, Flight Simulation - Virtual environments- Requirements- Benefits of virtual reality. The historical development of virtual reality: Scientific landmarks, 3d computer graphics: Virtual world space - Positioning the observer- Perspective projection - Human vision - Stereo perspective Projection - Human Vision -Stereo Perspective Projection - 3D clipping - Color theory - 3D Modeling -Illumination models - Reflection models - Shading Algorithms - Hidden surf ace removal - Stereographic Images.

UNIT-II **9**

GEOMETRIC MODELING

Conversion from 20 to 3D-3D Space curves-3D Boundary Representation -modeling strategies. Geometric Transformations ; Frames of references -Modeling Transformations - Instances - Packing - Flying - Scaling the Virtual Environment-Collision detection. Generic Virtual Reality: Virtual Environment - Computer environment - Virtual reality Technology- Models of interaction - Virtual Reality Systems.

UNIT-III **9**

ANIMATING THE VIRTUAL ENVIRONMENT

The dynamics of numbers - Animation of objects - shape and Object In betweening - Frame-from deformation - Particle systems Physical Simulation Objects falling in a gravitational field - Rotating Wheels-Elastic collision -Projectiles - simple Pendulums - Springs - Flight dynamics of an aircraft. Human Factors; Eye-Ear- Somatic senses- Equilibrium.

UNIT-IV **9**

VIRTUAL REALITY HARDWARE

Sensor Hardware - Head Coupled displays - Acoustic hardware - Integrated Virtual Reality systems. Virtual Reality Software: Modeling virtual worlds -Physical Simulation-Virtual Reality Toolkits.

UNIT-V **9**

VIRTUAL REALITY APPLICATIONS

Engineering-Entertainment-Science-Training Future of Virtual Reality: Virtual environments - Models of interactions.

TOTAL NO OF PERIODS: 45

TEXTBOOKS

1. John Vince, "Virtual Reality Systems", Pearson Education, 2005.
2. Adams, "Visualization of Virtual Reality", Tata McGraw Hill, 2000.

BCS023 E COMMERCE

L	T	P	C
3	0	0	3

Course Objectives:

- Understand the nature of e-Commerce;
- Recognize the business impact and potential of e-Commerce;
- Explain the technologies required to make e-Commerce viable;
- Discuss the current drivers and inhibitors facing the business world in adopting and using Ecommerce.
- Explain the economic consequences of e-Commerce;
- Discuss the trends in e-Commerce and the use of the Internet.

Course Outcomes:

CO1: Create and refine website and application designs based on industry's usability
CO2: Assess the suitability of various design principles for websites and applications
CO3: Apply the skills necessary for large-scale project development on the Web
CO4: Apply the technologies required to design and prototype Web-based information systems.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1								S				
CO2	M				M			S				
CO3	M							S			S	
CO4								S				

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

ELECTRONIC COMMERCE

Electronic Commerce, Electronic Data Interchange (EDI), E-Commerce Types – PC and networking: Networking, Communication media – Computer Communication Systems: ISO model, Electronic mail, X.400 Message Handling System, E-mail security, Light weight directory access protocol – Internet: Introduction, Communication protocols, Issues of concern.

UNIT-II **9**

ELECTRONIC DATA INTERCHANGE

EDI: Introduction, Cost and Benefits, Components of EDI System, Implementation Issues – UN/EDIFACT Standard: Introduction, An EDIFACT Message, Interchange Structure, Message Directories - EDI Over Internet, Commerce Over Extranets, Identification and Tracking Tools.

UNIT-III **9**

BUSINESS PROCESS REENGINEERING

Business process reengineering – Approach to BPR, BPR methodology – Change management: Change management in the Government, Implementation plan.

CONCERNS FOR E-COMMERCE GROWTH

Legal issues, Risks: Paper document versus electronic document, Technology for authenticating an electronic document, Laws for e-commerce, EDI interchange agreement.

UNIT-IV **9**

CYBER SECURITY: Cyber Attacks, Hacking, Firewalls, IDS, Secure Sockets Layer, Symmetric and asymmetric crypto systems, Guidelines for Cryptography Policy, Developing a Security Policy.

CYBER CRIMES: Cyber crimes and the Information Technology Act, 2000, Cyber forensics

UNIT-V **9**

CASE STUDIES

E-Commerce: Case Studies: ITC's e-Choupal - E-Governance: Case Studies: Indian customs EDI System, Indian Railways, Government of Andhra Pradesh – eSeva.

