P.S.R. ENGINEERING COLLEGE

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

SIVAKASI - 626140

B.E. – COMPUTER SCIENCE AND ENGINEERING

UG REGULATION-2012

CURRICULUM AND SYLLABI

[1st To 8th Semester]

REGULATION – 2012

B.E. COMPUTER SCIENCE AND ENGINEERING
CURRICULUM I to VIII SEMESTER

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER I									
Theory									
1	12F1Z1	Technical English-I	25	75	100	3	1	0	4
2	12F1Z2	Engineering Mathematics-I	25	75	100	3	1	0	4
3	12F1Z3	Engineering Physics-I	25	75	100	3	0	0	3
4	12F1Z4	Engineering Chemistry-I	25	75	100	3	0	0	3
5	12F1Z5	Computing Fundamentals and C Programming	25	75	100	3	0	0	3
6	12F1Z6	Engineering Graphics	25	75	100	3	1	0	4
Practical									
7	12F1Z7	Physics and Chemistry Laboratory - 1	25	75	100	0	0	3	2
8	12F1Z8	Computer Practice Laboratory -1	25	75	100	0	0	3	2
9	12F1Z9	Engineering Practices Laboratory	25	75	100	0	0	3	2
	Total				900	18	3	9	27

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER II									
Theory									
1	12F2Z1	Technical English-II	25	75	100	3	1	0	4
2	12F2Z2	Engineering Mathematics-II	25	75	100	3	1	0	4
3	12F2Z3	Engineering Physics-II	25	75	100	3	0	0	3
4	12F2Z4	Engineering Chemistry-II	25	75	100	3	0	0	3
5	12F2X5	Electric Circuits and Electron Devices	25	75	100	3	1	0	4
6	12F2X6	Basic Civil and Mechanical Engineering	25	75	100	3	1	0	4
Practical									
7	12F2Z7	Physics and Chemistry Laboratory - II	25	75	100	0	0	3	2
8	12F2Z8	Computer Practice Laboratory - II	25	75	100	0	0	3	2
9	12F2X8	Electric Circuits and Electron Devices Laboratory	25	75	100	0	0	3	2
	Total				900	18	4	9	28

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER III									
Theory									
1	12MA31	Transforms and Partial Differential Equations	25	75	100	3	1	0	4
2	12GE32	Professional Ethics in Engineering	25	75	100	3	0	0	3
3	12CS31	Digital Principles and Systems Design	25	75	100	3	1	0	4
4	12CS32	Analog and Digital Communication	25	75	100	3	1	0	4
5	12CS33	Object Oriented Programming	25	75	100	3	0	0	3
6	12CS34	Data Structures	25	75	100	3	0	0	3
Practical									
7	12CS35	Object Oriented Programming Laboratory	25	75	100	0	0	3	2
8	12CS36	Data Structures Laboratory	25	75	100	0	0	3	2
9	12CS37	Digital Laboratory	25	75	100	0	0	3	2
10	12HS31	Professional English – I	25	75	100	0	0	1	1
	Total				1000	18	3	10	28

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER IV									
Theory									
1	12MA41	Probability and Queuing Theory	25	75	100	3	1	0	4
2	12CS41	Microprocessors and Microcontrollers	25	75	100	3	0	0	3
3	12CS42	Operating Systems	25	75	100	3	0	0	3
4	12CS43	Design and analysis of Algorithms	25	75	100	3	1	0	4
5	12CS44	Database Management Systems	25	75	100	3	0	0	3
6	12CS45	Computer Organization & Architecture	25	75	100	3	0	0	3
Practical									
7	12CS46	Operating Systems Laboratory	25	75	100	0	0	3	2
8	12CS47	Database Management Systems Laboratory	25	75	100	0	0	3	2
9	12CS48	Microprocessors Laboratory	25	75	100	0	0	3	2
10	12HS41	Professional English – II	25	75	100	0	0	1	1
	Total				1000	18	2	10	27

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER V									
Theory									
1	12MA51	Discrete Mathematics	25	75	100	3	1	0	4
2	12MG51	Engineering Economics and Financial Accounting	25	75	100	3	0	0	3
3	12CS51	Digital Signal Processing	25	75	100	3	0	0	3
4	12CS52	Computer Networks	25	75	100	3	0	0	3
5	12CS53	Programming with JAVA	25	75	100	3	0	0	3
6	12CS54	Theory of Computation	25	75	100	3	1	0	4
Practical									
7	12CS55	Java Laboratory	25	75	100	0	0	3	2
8	12CS56	Networks Laboratory	25	75	100	0	0	3	2
9	12HS51	English for Employment – I	25	75	100	0	0	2	1
	Total				900	18	2	8	25

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VI									
Theory									
1	12GE31	Environmental Science and Engineering	25	75	100	3	0	0	3
2	12IT65	Cryptography and Network Security	25	75	100	3	1	0	4
3	12CS61	System Software & Compiler Design	25	75	100	3	0	0	3
4	12CS62	Object Oriented Software Engineering	25	75	100	3	0	0	3
5	12CS63	Advanced Computer Architecture	25	75	100	3	0	0	3
6	12CS6*	Elective I*	25	75	100	3	0	0	3
Practical									
7	12CS64	Object Oriented Software Engineering Laboratory	25	75	100	0	0	3	2
8	12CS65	System Software & Compiler Laboratory	25	75	100	0	0	3	2
9	12CS66	Open Source Laboratory	25	75	100	0	0	3	2
10	12HS61	English for Employment – II	25	75	100	0	0	3	1
	Total				1000	18	1	12	26

S.No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VII									
Theory									
1	12IT63	Web Technology	25	75	100	3	0	0	3
2	12CS71	Computer Graphics	25	75	100	3	0	0	3
3	12CS72	Mobile and Pervasive Computing	25	75	100	3	0	0	3
4	12CS73	Cloud Computing	25	75	100	3	0	0	3
5	12CS7*	Elective II*	25	75	100	3	0	0	3
6	12CS7*	Elective III*	25	75	100	3	0	0	3
Practical									
7	12IT67	Web Technology Laboratory	25	75	100	1	0	3	2
8	12CS74	Computer Graphics Laboratory	25	75	100	0	0	3	2
9	12CS75	Software Project Development Laboratory	25	75	100	0	0	4	2
	Total				900	19	0	10	24

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VIII									
Theory									
1	12CS8*	Elective IV*	25	75	100	3	0	0	3
2	12CS8*	Elective V*	25	75	100	3	0	0	3
Practical									
3	12CS81	Project Work	25	75	100	0	0	9	6
	Total				300	6	0	9	12

Credits for SEM I & II = 55
Credits for SEM III & IV = 55
Credits for SEM V & VI = 51
Credits for SEM VII & VIII = 36
Total Credits = 197

LIST OF ELECTIVES

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VI – Elective I									
Theory									
1	12MA42	Numerical Methods	25	75	100	3	0	0	3
2	12IT61	Embedded Systems	25	75	100	3	0	0	3
3	12IT62	Network Programming and Network Management	25	75	100	3	0	0	3
4	12CS6A	UNIX Internals	25	75	100	3	0	0	3
5	12CS6B	Advanced JAVA Programming	25	75	100	3	0	0	3
6	12CS6C	Distributed and Grid Systems	25	75	100	3	0	0	3
7	12CS6D	Advanced Operating Systems	25	75	100	3	0	0	3
8	12CS6E	Parallel Programming	25	75	100	3	0	0	3

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VII – Elective II									
Theory									
1	12MG72	Resource Management Techniques	25	75	100	3	0	0	3
2	12IT71	Service Oriented Architecture	25	75	100	3	0	0	3
3	12CS7A	Data Warehousing and Data Mining	25	75	100	3	0	0	3
4	12CS7B	Software Testing	25	75	100	3	0	0	3
5	12CS7C	Natural Language Processing	25	75	100	3	0	0	3
6	12CS7D	User Interface Design	25	75	100	3	0	0	3
7	12CS7E	Soft Computing	25	75	100	3	0	0	3
8	12CS7F	Real Time Systems	25	75	100	3	0	0	3

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VIII – Elective III									
Theory									
1	12MG71	Total Quality Management	25	75	100	3	0	0	3
2	12IT72	Knowledge Management	25	75	100	3	0	0	3
3	12CS7G	Wireless Networks	25	75	100	3	0	0	3
4	12CS7H	C# and .NET Framework	25	75	100	3	0	0	3
5	12CS7I	Systems Modeling & Simulation	25	75	100	3	0	0	3
6	12CS7J	TCP/IP Design and Implementation	25	75	100	3	0	0	3
7	12CS7K	Software Quality Assurance and Management	25	75	100	3	0	0	3
8	12CS7L	Multicore Programming	25	75	100	3	0	0	3

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VIII – Elective IV									
Theory									
1	12GE81	Intellectual Property Rights	25	75	100	3	0	0	3
2	12IT7A	Information Security	25	75	100	3	0	0	3
3	12IT73	Software Project Management	25	75	100	3	0	0	3
4	12IT8F	Internet of Things	25	75	100	3	0	0	3
5	12CS8A	High Speed Networks	25	75	100	3	0	0	3
6	12CS8B	Artificial Intelligence and Robotics	25	75	100	3	0	0	3
7	12CS8C	Graph Theory	25	75	100	3	0	0	3
8	12CS8D	Digital Image Processing	25	75	100	3	0	0	3
9	12CS8E	Knowledge Based Decision Support Systems	25	75	100	3	0	0	3
10	12CS8F	Big Data Analytics	25	75	100	3	0	0	3

S. No.	Course Code	Subject Name	Internal Marks	Final Exam Marks	Total Marks	Hrs & Credits			
						L	T	P	C
SEMESTER VIII – Elective V									
Theory									
1	12GE82	Indian Constitution and Society	25	75	100	3	0	0	3
2	12IT7B	Bio Informatics	25	75	100	3	0	0	3
3	12IT8J	Speech Signal Processing	25	75	100	3	0	0	3
4	12CS8G	Mobile Application Development	25	75	100	3	0	0	3
5	12CS8H	Advanced Database Technology	25	75	100	3	0	0	3
6	12CS8I	Multimedia Systems	25	75	100	3	0	0	3
7	12CS8J	Quantum Computing	25	75	100	3	0	0	3
8	12CS8K	Agent Based Intelligent Systems	25	75	100	3	0	0	3
9	12IT8E	Design Patterns	25	75	100	3	0	0	3

12F1Z1	TECHNICAL ENGLISH – I	L	T	P	C
		3	1	0	4

CATEGORY: Core
PREREQUISITES: Basic English Language Skill, Note-taking
AIM
To improve English communication skill with relevance to technical context.
COURSE OBJECTIVES:

- To Show the Basic knowledge of English Language and grammar
- To construct written communication with the mechanics of Writing
- To develop error-free communication
- To summarize the text
- To improve the basic knowledge of Business Communication.

COURSE OUTCOMES:

- Relate basic grammar and structure of a language with relevance to technical vocabulary.
- Analyze the technical English resources with reading skill.
- Develop technical communication skill in writing.
- Distinguish the sounds of English with Technical audio resources.
- Adapt Basic English language skill for effective oral communication.

UNIT I FOCUS ON LANGUAGE 12
General Vocabulary- prefix, suffix –Denotative & connotative- Parts of Speech-Types of Sentences- Conditionals Connectors Concord -Tenses- -Active &Passive voice -Phrases & Clauses-Spelling& Punctuation-Cause & Effect-Correct use of words(parts of speech)-Question Tags-'wh'&'Yes/No'Type questions-Rearranging Jumbled Sentences-One-Word Substitution

UNIT II READING 12
Reading for gist/Identifying information/gap filling-Reading different types of text like advertisement, instruction, manuals, report - Reading passage with multiple choice questions/cloze type passage/sentence matching/completing passage-Reading for flow chart completion/matching information/matching headings, Reading for sentence completion

UNIT III WRITING 12
Writing Sentences for Brevity, Clarity and Simplicity-Writing Topic sentences/General Information/Description Paragraph-structuring an Essay-Writing effective conclusions-Writing a Process- Writing formal letter like Requisition letter, Placing an order, Quotation letter, Acknowledgement letter, Enquiry Letter, Complaint Letter, Permission Letter.

UNIT IV LISTENING 12
Listening for Learning-Word Stress and Pronunciation practices-Listening for Specific information-Note taking-Listening to announcements- Listening to News on the radio/TV

UNIT V SPEAKING 12
Introducing oneself–offering Suggestions and recommendations-Expressing opinions suggestions- (agreement/disagreement)-Role play- Purchase Manager& Customer, Customer care executive (voice) & Customer, Bank manager& Employee, Commenting on the basis of Discussion-Using Verbal & Non-verbal cues in speech-Using Familiar Expressions in different situations.

TOTAL: 60 PERIODS

TEXT BOOKS

1. Department of Humanities & Social Sciences, Anna University, '*English for Engineers and Technologists*' Combined Edition (Volumes 1 & 2), Chennai: Orient Longman Pvt. Ltd., 2006.

REFERENCES

1 CambridgeBECPreliminary2Student'sBookwithAnswers: ExaminationpapersfromUniversityofCambridge ESOL Examinations, Cambridge ESOL, PB, ISBN: 9780521544504
2. Meenakshi Raman and Sangeetha Sharma-"Technical Communication: English skills for Engineers"-

Oxford University Press-2008,ISBN:0-19-569574-7

E-MATERIALS

1.www.usingenglish.com
2.www.ego4u.com
3.www.letterwritingguide.com
4.www.randallsenglishlab.com

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Relate basic grammar and structure of a language with relevance to technical vocabulary.									M	H		H	d,i,j,l
2	Develop technical communication skill in writing.				L					H	H		H	
3	Distinguish the sounds of English with Technical audio resources.									L	M		H	
4	Adapt basic English language skill for effective oral communication.									H	H		H	
5	Adapt basic English language skill for effective oral communication.									M	H		H	

L – Low, M - Medium, H –High.

12F1Z2 **ENGINEERING MATHEMATICS – I** **L 3** **T 1** **P 0** **C 4**

CATEGORY: Core
PREREQUISITES: Matrix, Three Dimension Geometry, Integration and Differentiation
AIM:
The Course is aimed at Developing the basic mathematical skills of Engineering Student.
COURSE OBJECTIVES:

- To develop the basic mathematical knowledge and computational skills of the student in the areas of applied mathematics.
- To develop the skills of the students in the area of Calculus, Three Dimensional Geometry and Matrices.
- To make the student for appreciating the purpose of using Eigen value and Eigen Vector to create a new domain in which it is easier to handle the problems that is being investigated in Spectral Theory.
- To make the student for appreciating the purpose of using Eigen value and Eigen Vector to create a new domain in which it is easier to handle the problems that is being investigated in Spectral Theory.

COURSE OUTCOMES:

- Able to find the inverse of given matrix and reduce matrix equation using Cayley-Hamilton theorem
- Elaborate given function as a power series using Taylor's series.
- Apply double integration to find area between two curves.
- Make use of Calculus in finding the envelope, Evolutes & Involutes.
- Evaluate the shortest distance between two skew-lines and find equation of coplanar planes.
- Classify Conic system in Three Dimensional Geometry.

UNIT I **MATRICES** **9+3**

Characteristic equation - Eigen Values and Eigen vectors of a real matrix - Properties of Eigen values - Problem solving using Cayley-Hamilton - Similarity Transformation - Orthogonal Transformation of a Symmetric matrix to diagonal form - Quadratic form - Orthogonal reduction to canonical form

UNIT II THREE DIMENSIONAL GEOMETRY 9+3

Introduction – Sphere - Tangent plane - Plane section of a sphere – Lines - Skew lines – Coplanar lines –– Equation of cylinder - Right circular cylinder.

UNIT III DIFFERENTIAL CALCULUS 9+3

Curvature - Radius of curvature - Cartesian and Parametric Coordinates - Circle of Curvature - Involutes and Evolutes – Envelope - Evolutes as Envelope of its normal.

UNIT IV FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial Derivatives - Euler's Theorem for homogeneous function - Total Derivative - differentiation of Implicit function – Jacobian - Taylor's Expansion - Maxima/Minima for function of two variables - Method of Lagrange's multipliers

UNIT V MULTIPLE INTEGRALS 9+3

Double integration - Cartesian and Polar co-ordinates - Change of order of integration - Change of variable between Cartesian and polar co-ordinates - Triple integration - Area as a double integration - Volume as a triple integral

TOTAL: 60 PERIODS

TEXT BOOKS

1. B.S.Grewal,'Higher Engineering Mathematics', Thirty Sixth Edition,Khanna Publishers,Delhi,2005.
2. Kreyszig, E., Advanced Engineering Mathematics, 8th edition, John Wiley Sons, 2001
3. Dr.P.Kandasamy , Dr.K.Thilagavathy , Dr.K.Gunavathy , S. Chand & Company Ltd. Ram nagar, New Delhi.

REFERENCES

1. Greenberg, M.D. Advanced Engineering Mathematics, Second Edition, Pearson Education Inc. (First Indian reprint), 2002
2. Venkataraman.M.K.,"Engineering Mathematics",Volume I and II Revised enlarged Fourth Edition, The National ?Publishing Cpompany,Chennai,2004.
3. Veerarajan.T"Engineering Mathematics",Fourth Edition,Tata McGraw – hill publishing company Ltd,New Delhi,2005.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	L	
1	Able to find the inverse of given matrix and reduce matrix equation using Cayley-Hamilton theorem	H	H		L								M	a, b, d, l.
2	Elaborate given function as a power series using Taylor's series.	M	H		M								L	
3	Apply double integration to find area between two curves.	H	H										H	
4	Make use of Calculus in finding the envelope, Evolutes & Involutes.	L	L											
5	Evaluate the shortest distance between two	H	M		L									

	skew-lines and find equation of coplanar planes.												
6	Classify Conic system in Three Dimensional Geometry.	M	M		L							H	

L – Low, M - Medium, H –High.

12F1Z3 ENGINEERING PHYSICS – I

L	T	P	C
3	0	0	3

CATEGORY: Core

PREREQUISITES: Basic knowledge in Physics

AIM:

To endow the students with the fundamentals of Physics and apply new ideas in the field of Engineering and Technology.

COURSE OBJECTIVES:

- To study the properties, production of ultrasonic waves and their applications in engineering field.
- To study the principle, types and applications of LASER and the principle of fiber optic communication and its applications.
- To study the basic concepts of Quantum physics and Crystal physics.

COURSE OUTCOMES:

- Examine the basic concepts of ultrasonics and their applications.
- Recapitulate the principles of different types of laser and laser characteristics, industrial and medical applications of the laser.
- Illuminate light propagation in optical fiber and recognize its structures, types and applications such as sensors, endoscope.
- Interpret the Planck's theory in quantum phenomena and basic concepts like Compton scattering, Schrodinger equations and its application.
- State in detail the crystal structure, identification of cubic unit cells (SC, BCC, FCC) and HCP, miller indices and crystal defects.

UNIT I ULTRASONICS 9

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

UNIT II LASERS 9

Introduction – Principle of Spontaneous emission and stimulated emission. Population inversion, pumping. Einsteins A and B coeffcients - derivation. Types of lasers – He-Ne, CO2 , Nd-YAG, Semiconductor lasers- Qualitative Industrial Applications - Lasers in welding, heat treatment, cutting – Medical applications - Holography and uses.

UNIT III FIBER OPTICS and APPLICATIONS 9

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

UNIT IV QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation)- Compton effect- Theory and experimental verification – Matter waves – Schrödinger's wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box.

UNIT V CRYSTAL PHYSICS 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New Delhi(2003).
2. M.N. Avadhanulu and PG Kshirsagar, 'A Text book of Engineering Physics', S.Chand and company, Ltd., New Delhi, 2005.
3. K.Rajagopal , " Engineering Physics " Prentice – Hall of India Pvt. Ltd. New Delhi , 2007.

REFERENCES

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Examine the basic concepts of ultrasonics and their applications.	H	H	M	M								M	a, b, c, d, e, l.
2	Recapitulate the principles of different types of laser and laser characteristics, industrial and medical applications of the laser.	H	H	M	M								M	
3	Illuminate light propagation in optical fiber and recognize its structures, types and applications such as sensors, endoscope.	H	H	M	M								M	
4	Interpret the Planck's theory in quantum phenomena and basic concepts like Compton scattering, Schrodinger equations and its application.		H											
5	State in detail the crystal structure, identification of cubic unit cells (SC, BCC, FCC) and HCP, miller indices and crystal defects.		M			L							M	

L – Low, M - Medium, H –High.

12F1Z4 ENGINEERING CHEMISTRY – I

L	T	P	C
3	0	0	3

CATEGORY: Core

PREREQUISITES: Basic knowledge in Chemistry

AIM

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

COURSE OBJECTIVES:

- The student should be conversant with the principles water characterizationand treatment of pot-

able and industrial purposes.

- Principles of polymer chemistry and engineering applications of polymers.
- Industrial applications of surface chemistry.
- Conventional and non-conventional energy sources and energy storage.
- Devices and Chemistry of engineering materials.

COURSE OUTCOMES:

- Demonstrate the essential concept of water chemistry with their properties and applications of water technology
- Analyze the chemistry of polymers and composites
- Explain the core concepts of surface chemistry
- Create the concepts of non-renewable energy sources and storage devices
- Examine and pertain the chemistry of engineering materials like abrasives
- Identify the chemistry of Engineering materials like Lubricants and refractories
- Illustrate the structure and applications of engineering materials like nano materials

UNIT I WATER TECHNOLOGY 9

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

UNIT II POLYMERS AND COMPOSITES 9

Polymers-definition – polymerization – types – addition and condensation Polymerization – free radical polymerization mechanism – Plastics, classification–Preparation, properties and uses of PVC, Teflon, polycarbonate, polyurethane, Nylon-6, 6, PET- Rubber -vulcanization of rubber, synthetic rubbers – buty1Rubber, SBR, Composites – definition, types polymer matrix composites – FRP only.

UNIT III SURFACE CHEMISTRY 9

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

UNIT IV NON-CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES 9

Nuclear energy – fission and fusion reactions and light water nuclear reactor for

Power generation (block diagram only) – breeder reactor – solar energy Conversion – Solar cells – wind energy – fuel cells – hydrogen – oxygen fuel cell – Batteries – Alkaline batteries – lead–acid, nickel–cadmium and lithium batteries

UNIT V ENGINEERING MATERIALS 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

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

REFERENCES

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		a	b	c	d	e	f	g	h	i	j	k	l	Associated POs
1	Demonstrate the essential concept of water chemistry with their properties and applications of water technology	H			H		H	L			L		M	a, b, d, e, f, g, j, k, l.
2	Be aware of the chemistry of polymers and composites	H			H			L						
3	Depict the core concepts of surface chemistry.	H										L		
4	Create the concepts of non-renewable energy sources and storage devices	H	H		M	L	H	M			L		H	
5	Examine and pertain the chemistry of engineering materials like abrasives	H										L		
6	Identify the chemistry of Engineering materials like Lubricants and refractories	H				M								
7	Illustrate the structure and applications of engineering materials like nano materials	H	H		M	L		L					H	

L – Low, M - Medium, H –High.

12F1Z5 **COMPUTING FUNDAMENTALS AND C PROGRAMMING** **L T P C 3 0 0 3**

CATEGORY: Core

PREREQUISITES: Basic knowledge in computer

AIM:

To provide an awareness to Computing and Programming.

COURSE OBJECTIVES:

- To enable the student to learn the major components of a computer system
- To know the correct and efficient ways of solving problems
- To learn to program in C

COURSE OUTCOMES:

- Explain the major components of computer and its functionalities.
- Recite evolution of computers generation and their classification
- Solve computing problems using algorithm and flowchart.
- Write small programs related to simple/ moderate mathematical and logical problems in 'C'.
- Develop programs using C language in advance like structures & pointers.

UNIT I INTRODUCTION TO COMPUTERS 9

Introduction – Characteristics of Computers – Evolution of Computers - Computer Generations – Classification of Computers – Basic Computer organization – Number Systems- Computer Software –Types of Software – Software Development Steps – Internet Evolution – Basic Internet Terminology- Internet Services

UNIT II PROBLEM SOLVING 9

Problem Solving Using Computers- Planning the Computer Program – Purpose – Algorithm – Flow Charts – Pseudo code.

UNIT III INTRODUCTION TO C 9

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

UNIT IV ARRAYS AND FUNCTIONS 9

Arrays- Handling of Character Strings – User-defined Functions – Definitions – Declarations - Call by reference – Call by value.

UNIT V STRUCTURES AND POINTERS 9

Structures and Unions – Pointers – Arrays – The Preprocessor – Developing a C Program : Some Guidelines

TOTAL: 45 PERIODS

TEXT BOOKS

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

REFERENCES

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Covered POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Elucidate the major components of computer and its functionalities	H				M								a, b, d, e.
2	Recite evolution of computers generation and their classification				M									
3	Solve computing problems using algorithm and flowchart	H	M		M	H								
4	Write small programs related to simple/ moderate mathematical and logical problems in ‘C’.		H		M									
5	Develop programs using C language in advance concepts like structures & pointers.		M		M	H								

L – Low, M - Medium, H –High.

12F1Z6 **ENGINEERING GRAPHICS** **L T P C**
3 1 0 4

CATEGORY: Core
PREREQUISITES: Nil
AIM:
To develop Graphic skills of the students.
COURSE OBJECTIVES:
To develop in students graphic skill for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings
COURSE OUTCOMES:
- Follow the conventions used in engineering graphics
- Practice plane curves and free hand sketching
- Draw the projections of points, lines and plane
- Draw the projections of simple solids and their sectional views
- Describe the applications of development of surfaces
- Practice isometric and perspective projections

UNIT I PLANE CURVES AND FREE HAND SKETCHING 15
Curves used in engineering practices:
Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method –Construction of cycloid – construction of involutes of squad and circle – Drawing of tangents and normal to the above curves.
Free hand sketching:
Representation of Three Dimensional objects – General principles of orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 15
Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III PROJECTION OF SOLIDS 15
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 15
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.
Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 15
Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray method.

TOTAL: 75 PERIODS

TEXT BOOKS
1. N.D. Bhatt, "Engineering Drawing" Charotar Publishing House, 46th Edition, (2003).

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Elucidate the major components of computer and its functionalities	H				M								a, b, d, e.
2	Recite evolution of computers generation and their classification				M									
3	Solve computing problems using algorithm and flowchart	H	M		M	H								
4	Write small programs related to simple/ moderate mathematical and logical problems in 'C'.		H		M									
5	Develop programs using C language in advance concepts like structures & pointers.		M		M	H								

L – Low, M - Medium, H –High.