COMPUTER EMERGENCY RESPONSE TEAM (CERT): Introduction, CERT-In, CERT-In Activities

TOTAL NO OF PERIODS: 45

REFERENCE BOOKS:

1. Kamlesh K Bajaj, Debjani Nag, "E-Commerce – The Cutting Edge of Business", Tata McGraw Hill, Second Edition, 2006
2. David Whitley, "E-Commerce: Strategy, Technologies and applications", McGraw Hill, 2000.
3. Ravi Kalakota and Andrew B. Whinston, "Frontiers of Electronic commerce", Pearson Education, 2005.
4. Pete Loshin, Paul A. Murphy, "Electronic Commerce", Jaico Publisher.

BCS024 **OBJECT ORIENTED DATABASE DESIGN**

L	T	P	C
3	0	0	3

Course Objectives:

- The objective of the course is to provide postgraduate students with a sound technical exposure to the concepts, principles, methods, and best practices in software architecture.

Course Outcomes:

CO1: Design and motivate software architecture for large scale software systems.

CO2: Recognize major software architectural styles, design patterns, and frameworks

CO3: Describe a software architecture using various documentation approaches

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									S
CO2		M	S								M	S
CO3		M	S								M	S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION TO DATABASE

Database management systems - The concepts of the database- levels of representation, using a DBMS. Relational systems - toward the relational model, The relational model, using a relational system, Advantages & limitations of relational systems. A new generation of systems - A new computing context, New Applications.

UNIT-II **9**

DATABASE MODELING

Fundamental Aspects - The role of the data model general principles, Data manipulation languages, some important models - ER, SDM, IFO, RM/T, Daplex, Type systems - Concept of type. Data abstraction. Polymorphism, sub typing Integrating models & type system- Abstract types and modeling, concepts of inheritance, classes & relations, views & desired data constants.& transaction.

UNIT-III **9**

PROGRAMMING LANGUAGES

Extended relational models and system - different approaches, model with structured values, Deductive models and logic programming, models with object identity. Extensible systems. Database programming language - Two approaches Integration into an existing languages. Persistent programming languages.

UNIT-IV **9**

OBJECT ORIENTED DATABASE

Object Oriented systems - Principles & technology databases. The system - origins & objective Data model, Data manipulation, interface generator, the programming environment. Implementation of the 02 system.

UNIT-V **9**

CLUSTERING AND INDEXING

Object manager architecture - Introduction, Problems encountered, Addressing mechanisms, Virtual memory, two address levels, distributed architecture, Data management - Data representation, Large sets & long strings, Representing inheritance. Indexing, clustering, transactions & versions.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.C.S.R. Prabhu,"Object-Oriented Database Systems: Approaches and Architectures", 2nd edition., Prentice-Hall Of India Pvt. Limited, 2005.

2.Jan L. Harrington,"Object-oriented Database Design Clearly Explained",,Morgan Kaughman,2000.

REFERENCES:

1. Abraham Silberschatz, Henry F.Korth, S. Sudharson, "Database System Concepts", 6th Edition, Tata McGraw Hill, 2011.

2. RamezElmasri, ShamKant B.Navathe,"Fundamentals of Database Systems", 5th Edition, Pearson Education, 2008.

3.M. Tamer Ozsu and PatricValduriea, "Principles of Distributed Database systems", Pearson Education, 2000.

BCS025 **PHP PROGRAMMING**

L	T	P	C
3	0	0	3

Course Objectives:

- It gives all students exposure to basics of PHP
- It gives knowledge on session tracking and graphics using PHP

Course Outcomes:

CO1: Recognize the difference between HTML, XHTML, MySQL& PHP.
CO2: Differentiate between PHP Web & HTML Controls
CO3: Understand different Web controls
CO4: Apply the Understand connecting Web pages with DB.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									
CO2	M		S		M							M
CO3			S									
CO4			S									M

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT -I **9**

PHP INTRODUCTION: PHP Basics - Evolution of PHP - Introduction to PHP Programming Variables, Operators, and Constants: Introduction to Variables – Operators – Type Juggling - Type Casting - Variable Variables - function for Determining and Setting Variable- Types - Constants. Control Structures: Conditional Expressions- Arrays: Introduction to Arrays- Initializing Arrays - Working with Arrays. Functions: Introduction to Functions - Passing Arguments to Functions - Returning Values from Functions - Understanding the Scope of a Variable within a Function, Variable Functions and Variable Argument Functions

UNIT- II **9**

UNDERSTANDING CLASSES: Classes – Constructors - Extending a class, Form Parsing in PHP: Parsing HTML Posted Values in PHP - Form Validation- Printing the Confirmation Page - Printing Hidden Fields - Putting Theory into Practice. Handling Files: Working with Files - Putting Theory into Practice.

UNIT III **9**

HANDLING DATA STORAGE: An Introduction to Database Concepts - Database Management System - Relational Database Management System - Database Normalization - PHP Support to various Databases - Web Database Architecture -MySQL Database Programming. Using PHP with SQL Databases: Working with MySQL - Using Multiple

Databases Simultaneously - Important PHP-MySQL Functions - Error handling in MySQL – Error Types in PHP - Creating Customized Error Handlers.

UNIT- IV **9**

SESSION TRACKING: An Overview of Sessions - Tracking Sessions. Input Validators in PHP: Validation Basics - Performing Validations in an HTML Web Page - Performing Validations in PHP - Functions for Validating User Input - Validating Email Addresses. Cookies: What Is a Cookie? Implementing Cookies in PHP - Are Cookies Harmful?

UNIT –V **9**

GRAPHICS IN PHP: Graphics on the web - Creating Images in PHP. Understanding CVS: CVS an Overview – The CVS Repository – Environment Variables in CVS - CVS Command Options. PEAR: Introduction to PEAR – Coding Standards in PEAR – PEAR and CVS – Contributing Codes to PEAR – Requirements to Make Changes in PEAR – Help in PEAR.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Matt Doyle," Beginning PHP 5.3",Wiley,2011.
2.AshishWilfred, Meeta Gupta and Kartik Bhatnagar with NIIT, "PHP Professional Projects", Prentice Hall of India, 2002.

REFERENCES:

1. Kevin Tatroe, Peter MacIntyre, RasmusLerdorf ,"Programming PHP",O'Rielley,2013.
2.RasmusLerdorf and Kevin Tatroe, "Programming in PHP", O'Reilly and Associates, 2002.

L	T	P	C
3	0	0	3

BCS026 MANAGEMENT INFORMATION SYSTEMS

Course Objectives:

- Understand types of MIS applications in organizations
- Discuss the development of management information systems in organizations.
- Select and design MIS systems appropriate to meet management requirements.
- Critically evaluate MIS contributions to the strategic management of organizations

Course Outcomes:

CO1: Understand the critical concepts and terminologies in information systems.

CO2: Understand the role of non-IT managers in information systems planning, systems development, and hardware and software selection.

CO3: Define problems and the current environment for existing business systems in the areas of accounting, finance, marketing, and manufacturing.

CO4: Understand the technical aspect of telecommunication systems and internet as well as their roles in business environment.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1								S				
CO2					M			S				
CO3							M	S			M	
CO4							M	S		S		

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I **9**

INTRODUCTION TO SYSTEMS

Fundamentals of Information systems: systems concepts - Types of system, system approach - relevance to modern organization - Data Vs information.

UNIT II **9**

TYPES OF SOFTWARE

Managerial overview: Computer Hardware & Trends in Computer Hardware & Computer Peripherals - Managerial overview: Computer software - System software: OS, DAMS, OOPS - Application software -spread sheet - Graphic packages.

UNIT III **9**

DECISION SUPPORT SYSTEM

Information systems in Business and Management:- Transaction processing system: Introduction, System Architecture Design, Types Of TPS – DSS:-Architecture of DSS, Fundamental of DSS Program Structure, DSS Tools, DSS Software, Group Decision Making .

UNIT IV **9**

COMMUNICATION

Communication Technology for Information System: Data communication – Methods of data communication – Communication model – Business uses of network– Information System Architecture – Centralized, Teleprocessing System Architecture – Distributed System Architecture.

UNIT V **9**

ENTERPRISE RESOURCE PLANNING

Strategic managements of information systems:-Characteristic of SMIS, Strategic Planning Of MIS, Development of SMIS - Information Resource Management: Principles Of IRM, Functional compound of IRM, Organization of Information Resource Function – Concept of ERP.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. C.S.V.Murthy, "Management Information System", First edition, Himalaya Publishing House, 1999.

2. Kenneth C.laudan, "Management Information System", 7th Edition, Eastern Economy Edition,2002.

3.A.K.Gupta," Management information System", 3rd Revised Edition,2008.