12F1Z7 PHYSICS & CHEMISTRY LABORATORY - I

L	T	P	C
0	0	3	2

CATEGORY: Core

PREREQUISITES: Basic practical knowledge in Physics & Chemistry

AIM:

To impart fundamental knowledge in various physics and chemistry experiments and train the students for systematic recording of experimental findings of various physics and chemistry parameters

COURSE OBJECTIVES:

- To measure the wavelength of Laser, velocity of ultrasonic waves thickness of a thin wire and Refractive index of a prism.
- To determine the thermal conductivity and Young's modulus of the materials. – light experiments
- To determine the total hardness of water sample and amount of Ferrous ion, HCl and dissolved oxygen present in given solutions using various methods.

COURSE OUTCOMES:

- Find the wavelength of Laser and velocity of ultrasonic waves
- Determine the thickness of a thin wire and Refractive index of a prism – light experiments.
- Experiment with the thermal conductivity and Young's modulus of the materials.
- Determine the total hardness of unknown water sample.
- Estimate the amount of ferrous ion, HCl, dissolved oxygen and copper ion present in given solutions using various methods.

LIST OF EXPERIMENTS

1. (a) Determination of a particle size using diode laser
   (b) Determination of wavelength of the laser source
   (c) Determination of acceptance angle and numerical aperture of an optical fiber
2. Determination of thickness of thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
4. Determination of dispersive power of the prism using spectrometer.
5. Determination of thermal conductivity of a bad conductor by Lee's disc method
6. Find the Young's Modulus of a Non Uniform Bending material.
7. Estimation of Total hardness of water by EDTA method
8. Estimation of copper in brass by EDTA method
9. Estimation of Ferrous ion by potetiometric titration
10. pH metry –Determination of strength of HCl by NaOH
11. Determination of DO in water (Winkler's Method)

REFERENCE:

1. Text book of Quantitative Inorganic Analysis,A.I.Vogel, ELBS, London.
2. A.Ravikrishnan,"Practical Engineering Chemistry", Sri Krishna Publications, Chennai(2002)

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Find the wavelength of Laser and velocity of ultrasonic waves.	H	L		M			L			L		H	a, b, c, d, g, j, l.
2	Determine the thickness of a thin wire and Refractive index of a prism – light experiments	H	L		M								H	
3	Experiment with the thermal conductivity and Young's modulus of the materials.	M	L										H	
4	Determine the total hardness of unknown water sample.	L											M	
5	Estimate the amount of Ferrous ion, HCl, dissolved oxygen and copper ion present in given solutions using various methods.	L		M										

L – Low, M - Medium, H –High.

12F1Z8 COMPUTER PRACTICE LABORATORY-I

L	T	P	C
0	0	3	2

CATEGORY: Core

PREREQUISITES: Basic practical knowledge in Computer

AIM:

To learn about application packages and high level programming in C.

COURSE OBJECTIVES:

- To learn application packages such as Microsoft word, Excel and PowerPoint.
- To learn the fundamental Programming concepts in C.
- To develop Programs in C.

COURSE OUTCOMES:

- Make use of MS-Office packages like, MS-Word, MS-Excel and PowerPoint
- Draw flowchart & write algorithms for computing problems
- Formulate problems and propose algorithms in C.
- Effectively choose programming components that efficiently solve computing
- Create programs using C language in advance like structures & pointers

LIST OF EXPERIMENTS

1) **Word Processing**

a) Create a word Document using Table creation, Table Formatting and Scientific notations
b) Create Mail Merge
c) Drawing Flowchart for the following
i) To find the largest of three numbers A,B, and C
ii) To find the sum of first 50 Natural numbers

iii) Factorial of given number using Recursion

2) **Spreadsheet**

a) Create Spreadsheet using the following features:
Tables, Charts, Formula, Formula Editor
Sorting, Import/Export Features.

3) **Power-point**

a) Create a Power point Presentation about your college.

"C" Programs

Aim:

To practice C programs for the following concepts:

4) Simple C Programs using Data types, Expression Evaluation
5) Program using Conditional and Looping Statements
6) Program using Arrays
7) Program using functions
8) Program using Switch…case Statement
9) Program using Strings
10) Program using Structures
11) Program using Unions
12) Program using Pointers.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of MS-Office packages like, MS-Word, MS-Excel and PowerPoint.	L	M			M				H				a, b, d, e, i.
2	Develop flowchart & write algorithms for computing problems.		H		L					L				
3	Formulate problems and propose algorithms in C.	M	L		M	M				M				
4	Effectively choose programming components that efficiently solve computing.	M	L		L	M								
5	Create programs using C language in advance concepts like structures & pointers.		M		L	H				M				

L – Low, M - Medium, H –High.

12F1Z9 ENGINEERING PRACTICES LABORATORY **L T P C**
0 0 3 2

CATEGORY: Core

PREREQUISITES: Nil

AIM:

To Provide exposure to the students with hands on experience on various basic Engineering Practices in Civil, Electrical, Mechanical and Electronics Engineering

COURSE OBJECTIVES:

- To prepare various carpentry joints & Plumbing joints
- To do various arc welding and fitting joints
- To Facilitate the house wiring circuits using switches, fuse, lamp and energy meter

COURSE OUTCOMES:

- Describe the pipe connections and identify the various components used in plumbing
- Produce simple wooden joints using wood working tools
- Create simple lap, butt and tee joints using arc welding equipments
- Generate the simple components using lathe and drilling machine
- Identify the fitting usage of square joint, L joint and stepped joints
- Facilitate the operation of iron box, fluorescent lamp, fan and regulator wiring circuits
- Describe and analyze the fundamentals of Boolean algebra and digital logic gates

GROUP A (CIVIL and MECHANICAL)

I CIVIL ENGINEERING PRACTICE 9

Buildings:

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

Plumbing Works:

(a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.

(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 connections – Mixed pipe material connection – Pipe Connections with different joining components.

(e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

(a) Study of the joints in roofs, doors, windows and furniture.

(b) Hands-on-exercise: Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE 13

Welding:

(a) Preparation of arc welding of butt joints, lap joints and tee joints.

(b) Gas welding practice

Basic Machining:

(a) Simple Turning and Taper turning

(b) Drilling Practice

Sheet Metal Work:

(a) Forming and Bending:

(b) Model making – Trays, funnels, etc.

(c) Different type of joints.

Machine assembly practice:

(a) Study of centrifugal pump

(b) Study of air conditioner

Demonstration on:

(a) Smithy operations, upsetting, swaging, setting down and bending. Example Exercise – Production of hexagonal headed bolt.

(b) Foundry operations like mould preparation for gear and step cone pulley.

(c) Fitting – Exercises – Preparation of square fitting and vee – fitting models.

GROUP B (ELECTRICAL and ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE 10

1. Residential house wiring using switches, fuse, indicator, lamp and energymeter.
2. Fluorescent lamp wiring.
3. Stair case wiring

4. Measurement of electrical quantities – voltage, current, power and power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of electrical equipment.

IV ELECTRONICS ENGINEERING PRACTICE 13

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

TOTAL: 45 PERIODS

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply the concept of pipe connections and identify the various components used in plumbing.	M	M	H	H	H				H				a, b, c, d, e, i.
2	Produce simple wooden joints using wood working tools	M	M	H	H	H				H				
3	Create simple lap, butt and tee joints using arc welding equipments.	M	M	H	H	H				H				
4	Generate the simple components using lathe and drilling machine.	M	L	H	H	H				H				
5	Identify the Fitting usage of square joint, L joint and stepped joints.	M	M	H	H	H				H				
6	Facilitate the operation of iron box, fluores-cent lamp, fan and regulator wiring circuits.	L	M	M	H	H				M				
7	Analyze the fundamentals of Boolean algebra and digital logic gates.	L	M	M	M	M				M				

L – Low, M - Medium, H –High.

12F2Z1 TECHNICAL ENGLISH-II

L	T	P	C
3	1	0	4

CATEGORY: Core
PREREQUISITES: 12F1Z1-Technical English-I
AIM:
To improve English communication skill with relevance to technical context.
COURSE OBJECTIVES:

- To show the basic knowledge of English Language for the specific purpose
- To construct written communication skill with mechanics of Writing
- To develop error-free messages
- To infer the meaning of the text to gather information
- To develop Business and technical Communication skill

COURSE OUTCOMES:

- Improve reading skill to distinguish different kinds of text.
- Infer communication module used at workplace.
- Determine specific information using listening skill.
- Adapt audience analysis method for an effective mass communication.
- Evaluate sentence structure and a word.

UNIT I READING 12

Intensive reading and predicting content, Reading and interpretation, Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) – Reading comprehension exercises with texts including graphic communication– Exercises in interpreting non-verbal communication-Reading comprehension exercises with critical questions, multiple choice, Reading comprehension exercises with analytical questions on content – Evaluation of content questions

UNIT II WRITING 12

Writing a Report-Writing a Proposal-Writing a Feasibility Report-Writing Situational Report- Memo-Writing Agenda -Writing Minutes -Writing Manuals-Writing Thesis statements-Writing Recommendation, Checklist, Instruction-Writing Statement of Purpose-Writing Letter of Recommendation-Writing Statement of the Problem-Transcoding Flow Chart, Pie Chart, Bar Diagram, Line Graph.

UNIT III LISTENING 12

Listening to gather Information- Listening to stories- Listening to a conversations/Interviews Listening to a News Report- Listening to a famous speeches, ceremonial speech, awareness programme and technical presentation- Intensive Listening to find exact information-Listening for gist-Listening to identify expressions used in Discussions-Listening to identify tonal Variations in Speeches

UNIT IV SPEAKING 12

Talking about General Contents, localities, home town, ambition in life, Future plan- Introducing others-Describing/Introducing function of a product/ machine, talking about pros and cons of the product-Communication for the Mass-Welcome Address, Special Address, Presidential Address, Vote of thanks - Speaking with good Pronunciation-Famous quotes, speeches- Public Speech-Speaking on the General Topic-Appropriate Communication-Answering to the Question, adding valuable points to the discussion, giving an appropriate reply, appropriate vocabulary according to the audience-Giving a specific information about Statistics used in Bar diagram, Pie Chart -Role-Play-Hr and applicant, Purchase Manager and Customer, Industrialist- Reporter, Employer- Employee, Managing Director-HR

UNIT V FOCUS ON LANGUAGE 12

Synonym-Antonym- Homonym-Tenses-Phrasal Verbs- Acronym- Abbreviations-Foreign words-Confusing Words-Analogy- Numerical Expressions- Purpose Statement- Error Corrections-Direct andIndirect Speech.

TOTAL: 60 PERIODS

TEXT BOOKS

1. Department of Humanities and Social Sciences, Anna University, '*English for Engineers and Technologists*' Combined Edition (Volumes 1 and 2), Chennai: Orient Longman Pvt. Ltd., 2006.

REFERENCES

1. Sharan J.Genrson and Steven M.Gerson – "Technical Writing – Process and Product" – Pearson Education – 2000.
2. Raymond V.Lesikar, John D. Pettit and Mary E.Flatley – Lesikass BasicCommunication Tata McGraw Will 8th Edition – 1999.
3. Stevel. E. Pauley, Daniel G.Riordan – Technical Report Writing Today – AITBS Publishing and Distributors, India 5th edition – 2000.
4. Robert L.Shurter, Effective letters in business Third Ed. 1983.
5. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.
6. Cambridge BEC Preliminary 1: Practice Tests from the University of Cambridge Local Examinations Syndicate, University of Cambridge Local Examinations Syndicate, PB, ISBN: 9780521753012.

7. Cambridge BEC Preliminary 2 Student's Book with Answers: Examination papers from University of Cambridge ESOL Examinations, Cambridge ESOL, PB, ISBN: 9780521544504

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Improve reading skill to distinguish different kinds of text.				M					M	H		H	d, i, j, k, l.
2	Infer communication module used at workplace.									H	H	H	H	
3	Find specific information using listening skill.									H	H		M	
4	Adapt audience analysis method for an effective mass communication.									H	H		H	
5	Evaluate sentence structure and a word.									M	H		H	

L – Low, M - Medium, H –High.

12F2Z2 ENGINEERING MATHEMATICS – II

L	T	P	C
3	1	0	4

CATEGORY: Core

PREREQUISITES: 12F1Z2-Engineering Mathematics-I

AIM:

To analyse the engineering problems using the techniques and the mathematical skills acquired by studying vector calculus, Laplace transform, complex variables, ordinary differential equations.

COURSE OBJECTIVES:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

COURSE OUTCOMES:

- Apply Laplace transform to solve first and second order differential equations with elementary forcing function.
- Classify Green's theorem to evaluate line integrals along simple closed contours on the plane.
- Construct an analytic function using the properties of analytic function
- Make use of Cauchy's residue theorem for applications in Engineering.
- Evaluate complicated real integrals using the basics of analytic functions and the complex integration
- Develop a series solution to an ODE, and recognize special functions defined by series.

UNIT I LAPLACE TRANSFORM 9+3

Laplace transform – Conditions for existence – Transform of elementary functions –Basic properties – Transform of derivatives and integrals – Transform of unit step function and impulse functions – Transform of periodic functions. Definition of Inverse Laplace transforms as contour integral – Convo-

lution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

UNIT II VECTOR CALCULUS 9+3

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and stokes' theorem (excluding proofs) – Simple applications involving 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 (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w= z+c, cz, 1/z, and bilinear transformation.

UNIT IV COMPLEX INTEGRATION 9+3

Statement and application of cauchy's theorem and Cauchy's integral formula, Taylor and Laurent expansion, Singularities, Classification, Residues, Cauchy's residue theorem, Contour integration, Unit circle and semi-circular contours (excluding poles on real axis)

UNIT V ORDINARY DIFFERENTIAL EQUATIONS 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.

TOTAL: 60 PERIODS

TEXT BOOKS

1. B.S.Grewal,'Higher Engineering Mathematics', Thirty Sixth Edition,Khanna Publishers, Delhi,2005.
2. Kreyszig, E., Advanced Engineering Mathematics, 8th edition, John Wiley Sons, 2001.

REFERENCES

1. Greenberg, M.D. Advanced Engineering Mathematics, Second Edition, Pearson Education Inc. (First Indian reprint), 2002
2. Venkataraman.M.K.,"Engineering Mathematics", Volume I and II Revised enlarged Fourth Edition The National ?Publishing Cpompany,Chennai,2004.
3. Veerarajan.T"Engineering Mathematics",Fourth Edition, Tata McGraw – hill publishing company Ltd,New Delhi,2005.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply Laplace transform to solve first and second order differential equations with elementary forcing function.	M	L		L								H	a, b, d, l.
2	Classify Green's theorem to evaluate line integrals along simple closed contours on the plane.	M	M		M									
3	Construct an analytic function using the properties of analytic function	M	L		M								L	
4	Make use of Cauchy's residue theorem for applications in Engineering.	L	M		H								L	
5	Evaluate complicated real integrals using the basics of analytic functions and the complex integration	H	H											
6	Develop a series solution to an ODE, and recognize special functions defined by series.	L	M		L								M	

L – Low, M - Medium, H –High.

12F2Z3 **ENGINEERING PHYSICS – II** **L T P C 3 0 0 3**

CATEGORY: Core
PREREQUISITES:12F1Z3-Engineeriong Physics - I
AIM:
To endow the students with the fundamentals of Physics and apply new ideas in the field of Engineering and Technology.
COURSE OBJECTIVES:
- To study the theories of conducting and semiconducting materials.
- To study the properties and applications of magnetic and super conducting materials.
- To understand the properties and applications of dielectric materials and modern engineering materials.

COURSE OUTCOMES:
- Illustrate the free electron theories (classical and quantum), Fermi Function, carrier concentration in metals.
- Analyze the theory of conducting and semiconducting materials, Hall Effect and its applications.
- Explain the properties and applications of magnetic materials and super conducting materials.
- Summarize the properties of dielectric materials and their applications – Ferro electricity.
- Analyze the properties and applications of modern engineering materials.
- Extend the acquaintance of nanophase materials.

UNIT I CONDUCTING MATERIALS 9
Conductors – classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT II SEMICONDUCTING MATERIALS 9
Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration – compound semiconductors – Hall effect –Determination of Hall coefficient – Applications.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS 9
Origin of magnetic moment – Bohr magneton – Dia and para magnetism – Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – anti – ferromagnetic materials – Ferrites – applications – magnetic recording and readout – storage of magnetic data – tapes, floppy and magnetic disc drives.Superconductivity : properties - Types of super conductors – BCS theory of superconductivity(Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

UNIT IV DIELECTRIC MATERIALS 9
Electrical susceptibility – dielectric constant – electronic, ionic, orientational and space charge polarization – frequency and temperature dependence of polarisation – internal field – Claussius – Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer) – ferroelectricity and applications.

UNIT V MODERN ENGINEERING MATERIALS 9
Metallic glasses: preparation, properties and applications.
Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA.
Nanomaterials: synthesis –plasma arcing – chemical vapour deposition – sol-gels – electrodeposition – ball milling - properties of nanoparticles and applications.
Carbon nanotubes: fabrication – arc method – pulsed laser deposition – chemical vapour deposition - structure – properties and applications.

TOTAL: 45 PERIODS

TEXT BOOKS
1. Charles Kittel ‘ Introduction to Solid State Physics’, John Wiley and sons, 7 edition, Singapore (2007)

2. Charles P. Poole and Frank J.Ownen, 'Introduction to Nanotechnology', Wiley India(2007) (for Unit V)
3. K.Rajagopal , "Engineering Physics" Prentice Hall of India Pvt.Ltd. New Delhi , 2007

REFERENCES

1. Rajendran, V, and Marikani A, 'Materials science'Tata McGraw Hill publications, (2004) New delhi.
2. Jayakumar, S. 'Materials science', R.K. Publishers, Coimbatore, (2008).
3. Palanisamy P.K, 'Materials science', Scitech publications(India) Pvt. LTd., Chennai, second Edition(2007)
4. M. Arumugam, 'Materials Science' Anuradha publications, Kumbakonam, (2006).

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Illustrate the free electron theories (classical and quantum), Fermi Function, carrier concentration in metals.	H	H										H	a, b, c, d, e, l.
2	Analyze the theory of conducting and semiconducting materials, Hall Effect and its applications.	H	H	H		M							H	
3	Symbolize the properties and applications of magnetic materials and super conducting materials.	H	M		H	M							H	
4	Reassess the properties of dielectric materials and their applications – Ferro electricity.	H	H	M									H	
5	Analyze the properties and applications of modern engineering materials.	H	M		H									
6	Extend the acquaintance of nanophase materials.	H	M	H	H	M							H	

L – Low, M - Medium, H –High.

12F2Z4 **ENGINEERING CHEMISTRY – II** **L T P C 3 0 0 3**

CATEGORY: Core

PREREQUISITES: 12F1Z4 - Engineering Chemistry - I

AIM

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

COURSE OBJECTIVES:

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

COURSE OUTCOMES:

- Explain the operating principles and the reaction involved in electrochemistry

- Illustrate the principle and applications of different electrodes with their merits and demerits.
- Discuss the principles and application of corrosion s control
- Describe the core concepts behind fuels and combustion
- Describe the concepts of fuel purification processes
- Analyze the importance in phase rule and pertain the chemistry of alloys
- Interpret the principles, importance and application of analytical techniques.

UNIT I ELECTROCHEMISTRY 9

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes –Standard Hydrogen electrode -Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - Fe^{2+} vs dichromate and precipitation – Ag^{+} vs CI- titrations) and conduct metric titrations (acid-base – HCI vs, NaOH) titrations

UNIT II CORROSION AND CORROSION CONTROL 9

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

UNIT III FUELS AND COMBUSTION 9

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

UNIT IV PHASE RULE AND ALLOYS 9

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

UNIT V ANALYTICAL TECHNIQUES 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co.,New Delhi (2002).
2. Dr.A.Ravikrishnan, "Engineering Chemistry" Sri Krishna Publications, Chennai. (2002)
3. S.S.Dara "A text book of Engineering Chemistry" S.Chand and Co.Ltd., New Delhi (2006).

REFERENCES

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Clarify the operating principles and the	H	L											a, b, c, d, e,

	reaction involved in electrochemistry.													f, g, i, j, l.
2	Illustrate the principle and applications of different electrodes with their merits and demerits.	H			M		L							
3	Consider the principles and application of corrosion s control.		M	L			H	M			M		L	
4	Apply the core concepts behind fuels and combustion.	H	L										M	
5	Show the concepts of fuel purification processes.						H	M						
6	Analyze the importance in phase rule and pertain the chemistry of alloys.	H			M	L				L	H			
7	Interpret the principles, importance and application of analytical techniques.	H	H		H	M				M	L			

L – Low, M - Medium, H –High.

12F2X5 ELECTRIC CIRCUITS AND ELECTRON DEVICES

L	T	P	C
3	1	0	4

CATEGORY: Core

PREREQUISITES: Nil

AIM:

To enable the students to develop skills in identifying and testing electronic components and designing circuits using BJT and FET.

COURSE OBJECTIVES:

- To utilize basic analysis laws (Kirchhoff's current law, KCL, Kirchhoff's voltage law, KVL, and Ohm's law) to derive useful relationships for series and parallel combinations of passive and active components.
- To analyze the transient responses of series RC, RL, and RLC circuits.
- To examine the concept of bipolar transistor, FET and its circuit operation.
- Discuss about the different types of diodes and their applications.

COURSE OUTCOMES:

- Become adept at using various methods of circuit's analysis, including simplified methods such as series parallel reductions, voltage and current dividers.
- Appreciate the consequences of linearity, in particular the principle of superposition and Thevenins-Nortons equivalent circuits.
- Analyze the transient responses of RL,RC circuits and RLC circuits.
- Compare and contrast the characteristics of different solid-state devices to each other relating those characteristics to appropriate applications for the particular devices.
- Demonstrate the internal workings of the special semiconductor diodes. Identify different types of diodes by schematic symbol

UNIT I CIRCUIT ANALYSIS TECHNIQUES 12

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

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS 12

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

UNIT III SEMICONDUCTOR DIODES 12

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

UNIT IV TRANSISTORS 12

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

eration – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES 12

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

TOTAL: 60 PERIODS

TEXT BOOKS

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

REFERENCES

1. Robert T. Paynter, "Introducing Electronics Devices and Circuits", Pearson Education, 7th Education, (2006).
2. William H. Hayt, J.V. Jack, E. Kemmebly and steven M. Durbin, "Engineering Circuit Analysis", Tata McGraw Hill, 6th Edition, 2002.
3. J. Millman & Halkins, Satyebranta Jit, "Electronic Devices & Circuits", Tata McGraw Hill, 2nd Edition, 2008.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Become adapt at using various methods of circuit's analysis, including simplified methods such as series parallel reductions, voltage and current dividers.	H	H		L	H							M	a, b, c, d, e, l.
2	Appreciate the consequences of linearity, in particular the principle of superposition and Thevenins- Nortons equivalent circuits.	H	H		M	H								
3	Analyze the transient responses of RL.RC circuits and RLC circuits.	H	H	H	M									
4	Compare and contrast the characteristics of different solid-state devices to each other relating those characteristics to appropriate applications for the particular devices.	M			H									
5	Demonstrate the internal workings of the special semiconductor diodes. Identify different types of diodes by schematic symbol	H			H									

L – Low, M - Medium, H –High.

12F2X6 BASIC CIVIL & MECHANICAL ENGINEERING

L	T	P	C
4	0	0	4

CATEGORY: Core

PREREQUISITES: Nil

AIM:

To study the basic criteria of Civil and Mechanical Engineering

COURSE OBJECTIVES:

- To introduce the concepts of surveying, building materials, components and structures.

- To be exposed to the functioning of power plants, pumps and turbines
- To realize the principle and working of IC engines, boilers, Refrigeration and Air-conditioning

COURSE OUTCOMES:

- Determine the variables in surveying and study building materials.
- Précis the building components and structures.
- Identify the working of various power plants, pumps and turbines.
- Illustrate the functioning of various IC engines and boilers.
- Recognize the operation of refrigerators and air conditioners.

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS 15

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

Civil Engineering Materials: Bricks: Properties & uses – Manufacturing, stones: Types, Cement: Manufacturing –Properties-Types of use, concrete: Manufacturing, Sand – steel sections.

UNIT II BUILDING COMPONENTS AND STRUCTURES 15

Components of Building with typical cross section sketch

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

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Mechanics – Internal and external forces – stress – strain – elasticity –illustrative examples - Types of Bridges and Dams

30 PERIODS

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING 10

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

UNIT IV I C ENGINES 10

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

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM 10

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

30 PERIODS

TOTAL: 60 PERIODS

REFERENCES

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Determine the variables in surveying and study building materials.	H	M			H								a, b, c, d, e, f, g.
2	Précis the building components and structures.	H		L		H	M							
3	Identify the working of various power plants, pumps and turbines.	H		M	L									
4	Illustrate the functioning of various IC engines and boilers.	H		M	M									
5	Recognize the operation of refrigerators and air conditioners.	H		M	M			H						

L – Low, M - Medium, H –High.

12F2Z7 PHYSICS & CHEMISTRY LABORATORY - II

L	T	P	C
0	0	3	2

CATEGORY: Core

PREREQUISITES: 12F1Z7 – Physics and Chemistry Laboratory I

AIM:

To develop laboratory skills and realization of Physics and chemistry concepts by doing experiments.

COURSE OBJECTIVES:

- To determine the different Modulus, specific resistance, Band gap of the given materials and the coefficient of viscosity of the given liquid.
- To determine the amount of chloride, strong acid, HCl and CH_3COOH and barium chloride present in given sample solutions by various methods.
- To estimate of alkalinity of the water sample.

COURSE OUTCOMES:

- Determine the rigidity modulus and Young's Modulus of the material of a wire.
- Find the coefficient of viscosity of a liquid.
- Determine the wavelength of mercury spectrum.
- Find the specific resistance of a coil of wire and Band gap of a semiconducting material.
- Determine the amount of chloride, strong acid, HCl and CH_3COOH and barium chloride present in given sample solutions by various methods.
- Estimate of alkalinity of the water sample.

LIST OF EXPERIMENTS

1. Torsional Pendulum – Determination of rigidity modulus.
2. Determination of Young's modulus of the material – Uniform bending.
3. Determination of Viscosity of liquid – Poiseuille's method.
4. Determination of wavelength of mercury spectrum – Spectrometer Grating.
5. Determination of band gap of semiconducting material.
6. Determination of specific resistance of a given coil of wire – Carey foster bridge.
7. Estimation of chloride content in water sample (Argentometric method)
8. Conductometric titration of strong acid with strong base.
9. Conductometric titration of mixture of acids (HCl & CH_3COOH)
10. Conductometric precipitation titration using $BaCl_2$ Vs Na_2SO_4
11. Estimation of alkalinity in water sample.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Determine the rigidity modulus and Young's Modulus of the material of a wire.	L	M		M					H			M	a, b, c, d, i, l
2	Find the coefficient of viscosity of a liquid.	L	M		M					H			M	
3	Determine the wavelength of mercury spectrum.	L	H		L					H			M	
4	Find the specific resistance of a coil of wire and Band gap of a semiconducting material.	H	M		M					H			H	
5	Determine the amount of chloride, strong acid, HCl and CH_3COOH and barium chloride present in given sample solutions by various methods.	L		M						H				
6	Estimate of alkalinity of the water sample.	L								H			M	

L – Low, M - Medium, H –High.

12F2Z8 COMPUTER PRACTICE LABORATORY-II **L 0** **T 0** **P 3** **C 2**

CATEGORY: Core

PREREQUISITES: 12F1Z8-Computer Practices Lab-I

AIM:

To get the practical knowledge in working Unix environment.

COURSE OBJECTIVES:

- To study about basic UNIX commands and study of Unix OS.
- To learn about Unix Shell commands and UNIX editor.
- To give an understanding of the c programs in UNIX environment and File Handling.

COURSE OUTCOMES:

- Make use of basic UNIX commands and shell scripts.
- Build simple shell programs.
- Develop shell scripts using Conditional and Iterative
- Construct C program using functions.
- Able to work with file concepts in C

LIST OF EXPERIMENTS

1. Study of Unix OS
2. Basic Commands in Unix

Shell Programs

1. Simple Shell Programs
2. Script using for Loop
3. Script using if loop
4. Script using combination of for and if loop
5. Script using while and until loop
6. Script using combination of while and if loop
7. Script using Switch case
8. String Manipulation
9. File manipulation

C-Programs

1. Function with no arguments and no return type
2. Function with no arguments and return type
3. Function with arguments and no return type
4. Function with arguments and return type
5. Call by value
6. Call by reference
7. Recursion function

8. Pointers
9. Random access functions in files
10. File handling

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of basic UNIX commands and shell scripts.	M	L		L									a, b, d, e, i.
2	Build simple shell programs.		H		M	M				M				
3	Develop shell scripts using Conditional and Iterative statements.		H		M					L				
4	Construct C program using functions.		M		M	H				H				
5	Able to Work with File concepts in C.	M								M				

L – Low, M - Medium, H –High.

12F2X8 ELECTRIC CIRCUITS AND ELECTRON DEVICES LABORATORY **L T P C**
0 0 3 2

CATEGORY: Core
PREREQUISITES:NIL
AIM:
To enable the students to design circuits using diodes, BJT and FET
COURSE OBJECTIVES:

- To explain how current flows through the p-n junction and relating this phenomena to the characteristics and operation of the diodes, bipolar and field-effect transistors.
- To expose students to the function and application of the diodes, bipolar junction and field effect transistors in electronic circuits.

COURSE OUTCOMES:

- Verify in practice some important circuit Theorems and concepts, such as Thevenin superposition, Norton's and maximum power transform.
- Analyze linear DC circuit using ohm's law, Kirchhoff's voltage law & kirchhoff's current law.
- Analyze steady state linear A.C circuit containing dependent & independent sources, Resistoe, capacitor & inductors.
- Design different types of biasing circuits of transistor & FET.
- Illustrate the capabilities & limitation of UJT,SCR, TRIAC, DIAC and make decision regarding their best utilization in a specific situation.

LIST OF EXPERIMENTS

1. Verification of KVL and KCL
2. Verification of Thevenin and Norton Theorems.
3. Verification of superposition Theorem.
4. Verification of Maximum power transfer and reciprocity theorems.
5. Frequency response of series and parallel resonance circuits.
6. Characteristics of PN and Zener diode
7. Characteristics of CE configuration

8. Characteristics of CB configuration
9. Characteristics of UJT and SCR
10. Characteristics of JFET and MOSFET
11. Characteristics of Diac and Triac.
12. Characteristics of Photodiode and Phototransistor.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Verify in practice some important circuit Theorems and concepts, such as Thevenin superposition, Nor-ton's and maximum power transform.	H			H	H				H				a, b, c, d, e, i
2	Analyze linear DC circuit using ohm's law, Kir-chhoff's voltage law & kirchhoff's current law.	H	H	H		H				H				
3	Analyze steady state linear A.C circuit containing dependent & independent sources, Resistor, capacitor & inductors.	H	H	H		H				H				
4	Design different types of biasing circuits of transistor & FET.	H	H	H						H				
5	Illustrate the capabilities & limitation of UJT,SCR, TRIAC, DIAC and make decision regarding their best utilization in a specific situation.	H			H					H				

L – Low, M - Medium, H –High.

12MA31 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS L T P C
(Common to all B.E. / B.Tech Degree Programmes) 3 1 0 4

CATEGORY: Core
PREREQUISITES: 12F1Z2-Engineering Mathematics-I , 12F2Z2-Engineering Mathematics-II
AIM

To facilitate the understanding of the principles and to cultivate the art of formulating physical problems in the language of mathematics.

COURSE OBJECTIVES:

- To develop the skills of the students in the areas of Transforms and Partial Differential Equations.
- To know the necessary for their effective studies in a large number of engineering subjects like Signals & Systems, Digital signal Processing ,Communication systems, and Electromagnetic theory.
- To serve as a prerequisite for post graduate and specialized studies and research.

COURSE OUTCOMES:

- Classify the Fourier series and half range Fourier sine and cosine series.
- Explain the Fourier transform and their properties.
- Determine Z-inverse transform using convolution theorem and partial fraction method.
- Solve the partial differential equation by using Lagrange's linear equation.
- Analyze separation of variable to solve linear partial differential equation.
- Discuss the formation of partial differential equation.

UNIT I FOURIER SERIES 12

Dirichlet's Conditions – General Fourier Series –Odd and even functions- Half range Sine and Cosine series – Complex form of Fourier Series - Parseval's Identity – Harmonic Analysis.

UNIT II FOURIER TRANSFORMS 12

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

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 12

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

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 12

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

UNIT V TRANSFORMS AND DIFFERENCE EQUATIONS 12

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

TOTAL: 60 PERIODS

TEXT BOOKS

1. Grewal, B.S, "Higher Engineering Mathematics", 40th Edition, Khanna publishers, Delhi, (2007)

REFERENCE BOOKS

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Classify the Fourier series and half range Fourier sine and cosine series.	M	H		H								H	a, b, d, l.
2	Apply Fourier transform and with their properties.	M	H		H								H	
3	Determine Z-inverse transform using convolution theorem and partial fraction method.	L	M		H								H	
4	Solve the partial differential equation by using Lagrange's linear equation.	L	L		L									
5	Analyze separation of variable to solve linear partial differential equation.	L	L										L	
6	Identify the formation of partial differential equation.	M	M											

L – Low, M - Medium, H –High.

12GE32 PROFESSIONAL ETHICS IN ENGINEERING L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITES: NIL
AIM

To have experience with the day-to-day problems and their allied alternative decision making towards social and professional environment.

COURSE OBJECTIVES:

- To identify the core values that shape the ethical behavior of an engineer
- To utilize opportunities to explore one's own values in ethical issues
- To become aware of ethical concerns and conflicts
- To enhance familiarity with codes of conduct
- To increase the ability to recognize and resolve ethical dilemmas

COURSE OUTCOMES:

- Summarize the codes of general ethics and Engineering Ethics.
- Analyze the moral complexities in all the engineering activities and decision-making processes.
- Make use of engineering ethics to justify a solution to an engineering problem based on professional and ethical standards.
- Design a system, component, process or products, almost satisfying all the aspects of safety, to meet the desired needs.
- Differentiate the personal, professional and ethical responsibilities and rights to engage in life-long learning.
- Build a multi-disciplinary team and direct the efforts of a team in ethical manner.

UNIT I ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Professions and Professionalism – Professional Ideals and Virtues – Uses of Ethical Theories.

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION 9

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 ENGINEER'S RESPONSIBILITY FOR SAFETY 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl Case Studies and Bhopal.

UNIT IV RESPONSIBILITIES AND RIGHTS 9

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V GLOBAL ISSUES 9

Multinational Corporations – 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 = 45 PERIODS

TEXT BOOKS

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, New York, 2005.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", 6th Edition, Ray James, Elian Englehardt Wadsworth publishing co, 2013.

REFERENCE BOOKS

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.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, (2003)

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Relate the connection between ethics and technology; the ethical issues emerged in the information society.						H		H	M				c, e, f, g, h, i, j, l.
2	Classify information privacy, intellectual property, and security.			L			M		H				M	
3	Acquire a broad perspective on the social and ethical impacts and implications of information technology.			H			M	L	H					
4	Make use of ethical principles, professional responsibilities and codes of conduct.					L			H				H	
5	Interpret the benefits that are expected to arise from acting ethically.								H		L		H	

L – Low, M - Medium, H –High.

12CS31 DIGITAL PRINCIPLES AND SYSTEM DESIGN L T P C
3 1 0 4

CATEGORY: Core
PREREQUISITES: 12F2X5 - Electric Circuits and Electron Devices

AIM

To provide an understanding of the fundamentals of digital logic and circuit design.

COURSE OBJECTIVES:

- To understand different methods used for the simplification of Boolean functions
- To design and implement combinational circuits
- To design and implement synchronous sequential circuits
- To design and implement asynchronous sequential circuits
- To study the fundamentals of VHDL / Verilog HDL

COURSE OUTCOMES:

- Apply the concept of Binary number systems
- Elucidate the minimizing algorithms (Boolean algebra, Karnaugh map and Tabulation Method)
- Analyze and design the Circuits for arithmetic operations and Code conversion.
- Analyze & design the Circuits for Decoders & Encoders and MUXs & DeMUXs
- Compare types of Memory Devices
- Design the circuits of Flip-Flops, Counters and Registers
- Analyze and design the asynchronous sequential circuits, Hazards and ASM Chart

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 12

Review of binary number systems – Binary arithmetic – Binary codes – Boolean algebra and theorems – Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Implementation of Boolean functions using logic gates.

UNIT II COMBINATIONAL LOGIC 12

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

UNIT III DESIGN WITH MSI DEVICES 12

Decoders and encoders - Multiplexers and demultiplexers - Memory devices - HDL for combinational circuits.

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 12

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

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC 12

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

TOTAL = 60 PERIODS

TEXT BOOKS

1. M.Morris Mano, "Digital Design", 3rd edition, Pearson Education, 2007.

REFERENCE BOOKS

1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, Cengage Earning, 5th edition, 2005.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply the concept of Binary number systems	H	M											a, b, c, d, e.
2	Elucidate the minimizing algorithms (Boolean algebra, Karnaugh map and Tabulation Method)	M	H											
3	Analyze and design the Circuits for arithmetic operations and Code conversion.	H	M	M	H	M								
4	Analyze & design the Circuits for Decoders & Encoders and MUXs & DeMUXs	H	M	M	H	M								
5	Compare types of Memory Devices	H			M									
6	Design the circuits of Flip-Flops, Counters and Registers	M		M	H	M								
7	Analyze and design the asynchronous sequential circuits, Hazards and ASM Chart	M	M	M										

L – Low, M - Medium, H –High.

12CS32 ANALOG AND DIGITAL COMMUNICATION L T P C

3 1 0 4

CATEGORY: Core

PREREQUISITES: 12F2X5 - Electric Circuits and Electron Devices

AIM

To study the principles of analog communication and their techniques.

COURSE OBJECTIVES:

- To understand the frequency modulation and transmission techniques
- To understand the error detection and control mechanisms
- To understand the accessing techniques

COURSE OUTCOMES:

- Apply the concept of communication system.
- Compare the performance of the various Analog modulation techniques.

- Design basic analog or digital communication systems to solve a given communications problem.
- Evaluate fundamental communication system parameters, such as bandwidth, power, signal to quantization noise ration, and data rate.
- Elucidate the standards and modems of data communication.
- Demonstrate the spread spectrum and multiple access techniques.

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 12

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

UNIT II DIGITAL COMMUNICATION 12

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

UNIT III DIGITAL TRANSMISSION 12

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

UNIT IV DATA COMMUNICATIONS 12

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

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 12

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

TOTAL = 60 PERIODS

TEXT BOOKS

1. Wayne Tomasi, "Advanced Electronic Communication Systems",6/e, Pearson Education, 2007.
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons. 2006.

REFERENCE BOOKS

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply the concept of communication system.	H	M										M	a, b, c, d, l.
2	Compare the performance of the various Ana-	H	H		M									

	log modulation techniques.													
3	Design basic analog or digital communication systems to solve a given communications problem.	H	H	H	M									
4	Evaluate fundamental communication system parameters, such as bandwidth, power, signal to quantization noise ration, and data rate.	M	M	M	H									
5	Elucidate the standards and modems of data communication.	M	M		H									
6	Demonstrate the spread spectrum and multiple access techniques.	M	M	L	H									

L – Low, M - Medium, H –High.

12CS33 OBJECT ORIENTED PROGRAMMING L T P C
3 0 0 3

CATEGORY: Core

PREREQUISITES: 12F1Z5 – Computing Fundamentals and C Programming

AIM

The aim is to introduce the concepts Object Oriented Programming.

COURSE OBJECTIVES:

- To understand the concepts of object-oriented programming
- To introduce the concepts of Templates and Error Handling.
- To master OOP using C++.

COURSE OUTOCOMES:

- Recite the differences between object oriented programming over procedure oriented programming
- Apply the concepts of data encapsulation, inheritance, method overloading and polymorphism to large-scale software.
- Use C++ to demonstrate practical experience in developing object-oriented solutions
- Choose the exception handling mechanism to deal with program errors.
- Develop the linked codes using RTTI and STL.

UNIT I INTRODUCTION 9

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance – abstract classes – polymorphism. Introduction to C++ – classes – access specifiers – function and data members – default arguments – function overloading – friend functions – const and volatile functions – static members – Objects – pointers and objects – constant objects – nested classes – local classes

UNIT II CONSTRUCTORS 9

Constructors – default constructor – Parameterized constructors – Constructor with dynamic allocation – copy constructor – destructors – operator overloading – overloading through friend functions – overloading the assignment operator – type conversion – explicit constructor

UNIT III EXCEPTION HANDLING AND INHERITANCE 9

Exception handling – try-catch-throw paradigm – exception specification – terminate and Unexpected functions – Uncaught exception - Inheritance – public, private, and protected derivations – multiple inheritance.

UNIT IV FUNCTIONS AND RUN TIME TYPE IDENTIFICATION 9

Function and Class template – virtual functions – pure virtual functions – virtual base class – abstract class – composite objects Runtime polymorphism –RTTI – typeid – dynamic casting – RTTI and templates – cross casting – down casting.

UNIT V INPUT/OUTPUT AND STANDARD TEMPLATE LIBRARY 9

Streams and formatted I/O – I/O manipulators - file handling – random access – object serialization – namespaces - std namespace – ANSI String Objects – standard template library.

TOTAL = 45 PERIODS

TEXT BOOKS

1. E.Balagurusamy, “Object oriented Programming with C++”, Tata McGraw-Hill 2013.
2. B. Trivedi, “Programming with ANSI C++”, Oxford University Press, 2012.

REFERENCE BOOKS

1. Ira Pohl, “Object Oriented Programming using C++”, Pearson Education, 2nd Edition Reprint 2004.

2. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition, Pearson Education, 2005.
3. B. Stroustrup, "The C++ Programming language", Third edition, Pearson Education, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recite the differences between object oriented programming over procedure oriented programming	M	H		M									a, b, d, e.
2	Apply the concepts of data encapsulation, inheritance, method overloading and polymorphism to large-scale software.	M	M		H									
3	Use C++ to demonstrate practical experience in developing object-oriented solutions		M		M									
4	Choose the exception handling mechanism to deal with program errors.		H			M								
5	Develop the linked codes using RTTI and STL.		L			L								

L – Low, M - Medium, H –High.

12CS34 DATA STRUCTURES L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITES: 12F1Z5 – Computing Fundamentals and C Programming
AIM

To introduce the concepts of Data Structures and to understand the design and implementation of data structures and their applications.

COURSE OBJECTIVES:

- To introduce the concepts of ADTs.
- To introduce the concepts of linear, tree, balanced tree, and graph structures.
- To introduce the concepts of Hashing and Sorting.

COURSE OUTOCMES:

- Implement abstract data types using static and dynamic allocations.
- Construct a suitable tree structure for the real world problems.
- Recite the various sorting algorithms.
- Model code for real life problems like shortest path and minimum spanning using graph.
- Identify & Utilize appropriate data structuring strategies for a given contextual problem in C language.

UNIT I LINEAR STRUCTURES 9

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues

UNIT II TREE STRUCTURES 9

Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT – Threaded Binary Trees.

UNIT III BALANCED TREES 9

AVL Trees – Splay Trees – B-Tree - heaps – binary heaps – applications of binary heaps.

UNIT IV HASHING AND SORTING 9

Hashing – Separate chaining – open addressing – rehashing – extendible hashing – Sorting – Insertion sort – Shell

sort – Merge sort – Heap sort – Quick sort.

UNIT V GRAPHS 9

Definitions – Topological sort – breadth-first traversal - shortest-path algorithms – minimum spanning tree – Prim's and Kruskal's algorithms – Depth-first traversal – biconnectivity – Euler circuits – applications of graphs.

TOTAL = 45 PERIODS

TEXT BOOKS

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2012.

REFERENCE BOOKS

1. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, 1st Edition Reprint 2003.
2. R. F. Gilberg, B. A. Forouzan, "Data Structures", Second Edition, Thomson India Edition, 2005.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Implement abstract data types using static and dynamic allocations.	M	M		M									a, b, c, d, g.
2	Construct a suitable tree structure for the real world problems.	M	H	M	L									
3	Recite the various sorting algorithms.		H		M									
4	Model code for real life problems like shortest path and minimum spanning using graph.	M	H	M	M			M						
5	Identify & Utilize appropriate data structuring strategies for a given contextual problem in C language.	M	M		L									

L – Low, M - Medium, H –High.

12CS35 OBJECT ORIENTED PROGRAMMING LABORATORY L T P C
0 0 3 2

CATEGORY: Core

PREREQUISITES: 12F1Z8 – Computer Practices Lab-I , 12F2Z8 – Computer Practices Lab-II

AIM

To develop and understand the principles of object oriented programming and apply object-based approaches.

COURSE OBJECTIVES:

- To motivate and develop programming using object oriented programming languages.
- To describe the essential features of object oriented programming languages.
- To describe the principles for testing object oriented software and derive sets of test data for a given specification.

COURSE OUTOCMES:

- Apply object-oriented approach in software development.
- Use advance features like templates and exception handling to support reusability and sophistication in programs.
- Implement Abstract Data Types using Object Oriented Concepts.
- Build object-oriented software using Standard coding practices.
- Develop application using inheritance and interfaces make use of advanced file handling techniques

LIST OF EXPERIMENTS:

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

TOTAL = 45 PERIODS

(Common to Information Technology & Computer Science Engineering)

List of Equipments and software for a batch of 30 students

1. PC – 30 nos.
   - Processor – 2.0 GHz or higher
   - RAM – 256 MB or higher
   - Hard disk – 20 GB or higher
   - OS- Windows 2000/ Windows XP/ NT
3. Software – C++ (freeware) – to be installed in all PCs.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply object-oriented approach in software development.	M	H		M	M								a, b, d, e, f, i.
2	Use advance features like templates and exception handling to support reusability and sophistication in programs.		H											
3	Implement Abstract Data Types using Object Oriented Concepts.	M	M		M									
4	Build object-oriented software using Standard coding practices.		M			M				M				
5	Develop application using inheritance and interfaces make use of advanced file handling techniques		M			H	L			M				

L – Low, M - Medium, H –High.

12CS36 DATA STRUCTURES LABORATORY **L T P C**
0 0 3 2

CATEGORY: Core

PREREQUISITES: 12F1Z8 – Computer Practices Lab-I , 12F2Z8 – Computer Practices Lab-II

AIM

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

COURSE OBJECTIVES:

- To learn/strengthen a programming language like C.
- To introduce the student to simple linear and nonlinear data structures such as lists, stacks, queues, trees, etc.,
- To learn and implement the various hashing techniques.
- To understand and implement the various sorting methods.

COURSE OUTCOMES:

- Build code for various data structures in C language.
- Implement Abstract Data Type (ADT) using both static and dynamic memory allocations.
- Utilize various kinds of searching and sorting techniques.
- Choose a suitable data structure and algorithm to solve a real world problem.
- Develop algorithm to find minimum spanning cost and shortest path in graph structures.

LIST OF EXPERIMENTS:

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

TOTAL = 45 PERIODS

List of Equipments and components for A Batch of 30 students (1 per batch)

1. SOFTWARE REQUIRED –C or GCC version 3.3.4.
2. OPERATING SYSTEM – WINDOWS 2000 / XP / NT OR LINUX
3. COMPUTERS REQUIRED – 30 Nos. (Minimum Requirement: Pentium III or Pentium IV with 256 RAM and 40 GB hard disk)

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Build code for various data structures in C language.	M	H		M					M				a, b, c, d, g, i.
2	Implement Abstract Data Type (ADT) using both static and dynamic memory allocations.	M	H		M									
3	Utilize various kinds of searching and sorting techniques.	M	H		M									
4	Choose a suitable data structure and algorithm to solve a real world problem.	M	H	H	M			M		M				

5	Develop algorithm to find minimum spanning cost and shortest path in graph structures.	M	H		H					M				

L – Low, M - Medium, H –High.

12CS37 DIGITAL LABORATORY L T P C
0 0 3 2

CATEGORY: Core
PREREQUISITE: 12F2X5-Electric Circuits and Electron Devices Lab

AIM

To implement the basic methods for the design of digital circuits and provide the fundamental concepts used in the design of digital systems.

COURSE OBJECTIVES:

- To verify the basic postulates of Boolean algebra and shows the correlation between Boolean expressions.
- To analyze and design the combinational circuits and sequential circuits.
- To design and implement the concept of synchronous and asynchronous sequential circuits.
- To simulate the combinational circuits using Hardware Description Language.
- To simulate the sequential circuits using HDL.

COURSE OUTCOMES:

- Design and implement digital logic gates.
- Implement the adder subtractor and code convertor
- Analyze and design of parity generator / checker using basic gates and MSI device
- Implementation of SISO, SIPO, PISO and PIPO shift registers using flip-flops.
- Construction and verification of 4-bit ripple counter and Mod-10counter. (Asynchronous)
- Simulation of combinational and sequential circuits using HDL

LIST OF EXPERIMENTS:

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

TOTAL = 45 PERIODS

List of Equipments and components for a Batch of 30 students

S.No.	Name of equipment / component	Quantity Required	Remarks
1	Dual power supply/ single mode power supply	15/30	+12/-12V
2	IC Trainer	15	10 bit
3	Bread Boards	15	
4	Multimeter	5	
6	IC 7400, 7402, 7404, 7408	60	
7	IC 7486, 7483, 7432, 74150	60	
8	IC74151, 74147, 74180, 74138	40	
9	IC7445, 7447	40	
10	IC7476, 7474, 7473	40	

11	IC7491, 7494	40	
12	IC555	40	
13	IC7485, 7411	40	
14	Computer with HDL software	30	
15	Seven segment display	40	
16	Assembled LED board/LEDs	40/200	
17	Wires		Single strand

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Design and implement digital logic gates.	H		M	H					H				a, b, c, d, e, i.
2	Implement the adder subtractor and code convertor	H	M	M	H	M				H				
3	Analyze and design of parity generator / checker using basic gates and MSI device	H		M	H					H				
4	Implementation of SISO, SIPO, PISO and PIPO shift registers using flip-flops.	H		L	H	M				H				
5	Construction and verification of 4-bit ripple counter and Mod-10counter. (Asynchronous)	H	M	M	H					H				
6	Simulation of combinational and sequential circuits using HDL	H		M	H	M				H				

L – Low, M - Medium, H –High.

12HS31 PROFESSIONAL ENGLISH-I **L T P C**
0 0 1 1

CATEGORY: Core
PREREQUISITES: 12F2Z1-Technical English-II, 12F1Z1-Technical English-I

AIM

To create an Environment to improve learner's communication skill using Professional English module.

COURSE OBJECTIVES:

- To impart basics of Language & Grammar relating to Business Communication
- To imbibe the spirit of accurate and appropriate Basic communication
- To introduce the professional Communication module
- To improve learners ability to understand Technical communication

COURSE OUTCOMES:

- Employ appropriate syntax and words
- Understand the text and its structure to respond any queries
- Improve technical communication
- Respond oral communication at work place
- Develop coherence in oral presentation and Initiate discussion with the mass

A. Language & Grammar **2**

1 Use of Verb,Article,Adjectives,Adverbs,Preposition,Conjunction,Comparative

Superlative,
2 Noun –Antecedent & Precedent
3 Spelling &Punctuation
4 Concord
5 Use of Active & Passive voice
6 Use of Conditional Sentence & Reported speech

B. Reading **4**
1 Reading technical reports for Gist
2 Reading Technical Article, Graphs, Charts, Adverts, Notices & Proposals for Structure and detail

C. Writing **3**
1 Writing E-mails for giving Instruction/ Summarizing/Persuading/Giving assurance/asking a comment
2 Writing an Introduction to Report/Proposal/Technical Description
3 Writing Instructions & Recommendations for User manuals/Equipments/devices/New Inventions

D. Listening **3**
1 Listening to Technical News for Gist
2 Listening to Technical Interviews for gathering information
3 Listening to a Presentation for inferring meaning

E. Speaking **6**
1 Self-Introduction
2 Have your say- Recent gadgets/Technical Innovations/ Scientific Inventions

TOTAL = 18 PERIODS

TEXT BOOKS

1. Technical Writing: Process and Product, Gerson, Pearson Education India, 2007 ISBN: 8131709280, 9788131709283
2. Business Benchmark Pre-Intermediate to Intermediate: Student's Book BEC Preliminary Edition, Norman Whitby, PB + 2 Audio CDs, ISBN: 9780521759397

Examination Guideline

Internal and External Examinations should be considered only from The BUSINESS ENGLISH oriented Articles/Extracts/Clips/Illustrations/Audio scripts.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Employ appropriate syntax and words						H	M					H	f, g, i, l.
2	Understand the text and its structure to respond any queries						H	H					H	
3	Improve technical communication						M	M		H			H	
4	Respond oral communication at work place						H	M					H	
5	Develop coherence in oral presentation and Initiate discussion with the mass						H	H		H			H	

L – Low, M - Medium, H –High.