REFERENCE BOOKS:

1. Kenneth C.laudan, "Management Information System", 10th Edition, Eastern Economy Edition,2013.

2. C.S.V.Murthy, "Management Information System", Fifth edition Himalaya Publishing House, 2010.

BCS027 ADVANCED WEB DESIGN

L	T	P	C
3	0	0	3

Course Objectives:

- To build web applications using ASP and client side script technologies use with Microsoft's IIS.
- To build XML applications with DTD and style sheets that span multiple domains ranging from finance to vector graphics to genealogy for use with legacy browsers.

Course Outcomes:

CO1: Create richly interactive environments natively within browsers.

CO2: Build web application frameworks which facilitate rapid application development.

CO3: Integrate web applications easily into other server-side web procedures, such as email and searching.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									
CO2			S		S							
CO3			S		M							M

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT - I
FUNDAMENTALS **9**

Introduction to the Web-Web enabling Technologies-Web Service Protocol-web Design Concepts- Examining Good and Bad Web Design-Page Design Resources.

UNIT – II
SIMPLE DESIGN ISSUES **9**

Page Design-HTML-Web Page Style Considerations-Page composition-Type Faces-Tag Parameters-Color and Graphics for web Pages-WYSIWYG web Page Editor-Dream Weaver.

UNIT - III
ADVANCE DESIGN ISSUES **9**

Advanced Page Design-Tables and Frames-Preparing Graphics and animations Forms-Cascading Sheets-User interface Design-Page grid-Page Templates-Usability Testing.

UNIT - IV
SCRIPTING IN DESIGN **9**

Typography and Graphic Design for the Web-Creating Transparent GIP- Lean Graphics-Image Maps-Palette Map-web Programming-Web Site Garage-W3C HTML Validation Services-Net Mechanic-DHTML-XML.

UNIT -V

TOOLS AND APPLICATIONS **9**

Online Applications-Developing an Online Shopping application-Database Design Issues-Connecting Database with tools such as Java, ASP, Cold fusion-Designing Portals and Vortals.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Deitel and Deitel, "Internet and World Wide Web-How to Program", 3rd Edition, Pearson Education, 2005.

REFERENCES:

1.N.P.Gopalan&J.Akilandeswari, "Web Technology: A Developer's Perspective", PHI Learning,2008

2.JeffFrantzen and Sobotka, "Java Script", Tata McGraw Hill, 2002.

3.JustinHunter,William Crawford, "Java Servlet Programming", O'Reilly Publications, 2nd Edition, 2001.

BCS 029 **ADVANCED DATABASES**

L	T	P	C
3	0	0	3

Course Objectives:

- The objective of this course is to expose the students to the implementation techniques of database system.
- This course explains techniques for query processing and optimization with transaction and concurrency control techniques

Course Outcomes:

CO1: Explain the fundamentals of distributed database.

CO2: Outline the importance of backup and recovery techniques in distributed database systems.

CO3: Apply the object oriented concepts in relational databases.

CO4: Summarize the concepts of various enhanced data models.

CO5: Explain the concepts of different emerging database technologies.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			S									S
CO2			S									S
CO3		M	S								M	S

CO4			S									S
CO5		M	S									S

Course Assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT -I

RELATIONAL DATABASES **9**

Integrity Constraints revisited, Extended ER diagram, Relational Algebra & Calculus, Functional, Multi valued and Join Dependency, Normal Forms, Rules about functional dependencies**.**

UNIT -II

QUERY PROCESSING AND OPTIMIZATION **9**

Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information.

UNIT- III

OBJECTED ORIENTED AND OBJECT RELATIONAL DATABASES **9**

Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases.

UNIT- IV

PARALLEL AND DISTRIBUTED DATABASES **9**

Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, and Parallel Query Evaluation.

UNIT V

ADVANCED TRANSACTION PROCESSING **12**

Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors. Multimedia databases, Databases on the Web and Semi–Structured Data Case Study: Oracle10g, Oracle 11i.

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1.Dietrich, and Urban, "An Advanced Course in Database Systems", Pearson, 2008.
2.Elmarsi, Navathe, Somayajuu, Gupta, "Fundamentals of Database Systems", 4th Edition, Pearson Education, 2007.
3.Garcia, Ullman, Widom, "Database Systems, The complete book", Pearson Education, 2007.

REFERENCES:

1.Date, Kannan, Swaminathan, —"An Introduction to Database Systems", 8th Edition Pearson Education, 2007.
2.Singh S.K., "Database System Concepts, design and application", Pearson Education, 2006.
3.Silberschatz, Korth, Sudarshan, "Database System Concepts", Tata Mcgraw Hill, 6th Edition, 2006.

BCS030 HUMAN COMPUTER INTERACTION

L	T	P	C
3	0	0	3

Course Objectives:

The main objective of this course student must able to understand about

- The human components functions.
- The Computer components functions. .
- The Interaction between the human and computer components.
- Paradigms
- Interaction design basics
- HCI in the software process
- Design rules
- Implementation supports

Course Outcomes:

CO1: Explain the human components functions regarding interaction with computer
CO2: Explain Computer components functions regarding interaction with human
CO3: Demonstrate Understanding of Interaction between the human and computer components.
CO4: Use Paradigms

CO5: Implement Interaction design basics
CO6: Use HCI in the software process
CO7: Apply Design rules
CO8: Produce Implementation supports
CO9: Use Evaluation techniques.

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S		S								
CO2	S	S		S								
CO3	S	S		S						S		
CO4	S	S		S								
CO5	S	S		S								
CO6	S	S		S	M							
CO7	S	S		S								
CO8	S	S		S								
CO9	S	S		S	M							

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4. Online Test 5. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT I FOUNDATIONS OF HCI 9

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

UNIT II DESIGN & SOFTWARE PROCESS 9

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering –

Prototyping in practice –design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III MODELS AND THEORIES 9

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

UNIT IV MOBILE HCI 9

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT V WEB INTERFACE DESIGN 9

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow.Case Studies.

TOTAL NO OF PERIODS: 45

TEXT BOOKS

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004.
2. Brian Fling, "Mobile Design and Development", First Edition , O'Reilly Media Inc., 2009
Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O'Reilly, 2009.

REFERENCE

1. Human Computer Interaction in the Millennium by Carroll, 2000

BBA014 ENTREPRENEURSHIP DEVELOPMENT

L	T	P	C
3	0	0	3

Course Objectives:

The course objectives are to enable students to understand Entrepreneurship Motivation and to know about types of Industries.

Course Outcomes:

CO1: Demonstrate the ability to provide a self-analysis in the context of an entrepreneurial career.

CO2: Demonstrate the ability to find an attractive market that can be reached economically.

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		S	M	M		M			S	S	S	
CO2		S	M	S		M			S	M	S	

Course Assessment methods:

Direct	**Indirect**
1. Internal Tests 2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	1.Students Exit Survey 2.Faculty Survey 3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION TO ENTRPRENEUR

Meaning and concept of Entrepreneur - Characteristics of entrepreneur -entrepreneur and intrapreneur - Types of Entrepreneurs - Entrepreneurship factor affecting Entrepreneurial growth - Entrepreneurship motivation -Entrepreneurial competence.

UNIT-II **9**

PHASES IN EDP

Entrepreneurial Environment - role of family and society EDP - need -objectives -course contents-phases of EDP

UNIT-III **9**

PROJECT MANAGEMENT

Project Management: Project identification - project selection - formulation -project evaluation - implementation- Social Cost - Benefit analysis.

UNIT-IV **9**

INDUSTRIES AND ITS TYPES

Small scale industries - definition - characteristics - objectives - scope -growth - strategies is SSIs - sickness of SSIs - Financial support to SSIs-Financial institutions TIIC , SIDCO , Export potential. DIG, SIPCOT, SISI, TIDCO rehabilitation of sick units Governments policies for SSIs and facilities provided to the SSIs

UNIT-V **9**

Sources of Finance

Financial Analysis - source of finance -capital -types of capital - capitalization and capital structure - financial feasibility - Marketing Management -Mobilization of HR - importance Human Resource in SSIs.

TOTAL NO OF PERIODS: 45

REFERENCES:

1. Khanka S. S, "Entrepreneur Development", S Chand & CO Ltd, 2007
3. Hisrich, "Entrepreneurship", Tata McGraw Hill, New Delhi 2001
4. Prasna Chandra, "Project Planning, Analysis selection implementation and Reviews", Tata McGraw Hill, 1996

BBA024 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING

L	T	P	C
3	0	0	3

Course Objectives:

The course objectives are to enable students to understand general purpose financial statements, appreciate their limitations, and be aware of the forces that influence their content**.**

Course Outcomes

CO3: Understand the measures of national income, the functions of banks and concepts of globalization