12MA41 **PROBABILITY AND QUEUEING THEORY** **L T P C**
3 1 0 4

CATEGORY: Core
PRERQUISITE: 12F2Z2-Engineering Mathematics-II,
12MA31-Transforms and Partial Differential Equations

AIM

The probabilistic models are employed in countless applications in all areas of science and engineering. Queuing theory provides models for a number of situations that arise in real life. The course aims at providing necessary mathematical support and confidence to tackle real life problems.

COURSE OBJECTIVES:

- To have a well – founded knowledge of standard distributions which can describe real life phenomena.
- To acquire skills in handling situations involving more than one random variable and functions of random variables.
- To understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
- To be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

COURSE OUTCOMES:

- Classify the discrete and continuous random variables.
- Determine strictly stationary, wide–sense stationary and Poisson process.
- Analyse the queueing models.
- Agree central limit theorem.
- Apply Little's formula and Pollaczek - Khintchine formula for queueing models.
- Analyse the binomial, poisson, geometric, uniform, exponential, gamma and normal distribution.

UNIT I RANDOM VARIABLES 12

Discrete and continuous random variables - Moments - Moment generating functions and their properties. Binomial, Poisson ,Geometric ,Negative binomial, Uniform, Exponential, Gamma, and Weibull distributions

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables - Central limit theorem.

UNIT III MARKOV PROCESSES AND MARKOV CHAINS 12

Classification - Stationary process - Markov process - Markov chains – Transition probabilities - Limiting distributions-Poisson process

UNIT IV QUEUEING THEORY 12

Markovian models – Birth and Death Queuing models- Steady state results: Single and multiple server queuing models- queues with finite waiting rooms- Finite source models- Little's Formula

UNIT V NON-MARKOVIAN QUEUES AND QUEUE NETWORKS 12

M/G/1 queue- Pollaczek- Khintchine formula, series queues- open and closed networks

TOTAL = 60 PERIODS

TEXT BOOKS

1. O.C. Ibe, "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Re print,2007 (For units 1, 2 and 3).
2. D. Gross and C.M. Harris, "Fundamentals of Queueing Theory", Wiley Student edition, 4th Edition 2008 (For units 4 and 5).

REFERENCE BOOKS

1. A.O. Allen, "Probability, Statistics and Queueing Theory with Computer Applications", Elsevier, 2nd edition, 2005.
2. H.A. Taha, "Operations Research", Pearson Education, Asia, 8th edition, 2011.
3. K.S. Trivedi, "Probability and Statistics with Reliability, Queueing and Computer Science Applica tions", John Wiley and Sons, 2nd edition, 2008.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Classify the discrete and continuous random variables.	H	M		H								H	a, b, d, l.
2	Determine strictly stationary, wide–sense stationary and Poisson process.	L	L											
3	Analyse the queueing models.	L	M		H								L	
4	Agree central limit theorem.	M	M		H								L	
5	Apply Little's formula and Pollaczek - Khintchine formula for queueing models.	L	M		H								M	
6	Analyse the binomial, poisson, geometric, uniform, exponential, gamma and normal distribution.	H	H		M								H	

L – Low, M - Medium, H –High.

12CS41 MICROPROCESSORS AND MICROCONTROLLERS L T P C
3 0 0 3

CATEGORY: Core

PREREQUISITE: 12CS31 - Digital Principles and Systems Design

AIM

To have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors, Microcontrollers and to study how to interface various peripheral devices with them.

COURSE OBJECTIVES:

- To study the basic architectures and operational features of the processors and controllers
- To learn the assembly language programming
- To design and understand the multiprocessor configurations
- To understand the interfacing concepts of the peripheral devices with that of the processors

COURSE OUTCOMES

- Interpolate the basic knowledge of 8-bit, 16-bit microprocessor and micro controller operations and architecture.
- Design a structured, well-commented, understandable assembly language programs in 8085, 8086 & 8051.
- Inter-relate internal organization of microprocessors & microcontrollers.
- Interface I/O devices to microprocessors and microcontrollers.
- Implement microprocessor and microcontroller-based systems.

UNIT I THE 8085 AND 8086 MICROPROCESSORS 9

8085 Microprocessor architecture – Addressing modes – Instruction set –Programming in 8085 – 8085A Microprocessor architecture – Addressing modes

UNIT II 8086 SOFTWARE ASPECTS 9

Intel 8086 microprocessor - Architecture - Signals- Instruction Set-Addressing Modes- Assembler Directives- Procedures-Macros-Interrupts And Interrupt Service Routines-BIOS function calls.

UNIT III MULTIPROCESSOR CONFIGURATIONS 9

Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –8087 Numeric Data Processor – Architecture –8089 I/O Processor –Architecture –Communication between CPU and IOP.

UNIT IV I/O INTERFACING 9

Memory interfacing and I/O interfacing with 8085 – parallel communication interface – serial communication interface – timer-keyboard/display controller – interrupt controller – DMA controller (8237) – applications – stepper motor.

UNIT V MICROCONTROLLERS 9

Architecture of 8051 Microcontroller – signals – I/O ports – memory – counters and timers – serial data I/O – interrupts- Interfacing - LCD,ADC & DAC

TOTAL = 45 PERIODS

TEXT BOOKS

1. Ramesh S. Gaonkar,"Microprocessor – Architecture, Programming and Applications with the

8085" Penram International Publisher, 6th Edition., 2013.
2. Yn-cheng Liu, Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", second edition, Prentice Hall of India, 2006.
3. Kenneth J.Ayala, "The 8051 microcontroller Architecture, Programming and applications", second edition, Penram international.

REFERENCE BOOKS

1. Douglas V.Hall, "Microprocessors and Interfacing : Programming and Hardware", 2nd edition , Tata Mc Graw Hill ,2006.
2. A.K.Ray & K.M Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Tata Mc Graw Hill, 2006.
3. Peter Abel,"IBM PC Assembly language and programming",5thedition,Pearson education, Prentice Hall of India Pvt.Ltd, 2007.
4. Mohamed Ali Mazidi, Janice Gillispie Mazidi," The 8051 microcontroller and embedded systems using Assembly and C", second edition, Pearson education /Prentice hall of India, 2007.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess. Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Interpolate the basic knowledge of 8-bit, 16-bit microprocessor and micro controller operations and architecture.	H	H		H									a, b, d, e.
2	Design a structured, well-commented, understandable assembly language programs in 8085, 8086 & 8051.	H	M		M	H								
3	Inter-relate internal organization of microprocessors & microcontrollers.	M	L			H								
4	Interface I/O devices to microprocessors and microcontrollers.	M	M		M	M								
5	Implement microprocessor and microcontroller-based systems.	H	H		M	M								

L – Low, M - Medium, H –High.

12CS42 OPERATING SYSTEMS

L	T	P	C
3	0	0	3

CATEGORY: Core

PREREQUISITE: Nil

AIM

The course introduces the students to the basic principles of operating systems.

COURSE OBJECTIVES:

- To be aware of the evolution of operating systems
- To learn what processes are, how processes communicate, how process synchronization is done and how to manage processes
- To have an understanding of the main memory and secondary memory management techniques.
- To understand the Input/output Subsystem

COURSE OUTCOMES:

- Develop programs using Inter process communication.
- Apply the concepts of process synchronization and scheduling mechanisms.

- Manage memory allocation strategies and make use of paging concepts.
- Evaluate storage management and file system.
- Analyze various I/O systems and interface.

UNIT I PROCESSES AND THREADS 9

Introduction to operating systems – operating system structures – system calls – system programs – system structure –operating system debugging – Generations - System boot. Processes: Process concept – Process scheduling – Operations on processes –Cooperating processes – Inter process communication – Communication in client-server systems. Threads: Multicore programming - Multi-threading models – Threading issues. Case Study: Operating system examples.

UNIT II PROCESS SCHEDULING AND SYNCHRONIZATION 10

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

UNIT III MEMORY MANAGEMENT 9

Memory Management: Background – Swapping – Contiguous memory allocation – Structure of the Page Table–Paging – Segmentation – Example: ARM Architecture. Virtual Memory: Background–Demand paging – Process creation–Copy-on-Write- Page replacement–Allocation of frames–Thrashing. Case Study: Operating system examples.

UNIT IV STORAGE MANAGEMENT 9

Mass-Storage Structure: Disk Structure - Disk Attachment - Disk Scheduling - Disk Management - Swap-Space Management - RAID Structure - Stable-Storage Implementation. File-System Interface : File Concept - Access Methods - Directory and Disk Structure - File Sharing – Protection – Directory Implementation - Allocation Methods – Recovery – NFS - Example: The WAFL File System.

UNIT V I/O SYSTEMS 8

I/O Systems – I/O Hardware – Application I/O interface – kernel I/O subsystem – streams – Transforming I/O Requests to Hardware Operations – Performance. Case study: I/O in Linux, Programmer Interface in Windows 7.

TOTAL =45 PERIODS

TEXT BOOKS

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", 9th Edition, Wiley India Pvt Ltd,2012.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, "Modern Operating Systems", 3rd Edition, Pearson Education, 2007.
2. Gary Nutt, "Operating Systems", Third Edition, Pearson Education, 2004.
3. Harvey M. Deitel, "Operating Systems", Third Edition, Pearson Education, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess. Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop programs using Inter process communication.	H	H		M									a, b, d.
2	Apply the concepts of process synchronization and scheduling mechanisms.	M	H		H									
3	Manage memory allocation strategies and make use of paging concepts.	L	H		M									

4	Evaluate storage management and file system.	H	M		L									
5	Analyze various I/O systems and interface.	M	M		M									

L – Low, M - Medium, H –High.

12CS43 DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	1	0	4

CATEGORY: Core

PREREUISITE: 12F1Z1 – Engineering Mathematics – I

AIM

To introduce the basics of algorithm design paradigms and analysis to enable designing of efficient algorithms.

COURSE OBJECTIVES:

- To introduce the basic concepts of algorithm analysis
- To introduce the design paradigms for algorithm design
- To introduce the basic complexity theory.

COURSE OUTCOMES:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analyze worst-case running times of algorithms using asymptotic analysis.
- Apply divide-and-conquer, greedy algorithms and dynamic-programming paradigm to solve various real world problems.
- Apply major graph algorithms to model engineering problems, when appropriate.
- Choose an appropriate design algorithm for a design situation.

UNIT I COMPLEXITY ANALYSIS & ELEMENTARY DATA STRUCTURES 12

Algorithm Analysis – Time Space Tradeoff – Asymptotic Notations – Conditional asymptotic notation – Removing condition from the conditional asymptotic notation - Properties of big-Oh notation – Recurrence equations – Solving recurrence equations – Analysis of linear search.

UNIT II DIVIDE AND CONQUER AND GREEDY ALGORITHMS 12

Divide and Conquer: General Method – Binary Search – Finding Maximum and Minimum – Merge Sort – Greedy Algorithms: General Method – Container Loading – Knapsack Problem.

UNIT III DYNAMIC PROGRAMMING 12

Dynamic Programming: General Method – Multistage Graphs – All-Pair shortest paths – Optimal binary search trees – 0/1 Knapsack – Travelling salesperson problem.

UNIT IV BACKTRACKING 12

Backtracking: General Method – 8 Queens problem – sum of subsets – graph coloring – Hamiltonian problem – knapsack problem.

UNIT V GRAPH AND BRANCH AND BOUND 12

Graph Traversals – Connected Components – Spanning Trees – Biconnected components – Branch and Bound: General Methods (FIFO & LC) – 0/1 Knapsack problem – Introduction to NP-Hard and NP-Completeness.

TOTAL =60 PERIODS

TEXT BOOKS

1. Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Computer Algorithms/C++, 3rd Edition, Universities Press, 2007. (For Units II to V)
2. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt. Ltd., 2000 (For Unit I)

REFERENCE BOOKS

1. T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms", 2nd Edition, MIT Pren, 2013.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]

Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail

Course Outcomes (COs)		Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Argue the correctness of algorithms using inductive proofs and invariants.	H	M											a, b, c, d e.
2	Analyze worst-case running times of algorithms using asymptotic analysis.	M	H		M									
3	Apply divide-and-conquer, greedy algorithms and dynamic-programming paradigm to solve various real world problems.	H	H	M		M								
4	Apply major graph algorithms to model engineering problems, when appropriate.	L	H	M		M								
5	Choose an appropriate design algorithm for a design situation.	L	M	H		M								

L – Low, M - Medium, H –High.

12CS44 DATABASE MANAGEMENT SYSTEMS L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: Nil
AIM

To provide a strong foundation in database technology and an introduction to the current trends in this field.

COURSE OBJECTIVES:

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
- To have an introductory knowledge about the Storage and Query processing techniques.

COURSE OUTCOMES:

- Make use of Relational Data Model concepts
- Formulate data retrieval queries in SQL, the Relational Algebra and Relational Calculus
- Identify good and bad database design.
- Apply data normalization principles.
- Build concurrent database transaction.
- Choose optimum Database processing technique for real world problems.

UNIT I INTRODUCTION 9

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

UNIT II RELATIONAL MODEL & OBJECT BASED DATABASES 9

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals - Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases, Object based databases.

UNIT III DATABASE DESIGN 9

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT IV TRANSACTIONS 9

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

UNIT V IMPLEMENTATION TECHNIQUES 9

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

TOTAL =45 PERIODS

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6th Edition, Tata McGraw Hill, 2010.
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

REFERENCE BOOKS

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition , Pearson Addision wesley, 2007.
2. Raghu Ramakrishnan, "Database Management Systems", 3rd Edition, MGH,2003
3. S.K.Singh, "Database Systems Concepts, Design and Applications", First Edition, Pearson Education,2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of Relational Data Model concepts	H	M		M	L								a, b, d, e, g, j.
2	Formulate data retrieval queries in SQL, the Relational Algebra and Relational Calculus	H	H		M	L								
3	Identify good and bad database design.	H	H		M	L								
4	Apply data normalization principles.	H	L		L	M								
5	Build concurrent database transaction.	M												
6	Choose optimum Database processing technique for real world problems.	H	L		L	M		L			M			

L – Low, M - Medium, H –High.

12CS45 COMPUTER ORGANIZATION AND ARCHITECTURE L T P C

3 0 0 3

CATEGORY: Core

PREREQUISITE 12CS32 – Analog and Digital Communication

AIM

To understand the organization of a computer, and the hardware-software interface, and to discuss the basic structure of a digital computer and to study in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

COURSE OBJECTIVES:

- To know about the various components of a computer and their internals.
- To comprehend the importance of the hardware-software interface, and instruction-set architecture.

- To study in detail the different types of control and the concept of pipelining.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

COURSE OUTCOMES:

- Identify the various components of a computer.
- Design the hardware-software interface, and instruction-set architecture.
- Review the different types of control and the concept of pipelining.
- Develop the hierarchical memory system including cache memories and virtual memory.
- Do the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Instruction set architecture – ARM ISA – Addressing modes – RISC – CISC.

UNIT II BASIC PROCESSING UNIT 9

Fixed point and floating point operations – Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming.

UNIT III PIPELINING 9

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

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache Memories – Improving cache performance – Virtual memory – Memory management requirements – Associative memories – Performance Considerations.

UNIT V I/O ORGANIZATION 9

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

TOTAL = 45 PERIODS

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Fifth Edition, Tata McGraw Hill, 2011.

REFERENCE BOOKS

1. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/ Software interface”, Third Edition, Elsevier, 2005.
2. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.
3. John P. Hayes, “Computer Architecture and Organization”, Third Edition, Tata McGraw Hill, 1998.
4. V.P. Heuring, H.F. Jordan, “Computer Systems Design and Architecture”, Second Edition, Pearson Education, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Identify the various components of a computer.	H	H		M									a, b, d, e, g.
2	Design the hardware-software interface, and instruction-set architecture.	H	M		M									
3	Review the different types of control and the concept of pipelining.	H	H		M	H								
4	Develop the hierarchical memory system	H	H		M	H		M						

	including cache memories and virtual memory.													
5	Do the different ways of communicating with I/O devices and standard I/O interfaces.	H	H		M									

L – Low, M - Medium, H –High.

12CS46 OPERATING SYSTEMS LABORATORY L T P C
0 0 3 2

CATEGORY: Core
PREREQUISITE: 12CS34 – Data Structures Lab, 12F2Z8 – Computer Practices Lab-II

AIM

To develop programming skills in operating systems and their applications.

COURSE OBJECTIVES:

- The purpose of an operating system is to provide an environment in which a user can execute programs in a convenient and efficient manner.
- To learn and implement the various CPU scheduling techniques.
- To learn and implement the various memory management schemes.
- To learn and implement the various system calls.

COURSE OUTCOMES:

- Develop programs using system calls of UNIX operating system.
- Compute the average waiting time and turnaround time.
- Create programs using Inter process communication.
- Analyze producer - consumer problems using semaphores.
- Implement memory management schemes.

LIST OF EXPERIMENTS:

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

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

Example for exercises 8 & 9:

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

TOTAL: 45 PERIODS

Hardware and Software required for a batch of 30 students.

HARDWARE:

30 Personal Computers

SOFTWARE:

Linux:
Ubuntu / OpenSUSE / Fedora / Red Hat / Debian / Mint OS
Linux could be loaded in individual PCs. (OR)
A single server could be loaded with Linux and connected from the individual PCs.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop programs using system calls of UNIX operating system.	H	M		H									a, b, d, i.
2	Compute the average waiting time and turnaround time.	H	H		M									
3	Create programs using Inter process communication.	H	L		M					M				
4	Analyze producer - consumer problems using semaphores.	H	M		L					M				
5	Implement memory management schemes.	M	L		M					M				

12CS47 DATA BASE MANAGEMENT SYSTEM LABORATORY L T P C
0 0 3 2

CATEGORY: Core
PREREQUISITE: Nil
AIM
To study and implement DDL, DML commands and basics of PL/SQL functions, cursors, triggers etc.
COURSE OBJECTIVES:
- To implement SQL and PL/SQL functions.
- To provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers.
- To implement a mini project using back end as an Oracle and front end with VB.

COURSE OUTCOMES:
- Apply the basic concepts of SQL & Create simple database system
- Design and implement a database schema using relational data models.
- Formulate SQL query using DDL/DML commands.
- Analyze the consistency of database.
- Make use of Pl/SQL functions.
- Create simple database system

LIST OF EXPERIMENTS:
1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update & Delete Commands.
3. Nested Queries & Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end tools
7. Forms
8. Triggers
9. Menu Design

10. Reports.
11. Database Design and implementation (Mini Project).

TOTAL: 45 PERIODS

Hardware and Software required for a batch of 30 students:
Hardware:
30 Personal Computers
Software:
Front end: VB/VC ++/JAVA
Back end: Oracle 11g, my SQL, DB2
Platform: Windows 2000 Professional/XP.
Oracle server could be loaded and can be connected from individual PCs.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply the basic concepts of SQL & Create simple database system	H	M											a, b, c, d, e, f, i.
2	Design and implement a database schema using relational data models.			H		H	M			M				
3	Formulate SQL query using DDL/DML commands.		H		M	M								
4	Analyze the consistency of database.	M	H		M					H				
5	Make use of Pl/SQL functions.	H				M								
6	Create simple database system	M	M	H	M	H				H				

L – Low, M - Medium, H –High.

12CS48 MICROPROCESSORS LABORATORY L T P C
0 0 3 2

CATEGORY: Core
PREREQUISITE: 12CS37 – Digital Lab, 12F2X8 – Electric Circuits & Electron Devices Lab
AIM:
To learn the assembly language programming of 8085,8086 and 8051 and also to give a practical training of interfacing the peripheral devices with the processor.
COURSE OBJECTIVES:

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

COURSE OUTCOMES:

- Make use of basic programming skills of 8-bit and 16-bit microprocessors.
- Develop assembly language programs in 8085, 8086 & 8051.
- Create the assembly language programs using BIOS/DOS calls.
- Interconnect co-processors along with microprocessor.
- Interfacing I/O devices to microcontroller applications.

LIST OF EXPERIMENTS:

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

TOTAL: 45 PERIODS

List of equipments/components for 30 students (two per batch)

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of basic programming skills of 8-bit and 16-bit microprocessors.	M			H	M								a, b, d, e, i.
2	Develop assembly language programs in 8085, 8086 & 8051.		H		H	M				H				
3	Create the assembly language programs using BIOS/DOS calls.		H		H	M				M				
4	Interconnect co-processors along with microprocessor.		M		M	L				L				
5	Interfacing I/O devices to microcontroller applications.		M		H					M				

L – Low, M - Medium, H –High.

12HS41 PROFESSIONAL ENGLISH-II L T P C
(Common to All B.E./B.Tech Degree programmes) 0 0 1 1

CATEGORY: Core
PREREQUISITE: 12HS31 - Professional English-I
AIM

To Create an Environment to experiment Professional English communication module with Intermediate resources

COURSE OBJECTIVES:

- To be competent in Presentation skill
- To develop students' accuracy in Written Communication
- To improve learners ability to understand Technical Presentations and Conversations
- To give the exposure with Internal and External workplace Communication

COURSE OUTCOMES:

- Develop grasping skill to interpret the text.
- Create technical communication at work place.
- Distinguish sounds of English to respond any queries.
- Identify vocabulary for effective communication.
- Evaluate the topic and Present personal opinion using suitable verbal and non-verbal cues.

A. Reading **4**

1. Reading Technical Articles, Reports, Proposals for gathering information
2. Reading Technical Journals, User manuals, annual reports for matching information

B. Writing **6**

1. Writing E-mail to inform/respond/Insist/Convince/comment
2. Writing Technical Report (Format, Types, Abstract)
3. Writing Project Introduction/Website/Product
4. Writing User Manuals/Guidelines
5. Writing Product Reviews
6. Writing Useful Expressions for Persuading, Summarizing, gathering information

C. Listening **2**

1. Listening to Telephonic conversation for filling the gaps
2. Listening to Group discussion to gather information
3. Listening to Interviews for writing short answers
4. Listening to Technical Presentation for evaluation

D. Speaking **6**

1. Mini-Presentation on Technical Themes:
   a) Cloud computing b) 4g c) Mission to Mars
   d) Water Resource e) Sixth Sense Technology
2. Group Discussion on Social and Technical issues.

TOTAL = 18 PERIODS

TEXT BOOKS

1. Technical Communication: Principles and Practice, 2e, MEENAKSHI RAMAN; SANGEETA SHARMA ISBN: 0198065299, 9780198065296
2. Business Benchmark Pre-Intermediate to Intermediate: Student's Book BEC Preliminary Edition, Norman Whitby, PB + 2 Audio CDs, ISBN: 9780521759397

Examination Guideline

Internal and External Examinations should be considered only from The BUSINESS ENGLISH oriented Articles/Extracts/Clips/Illustrations/Audio scripts.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop grasping skill to interpret the text.				L					M	M	L	H	d, i, j, k, l.
2	Create technical communication at work place.									H	H	H	H	
3	Distinguish sounds of English to respond any queries.				L					H	H	M	H	
4	Identify vocabulary for effective communication.				L					H	H	H	H	
5	Evaluate the topic and Present personal opinion using suitable verbal and non-verbal cues.									H	H	H	H	

L – Low, M - Medium, H –High.

12MA51 DISCRETE MATHEMATICS L T P C
3 1 0 4

CATEGORY: Core
PREREQUISITE: 12MA41 – Probability & Queuing Theory, 12MA31 – Transforms &PDE
AIM:
To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.
COURSE OBJECTIVES:
- To have knowledge of the concepts needed to test the logic of a program.
- To have an understanding in identifying structures on many levels.
- To be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
- To be aware of the counting principles
- To be exposed to concepts and properties of algebraic structures such as semi groups, monoids and groups.

COURSE OUTCOMES:
- Analyze the mathematical arguments.
- Apply mathematical induction and prove a relation.
- Make use of graph theoretic models to solve basic problems in networks.
- Invent Eulerian and Hamiltonian paths to find shortest paths.
- Utilize Boolean algebra concepts to construct logical gates.

UNIT I LOGIC AND PROOFS 9 + 3
Propositional Logic – Propositional equivalences-Predicates and quantifiers-Nested Quantifiers -Rules of inference-introduction to Proofs-Proof Methods and strategy

UNIT II COMBINATORICS 9 + 3
Mathematical inductions-Strong induction and well ordering-The basics of counting-The pigeonhole principle–Permutations and combinations-Recurrence relations-
Solving Linear recurrence relations-generating functions-inclusion and exclusion and applications.

UNIT III GRAPHS 9 + 3
Graphs and graph models-Graph terminology and special types of graphs-Representing graphs and graph isomorphism -connectivity-Euler and Hamilton paths

UNIT IV ALGEBRAIC STRUCTURES 9 + 3
Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms- Cosets and Lagrange's theorem- Ring & Fields (Definitions and examples)

UNIT V LATTICES AND BOOLEAN ALGEBRA 9 + 3
Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic systems –Sub lattices –direct product and Homomorphism-Some Special lattices- Boolean Algebra

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

TEXT BOOKS:
1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Special Indian edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, (2007). (For the units 1 to 3,
Sections 1.1 to 1.7 , 4.1 & 4.2, 5.1 to 5.3, 6.1, 6.2, 6.4 to 6.6, 8.1 to 8.5)
2. Trembly J.P and Manohar R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Re-print 2007. (For units 4 & 5 , Sections 2-3.8 & 2-3.9,3-1,3-2 & 3-5, 4-1 & 4-2)

REFERENCES:
1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Fourth Edition, Pearson Education Asia, Delhi, (2002).
2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, 2006.
3. Seymour Lipschutz and Mark Lipson, "Discrete Mathematics", Schaum's Outlines, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, Second edition, (2007).

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Analyze the mathematical arguments.	L	M		H								L	a, b, d, l.
2	Apply mathematical induction and prove a relation.	M	M		M								M	
3	Make use of graph theoretic models to solve basic problems in networks.	H	M		H								M	
4	Invent Eulerian and Hamiltonian paths to find shortest paths.	H	L										L	
5	Review the definitions of groups and rings and deduce some consequences of these structures.	L	L											
6	Utilize Boolean algebra concepts to construct logical gates.	H	M		H									

L – Low, M - Medium, H –High.

12MG51 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: Nil
AIM:
To pioneer the knowledge of economics and accounting to the engineering students.
COURSE OBJECTIVES:

- To understand the concepts of economics and decision influencing managerial economics
- To gain the knowledge of demand and supply analysis, production & cost analysis and pricing decisions
- To be able to gather ideas over financial accounting and its techniques and capital budgeting on its application towards investment decisions.

OUTCOMES:

- Ability to acquire indepth knowledge about the importance of engineering economy and modern parameters of economy for everyday life.
- Applying skills in enhancing an organisation's decision-making process under economical ground.
- Utlization of various demand and supply and pricing techniques.
- Development of a cost estimation for any project under ecomomic ground in favour of an organization.
- Identification of issues in the financial statements by key performance ratios and know when to take action.

UNIT I INTRODUCTION 5
Managerial Economics - Relationship with other disciplines - Firms: Types,Objectives and goals - Managerial decisions - Decision analysis.
UNIT II DEMAND & SUPPLY ANALYSIS 10
Demand - Types of demand - Determinants of demand - Demand function – Demand elasticity – Demand forecasting - Supply - Determinants of supply - Supply function - Supply elasticity.
UNIT III PRODUCTION AND COST ANALYSIS 10
Production function - Returns to scale - Production optimization - Least cost input - Isoquants - Managerial uses of production function. Cost Concepts - Cost function - Determinants of cost - Short run and Long run cost curves - Cost Output Decision - Estimation of Cost.
UNIT IV PRICING & CAPITAL BUDGETING 10
PRICING – Determinants of Price - Pricing under different objectives and different market structures –

Price discrimination - Pricing methods in practice.
CAPITAL BUDGETING (ELEMENTARY TREATMENT) – Investments - Risks and return evaluation of investment decision - Average rate of return – Payback Period - Net Present Value - Internal rate of return.

UNIT V FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT) 10

Balance sheet and related concepts - Profit & Loss Statement and related concepts - Financial Ratio Analysis - Cash flow analysis - Funds flow analysis – Comparative financial statements – Analysis & Interpretation of financial statements.

TOTAL: 45 PERIODS

REFERENCES:

1. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
2. McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.
3. Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, New Delhi, 2007.
4. Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson South Western, 4th Edition, 2001.
5. Prasanna Chandra. 'Fundamentals of Financial Management', Tata McGraw Hill Publishing Ltd., 4th edition, 2005.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Ability to acquire indepth knowledge about the importance of engineering economy and modern parameters of economy for everyday life.											H		c, k
2	Applying skills in enhancing an organisation's decision-making process under economical ground.			H								H		
3	Utlization of various demand and supply and pricing techniques.			H								M		
4	Development of a cost estimation for any project under ecomomic ground in favour of an organization.			L								H		
5	Identification of issues in the financial statements by key performance ratios and know when to take action.											L		

L – Low, M - Medium, H –High.

12CS51 DIGITAL SIGNAL PROCESSING L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12CS31 – Digital Principles and Systems Design
AIM:
To give an understanding on the study that deals with the representation of signals as ordered sequences of numbers and how to process those ordered sequences.
COURSE OBJECTIVES:

- To understand the basics of signals and system by analyzing the various transformations available

and determine their use to DSP

- To study on the various digital filtering techniques and how to apply to DSP
- To study on the ways to estimate signal parameters, and transform a signal into a form that is more informative.
- To give students a flavor on the applications of DSP in the areas of speech and image.

COURSE OUTCOME:

- Analyze the properties of signals and systems.
- Use Nyquist sampling theorem to choose adequate sampling rates and to understand aliasing.
- Apply transform domain representation of signals.
- Determine the discrete Fourier transform (DFT) of a sequence.
- Determine the discrete Fourier transform (DFT) of a sequence.
- Design IIR filters using bilinear transformation.
- Design FIR filters using windowing technique.

UNIT I SIGNALS AND SYSTEMS 9

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Exponential, DT signals - periodic and periodic, random signals, DT systems, Basic properties of systems - Linear Time invariant Systems and properties.

UNIT II ANALYSIS OF DISCRETE TIME SIGNALS 9

Sampling of CT signals and aliasing, DTFT and properties, Z-transform and properties of Z-transform-Convolution (linear and circular) – Correlation.

UNIT III FREQUENCY TRANSFORMATIONS 9

Introduction to DFT – Properties of DFT – Filtering methods based on DFT – FFT Algorithms Decimation – in – time Algorithms, Decimation – in – frequency Algorithms – Use of FFT in Linear Filtering – DCT.

UNIT IV IIR FILTER DESIGN 9

Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT V FIR FILTER DESIGN 9

Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

Total: 45 Periods

TEXT BOOKS:

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Fourth edition, Pearson education / Prentice Hall, 2007.

2. Emmanuel C..Ifeachor, & Barrie.W.Jervis, "Digital Signal Processing", Second edition, Pearson Education / Prentice Hall, 2002.

REFERENCES:

1. Alan V.Oppenheim, Ronald W. Schafer & Hohn. R.Back, "Discrete Time Signal Processing", Pearson Education.

2. Andreas Antoniou, "Digital Signal Processing", Tata McGraw Hill.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Analyze the properties of signals and systems.	H	H											a, b, c, d, e.
2	Use Nyquist sampling theorem to choose ade-	H			M	M								

	quate sampling rates and to understand alias-ing.													
3	Apply transform domain representation of sig-nals.	H	H		M	M								
4	Determine the discrete Fourier transform (DFT) of a sequence.	H			M	M								
5	Design IIR filters using bilinear transformation.	H		H	M	M								
6	Design FIR filters using windowing technique.	H		H	M	M								

L – Low, M - Medium, H –High.

12CS52 COMPUTER NETWORKS **L T P C**
3 0 0 3

CATEGORY: Core
PREREQUISITE: Nil
AIM:
To understand the concepts of data communication and computer networks.
COURSE OBJECTIVES:
- To grasp the principles of data communication.
- To understand the layering concepts in computer networks.
- To understand the functions of each layer.
- To have knowledge in different applications that use computer networks.

COURSE OUTCOMES:
- Recite various network architectures, physical media and the related link-level protocols.
- Recapitulate the concept of error handling for reliable transmission
- Paraphrase the working of Internetworking and Routing Algorithms
- Analyse the congestion avoidance mechanisms in TCP
- Recognize the various applications like Email, DNS, SNMP and PGP
- Apply the socket programming concept for client and server communication

UNIT I **9**
Network architecture – OSI layers – TCP/IP Layers-Physical links– Hybrid multiple access techniques - Issues in the data link layer - Framing – Error correction and detection – Link-level Flow Control.
UNIT II **9**
Medium access – CSMA – Ethernet (IEEE 802.3) – Token ring (IEEE 802.5)– FDDI - Wireless LAN (IEEE 802.11) – Bridges and Switches.
UNIT III **9**
Circuit switching vs. packet switching – IP – ARP – RARP – DHCP – ICMP – Queuing discipline– Routing algorithms–RIP–OSPF–Subnetting – CIDR –Interdomain routing – BGP–IPv6–Multicasting– Congestion avoidance in network layer.
UNIT IV **9**
UDP – TCP – Adaptive Flow Control – Adaptive Retransmission- Congestion control – Congestion avoidance – QoS
UNIT V **9**
Email (SMTP, MIME, IMAP, POP3) – HTTP – DNS- SNMP – Telnet – FTP – Security –PGP – SSH-Introduction to Socket Programming-Socket address Structure-Elementary TCP sockets-socket, connect, bind, listen, accept, read, write, close functions.

Total: 45 Periods

TEXT BOOKS:
1. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fourth Edition, Morgan Kauffmann Publishers Inc., 2007.
2. W.Richard Stevens,”Unix Network Programming Vol-I”, Second Edition, Pearson Education,1998.
REFERENCES:
1. James F. Kuross, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Third Edition, Addison Wesley, 2004.
2. Nader F.Mir, “Computer and Communication Networks”, Pearson Education, 2007

3. Comer, "Computer Networks and Internets with Internet Applications", Fourth Edition, Pearson Education, 2003.
4. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, 2003.
5. William Stallings, "Data and Computer Communication", Sixth Edition, Pearson Education, 2000

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recite various network architectures, physical media and the related link-level protocols.	H	H		L	M								a, b, d, e, i.
2	Recapitulate the concept of error handling for reliable transmission	H	H			L								
3	Paraphrase the working of Internetworking and Routing Algorithms	H	M		M	H								
4	Analyse the congestion avoidance mechanisms in TCP	M	H		M	M								
5	Recognize the various applications like Email, DNS, SNMP and PGP	M	M		M	H				H				
6	Apply the socket programming concept for client and server communication	H	M		M	H								

L – Low, M - Medium, H –High.

12CS53 PROGRAMMING WITH JAVA **L T P C**
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12CS33 – Object Oriented Programming
AIM:
To understand the basic concepts of Java.
COURSE OBJECTIVES:

- To understand the exception handling techniques.
- To understand the concepts of object-oriented, event driven, and concurrent programming paradigms and develop skills in using these paradigms using Java.
- To understand the JDBC Connectivity and event handling methods.

COURSE OUTCOME:

- Make use of object oriented-programming principles and concepts.
- Solve real world computing problems in java.
- Design java program using inheritance.
- Develop java programming using an event-driven graphical user interface.
- Code various real time application in java using concurrent programming concepts.

UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS 9
Review of OOP - Objects and classes in Java – defining classes – methods – access specifiers – static members – constructors – finalize method – Arrays – Strings - Packages – JavaDoc comments
UNIT II OBJECT-ORIENTED PROGRAMMING – INHERITANCE 10
Inheritance–class hierarchy–polymorphism–dynamic binding–final keyword–abstract classes–Object class–Reflection–interfaces–object cloning –inner classes – proxies
UNIT III EVENT-DRIVEN PROGRAMMING 10
Graphics programming–Frame–Components–working with 2D shapes – Using color, fonts, and images

– Basics of event handling – event handlers – adapter classes–actions–mouse events–AWT event hierarchy–Introduction to Swing– Model–View–Controller design pattern–buttons–layout management–Swing Components

UNIT IV GENERIC PROGRAMMING 8

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine – inheritance and generics – reflection and generics – exceptions – exception hierarchy – throwing and catching exceptions – Stack Trace Elements – Applications and Applets – assertions – logging

UNIT V CONCURRENT PROGRAMMING 8

Multi-threaded programming – interrupting threads – thread states – thread properties – thread synchronization – thread-safe Collections – Executors – synchronizers – threads and event-driven programming

TOTAL: 45 PERIODS

TEXT BOOK:

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.

REFERENCES:

1. K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
2. Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.
3. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, Tata McGraw-Hill Publishing company Ltd., 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of object oriented-programming principles and concepts.	H	M		L									a, b, d, e, i.
2	Solve real world computing problems in java.	H	M		M	M								
3	Design java program using inheritance.	L	L		M	M								
4	Develop java programming using an event-driven graphical user interface.	H	M		L	M								
5	Code various real time application in java using concurrent programming concepts.	H	L		M	M				M				

L – Low, M - Medium, H –High.

12CS54 THEORY OF COMPUTATION L T P C
3 1 0 4

CATEGORY: Core

PREREQUISITE: Nil

AIM:

To get the fundamental ideas on Automata and Languages

COURSE OBJECTIVES:

- To study about formal relationships between machines, languages and grammar.
- To learn about automata, grammar, language, and their relationships.
- To give an understanding of the power of Turing machine, and the decidable nature of a problem. Also, gives the idea on some new trends and applications.

COURSE OUTCOMES:

- Solve problems using formal proofs and relationships.
- Infer knowledge about languages and able to classify languages into their types.
- Analyse and design FA, PDA, TM, Formal languages, and grammars.
- Prove or disprove theorems in automata theory using its properties
- Distinguish the decidable and undecidable problems in various automata.
- Apply the theory of computation concepts for real world problems in societal contexts.

UNIT I AUTOMATA 9

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

UNIT II REGULAR EXPRESSIONS AND LANGUAGES 9

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

UNIT III CONTEXT-FREE GRAMMARS AND LANGUAGES 9

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

UNIT IV PROPERTIES OF CONTEXT-FREE LANGUAGES 9

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

UNIT V UNDECIDABALITY 9

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

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

TEXT BOOK:

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", Third Edition, Pearson Education, 2007.

REFERENCES:

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

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Solve problems using formal proofs and relationships.	H	M											a, b, c, d, e, f, g, j.
2	Infer knowledge about languages and able to classify languages into their types.	H	M		H									
3	Analyse and design FA, PDA, TM, Formal languages, and grammars.	M	H		H	M								

4	Prove or disprove theorems in automata theory using its properties	M	H		M	H								
5	Distinguish the decidable and undecidable problems in various automata.	L	M		H	M								
6	Apply the theory of computation concepts for real world problems in societal contexts.	H		H			H	H			M			

L – Low, M - Medium, H –High.

12CS57 JAVA LABORATORY L T P C
0 0 3 2

CATEGORY: Core
PREREQUISITE: 12CS35 – Object Oriented Programming Lab
AIM:
To learn the concepts of object oriented programming and to get better programming skills in java.
COURSE OBJECTIVES:

- To obtain the knowledge about object oriented concepts
- To know about the concepts like abstract class, event-driven programs.
- To make students to write Java programs using classes, generic programming and concurrent programming.

COURSE OUTCOMES:

- Notch simple java programs for various computing problems.
- Develop java programs using inheritance concepts.
- Create interfaces in java and implement for various applications.
- Work with combination of border layout and grid layout in java.
- Design multithreaded java programs to support real time applications.

LIST OF EXPERIMENTS:
1. Develop Rational number class in Java. Use JavaDoc comments for documentation. Your implementation should use efficient representation for a rational number, i.e. (500 / 1000) should be represented as (½).
2. Develop Date class in Java similar to the one available in java.util package. Use JavaDoc comments.
3. Implement Lisp-like list in Java. Write basic operations such as 'car', 'cdr', and 'cons'. If L is a list [3, 0, 2, 5], L.car () returns 3, while L.cdr () returns [0, 2, 5].
4. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.
5. Design a Vehicle class hierarchy in Java. Write a test program to demonstrate polymorphism.
6. Create a Java program for various 2D shapes
7. Combine border layout and grid layout in Java.
8. Design classes for Currency, Rupee, and Dollar. Write a program that randomly generates Rupee and Dollar objects and write them into a file using object serialization. Write another program to read that file, convert to Rupee if it reads a
Dollar, while leave the value as it is if it reads a Rupee.
9. Design a scientific calculator using event-driven programming paradigm of Java.
10. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and Fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe.
Design another thread that generates Fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify no.s common to both.
11. Develop a simple OPAC system for library using even-driven and concurrent programming paradigms of Java. Use JDBC to connect to a back-end database.
12. Develop multi-threaded echo server and a corresponding GUI client in Java.
13. [Mini-Project] Develop a programmer's editor in Java that supports syntax highlighting, compilation support, debugging support, etc.

TOTAL: 45 PERIODS

Requirement for a batch of 30 students

S. No.	Description of Equipment	Quantity Required	Quantity Available	Deficiency %
1.	PC's	30		
2.	JVM & J2SE (Freeware)	30		
3.	MYSQL or any other DB	30		

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Notch simple java programs for various computing problems.	H	M		H									a, b, d, i.
2	Develop java programs using inheritance concepts.	H	L		M									
3	Create interfaces in java and implement for various applications.	M	M		M					M				
4	Work with combination of border layout and grid layout in java.	M			L									
5	Design multithreaded java programs to support real time applications.	L	M		M					H				

L – Low, M - Medium, H –High.

12CS58 NETWORKS LABORATORY **L T P C**
0 0 3 2

CATEGORY: Core
PREREQUISITE: Nil
AIM:
To gain the knowledge of the networking environment and also able to configure the routing protocols.
COURSE OBJECTIVES:

- To understand fundamental services provided by TCP and UDP, how the information is sent between TCP and UDP ports.
- To understand the concept of reliable data transfer and unreliable data transfer.
- To understand the concept of TCP's congestion control algorithm and flow control mechanism.
- To understand the concept of Routing Protocols.

COURSE OUTCOMES:

- Construct the program using TCP and UDP to enhance the client server communication.
- Develop programs to implement error correction strategy using CRC and Check-sum.
- Compose the Routing Protocol OSPF, BGP.
- Develop RPC applications.
- Design and simulate the knowledge of MAC protocols-ARP-RARP.

LIST OF EXPERIMENTS:
1. Programs using TCP Sockets (like date and time server & client, echo server & client, etc.)
2. Implementation of CRC and Checksum
3. Programs using UDP Sockets (like simple DNS)
4. Programs using Raw sockets (like packet capturing and filtering)
5. Programs using RPC
6. Simulation of sliding window protocols-GoBack and Selective Repeat

7. Performance comparison of MAC protocols-ARP-RARP
8. Performance comparison of Routing protocols-OSPF-BGP
9. Study of TCP/UDP performance

TOTAL: 45 PERIODS

Requirement for a batch of 30 students

S. No.	Description of Equipment	Quantity Required	Quantity available	Deficiency %
1.	**SOFTWARE** • C++ Compiler • J2SDK (freeware) • Linux • NS2/Glomosim/OPNET (Freeware)	30		
2.	**HARDWARE** • PCs	30 Nos		

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Construct the program using TCP and UDP to enhance the client server communication.	H	M		M	M				L				a, b, c, d, e, i.
2	Develop programs to implement error correction strategy using CRC and Check-sum.		L		H					M				
3	Compose the Routing Protocol OSPF, BGP.			H	H					M				
4	Develop RPC applications.	H	M		H	M				M				
5	Design and simulate the knowledge of MAC protocols-ARP-RARP.		M		M	L				M				

L – Low, M - Medium, H –High.

12HS51 ENGLISH FOR EMPLOYMENT – I **L T P C**
(Common to All B.E./B.Tech) **0 0 2 1**

CATEGORY: Core
PREREQUISITE: 12HS41 – English for Employment - II
AIM:
To practice English for Enhancing Employability skills
COURSE OBJECTIVES:

- To get proficiency in business communication at work place
- To develop students accuracy in communication
- To improve learners ability to understand any kind of text

COURSE OUTCOMES:

- Develop analytical skill and vocabulary
- Improve job prospects
- Predict the main idea of the topic and use verbal cues
- Develop negotiation skill
- Utilize documentation methodology

Task: 1	**Verbal Reasoning**	**1**
Task: 2	**Resume and Covering Letter**	**1**
Task: 3	**Channel Conversations**	**2**
Task: 4	**Debate**	**10**
Task: 5	**Mock Interview**	**6**
Task: 6	**Documentation methodology for Projects/ Products/ Softwares**	**10**

TOTAL: 30 HOURS

E-MATERIAL:

www.indiabix.com/verbal-reasoning

INTERNAL ASSESSMENT **100 MARKS**

(100 Marks to be converted to 25)

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop analytical skill and vocabulary		H		H					H	H		H	
2	Improve job prospects									H	H		H	
3	Predict the main idea of the topic and use verbal cues									H	H	L	H	
4	Develop negotiation skill				M					M	M	M	M	
5	Utilize documentation methodology									M	H	H	H	

L – Low, M - Medium, H –High.

12GE31 ENVIRONMENTAL SCIENCE AND ENGINEERING **L T P C**

(Common to all B.E/B.Tech. Degree Programmes) **3 0 0 3**

CATEGORY: Core

PREREQUISITE: 12F2Z4 – Engineering chemistry-II, 12F1Z4 – Engineering Chemistry-I

AIM:

The aim of this course is to create awareness in every engineering graduate about the important of environment, the effect of technology on the environment and ecological balance and make him/her sensitive to the environment problems in every Professional endeavor that he/she participates.

COURSE OBJECTIVES:

At the end of this course the student is expected to understand,

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

COURSE OUTCOMES:

- Register the importance of environment and need for biodiversity.
- Classify the roles of an individual in prevention of pollution.

- Realize the roles of an individual in conservation of natural resources.
- Evaluate the liability of non-governmental organization in environmental ethics.
- Value the role of information technology in environment and human health.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hotspots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds.

Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

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

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of nongovernmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).

2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2006).

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law',Prentice hall of India, New Delhi,2007
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Register the importance of environment and need for biodiversity.						M	H	L					f, g, h, j, l
2	Classify the roles of an individual in prevention of pollution.						M	M					M	
3	Realize the roles of an individual in conservation of natural resources.						H	M					H	
4	Evaluate the liability of non-governmental organization in environmental ethics.						H	M			L			
5	Value the role of information technology in environment and human health.						H	M			L		M	

L – Low, M - Medium, H –High.

12IT65 CRYPTOGRAPHY AND NETWORK SECURITY L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12CS52 – Computer Networks
AIM:
To introduce the fundamentals of Cryptography and its application to security.
COURSE OBJECTIVES:

- To understand the mathematics behind Cryptography
- To understand the standard algorithms used to provide confidentiality provide integrity and authenticity.
- To get a working knowledge of network security, data base security and DS security issues in order to build secure systems.

COURSE OUTCOMES:

- Identify various security threats, security services and mechanisms to counter them.
- Make use of fundamental cryptographic and efficient basic number - theoretic algorithms.
- Build cryptosystems by applying / developing crypto algorithms.
- Apply message authentication techniques for email and web security applications.
- Work with firewall based solution against intruders and security threats.

UNIT I **9**
Security trends – The OSI Security Architecture – Attacks and services – Security mechanisms – A model for network security – Classical crypto systems – Different types of ciphers – LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite fields – continued fractions.
UNIT II **9**
Simple DES – Differential cryptoanalysis – DES – Modes of operation – Triple DES – AES – RC4 –

RSA – Attacks – Primality test – factoring.

UNIT III **9**

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks - MD5 – Digital signatures – RSA – ElGamal – DSA.

UNIT IV **9**

Authentication applications – Kerberos, X.509, PKI – Electronic Mail security – PGP, S/MIME – IP security – Web Security – SSL, TLS, SET.

UNIT V **9**

System security – Intruders – Malicious software – viruses – Firewalls – Security Standards.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Wade Trappe, Lawrence C Washington, "Introduction to Cryptography with coding theory", 2nd edition, Pearson, 2007.
2. William Stallings, "Cryptography and Network security Principles and Practices", Pearson/PHI, 4th edition, 2006.

REFERENCES:

1. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education, Second Edition, 2007.
2. Charles P. Pfleeger, Shari Lawrence Pfleeger – Security in computing Third Edition – Prentice Hall of India, 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Identify various security threats, security services and mechanisms to counter them.	M	H	H	L	L								a, b, c, d, e, l
2	Make use of fundamental cryptographic and efficient basic number - theoretic algorithms.	H	M		M	M								
3	Build cryptosystems by applying / developing crypto algorithms.	H	M	H	L	M								
4	Apply message authentication techniques for email and web security applications.	M	L	L	L								M	
5	Work with firewall based solution against intruders and security threats.	L	L	M		M								

L – Low, M - Medium, H –High.

12CS61 SYSTEM SOFTWARE AND COMPILER DESIGN **L T P C**
3 0 0 3

CATEGORY: Core

PREREQUISITE: 12CS54 – Theory of Computation

AIM:

To gain the knowledge of the system software and also able to know the design and implementation a simple assembler and compiler.

COURSE OBJECTIVES:

- To understand the relationship between system software and machine architecture.
- To understand, design and implement a parser.
- To understand, design code generation schemes.

- To understand optimization of codes and runtime environment

COURSE OUTCOMES:

- Recite basic system software and machine architecture such as SIC, Assembler.
- Design various loader & linker.
- Understand and develop lexical analyser.
- Design code generator.
- Apply code optimization technique to minimize program.

UNIT I INTRODUCTION 8

System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT II ASSEMBLERS 9

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers.

UNIT III INTRODUCTION TO COMPILING AND SYNTAX ANALYSIS 10

Compilers – Phases of a compiler – Cousins of the Compiler – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Specification and recognition of Tokens. Syntax Analysis – The role of the parser – Context-free grammars – Writing a grammar – Topdown parsing – Bottom-up Parsing – LR parsers – Constructing an SLR(1) parsing table.

UNIT IV INTERMEDIATE CODE GENERATION AND CODE OPTIMIZATION 9

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls – Introduction to code optimization – Principal Sources of Optimization – Optimization of basic Blocks – loops in flow graphs – Peephole optimization – Introduction to Global Data Flow Analysis.

UNIT V CODE GENERATION 9

Issues in the design of a code generator – The target machine – Run-time storage management – Basic blocks and flow graphs – Next-use information – A simple code generator – Register allocation and assignment – The DAG representation of basic blocks – Generating code from DAGs.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, “Compilers Principles, Techniques and Tools”, Pearson Education Asia, 2003.
2. K. Muneeswaran, “Compiler Design”, Oxford University Press, 2013.
3. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education Asia, 2006.

REFERENCES:

1. Allen I. Holub “Compiler Design in C”, Prentice Hall of India, 2003.
2. C.N.Fischer and R. J. LeBlanc, “Crafting a compiler with C”, Benjamin Cummings, 2003.
3. J.P. Bennet, “Introduction to Compiler Techniques”, Second Edition, TMGH, 2003.
4. John J. Donovan “System Programming”, Tata McGraw-Hill Edition, 2000.
5. Kenneth C. Louden, “Compiler Construction: Principles and Practice”, Thompson Learning, 2003

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recite basic system software and machine architecture such as SIC, Assembler.	L	M											a, b, c, d, e, g

2	Design various loader & linker.	H	M					M						
3	Understand and develop lexical analyser.	L	M		M	H								
4	Design code generator.	M		H		M								
5	Apply code optimization technique to minimize program.	M		H		M		L						

L – Low, M - Medium, H –High.

12CS62 OBJECT ORIENTED SOFTWARE ENGINEERING L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12CS53 – Programming with Java, 12CS33 – Object Oriented Programming
AIM:
To study object oriented analysis and design and the techniques needed to apply them.
COURSE OBJECTIVES:

- To study the concepts of modelling in object oriented contexts.
- To learn about the Object Constraint Language.
- To study and learn how to apply analysis techniques and methodologies including Use cases, System Sequence Diagrams.
- To study and learn how to apply design techniques and methodologies including Interaction Diagrams, Class Diagrams.
- To study implementation related issues.
- To study and learn how to apply advanced techniques including Architectural Analysis and Design Patterns.

COURSE OUTCOMES:

- Apply the Object oriented concepts & software engineering methodologies to develop the software projects.
- Draw UML diagrams and interrelate the concepts to build the software projects.
- Solve problems in software development activities from requirement specification to testing.
- Choose and utilize suitable testing methods to test the software projects.
- Model different kinds of real world problems using OOSE concepts.