CO4: Apply the concepts of financial management for project appraisal

CO5: Understand accounting systems and analyze financial statements using ratio analysis

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	S		M					S	
CO2	S	S		S		M					S	
CO3	S	S	M	S		M					S	
CO4	S	S	M	S							S	
CO5	S	S		S		M					S	

Course assessment methods:

Direct	Indirect
1. Internal Tests 2. Assignments	1.Students Exit Survey 2.Faculty Survey

3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	3.Industry 4.Alumni

UNIT-I **9**

INTRODUCTION

Introduction - economic theories and scope - demand and supply analysis -determinants of demand - law of demand - elasticity of demand - demand forecasting - demand sensitivity - price, income, gross, advertisement-law of supply - elasticity of supply - cost concepts - types - cost curves - short run and long run - break even analysis - pricing concepts - types, price determinations.

UNIT-II **9**

INTEGRATION AND TYPES

Concepts - firm, industry, market, market power, market conduct, market performance. Market structure-types- perfect, monopoly, monopolistic and oligopoly competition. Manufacturing practices- diversification, vertical and horizontal integration, merger.

UNIT-III **9**

SOURCES OF INCOME

National income : concepts and - measurement - GNP, NNP - methods of measuring National income-inflation and deflation, unemployment..

Money-and Banking: Value-of money - banking - commercial bank and its functions, central bank and its function. New Economic environment economic systems, economic liberalization, privatization and globalization.

UN1T-IV **9**

SOURCES OF FINANCE

Introduction, Scope, Objectives, Basic financial concepts - time value of money and method of appraising project profitability - rate of return - payback period-present value, NPV comparison-cost-benefit analysis. Source of finance - internal and external - long term and short term - securities, debentures/bonds, shares, financial institutions.

UNIT-V **9**

FINANCIAL STATEMENTS

Accounting system - financial statements - types - ledger, cash flow statement, profit and loss account, balance sheet. Ratios/Financial analysis - liquidity, leverage activity, profitability, trends analysis.

TOTAL NO OF PERIODS: 45

REFERENCE BOOKS:

1. Maheswari S. N "Management Accounting and Financial Accounting", S. Chand & Co. 2003,
2. D.N.Dwivedi, "Managerial Economics", Vikas Publishing House, 2010
3. R.R.Barthwal, "Industrial Economics", Wiley Eastern Ltd.,2005
4. G.S. Gupta, "Managerial Economics",8th edition, Tata McGraw-Hill Ltd.,2002
5. M. Y.Khan&P.K.Jain, "Basic Financial Management", Tata Mc Graw Hill Ltd, 2010.

BBA025 PROFESSIONAL ETHICS IN ENGINEERING

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the concepts of computer ethics in work environment.
- To ensure safe exits when designing the software projects
- To understand the intricacies of accessibility issues
- To understand the threats in computing environment

Course Outcomes:

CO1: Engage with their peers in a public discourse on ethical challenges, which serves to inform autonomous choices.

CO2: Gather evidence that can be used to support a claim or conclusion.

CO3: Understand the measures of national income, the functions of banks and concepts of globalization.

CO4: Understanding the concepts of responsibilities and rights.

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						M			M		S	M
CO2						M			M		S	M
CO3						M			M		S	M
CO4						M			M		S	M

Course assessment methods:

Direct	Indirect
1. Internal Tests	1.Students Exit Survey

2. Assignments 3. Seminar 4.Quiz 5.Online Test 6. End Semester Exam	2.Faculty Survey 3.Industry 4.Alumni

UNIT – I **9**

ENGINEERING ETHICS

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories

UNIT – II **9**

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as Experimentation – Engineers as responsible Experimenters –Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT – III **9**

ENGINEER'S RESPONSIBILITY FOR SAFETY

Safety and Risk – Assessment of Safety and Risk – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl Case Studies and Bhopal

UNIT – IV **9**

RESPONSIBILITIES AND RIGHTS

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 **9**

GLOBAL ISSUES

Multinational Corporations – Business Ethics - Environmental Ethics – Computer Ethics - Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors– Honesty – Moral Leadership – Sample Code of Conduct

TOTAL NO OF PERIODS: 45

TEXT BOOKS:

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”, McGraw Hill, New York, 2010.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, “Engineering Ethics– Concepts and Cases”, Thompson Learning, 2000.

REFERENCES:

1. Charles D Fleddermann, “Engineering Ethics”, Prentice Hall, New Mexico, 1999.
2. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, 2003.
3. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, 2001.