UNIT I INTRODUCTION 9
System Concepts – Software Engineering Concepts – Development Activities– Managing Software Development – Modeling with UML – Modeling concepts – UML Diagrams.
UNIT II ANALYSIS 9
Requirements Elicitation – Concepts – Activities – Managing Requirement elicitation –Analysis -concepts-Activities-Managing Analysis-Case Study.
UNIT III SYSTEM DESIGN 9
Decomposing the system – Overview of System Design – System Design Concepts – System Design Activities – Addressing Design Goals – Activities-Managing System Design.
UNIT IV OBJECT DESIGN 9
Reusing Pattern Solutions – Concepts-Activities-Managing reuse- Specifying Interfaces – object design.
UNIT V IMPLEMENTATION ISSUES AND MANAGING CHANGE 9
Mapping Models to Code – overview-concepts – activities-Managing implementation – Testing overview-Managing Change – Rationale Management – Configuration Management- Project management.
TOTAL : 45 PERIODS

TEXT BOOK:
1. Bernd Bruegge, Alan H Dutoit, Object-Oriented Software Engineering, Pearson Education, 2011.
REFERENCES:
1. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.
2. Roger S Pressman, Software Engineering 6th ed, Tata McGraw-Hill.
3. Stephen Schach, Software Engineering 7th ed, McGraw Hill,2007.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply the Object oriented concepts & software engineering methodologies to develop the software projects.	M	M	H	H									a, b, c, d, e, i.
2	Draw UML diagrams and interrelate the concepts to build the software projects.	M	L		M	H								
3	Solve problems in software development activities from requirement specification to testing.		H		H									
4	Choose and utilize suitable testing methods to test the software projects.	L	M		L	M								
5	Model different kinds of real world problems using OOSE concepts.	M	H		H					M				

L – Low, M - Medium, H –High.

12CS63 ADVANCED COMPUTER ARCHITECTURE L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12CS45 – Computer Organization & Architecture
AIM:
To comprehend the advancements in computer architecture in all aspects from implicit to explicit parallelism.
COURSE OBJECTIVES:
- To understand the principle and various dimensions of instruction-level parallelism, and thread-level parallelism.
- To appreciate the move towards multi-core architectures and realize the challenges in dealing with such architectures.
- To get a feel of programming for such architectures.

COURSE OUTCOMES:
- Reassess the various computer architectural designs and Instruction set designs.
- Apply pipeline concept in architectural design
- Improve the performance using static/dynamic approaches in ILP
- Infer the design of multiprocessor and multi-core architectures.
- Design Memory models for multiprocessor architectures.

UNIT I INSTRUCTION LEVEL PARALLELISM 9
ILP – Concepts and challenges – Hardware and software approaches – Compiler techniques for exposing ILP - Branch prediction - Dynamic scheduling – Speculation.
UNIT II MULTIPLE ISSUE PROCESSORS 9
VLIW & EPIC – Advanced compiler support – Hardware support for exposing parallelism– Hardware versus software speculation mechanisms – IA 64 and Itanium processors –Limits on ILP.
UNIT III MULTIPROCESSORS AND THREAD LEVEL PARALLELISM` 9
Symmetric and distributed shared memory architectures – Performance issues – Synchronization – Models of memory consistency – Introduction to Multithreading.
UNIT IV MEMORY AND I/O 9
Introduction - Cache performance – Reducing cache miss penalty and miss rate – Reducing hit time –

Main memory and performance – Memory technology. Types of storage devices – Buses – RAID – Reliability, availability and dependability – I/O performance measures – Designing an I/O system.

UNIT V MULTI-CORE ARCHITECTURES 9

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

TOTAL: 45 HOURS

TEXT BOOKS:

1. John L. Hennessey and David A. Patterson, "Computer architecture – A quantitative approach", Morgan Kaufmann / Elsevier Publishers, 4th.edition, 2007.

REFERENCES:

1. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture : A hardware/ software approach" , Morgan Kaufmann /Elsevier Publishers, 1999.
2. Kai Hwang and Zhi.Wei Xu, "Scalable Parallel Computing",TMGH,New Delhi,2003.
3. http://pptnotes.blogspot.in/2011/03/cs2354-advanced-computer-architecture.html.
4. http://www.csie.ntu.edu.tw/~hungsh/CA/lec11-mt.ppt.
5. http://docs.notur.no/uit/archive/HPCiA07/hpcia07-documents/intel-tools tutorial/1.%20 Core%20Architecture.pdf
6. http://www.cis.upenn.edu/~palsetia/cellproc.ppt

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess. Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Reassess the various computer architectural designs and Instruction set designs.	M	L		H									a, b, d, e.
2	Apply pipeline concept in architectural design	L	M		M									
3	Improve the performance using static/dynamic approaches in ILP	L	H		L									
4	Infer the design of multiprocessor and multi-core architectures.	M	M		H	L								
5	Design Memory models for multiprocessor architectures.	L	L		M									

L – Low, M - Medium, H –High.

12CS67 OBJECT ORIENTED SOFTWARE ENGINEERING LABORATORY L T P C
0 0 3 2

CATEGORY: Core

PREREQUISITE: 12CS57 – Java Lab, 12CS35 – OOPs Lab

AIM:

To understand and apply the object oriented design principles in software engineering.

COURSE OBJECTIVES:

- To learn UML (Unified Modeling Language) that is part of most CASE (Computer Aided Software Engineering) tools and the benefits of visual modeling / diagramming.
- To practice the application of principles of object-oriented software development through the course group project.
- To develop teamwork and communication skills through the course group project.

- To understand the application of case tools, which focuses on the following software engineering activities:
  - Software requirements analysis and specification.
  - Software design.
  - Software implementation.
  - Software testing and maintenance.
  - Communication skills and teamwork.
  - Modeling techniques and CASE tools.
  - Software project planning and management.

COURSE OUTCOMES:

- Notch problem statement for any real world problems.
- Analyze and Draw the UML diagram based on the problems defined.
- Recommend alternative development processes.
- Implement and test Unified Modeling Language (UML) application towards analysis and design.
- Involve team projects, technical writing and oral presentations.

To develop a mini-project following the 12 exercises listed below.

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

Suggested domains for Mini-project.

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

Suggested Software Tools

1. ArgoUML, Eclipse IDE, Visual Paradigm, Visual case, and Rational Suite

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Notch problem statement for any real world problems.	H	M		M									a, b, d, e, i, j.
2	Analyze and Draw the UML diagram based on the problems defined.		H		M	M				M				
3	Recommend alternative development processes.	H			H					H				
4	Implement and test Unified Modeling Language (UML) application towards analysis and design.				H	H								
5	Involve team projects, technical writing and oral presentations.									H	M			

L – Low, M - Medium, H –High.

12CS68 SYSTEM SOFTWARE AND COMPILER LABORATORY (Using C) **L T P C 0 0 3 2**

CATEGORY: Core

PREREQUISITE: 12F1Z8 – Computer Practices Lab-I

AIM:

To know how to implement various system software tools like assemblers, macroprocessor, loaders and etc.

COURSE OBJECTIVES:

- To know the implementation of different passes of Assembler.
- To know the implementation of different types of Loaders.
- To know the implementation of macroprocessors.
- To know the implementation of some of the mechanisms, in particular lexical analysis and code generation

COURSE OUTCOMES:

- Design simple assemblers.
- Implement a loader.
- Perform Lexical Analyzing.
- Create optimized code.
- Develop an Editor.

LIST OF EXPERIMENTS

1. Implement a symbol table with functions to create, insert, modify, search, and display.
2. Implement pass one of a two pass assembler.
3. Implement pass two of a two pass assembler.
4. Implement a single pass assembler.
5. Implement a single pass macro processor.
6. Implement a absolute loader.
7. Implement a relocating loader.
8. Implement pass one of a direct-linking loader.
9. Implement pass two of a direct-linking loader.
10. Implement a lexical analyzer
11. Generate intermediate code and target code for a given source program.
12. Implement a simple text editor.

(For loader exercises, output the snap shot of the main memory as it would be, after the loading has taken place)

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				

Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail

Course Outcomes		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Design simple assemblers.	H	H							M				a, b, d, e, i.
2	Implement a loader.	M	M		H					M				
3	Perform Lexical Analyzing.	H	L		L	H								
4	Create optimized code.	M				M				H				
5	Develop an Editor.	L	M		L	L				H				

L – Low, M - Medium, H –High.

12CS69 OPEN SOURCE LABORATORY **L T P C**
0 0 3 2

CATEGORY: Core
PREREQUISITE: 12CS46 – OS Lab
AIM:
To bring in more creativity in programming and will increase the ability of the budding engineers to write their own programs / softwares. This includes the fundamental concepts of Linux OS which is an essential learning for programmers and developers.
COURSE OBJECTIVES:
- To expose students to FOSS environment and introduce them to use open Source packages
- To obtain a variety of packages including complete Debian binary and source repository, Fedora package, Comprehensive Perl Archive Network (CPAN) and various Linux kernels
- To obtain Source code formatted with syntax highlighting, hyperlinked and cross-referenced
- To obtain Archived and searchable documentation which includes CUPS, Debian, Perl, PHP, Post-fix, MySQL, PostgreSql
- To obtain Python, Squid, Subversion, TLDP, etc.
- To obtain All data indexed and made searchable via a simple browser interface
- To obtain Project Management Tool for the academic projects packed with features.
- To obtain Graphical tool with options for carrying out high-end admin contents etc.

COURSE OUTCOMES:
- Implement & test Kernel configuration, compilation
- Utilize various build systems like the auto* family, cmake, ant etc.
- Construct Version Control System setup and usage using RCS, CVS, SVN
- Build the complete network interface using ifconfig command like setting gateway, DNS, IP tables, etc.,
- Develop programs using php, python, perl and GUI.

LIST OF EXPERIMENTS:
1. **Kernel configuration, compilation and installation:** Download / access the latest kernel source code from kernel.org, compile the kernel and install it in the local system. Try to view the source code of the kernel
2. Virtualisation environment (e.g., xen, kqemu or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to other alternate OSs like *BSD
3. Compiling from source: learn about the various build systems used like the auto* family, cmake, ant etc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf, automake etc.,
4. **Introduction to packet management system:** Given a set of RPM or DEB, how to build and maintain, serve packages over http or ftp. and also how do you configure client systems to access the package repository.
5. **Installing various software packages**
- Either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. Of course, this might need internet access.
- Install samba and share files to windows
- Install Common Unix Printing System(CUPS)

6. **Write userspace drivers using fuse** -- easier to debug and less dangerous to the system (Writing full-fledged drivers is difficult at student level)
7. **GUI programming: a sample programme** – using Gambas since the students have VB knowledge. However, one should try using GTK or QT
8. **Version Control System setup and usage** using RCS, CVS, SVN
9. **Text processing with Perl:** simple programs, connecting with database e.g., MYSQL
10. **Running PHP:** simple applications like login forms after setting up a LAMP stack
11. **Running Python:** some simple exercise – e.g. Connecting with MySql database
12. **Set up the complete network interface** using ifconfig command like setting gateway, DNS, IP tables, etc.,

TOTAL: 45 PERIODS

RESOURCES:
An environment like **FOSS Lab Server** (developed by NRCFOSS containing the various packages)
OR
Equivalent system with Linux distro supplemented with relevant packages
Note: Once the lists of experiments are finalized, NRCFOSS can generate full lab manuals complete with exercises, necessary downloads, etc. These could be made available on NRCFOSS web portal.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Implement & test Kernel configuration, compilation	M			H					H				a, b, d, e, f, i.
2	Utilize various build systems like the auto* family, cmake, ant etc.	H	M			H				M				
3	Construct Version Control System setup and usage using RCS, CVS, SVN					H	L							
4	Build the complete network interface using if-config command like setting gateway, DNS, IP tables, etc.,	M	M			H				H				
5	Develop programs using php, python, perl and GUI.	L								M				

L – Low, M - Medium, H –High.

12HS61 English for Employment – II **L T P C**
(Common to All B.E./B.Tech) **0 0 2 1**

CATEGORY: Core
PREREQUISITE: 12HS51- English for Employment–I
AIM:
To improve learners Communication Skill in English with the Professional English Examination Module
COURSE OBJECTIVES:
- To impart Employment skill among the students
- To improve Technical vocabulary related to work place
- T o develop students job prospects through oral communication

COURSE OUTCOMES:
- Improve efficiency in reading skill
- Create effective technical written communication
- Develop listening skill to infer native speaker's communication
- Develop oral presentation skill
- Demonstrate personal ideas

A)	**Reading**	**6**
1	Reading for Gist	
2	Reading for Structure and detail	
3	Understanding General Points	
4	Reading-Vocabulary and Texture	
5	Structure and Discourse features	
6	Understanding sentence structure	
B)	**Writing**	**6**
1	Describing figure from graphic input	
2	Deriving conclusion from illustrations	
3	Writing a Report-Describing/Summarizing	
4	Explaining a context	
5	Writing Apologies	
6	Writing for giving assurance	
C)	**Listening**	**6**
1	Listening for Specific Information	
2	Listening to Identify topic	
3	Listening to a context	
4	Listening to opinions expressed in a debate	
5	Listening for Gist	
6	Listening for making Inferences	
D)	**Speaking**	**12**
1	'Mini-Presentation' on the given topic 6	
2	Group Discussion 4	
3	Expressing personal opinion about the Social Issues 2	

Total:30 Hours

TEXT BOOKS:

1) Business Benchmark Advanced Audio Cassettes BEC Higher, Guy Brook-Hart, 2 Audio cassettes, ISBN: 9780521672986
2) Business Benchmark Upper Intermediate Personal Study Book BEC and BULATS Edition, Guy Brook-Hart, PB, ISBN: 9780521672917

INTERNAL ASSESSMENT **100 MARKS**

(100 Marks to be converted to 25)

***Note: Contents for the Internal and External Examinations should be considered only from The BUSINESS ENGLISH oriented Articles / Extracts / Clips / Illustrations / Audio scripts.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Improve efficiency in reading skill		M		M					M	H	H	H	b, d, i, j, k, l.
2	Create effective technical written communication									H	H	H	H	
3	Develop listening skill to infer native speaker's communication				M					H	H	H	H	
4	Develop oral presentation skill									H	H	H	H	
5	Demonstrate personal ideas				M					H	H	M	H	

L – Low, M - Medium, H –High.

12IT63 WEB TECHNOLOGY **L T P C**
3 0 0 3

CATEGORY: Core
PREREQUISITE: Nil
AIM:
To provide an introduction to Java and basic Web concepts and enable the student to create simple Web based applications.
COURSE OBJECTIVES:
- To design and create user interfaces using Java frames and applets
- To have a basic idea about network programming using Java
- To create simple Web pages and provide client side validation
- To create dynamic web pages using server side scripting

COURSE OUTCOMES:
- Develop advanced HTML pages using various elements.
- Create web pages using XHTML and Cascading Styles sheets.
- Build dynamic web pages using JavaScript (client side programming).
- Interpret web site planning, management and maintenance.
- Design secure and dynamic web sites.

UNIT I **9**
Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers-Case Study. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-XML Creating HTML Documents. Case Study.

UNIT II **9**
Style Sheets: CSS – Introduction to Cascading Style Sheets – Features – Core Syntax-Style Sheets and HTML Style Role Cascading and Inheritance – Text Properties – Box Model Normal Flow Box Layout-Beyond the Normal Flow – Other Properties – Case Study. Client-Side Programming: The JavaScript Language - History and Versions Introduction: JavaScript in Perspective – Syntax – Variables and Data Types-Statements-Operators- Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

UNIT III **9**
Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window-Case Study. Server-Side Programming: Java Servlets- Architecture-Overview-A Servelet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency-Case Study- Related Technologies.

UNIT IV **9**
Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration- Namespaces JavaScript and XML: Ajax-DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data:XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browsers-Case Study- Related Technologies. Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm-Case Study-Related Technologies.

UNIT V **9**
Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files-Databases and Java Servlets.

TOTAL: 45 PERIODS

TEXT BOOK:
1. Jeffrey C. Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2012.

REFERENCES:

1. Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.
2. Robert. W. Sebesta, "Programming the World Wide Web",4th Edition, Pearson Education, 2007 .
3. Marty Hall and Larry Brown, "Core Web Programming", 2nd Edition, Vol I and II, Pearson Education, 2001.
4. Bates, "Developing Web Applications", Wiley, 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop advanced HTML pages using various elements.	L		H	M									a, b, c, d, e, g, i.
2	Create web pages using XHTML and Cascading Styles sheets.		M	H		L								
3	Build dynamic web pages using JavaScript (client side programming).			H		L		M						
4	Interpret web site planning, management and maintenance.	M	M		L			M		H				
5	Design secure and dynamic web sites.		L	H	M			M		M				

L – Low, M - Medium, H –High.

12CS71 COMPUTER GRAPHICS **L T P C**
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12F1Z8 – Computer Practices Lab - I
AIM:

- Introduce students to various two and three dimensional primitives and concepts
- Provide an opportunity for students to represent, design and implement two dimensional and three dimensional objects

COURSE OBJECTIVES:

- Explain two and three dimensional concepts and their applications.
- Identify all techniques related to modern graphics programming concepts.

COURSE OUTCOMES:

- Implement graphics primitives.
- Make use of current 3D graphics (e.g., OpenGL or DirectX).
- Choose models for lighting/shading
- Analysis geometric transformation matrices
- Generate image by iterated function.

UNIT I 2D PRIMITIVES **9**

output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output primitives – Two dimensional Geometric transformation - Two dimensional viewing – Line, Polygon, Curve and Text clipping algorithms

UNIT II 3D CONCEPTS **9**

Parallel and Perspective projections - Three dimensional object representation – Polygons, Curved lines, Splines, Quadric Surfaces,- Visualization of data sets - 3D transformations – Viewing -Visible

surface identification.

UNIT III GRAPHICS PROGRAMMING 9

Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation, Raster, Key frame - Graphics programming using OPENGL – Basic graphics primitives – Drawing three dimensional objects - Drawing three dimensional scenes

UNIT IV RENDERING 9

Introduction to Shading models – Flat and Smooth shading – Adding texture to faces – Adding shadows of objects – Building a camera in a program – Creating shaded objects – Rendering texture – Drawing Shadows.

UNIT V FRACTALS 9

Fractals and Self similarity – Peano curves – Creating image by iterated functions – Mandelbrot sets – Julia Sets – Random Fractals – Overview of Ray Tracing – Intersecting rays with other primitives – Adding Surface texture – Reflections and Transparency – Boolean operations on Objects.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Donald Hearn, Pauline Baker, Computer Graphics – C Version, 2nd edition, Pearson Education,2004.
2. F.S. Hill, Computer Graphics using OPENGL,2nd edition,Pearson Education, 2003.

REFERENCE:

1. James D. Foley, Andries Van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics – Principles and practice, Second Edition in C, Pearson Education, 2007.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Implement graphics primitives.	L												a, b, d, e.
2	Make use of current 3D graphics (e.g., OpenGL or DirectX).		M		L	M								
3	Choose models for lighting/shading	M	M											
4	Analysis geometric transformation matrices		M		M									
5	Generate image by iterated function.		L		M									

L – Low, M - Medium, H –High.

12CS72 MOBILE AND PERVASIVE COMPUTING L T P C
3 0 0 3

CATEGORY: Core

PREREQUISITE: 12CS52 – Computer Networks

AIM:

To study the details of lower layers of mobile architectures in the context of pervasive computing and mobile applications.

COURSE OBJECTIVES:

- To understand the concepts of Wireless Communication
- To discuss the features of IEEE 802.11 Wireless LANs
- To learn the various types of cellular telephone systems
- To explain the role of TCP/IP in Mobile networks
- To understand the WAP framework

COURSE OUTCOMES:

- Recognize basic of wireless voice network and data communication technologies.
- Make use of various GSM, GPRS system.
- Choose suitable wireless network standard for real world applications.

- Configure mobile network using various routing algorithms.
- Apply various protocols in transport and application layers.
- Infer the pervasive computing infrastructure and applications.

UNIT I MOBILE NETWORKS 9

Cellular Wireless Networks – GSM – Services – Architecture– Radio Interface – Protocols– Localization and Calling – Handover – Security – GPRS.

UNIT II WIRELESS NETWORKS 9

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

UNIT III ROUTING 9

Mobile IP – DHCP – Ad-Hoc – Proactive and Reactive Routing Protocols – Multicast Routing.

UNIT IV TRANSPORT AND APPLICATION LAYERS 9

Classical TCP improvements – WAP – Architecture – WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML – WMLScripts.

UNIT V PERVASIVE COMPUTING 9

Pervasive computing infrastructure – applications – Device Technology – Hardware, Human-machine Interfaces, Biometrics, and Operating systems – Device Connectivity – Protocols, Security, and Device Management – Pervasive Web Application architecture – Access from PCs and PDAs – Access via WAP

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", PHI, Second Edition, 2003.

2. Jochen Burkhardt, "Pervasive Computing: Technology and Architecture of Mobile Internet Applications", Addison-Wesley Professional; 3rd edition, 2007

REFERENCES:

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

2. Debashis Saha, "Networking Infrastructure for Pervasive Computing: Enabling Technologies", Kluwer Academic Publisher, Springer; First edition, 2002

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

4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recognize basic of wireless voice network and data communication technologies.	H												a, b, d, e.
2	Make use of various GSM, GPRS system.		H		M	H								
3	Choose suitable wireless network standard for real world applications.		M		M	H								
4	Configure mobile network using various routing algorithms.		M		L	M								
5	Apply various protocols in transport and application layers.	H	M		M									
6	Infer the pervasive computing infrastructure and applications.	M												

L – Low, M - Medium, H –High.

12CS73 CLOUD COMPUTING L T P C
3 0 0 3

CATEGORY: Core
PREREQUISITE: 12CS52 – Computer Networks, 12CS42 – Operating Systems
AIM:
To present a basic architecture and service models with programming models for Cloud applications.
COURSE OBJECTIVES:
- To understand the concept of Cloud Service Providers (CSPs)
- To create the awareness of resource provisioning in Clouds
- To understand the Cloud Computing architectures and programming models
- To develop applications using Enterprise Clouds.

COURSE OUTCOMES:
- Compare the strengths and limitations of cloud computing.
- Identify the architecture, infrastructure and delivery models of cloud computing.
- Apply suitable virtualization concept.
- Choose the appropriate Programming Models and approach.
- Address the core issues of cloud computing such as privacy and interoperability.

UNIT I INTRODUCTION TO CLOUD COMPUTING 9
Roots of Cloud Computing, Layers and Types of Clouds, Features of a Cloud, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, and Challenges and Opportunities.

UNIT II VIRTUALIZATION AND RESOURCE PROVISIONING IN CLOUDS 9
Introduction and Inspiration, Virtual Machines (VM), VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions.

UNIT III CLOUD COMPUTING ARCHITECTURE 9
Cloud Benefits and Challenges, Market-Oriented Cloud Architecture, SLA-oriented Resource Allocation, Global Cloud Exchange; Emerging Cloud Platforms, Federation of Clouds

UNIT IV PROGRAMMING ENTERPRISE CLOUDS USING ANEKA 9
Introduction, Aneka Architecture, Aneka Deployment, Parallel Programming Models, Thread Programming using Aneka, Task Programming using Aneka, and MapReduce Programming using Aneka, Parallel Algorithms, Parallel Data mining, Parallel Mandelbrot, and Image Processing.

UNIT V ADVANCED TOPICS AND CLOUD APPLICATIONS 9
Integration of Private and Public Clouds, Cloud Best Practices, GrepTheWeb on Amazon Cloud, ECG Data Analysis on Cloud using Aneka, Hosting Massively Multiplayer Games on Cloud, and Content Delivery Networks Using Clouds, and Hosting Twitter and Facebook on Cloud.

TOTAL: 45 PERIODS

TEXT BOOK
1. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, "Mastering Cloud Computing", Tata McGraw Hill, New Delhi, India, 2013.

REFERENCES
1. Kai Hwang, Geoffrey C.Fox, Jack J Dongarra, Distributed and Cloud Computing, Morgan Kaufmann Publishers, 2012
2. Toby Velte, Anthony Velte and Robert Elsenpeter "Cloud Computing – A Practical Approach", Tata McGraw Hill, 2010.
3. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", QUE publishing, 2009.
4. Jeorge Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud", O'Reilly Applications, 2009.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				

Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail

Course Outcomes (COs)		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Compare the strengths and limitations of cloud computing.	H												a, b, d, e, g.
2	Identify the architecture, infrastructure and delivery models of cloud computing.		H		M	H								
3	Apply suitable virtualization concept.	M			M	H		M						
4	Choose the appropriate Programming Models and approach.	L			M	H		M						
5	Address the core issues of cloud computing such as privacy and interoperability.	M	L		L									

L – Low, M - Medium, H –High.

12IT67 WEB TECHNOLOGY LABORATORY **L T P C**
1 0 3 2

CATEGORY: Core
PREREQUISITE: Nil
AIM:
To enable the students to program in Java and to create simple Web based applications.
COURSE OBJECTIVES:
- To write simple programs using HTML 5.0
- To design and create user interfaces using Java frames and applets
- To write I/O and network related programs using Java
- To create simple Web pages and provide client side validation
- To create dynamic web pages using server side scripting

COURSE OUTCOMES:
- Develop simple web pages using HTML elements.
- Design and implement dynamic websites.
- Develop client side scripting applications.
- Create well formed JSP and servlets documents.
- Model different kinds of real world problems using database connectivity.

Brief lecture of HTML 5.0 – CSS, DHTML. Javascripts – Java Applets – Servlets – JSP – JDBC – XML – AJAX.

LIST OF EXPERIMENTS
1. Create a web page with the following using HTML 5.0
   i) To embed an image map in a web page
   ii) To fix the hot spots
   iii) Show all the related information when the hot spots are clicked.
2. Create a web page with all types of Cascading style sheets.
3. Client Side Scripts for Validating Web Form Controls using DHTML
4. Random Number generation using Javascripts
5. Bubble Sort using Javascripts.
6. Write programs in Java to create applets incorporating the following features:
   - Create a color palette with matrix of buttons
   - Set background and foreground of the control text area by selecting a color from color palette.
   - In order to select Foreground or background use check box control as radio buttons
   - To set background images
7. Write programs in Java using Servlets:
   - To invoke servlets from HTML forms
   - To invoke servlets from Applets

8. Write programs in Java to create three-tier applications using JSP and Databases
   - for conducting on-line examination.
   - for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
9. Programs using XML – Schema – XSLT/XSL
10. Programs using AJAX
11. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Data base.

TOTAL 15 + 45 = 60 PERIODS

TEXT BOOK:

1. Robert W.Sebesta, "Programming the world wide web", Pearson Education, 2006.

REFERENCE:

1. Deitel, "Internet and world wide web, How to Program", PHI, 3rd Edition, 2005

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes	Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop simple web pages using HTML elements.		M	H	M									b, c, d, e, g, i.
2	Design and implement dynamic websites.		L	H		H				H				
3	Develop client side scripting applications.			M	L									
4	Create well formed JSP and servlets documents.		L	M	M									
5	Model different kinds of real world problems using database connectivity.		L	M	M	H		M		H				

L – Low, M - Medium, H –High.

12CS78 COMPUTER GRAPHICS LABORATORY **L T P C**
0 0 3 2

CATEGORY: Core

PREREQUISITE: 12F1Z8 – Computer Practices Lab - I

AIM:

To introduce the necessary background, the basic algorithms, and the applications of computer graphics.

COURSE OBJECTIVES:

- To describe and implement the following algorithms: Bresenham's line drawing, mid-point line drawing, mid-point circle drawing, Cohen-Sutherland line clipping, Sutherland-Hodgeman polygon clipping.
- To perform pixel-based processing to create simple geometric figures upon a screen.
- To understand the principles of filling and rendering in the representation of solid objects
- To understand the principles of animation
- To implement transformations of graphical objects in two and three dimensions, project such objects from three to two dimensions.
- To use matrices and homogeneous coordinates to represent and perform 2D and 3D transformations; understand and use 3D to 2D projection, the viewing volume, and 3D clipping.

COURSE OUTCOMES:

- Make use of basic ideas of computer graphics.
- Develop functions to implement graphics primitives.
- Build programs that demonstrate 2D image processing techniques.

- Construct program for geometry transformations in 3D.
- Creates model and texture mapping.

LIST OF EXPERIMENTS:

1. Implementation of Bresenhams Algorithm – Line, Circle, Ellipse.
2. Implementation of Line, Circle and ellipse attributes
3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
4. Composite 2D Transformations
5. Cohen Sutherland 2D line clipping and Windowing
6. Sutherland – Hodgeman Polygon clipping Algorithm
7. Three dimensional transformations - Translation, Rotation, Scaling
8. Composite 3D transformations
9. Drawing three dimensional objects and Scenes
10. Generating Fractal images

TOTAL: 45 PERIODS

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of basic ideas of computer graphics.	M								L				a, b, d, e, i.
2	Develop functions to implement graphics primitives.		M		L	M				H				
3	Build programs that demonstrate 2D image processing techniques.		M		M	H				M				
4	Construct program for geometry transformations in 3D.		M		M	H				M				
5	Creates model and texture mapping.					M				L				

L – Low, M - Medium, H –High.

12CS79 SOFTWARE PROJECT DEVELOPMENT LAB **L T P C**
0 0 4 2

CATEGORY: Core

PREREQUISITE: 12CS69 – Open Source Lab, 12CS67 – OOSE Lab

AIM:

Develop a software package in any application relevant to any area of study of your curriculum by applying the Software Engineering Practices generally done by software industries, which are

COURSE OBJECTIVES:

- Identification of Use cases for each application system and SRS preparation.
- Identification of reusable Components/Frameworks from open source and customizing them for each application.
- Coding/Customizing/Wrapping for components/subsystems.
- Testing – Scenario testing and test case preparation for each components/subsystems
- Integration of subsystems and Testing
- Simulation of datasets and load testing to analyze performance of the system.

COURSE OUTCOMES:

- Experiment with fundamental principles of Object Oriented programming.
- Demonstrate key principles in OO analysis, design, and development.
- Design and implement various applications with different programming languages.

- Identify alternative development processes.
- Familiar with group/team projects, technical writing and oral presentations.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Regular Class / Record Work (50%)	Lab Test (40%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes		Programme Outcomes (POs)												Associated (POs)
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Experiment with fundamental principles of Object Oriented programming.	H	H		M					L				a, b, d, e, g, i, j.
2	Demonstrate key principles in OO analysis, design, and development.		M		L	M				M				
3	Design and implement various applications with different programming languages.		L		M	L				M				
4	Identify alternative development processes.		M		M	L								
5	Familiar with group/team projects, technical writing and oral presentations.							M		H	M			

L – Low, M - Medium, H –High.

12MA42 NUMERICAL METHODS **L T P C**
3 1 0 4

CATEGORY: Elective
PREREQUISITE: 12MA31 – Transforms & PDE, 12F2Z2 – Engineering Mathematics-II
AIM:
With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in science, engineering and technology. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically.
COURSE OBJECTIVES:
The students would be acquainted with the basic concepts in numerical methods and their uses are summarized as follows:

- The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigen value problem of a matrix can be obtained numerically where analytical methods fail to give solution.
- When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.
- The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.
- Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

COURSE OUTCOMES:

- Examine Newton-Raphson method
- Evaluate matrix Inverse by using Gauss-Jordan method.
- Apply Newton's forward and backward difference interpolation
- Discover Numerical integration using Trapezoidal and Simpson's 1/3 rules.
- Analyse the theModified Euler's method.

- Understand Finite difference solution of Second order Equation

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9

Solution of equation –Fixed point iteration: x=g(x) method - Newton's method – Solution of linear system by Gaussian elimination and Gauss-Jordon method– Iterative method - Gauss-Seidel method - Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix by power method and by Jacobi method for symmetric matrix.

UNIT II INTERPOLATION AND APPROXIMATION 9

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

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9

Differentiation using interpolation formulae –Numerical integration by trapezoidal and Simpson's 1/3 and 3/8 rules – Romberg's method – Two and Three point Gaussian quadrature formulae – Double integrals using trapezoidal and Simpsons's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9

Single step methods: Taylor series method – Euler method for first order equation – 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 BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 9

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: 45 PERIODS

TEXT BOOKS

1. Veerarajan, T and Ramachandran, T. 'Numerical methods with programming in 'C' 2/e, Tata McGraw-Hill Publishing. Co. Ltd. 2007.
2. Sankara Rao K, 'Numerical Methods for Scientists and Engineers' – 3/e, Prentice Hall of India Private Ltd, New Delhi, 2007.

REFERENCES

1. Chapra, S. C and Canale, R. P. "Numerical Methods for Engineers", 5/e, Tata McGraw-Hill, New Delhi, 2007.
2. Gerald, C. F. and Wheatley, P.O., "Applied Numerical Analysis", 6/e, Pearson Education Asia, New Delhi, 2006.
3. Grewal, B.S. and Grewal,J.S., " Numerical methods in Engineering and Science", 6/e, Khanna Publishers, New Delhi, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Examine Newton-Raphson method	H	H		H								H	a, b, d, l.
2	Evaluate matrix Inverse by using Gauss-Jordan method.	L	H		M								L	
3	Apply Newton's forward and backward difference interpolation	L	M											
4	Discover Numerical integration using Trapezoidal and Simpson's 1/3 rules.	M	M		H								M	
5	Analyse the the Modified Euler's method.	M	L		L								L	
6	Understand Finite difference solution of Second order Equation	M	L										L	

L – Low, M - Medium, H –High.

12IT61 EMBEDDED SYSTEMS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS41 – Microprocessors and microcontrollers

AIM

To provide sufficient Knowledge to understand the embedded systems design, embedded programming and their operating system.

COURSE OBJECTIVES

- To provide in-depth knowledge about embedded processor, its hardware and software.
- To explain programming concepts and embedded programming in C and assembly language.
- To explain real time operating systems, inter-task communication and an embedded software development tool.

COURSE OUTCOMES:

- Illustrate the characteristics and challenges of embedded systems.
- Aware of interrupt handling in input/ output and memory devices.
- Generalize the concept of context switching, scheduling policies and performance issues
- Design, test and evaluate embedded solutions to real world situations using (embedded) computer systems.
- Sketch various examples of embedded systems based on different application.

UNIT I EMBEDDED COMPUTING 9

Introduction-Characteristics of embedded system-Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, Instruction sets and programming.

UNIT II MEMORY AND INPUT / OUTPUT MANAGEMENT 9

Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.

UNIT III PROCESSES AND OPERATING SYSTEMS 9

Multiple tasks and processes – Context switching – Scheduling policies – Interprocess Communication mechanisms – Performance issues.

UNIT IV EMBEDDED SOFTWARE 9

Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers.

UNIT V EMBEDDED SYSTEM APPLICATION 9

Design issues and techniques – Complete design of example embedded systems: Global Positioning System (GPS), Train Control System, Personal Digital Assistant (PDA)

TOTAL: 45 PERIODS

TEXT BOOKS

1. Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006.
2. Michael J. Pont, "Embedded C", Pearson Education, 2007.

REFERENCES

1. Steve Heath, "Embedded System Design", Elsevier, 2005.
2. Muhammed Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051Microcontroller and Embedded Systems", Pearson Education, Second edition, 2007.
3. Steve Furber ,"ARM System on chip Architecture",2nd Edition,2000, Addition Wesley publishers.
4. N.Sloss, D.Symes, C.Wright, "ARM system Developers Guide, designing & optimizing system software",2004, Morgann Kaufmann publishers.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Illustrate the characteristics and challenges of embedded systems.	M	L	M	M	L								a, b, c, d, e, g.
2	Aware of interrupt handling in input/ output and memory devices.	L	L		M									
3	Generalize the concept of context switching, scheduling policies and performance issues	M	H		M	M								
4	Design, test and evaluate embedded solutions to real world situations using (embedded) computer systems.	H	L		M	M		M						
5	Sketch various examples of embedded systems based on different application.		M		M									

L – Low, M - Medium, H –High.

12IT62 **NETWORK PROGRAMMING AND NETWORK MANAGEMENT** **L T P C 3 0 0 3**

CATEGORY: Elective

PREREQUISITE: 12CS52 – Computer Neworks

AIM

To enable the students to develop the necessary skills for developing robust & scalable network applications and to build necessary basic knowledge for managing networks.

COURSE OBJECTIVES

- To learn the basics of socket programming using TCP Sockets.
- To learn basics of UDP sockets.
- To develop knowledge of threads for developing high performance scalable applications.
- To learn about raw sockets.
- To understand simple network management protocols & practical issues.

COURSE OUTCOMES:

- Design and program client server based applications.
- Evaluate the security vulnerabilities in a Network
- Illustrate various TCP and UDP socket options and functions
- Acquire knowledge about Threads and raw sockets
- Analyze various simple network managing concepts and its issues

UNIT I ELEMENTARY TCP SOCKETS 9

Introduction to Socket Programming – Overview of TCP/IP Protocols –Introduction to Sockets – Socket address Structures – Byte ordering functions – address conversion functions – Elementary TCP Sockets – socket, connect, bind, listen, accept, read, write, close functions – Iterative Server – Concurrent Server.

UNIT II APPLICATION DEVELOPMENT 9

TCP Echo Server – TCP Echo Client – Posix Signal handling – Server with multiple clients – boundary conditions: Server process Crashes, Server host Crashes, Server Crashes and reboots, Server Shutdown – I/O multiplexing – I/O Models – select function – shutdown function – TCP echo Server (with multiplexing) – poll function – TCP echo Client (with Multiplexing).

UNIT III SOCKET OPTIONS, ELEMENTARY UDP SOCKETS 9

Socket options – getsocket and setsocket functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions.

UNIT IV ADVANCED SOCKETS 9

Ipv4 and Ipv6 interoperability – threaded servers – thread creation and termination – TCP echo server using threads – Mutexes – condition variables – raw sockets – raw socket creation – raw socket output – raw socket input – ping program – trace route program.

UNIT V SIMPLE NETWORK MANAGEMENT 9

SNMP network management concepts – SNMP management information – standard MIB's – SNMPv1 protocol and Practical issues – introduction to RMON, SNMPv2 and SNMPv3.

TOTAL: 45 PERIODS

TEXT BOOKS

1 W. Richard Stevens, "Unix Network Programming Vol-I", Second Edition, Pearson Education, 1998.

2 Mani Subramaniam, "Network Management: Principles and Practice", Addison Wesley", 1st Edition, 2001.

REFERENCES

1. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Second Edition, Pearson Education, 2003.

2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", 3rd Edition, Addison Wesley, 1999.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Design and program client server based applications.	M	M		H									a, b, d, e.
2	Evaluate the security vulnerabilities in a Network	M	H		M									
3	Illustrate various TCP and UDP socket options and functions	M	L		M									
4	Acquire knowledge about Threads and raw sockets	H	L		M									
5	Analyze various simple network managing concepts and its issues		M		M	H								

L – Low, M - Medium, H –High.

12CS6A **UNIX INTERNALS** **L 3** **T 0** **P 0** **C 3**

CATEGORY: Elective

PREREQUISITE: 12CS42 – Operating Systems

AIM

To understand the kernel, I/O and files, process control, scheduling an memory management policies in unix.

COURSE OBJECTIVES

- To get through understanding of the kernel.
- To understand the file organization and management.
- To know the various system calls.
- To have a knowledge of process architecture, process control & scheduling and memory management.

COURSE OUTCOMES:

- To learn the basic functioning of UNIX operating systems and shell programming
- Outline of buffers and kernel representation inode.
- Analyse the system calls &implementation of system.
- Apply the concepts of processes,inter processes communication
- Make use of Memory management in a Unix system.

UNIT I INTRODUCTION 9

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

UNIT II FILE STRUCTURE 9

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

UNIT III SYSTEM CALLS FOR FILE SYSTEM 9

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

UNIT IV PROCESS MANAGEMENT 9

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

UNIT V MEMORY MANAGEMENT 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. MauriceJ.Bach,"The Design of the Unix Operating System" Pearson Education, 2002.

REFERENCES

1 Uresh Vahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.
2 John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.
3 Daniel P. Bovet & Marco Cesati, “Understanding the Linux Kernel”, O’REILLY, Shroff Publishers &Distributors Pvt. Ltd, 2000.
4 M. Beck et al, “Linux Kernel Programming”, Pearson Education Asia, 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated Pos
		a	b	c	d	e	f	g	h	i	j	k	l	
1	To learn the basic functioning of UNIX operating systems and shell programming	M	H											a, b, d.
2	Outline of buffers and kernel representation inode.	M	M		L									
3	Analyse the system calls &implementation of system.	M	M		M									
4	Apply the concepts of processes, inter processes communication	H	H		M									
5	Make use of Memory management in a Unix system.	M			M									

L – Low, M - Medium, H –High.

12CS6B **ADVANCED JAVA PROGRAMMING** **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS54 – Programming with Java

AIM

To enable the students to design and develop enterprise strength distributed and multi-tier applications – Using Java Technology.

COURSE OBJECTIVES

- To learn advanced Java programming concepts like interface, threads, Swings etc
- To develop network programs in Java
- To understand Concepts needed for distributed and multi-tier applications
- To understand issues in enterprise applications development.

COURSE OUTCOMES:

- Make use of advanced java programming concepts.
- Solve the network programming using Sockets in java.
- Construct distributed applications using RMI.
- Design multitier server side application programs.
- Develop enterprise applications using java.

UNIT I **JAVA FUNDAMENTALS** **9**

Java I/O streaming–filter and pipe streams–Byte Code interpretation-Threading–Swing.

UNIT II **NETWORK PROGRAMMING IN JAVA** **9**

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

UNIT III **APPLICATIONS IN DISTRIBUTED ENVIRONMENT** **9**

Remote method Invocation – activation models – RMI custom sockets – Object Serialization – RMI – IIOP implementation – CORBA – Introduction – IDL technology – Naming Services – JAR file creation.

UNIT IV **MULTI-TIER APPLICATION DEVELOPMENT** **9**

Server side programming – servlets – Java Server Pages - Applet to Applet communication – applet to Servlet communication – JDBC – Applications on databases – Multimedia streaming applications – Java Media Framework.

UNIT V **ENTERPRISE APPLICATIONS** **9**

Server Side Component Architecture – Introduction to J2EE – Session Beans – Entity Beans – Persistent Entity Beans .

TOTAL: 45 PERIODS

TEXT BOOKS

1. Elliotte Rusty Harold, “Java Network Programming”, O’Reilly publishers, 2000 (UNIT II)
2. Ed Roman, “Mastering Enterprise Java Beans”, John Wiley & Sons Inc., 1999. (UNIT III and UNIT V).
3. Hortsmann & Cornell, “Core Java 2 Advanced Features, VOL II”, Pearson Education, 2002. (UNIT I and UNIT IV).

REFERENCES

1. Web reference: http://java.sun.com.
2. Patrick Naughton, “COMPLETE REFERENCE: JAVA2”, Tata McGraw-Hill, 2003.
3. Rajkumar Buyya, S.Thamarai Selvi, Xingchen Chu, “Object-Oriented Programming with JAVA: Essentials and Applications”, Tata McGraw Hill, 2009.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of advanced java programming concepts.	H	M											a, b, c, d, e, i.
2	Solve the network programming using Sockets in java.	M	H		M									
3	Construct distributed applications using RMI.	M	M		L	M								
4	Design multitier server side application programs.	H	M	L	L	M				L				
5	Develop enterprise applications using java.	L	M	M		M				L				

L – Low, M - Medium, H –High.

12CS6C DISTRIBUTED AND GRID SYSTEMS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS42 – Operating Systems

AIM

This course aims to gain a knowledge in concepts of distributed and grid computing.

COURSE OBJECTIVES

- To appraise advanced software technologies and principles for large scale distributed systems such as grid computing systems;
- To learn about middleware technologies and Globus Toolkit.
- To examine recent developments in distributed and grid systems.
- To understand the concepts of Grid security**.**

COURSE OUTCOMES:

- Make use of open grid service architecture.
- Work with middleware technologies.
- Create grid system models.
- Apply the concepts of grid security.
- Evaluate security risks in grid computing in order to establish security.

UNIT I INTRODUCTION 9

Introduction – Overview of Distributed and Grid Computing –Examples and Scope- Review of Web Services-OGSA-WSRF.

UNIT II MIDDLE WARE TECHNOLOGIES 9

Middle Ware Technologies -IPC-RPC, RMI and CORBA - OGSI .Net middleware Solutions-Globus Toolkit and gLite - Architecture, Components and Features.

UNIT III GRID SYSTEM MODELS 9

Distributed System Models-Architectural-Fundamental-Grid Architecture with the Web Devices Architecture-Globus GT 3 Toolkit -Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems-Grid ICE – JAMM –MDS.

UNIT IV DISTRIBUTED FILE SYSTEM 9

Distributed File Systems-Introduction-File service architecture- Name Services-Introduction Name Services and the Domain Name System-Directory Services- OGSA Basic Services-Data Management-Categories and Origins of Structured Data-Data Management Challenges-Architectural Approaches-Collective Data Management Services-Federation Services.

UNIT V GRID SECURITY AND OTHER ISSUES 9

Grid Security-A Brief Security Primer-PKI-X509 Certificates-Grid Security-Design and implementation issues in Distributed Computing and Grid Computing.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons,2005.
2. George Coulouris, Jean Dollimore, Tim Kindberg, , "Distributed Systems: Concepts and Design",4th Edition, Pearson Education, 2005.

REFERENCES

1. Ahmar Abbas, “Grid Computing: A Practical Guide to technology and Applications”, Charles River media 2003.

2. Joshy Joseph & Craig Fellenstein, "Grid Computing", PHI, PTR-2003.
3. A. S. Tanenbaum and M. V. Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Prentice Hall, 2006.
4. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.
5. Mukesh Singhal, "Advanced Concepts In Operating Systems", McGrawHill Series in Computer Science, 1994.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/ Seminar/Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of open grid service architecture.	M	H		M									a, b, d, e.
2	Work with middleware technologies.	L	M		M	L								
3	Create grid system models.	M	L		H	M								
4	Apply the concepts of grid security.	M	M		M									
5	Evaluate security risks in grid computing in order to establish security.	H	M		M									

L – Low, M - Medium, H –High.

12CS6D ADVANCED OPERATING SYSTEMS **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS42 – Operating Systems

AIM

To understand the principles in the design of modern operating systems, distributed and multiprocessor operating systems.

COURSE OBJECTIVES:

- To get a comprehensive knowledge of the architecture of distributed systems.
- To understand the deadlock and shared memory issues and their solutions in distributed environments.
- To know the security issues and protection mechanisms for distributed environments.
- To get a knowledge of multiprocessor and database operating systems.

COURSE OUTCOMES:

- Brief the various fundamental concepts of distributed Operating Systems.
- Apply various algorithms for distributed mutual exclusion.
- Manage the resources in distributed environment.
- Aware of failure recovery and fault tolerance in distributed database systems.
- Make use of multiprocessor and database operating systems.

UNIT I INTRODUCTION **9**

Architectures of Distributed Systems - System Architecture types - issues in distributed operating systems - communication networks – communication primitives. Theoretical Foundations - inherent limitations of a distributed system – lamp ports logical clocks – vector clocks – casual ordering of messages – global state – cuts of a distributed computation – termination detection. Distributed Mutual Exclusion – introduction – Non-Token Based Algorithms – Lamport's Algorithm - Token-Based
Algorithms – Suzuki-Kasami's Broadcast Algorithm.

UNIT II DISTRIBUTED DEADLOCK DETECTION **9**

Distributed Deadlock Detection -Introduction - deadlock handling strategies in distributed systems – issues in deadlock detection and resolution – control organizations for distributed deadlock detection – centralized and distributed

deadlock detection algorithms –hierarchical deadlock detection algorithms. Agreement protocols – introduction-the system model, a classification of agreement problems, solutions to the Byzantine agreement problem, applications of agreement algorithms.

UNIT III DFS, DSM AND SCHEDULING 9

Distributed resource management: introduction-architecture – mechanism for building distributed file systems – design issues – log structured file systems. Distributed shared memory-Architecture– algorithms– memory coherence and protocols – design issues. Distributed Scheduling – introduction – issues – components – stability – load distributing algorithm

UNIT IV FAILURE RECOVERY AND FAULT TOLERANCE 9

Failure Recovery and Fault tolerance: introduction– basic concepts – classification of failures – backward and forward error recovery, backward error recovery- recovery in concurrent systems – consistent set of check points – synchronous and asynchronous check pointing and recovery – check pointing for distributed database systems- recovery in replicated distributed databases.

UNIT V DISTRIBUTED DATABASE OS AND CONCURRENCY CONTROL 9

Multiprocessor operating systems - system architectures – inter connection networks for multiprocessor systems – caching – hypercube architecture. Multiprocessor Operating System - structures, design issues- threads- process synchronization and scheduling. Database Operating systems :Introduction- requirements of a database operating system- Concurrency control : theoretical aspects – introduction, database systems – a concurrency control model of database systems- the problem of concurrency control – serializability theory - distributed database systems, concurrency control algorithms – introduction, basic synchronization primitives, lock based algorithms-timestamp based algorithms, optimistic algorithms – concurrency control algorithms.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Mukesh Singhal, Niranjan G.Shivaratri, "Advanced concepts in operating systems: Distributed, Database and multiprocessor operating systems", TMH, 2001.

REFERENCES

1 Andrew S.Tanenbaum, "Modern operating system", PHI, 2003.
2. Pradeep K.Sinha, "Distributed operating system-Concepts and design", PHI, 2003.
3. Andrew S.Tanenbaum, "Distributed operating system", Pearson education, 2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Brief the various fundamental concepts of distributed Operating Systems.	H	L		M								L	a, b, d, e, l.
2	Apply various algorithms for distributed mutual exclusion.	M	L		M	H								
3	Manage the resources in distributed environment.	H	M		H	L								
4	Aware of failure recovery and fault tolerance in distributed database systems.	M	H		M	H								
5	Make use of multiprocessor and database operating systems.	L	M		M									

L – Low, M - Medium, H –High.

12CS6E PARALLEL PROGRAMMING

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS45 – Computer Organization and Architecture

AIM

To study about parallelism, different software programming models and algorithms.

COURSE OBJECTIVES

- To study about parallelism models and methodologies
- To study about message passing models and standards.
- To study about shared programming models
- To study about various parallel algorithms.

COURSE OUTCOMES:

- Analyse the efficiency of a parallel processing system.
- Make use of the terms to measures the performance of parallel computers and associated algorithms.
- Analyse language design issues related to parallel programming
- Use Open MP and MPI
- Create medium-scale parallel programs

UNIT I PARALLEL PROGRAMMING 9

Introduction to parallel programming – data parallelism – functional parallelism – pipelining – Flynn's taxonomy – parallel algorithm design – task/channel model – Foster's design methodology – case studies: boundary value problem – finding the maximum – n-body problem – Speedup and efficiency – Amdahl's law – Gustafson- Barsis's Law – Karp-Flatt Metric – Isoefficiency metric.

UNIT II MESSAGE-PASSING PROGRAMMING 9

The message-passing model – the message-passing interface – MPI standard – basic concepts of MPI: MPI_Init, MPI_Comm_size, MPI_Comm_rank, MPI_Send, MPI_Recv, MPI_Finalize – timing the MPI programs: MPI_Wtime, MPI_Wtick – collective communication: MPI_Reduce, MPI_Barrier, MPI_Bcast, MPI_Gather, MPI_Scatter – case studies: the sieve of Eratosthenes, Floyd's algorithm, Matrix-vector multiplication.

UNIT III SHARED-MEMORY PROGRAMMING 9

Shared-memory model – OpenMP standard – parallel *for* loops – parallel *for* pragma – private variables – critical sections – reductions – parallel loop optimizations – general data parallelism – functional parallelism – case studies: the sieve of Eratosthenes, Floyd's algorithm, matrix-vector multiplication – distributed shared-memory programming – DSM primitives.

UNIT IV PARALLEL ALGORITHMS – I 9

Monte Carlo methods – parallel random number generators – random number distributions – case studies – Matrix multiplication – row wise block – stripped algorithm – Cannon's algorithm – solving linear systems – back substitution – Gaussian elimination – iterative methods – conjugate gradient method.

UNIT V PARALLEL ALGORITHMS – II 9

Sorting algorithms – quick sort – parallel quick sort – hyper quick sort – sorting by regular sampling – Fast Fourier transform – combinatorial search – divide and conquer – parallel backtrack search – parallel branch and bound – parallel alpha-beta search.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Michael J. Quinn, "Parallel Programming in C with MPI and OpenMP", Tata McGraw-Hill Publishing Company Ltd., 2003.

REFERENCES

1 B. Wilkinson and M. Allen, "Parallel Programming – Techniques and applications using networked workstations and parallel computers", Second Edition, Pearson Education, 2005.
2. M. J. Quinn, "Parallel Computing – Theory and Practice", Second Edition, Tata McGraw-Hill Publishing Company Ltd., 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Analyse the efficiency of a parallel processing system.		H		M									a, b, d, e.
2	Make use of the terms to measures the performance of parallel computers and associated algorithms.	H			M									
3	Analyse language design issues related to parallel programming		H		M									
4	Use Open MP and MPI		L		M	H								
5	Create medium-scale parallel programs		M		M									

L – Low, M - Medium, H –High.

12MG72 RESOURCE MANAGEMENT TECHNIQUES **L 3 T 0 P 0 C 3**

CATEGORY: Elective

PREREQUISITE: Nil

AIM

To pioneer the knowledge of various resource management techniques.

COURSE OBJECTIVES

- To understand the concepts of linear programming and dual problem.
- To gain the knowledge of integer programming and multistage programming.
- To be able to gather ideas over classical optimization theory and object scheduling.

COURSE OUTCOMES:

- Usage of resource management techniques /Management Science in managerial problem solving techniques.
- Evaluate dual problem and formulate mathematical model for specific managerial situations
- Applying suitable algorithms for solving the managerial decision making
- Analyze various methods in management techniques and problems.
- Develop and categorize program evaluation review techniques

UNIT I LINEAR PROGRAMMING 9

Principal components of decision problem – Modeling phases – LP Formulation and graphic solution – Resource allocation problems – Simplex method – Sensitivity analysis.

UNIT II DUALITY AND NETWORKS 9

Definition of dual problem – Primal – Dual relationships – Dual simplex methods – Post optimality analysis – Transportation and assignment model shortest route problem.

UNIT III INTEGER PROGRAMMING 9

Cutting plan algorithm – Branch and bound methods, Multistage (Dynamic) programming.

UNIT IV CLASSICAL OPTIMISATION THEORY 9

Unconstrained external problems, Newton – Ralphson method – Equality constraints – Jacobean methods – Lagrangian method – Kuhn – Tucker conditions – Simple problems.

UNIT V OBJECT SCHEDULING 9

Network diagram representation – Critical path method – Time charts and resource leveling – PERT.

TOTAL: 45 PERIODS

REFERENCES

1 Anderson ‘Quantitative Methods for Business’,8th Edition,Thomson Learning,2002.
2 Winston ‘Operation Research’, Thomson Learning, 2003.
3. H.A.Taha, ‘Operation Research’, Prentice Hall of India, 2002.
4. Vohra, ‘Quantitative Techniques in Management’, Tata McGraw Hill, 2002.
5. Anand Sarma, ‘Operation Research’, Himalaya Publishing House, 2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Usage of resource management techniques /Management Science in managerial problem solving techniques.	M						M		L		M		a, c, e, g, i, k.
2	Evaluate dual problem and formulate mathematical model for specific managerial situations	H				L						M		
3	Applying suitable algorithms for solving the managerial decision making	M								M		M		
4	Analyze various methods in management techniques and problems.	L				H				L		M		
5	Develop and categorize program evaluation review techniques	H		M						H		L		

L – Low, M - Medium, H –High.

12IT71 SERVICE ORIENTED ARCHITECTURE **L T P C**
3 0 0 3

CATEGORY: Elective Nil

PREREQUISITE:

AIM

To understand the concepts needed to have an effective working knowledge of SOA methodologies, and SOA systems design.

COURSE OBJECTIVES:

- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To learn technology underlying the service design
- To learn advanced concepts such as service composition, orchestration and Choreography.
- To know about various WS-* specification standards.

COURSE OUTCOMES:

- Apply the concepts of Service-Oriented Architecture.
- Classify the approaches to compose services
- Design, develop and test Web services
- Evaluate Web services architectures.
- Conceptually model Web services and formulate specifications of them in the Resource Description Framework (RDF)

UNIT I INTRODUCTION **9**

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

UNIT II WEB SERVICES **9**

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

UNIT III SERVICE ORIENTED ANALYSIS AND DESIGN **9**

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

UNIT IV SOA PLATFORMS **9**

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

UNIT V WEB SERVICE ISSUES 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. Thomas Erl**, "**Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

REFERENCES

1 Thomas Erl, "SOA Principles of Service Design "(The Prentice Hall Service- Oriented Computing Series from Thomas Erl), 2005.
2. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education, 2005.
4. Dan Woods and Thomas Mattern, "Enterprise SOA Designing IT for Business Innovation" O'REILLY, First Edition, 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply the concepts of Service-Oriented Architecture.	H	L		L									a, b, d, e, g, i.
2	Classify the approaches to compose services		H		M	M								
3	Design, develop and test Web services		H		L	M								
4	Evaluate Web services architectures.		H		L			M						
5	Conceptually model Web services and formulate specifications of them in the Resource Description Framework (RDF)		H		M					L				

L – Low, M - Medium, H –High.

12CS7A DATA WAREHOUSING AND DATA MINING

L	T	P	C
3	0	0	3

CATEGORY: Elective

12CS44 – Database Management Systems

PREREQUISITE:

AIM

To serve as an introductory course to under graduate students with an emphasis on the design aspects of Data Mining and Data Warehousing.

COURSE OBJECTIVES:

- To introduce the concept of data mining with in detail coverage of basic tasks, metrics, issues, and implication.
- To introduce core topics like classification, clustering and association rules are exhaustively dealt with.
- To introduce the concept of data warehousing with special emphasis on architecture and design.

COURSE OUTCOMES:

- Build data warehouses for different data types and applications.
- Design a data warehouse to support and provide business solutions.

- Analyze the features and applications of data warehouses.
- Apply knowledge discovery processes and associated algorithms to large business datasets.
- Make use of various data mining techniques.

UNIT I DATA WAREHOUSING 10

Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

UNIT II BUSINESS ANALYSIS 8

Reporting and Query tools and Applications – Tool Categories – The Need for Applications – Cognos Impromptu – Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multirelational OLAP – Categories of Tools – OLAP Tools and the Internet.

UNIT III DATA MINING 8

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse – Issues – Data
preprocessing

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION 11

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods –Prediction.

UNIT V CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING 8

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – Kmeans – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Clustering High Dimensional Data - Constraint – Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Alex Berson and Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Second Edition, Elsevier, 2007.

REFERENCES

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, “ Introduction To Data Mining”, Person Education, 2007.
2. K.P. Soman, Shyam Diwakar and V. Ajay “, Insight into Data mining Theory and Practice”, Easter Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “ Introduction to Data Mining with Case Studies”, Easter Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wile-Interscience, 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess. Tests (60%)	Assign/ Seminar/ Miniproj (30%)	Attendance (10%)		
	12.5	10	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Build data warehouses for different data types and applications.	M	H		L									a, b, d, e, k.
2	Design a data warehouse to support and provide business solutions.	M	H		L	M								
3	Analyze the features and applications of data warehouses.		M		M									
4	Apply knowledge discovery processes and associated algorithms to large business datasets.		M		H	M						M		
5	Make use of various data mining techniques.	H	H		M	M								

L – Low, M - Medium, H –High.

12CS7B **SOFTWARE TESTING** **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS64 – OOSE

AIM

To make students understand the principles of software testing.

COURSE OBJECTIVES:

- To explain the basics of software testing
- To highlight the strategies for software testing
- To stress the need and conduct of testing levels
- To identify the issues in testing management
- To bring out the ways and means of controlling and monitoring testing activity.

COURSE OUTCOMES:

- Recite Software testing principles and the role of software tester.
- Design test case strategies for any real world applications.
- Conduct software testing at different levels.
- Manage and Report test plans.
- Continuously control and monitor the software testing process.

UNIT I INTRODUCTION **9**

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

UNIT II TEST CASE DESIGN **9**

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing -–– Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause effect graphing – error guessing - compatibility testing – user documentation testing – domain testing Using White–Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria.

UNIT III LEVELS OF TESTING **9**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination -System Testing – types of system testing - Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing - Alpha – Beta Tests – testing OO systems – usability and accessibility testing.

UNIT IV TEST MANAGEMENT **9**

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management

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

UNIT V CONTROLLING AND MONITORING 9

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

REFERENCES

1. Boris Beizer, "Software Testing Techniques", Second Edition, Dreamtech, 2003
2. Elfriede Dustin, "Effective Software Testing",1st Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recite Software testing principles and the role of software tester.	M	L		L									a, b, d, e.
2	Design test case strategies for any real world applications.	L	M		M									
3	Conduct software testing at different levels.		M		M	M								
4	Manage and Report test plans.		L		M	L								
5	Continuously control and monitor the software testing process.	L	M		M									

L – Low, M - Medium, H –High.

12CS7C NATURAL LANGUAGE PROCESSING

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS61 – System Software & Compiler Design, 12CS54 - TOC

AIM

The aim is to expose the students to the basic principles of language processing and typical applications of natural language processing systems.

COURSE OBJECTIVES:

- To provide a general introduction including the use of state automata for language processing
- To provide the fundamentals of syntax including a basic parse
- To explain advanced feature like feature structures and realistic parsing methodologies
- To explain basic concepts of remotes processing
- To give details about a typical natural language processing applications

COURSE OUTCOMES:

- Relate relevant linguistic concept.
- Describe methods for morphological analysis and tagging of natural language
- Identify the context-free rules for constructing context free grammars.
- Analyze the syntax and semantics of the language
- Explain how to write programs that process language.
- Formulate NLP tasks as learning and inference tasks.

UNIT I FINITE STATE AUTOMATA 9

Introduction – Models -and Algorithms - The Turing Test -Regular Expressions Basic Regular Expression Patterns -Finite State Automata -Regular Languages and FSAs – Morphology -Inflectional Morphology - Derivational Morphology -Finite-State Morphological Parsing - Combining an FST Lexicon and Rules -Porter Stemmer.

UNIT II TAGGING 9

N-grams Models of Syntax - Counting Words - Unsmoothed N-grams – Smoothing- Backoff - Deleted Interpolation – Entropy - English Word Classes - Tagsets for English - Part of Speech Tagging -Rule-Based Part of Speech Tagging - Stochastic Part of Speech Tagging - Transformation-Based Tagging.

UNIT III CONTEXT FREE GRAMMAR(CFG) 9

Context Free Grammars for English Syntax- Context-Free Rules and Trees - Sentence- Level Constructions – Agreement – Sub Categorization – Parsing – Top-down – Earley Parsing -Feature Structures - Probabilistic Context-Free Grammars.

UNIT IV SYNTAX ANALYZER 9

Representing Meaning - Meaning Structure of Language - First Order Predicate Calculus - Representing Linguistically Relevant Concepts -Syntax-Driven Semantic Analysis - Semantic Attachments - Syntax-Driven Analyzer - Robust Analysis - Lexemes and Their Senses - Internal Structure - Word Sense Disambiguation - Information Retrieval.

UNIT V LANGUAGE GENERATION 9

Discourse -Reference Resolution - Text Coherence -Discourse Structure - Dialog and Conversational Agents - Dialog Acts – Interpretation – Coherence –Conversational Agents - Language Generation – Architecture - Surface Realizations – Discourse Planning – Machine Translation -Transfer Metaphor – Interlingua – Statistical Approaches.

TOTAL: 45 PERIODS

TEXT BOOKS

1. D. Jurafsky and J. Martin "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition",
2. C. Manning and H. Schutze, "Foundations of Statistical Natural Language Processing".

REFERENCES

1. James Allen. "Natural Language Understanding", Addison Wesley, 1994.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Relate relevant linguistic concept.	H	H		M									a, b, d, e, g, l.
2	Describe methods for morphological analysis and tagging of natural language	H	H											
3	Identify the context-free rules for constructing context free grammars.	H	H		H									

4	Analyze the syntax and semantics of the language	M	H		H	M							
5	Explain how to write programs that process language.	M	M			H		H					
6	Formulate NLP tasks as learning and inference tasks.	L	L		M	H						H	

L – Low, M - Medium, H –High.

12CS7D **USER INTERFACE DESIGN** **L T P C**
3 0 0 3

CATEGORY: Elective

PREREQUISITE: 12CS52 – Computer Networks

AIM

To understand that User Interface Design is as important as Functionality Design to study the basic principles User-Centered Design.

COURSE OBJECTIVES:

- To study the basic characteristics of graphics and web interfaces
- To study the basics of Human Computer Interaction
- To study the basics of WIMP interfaces
- To study the multimedia interfaces for the web

COURSE OUTCOMES:

- Infer the Interaction between the human and computer components
- Apply design principles, guidelines and heuristics to create a user-interaction strategy that solves a real-world problem.
- Design a usable user-interface for a given set of requirements.
- Illustrate the concepts and strategies for making design decisions for the future user interface designer.
- Apply techniques applicable to the design of Web User Interfaces

UNIT I INTRODUCTION 9

Human–Computer Interface – Characteristics Of Graphics Interface –Direct Manipulation Graphical System – Web User Interface –Popularity –Characteristic & Principles.

UNIT II HUMAN COMPUTER INTERACTION 9

User Interface Design Process – Obstacles –Usability –Human Characteristics In Design – Human Interaction Speed –Business Functions –Requirement Analysis – Direct – Indirect Methods – Basic Business Functions – Design Standards – System Timings – Human Consideration In Screen Design – Structures Of Menus – Functions Of Menus – Contents Of Menu– Formatting – Phrasing The Menu – Selecting Menu Choice– Navigating Menus – Graphical Menus.

UNIT III WINDOWS 9

Characteristics– Components– Presentation Styles– Types– Managements– Organizations– Operations– Web Systems– Device– Based Controls Characteristics– Screen – Based Controls – Operate Control – Text Boxes– Selection Control– Combination Control– Custom Control– Presentation Control.

UNIT IV MULTIMEDIA 9

Text For Web Pages – Effective Feedback– Guidance & Assistance– Internationalization– Accesssibility– Icons– Image– Multimedia – Coloring.

UNIT V WINDOWS LAYOUT– TEST 9

Prototypes – Kinds Of Tests – Retest – Information Search – Visualization – Hypermedia – WWW– Software Tools.

TOTAL: 45 PERIODS

TEXT BOOKS

1 Wilbent. O. Galitz ,"The Essential Guide To User Interface Design", John Wiley & Sons, 2001.
2. Ben Sheiderman, "Design The User Interface", Pearson Education, 1998.

REFERENCES

1 Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Infer the Interaction between the human and computer components	H												a, b, d, e.
2	Apply design principles, guidelines and heuristics to create a user-interaction strategy that solves a real-world problem.	M	H		M									
3	Design a usable user-interface for a given set of requirements.	M	M		M	M								
4	Illustrate the concepts and strategies for making design decisions for the future user interface designer.	M	M		L									
5	Apply techniques applicable to the design of Web User Interfaces.	M	M		M	M								

L – Low, M - Medium, H –High.

12CS7E **SOFT COMPUTING** **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: Nil

AIM

To give an overall understanding on the theories that is available to solve hard real world problems.

COURSE OBJECTIVES:

- To give the students an overall knowledge of soft computing theories and fundamentals.
- To give an understanding on the fundamentals of non-traditional technologies and approaches to solving hard real-world problems.
- Fundamentals of artificial neural networks, fuzzy sets and fuzzy logic and genetic algorithms.
- Use of ANN, Fuzzy sets to solve hard real-world problems.
- To given an overview of Genetic algorithms and machine learning techniques to solving hard real-world problems.
- To study about the applications of these areas.

COURSE OUTCOMES:

- Apply computational and Artificial Intelligence concepts in various applications.
- Make use of various learning methods.
- Design neural networks for applications.
- Choose suitable neural networks for the real computing problems.
- Work with fuzzy set theory and neuro fuzzy models.

UNIT I ARTIFICIAL INTERLLIGENCE 9

Introduction – Searching Techniques - first-order logic – forward reasoning – backward reasoning – Planning with step–space search – partial – order planning – planning graphs – planning and acting in the real world.

UNIT II UNCERTAIN KNOWLEDGE AND LEARNING 9

Uncertainty – review of probability – Probabilistic reasoning – Bayesian Networks – Inferences in Bayesian networks – Learning from observation – Inductive Learning – Decision trees – Explanation based learning – Statistical Learning methods – Reinforcement Learning.

UNIT III NEURAL NETWORKS 9

Introduction to ANS – Adaline – Back propagation network – Hopfield network – Boltzman Machine – Self organizing maps.

UNIT IV FUZZY LOGIC 9

Fuzzy sets – Fuzzy rules and fuzzy reasoning – Fuzzy inference system – Mamdani fuzzy model – Sugeno fuzzy model –Tsukamoto fuzzy model.

UNIT V NEURO FUZZY 9

Adaptive Neuro fuzzy inference system – Coactive nuero-fuzzy modeling – Classification and regression trees – Data clustering algorithm – Rule based structure – Neuro–fuzzy control I – Neuro–fuzzy control II - Fuzzy decision making.

TOTAL: 45 PERIODS

REFERENCES

1. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
4. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
5. Stuart J. Russel, Peter Norvig, "Artificial Intelligence A modern Aprroach", 2nd Edition Pearon Education, 2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar / Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply computational and Artificial Intelligence concepts in various applications.	H	H		H			H						a, b, d, e, g.
2	Make use of various learning methods.	M	M		M	M								
3	Design neural networks for applications.	M	L		H	M		M						
4	Choose suitable neural networks for the real computing problems.	M	M		M			M						
5	Work with fuzzy set theory and neuro fuzzy models.	M				H		L						

L – Low, M - Medium, H –High.

12CS7F REAL TIME SYSTEMS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS42 – Operating Systems

AIM

To study the adaptation of architecture and development methods to support real-time systems.

COURSE OBJECTIVES:

- To characterize the problem space real-time systems address and what are the specialized requirements of real-time systems
- To describe the solutions for standard problems of real-time systems

- To characterize the solution space real-time systems employ and how these
- solutions tend to differ from other systems
- To describe and justify adaptations to the development process to support real-time systems
- To understand the evaluation of real time systems.

COURSE OUTCOMES:

- Learn the differences between general purpose and real-time systems.
- Make use of scheduling techniques for real-time application.
- Work with real time Databases.
- Design a program for real-time applications to run in a realistic operating environment.
- Apply synchronization Techniques for real time system.

UNIT I INTRODUCTION 9

Introduction – Issues in Real Time Computing, Structure of a Real Time System. Task Classes, Performance Measures for Real Time Systems, Estimating Program Run times. Task Assignment and Scheduling - Classical Uniprocessor scheduling algorithms, UniProcessor scheduling of IRIS Tasks, Task Assignment, Mode Changes, and Fault Tolerant Scheduling.

UNIT II PROGRAMMING LANGUAGES AND TOOLS 9

Programming Language and Tools – Desired Language characteristics, Data Typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run-time (Exception) Error handling, Overloading and Generics, Multitasking, Low Level programming, Task scheduling, Timing Specifications, Programming Environments, Run-time Support.

UNIT III REAL TIME DATABASES 9

Real time Databases - Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithms, Two-phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time systems.

UNIT IV COMMUNICATION 9

Real-Time Communication - Communications Media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques - Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure handling.

UNIT V EVALUATION TECHNIQUES 9

Reliability Evaluation Techniques - Obtaining Parameter Values, Reliability Models for Hardware Redundancy, Software Error models. Clock Synchronization - Clock, A Nonfault-Tolerant Synchronization Algorithm, Impact of Faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in Software.

TOTAL: 45 PERIODS

TEXT BOOKS

1. C.M. Krishna, Kang G. Shin, “Real-Time Systems”, McGraw-Hill International Editions, 1997.

REFERENCES

1. Stuart Bennett, “Real Time Computer Control-An Introduction”, Second edition Prentice Hall PTR, 1994.
2. Peter D. Lawrence, “Real time Micro Computer System Design – An Introduction”, McGraw Hill, 1988.
3. S.T. Allworth and R.N. Zobel, “Introduction to real time software design”, Macmillan, II Edition, 1987.
4. R.J.A Buhur, D.L. Bailey, “ An Introduction to Real-Time Systems”, Prentice-Hall International, 1999.
5. Philip.A.Laplante “Real Time System Design and Analysis” PHI, III Edition, Apr 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Learn the differences between general purpose and real-time systems.	H	L		M									a, b, d, e.
2	Make use of scheduling techniques for real-time application.	M	L		M									
3	Work with real time Databases.		L		H									
4	Design a program for real-time applications to run in a realistic operating environment.	L	M		H	M								
5	Apply synchronization Techniques for real time system.	L	M		H	M								

L – Low, M - Medium, H –High.

12MG71 TOTAL QUALITY MANAGEMENT **L T P C**
3 0 0 3

CATEGORY: Elective

PREREQUISITE: 12MG51 – Engineering Economics and Financial Accounting

AIM

This course aims to provide the student with the underlying principles and techniques of Total Quality Management (TQM) with emphasis on their application to technical organizations.

COURSE OBJECTIVES:

- To develop a working knowledge of the best practices in Quality and Process Management.
- To view quality from a variety of functional perspectives.
- To gain the better understanding of quality tools utilized in service and international environment.
- To discuss the importance of "benchmarking", as a means of identifying the choice of markets.

COURSE OUTCOMES:

- Implement quality management philosophies, applications of quality tools & techniques in both manufacturing & service industry
- Develop analytical skills for investigating and analyzing quality management issues in the industry and suggest implement able solutions to those.
- Design principles and concepts inherent in a Total Quality Management (TQM) approach to managing a manufacturing or service organization
- Assess exactly where an organization stands on quality management with respect to the ISO 9000 quality management standard and ISO-14000 Envt. Mgmt Std.
- Develop a strategy for implementing TQM in an organization.
- Lead a team with good leadership traits and good interpersonal relationship with the members in other functional teams.
- Achieve world-class status in manufacturing and service through TQM.

UNIT I INTRODUCTION **9**

Introduction - Need for quality - Evolution of quality - Definition of quality – Dimensions of manufacturing and service quality - Basic concepts of TQM – Definition of TQM – TQM Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II TQM PRINCIPLES **9**

Leadership – Strategic quality planning, Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I **9**

The seven traditional tools of quality – New management tools–Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT– Bench marking–Reason to bench mark, Bench marking process–FMEA–Stages, Types.

UNIT IV TQM TOOLS & TECHNIQUES II **9**

Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, im-

provement needs – Cost of Quality – Performance measures.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000- ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing- QS 9000 – ISO 14000 – Concepts, Requirements and Benefits – Case studies: TQM implementation in manufacturing & service sectors including IT.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Dale H.Besterfiled, et at., "Total Quality Management", Pearson Education Asia, 3rd Edition, Indian Reprint (2006).

REFERENCES

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality",6th Edition, South-Western (Thomson Learning), 2005.
2. Oakland, J.S., "TQM – Text with Cases", Butterworth – Heinemann Ltd., Oxford, 3rd Edition, 2003.
3. Suganthi,L and Anand Samuel, "Total Quality Management", Prentice Hall, 2006.
4. Janakiraman, B and Gopal, R.K, "Total Quality Management – Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Implement quality management philosophies, applications of quality tools & techniques in both manufacturing & service industry	M	M	L	L	M		L		M	M	H		a, b, c, d, e, f, g, h, i, j, k, l.
2	Develop analytical skills for investigating and analyzing quality management issues in the industry and suggest implement able solutions to those.	M				L								
3	Design principles and concepts inherent in a Total Quality Management (TQM) approach to managing a manufacturing or service organization			H	L	M		M		L	H			
4	Assess exactly where an organization stands on quality management with respect to the ISO 9000 quality management standard and ISO-14000 Envt. Mgmt Std.			M					H					
5	Develop a strategy for implementing TQM in an organization.		H		M		H		M		L			
6	Lead a team with good leadership traits and good interpersonal relationship with the members in other functional teams.				H		M	M		H	L			
7	Achieve world-class status in manufacturing and service through TQM.										H	H	M	

L – Low, M - Medium, H –High.

12IT72 KNOWLEDGE MANAGEMENT **L T P C**
3 0 0 3

CATEGORY: Elective

PREREQUISITE: Nil

AIM

This course focus to give a solid foundation covering the major problems, challenges, concepts, and techniques dealing with the organization and management of knowledge with the help of computers.

COURSE OBJECTIVES:

- To understand the fundamental concepts in the study of knowledge and its creation, acquisition, representation, dissemination, use and re-use, and management.
- To analyze the role and use of knowledge in organizations and institutions, and the typical obstacles that KM aims to overcome.
- To focus on further study in knowledge generation, engineering, and transfer, and in the representation, organization, and exchange of knowledge.
- To evaluate current trends in knowledge management and their manifestation in business and industry.

COURSE OUTCOMES:

- Recite the fundamental concepts of knowledge management.
- Depict the knowledge management system life cycle.
- Analyze various knowledge capturing techniques.
- Apply codification tools and testing procedures.
- Elucidate about knowledge transfer and sharing systems.

UNIT I KNOWLEDGE MANAGEMENT 9

KM Myths – KM Life Cycle – Understanding Knowledge – Knowledge, intelligence – Experience – Common Sense – Cognition and KM – Types of Knowledge – Expert Knowledge – Human Thinking and Learning.

UNIT II KNOWLEDGE MANAGEMENT SYSTEM LIFE CYCLE 9

Challenges in Building KM Systems – Conventional Vrs KM System Life Cycle (KMSLS) – Knowledge Creation and Knowledge Architecture – Nonaka's Model of Knowledge Creation and Transformation. Knowledge Architecture.

UNIT III CAPTURING KNOWLEDGE 9

Evaluating the Expert – Developing a Relationship with Experts – Fuzzy Reasoning and the Quality of Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol Analysis – Consensus Decision Making – Repertory Grid- Concept Mapping – Blackboarding.

UNIT IV KNOWLEDGE CODIFICATION 9

Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer's Skill Sets – System Testing and Deployment – Knowledge Testing – Approaches to Logical Testing, User Acceptance Testing – KM System Deployment Issues – User Training – Post implementation.

UNIT V KNOWLEDGE TRANSFER AND SHARING 9

Transfer Methods – Role of the Internet – Knowledge Transfer in e-world – KM System Tools – Neural Network – Association Rules – Classification Trees – Data Mining and Business Intelligence – Decision Making Architecture – Data Management – Knowledge Management Protocols – Managing Knowledge Workers.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Elias. M. Award & Hassan M. Ghaziri – "Knowledge Management" Pearson Education 2003.

REFERENCES

1. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt,
2. Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management",
3. Universities Press, 2001.
4. C.W. Holsapple, "Handbooks on Knowledge Management", International Handbooks on Information Systems, Vol 1 and 2, 2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recite the fundamental concepts of knowledge management.	H												a, b, d, e.
2	Depict the knowledge management system life cycle.	H	M											
3	Analyze various knowledge capturing techniques.	M	H		M	M								
4	Apply codification tools and testing procedures.	H	M			M								
5	Elucidate about knowledge transfer and sharing systems.	H												

L – Low, M - Medium, H –High.

12CS7G **WIRELESS NETWORKS** **L T P C**
3 0 0 3

CATEGORY: Elective

PREREQUISITE: 12CS52 – Computer Networks

AIM

This course aims is to provide knowledge with regard to the wireless and mobile network architectures, technologies and protocols.

COURSE OBJECTIVES:

- To learn the wireless Systems - terminology, types of systems, issues,
- To understand the IEEE802.11 standards, architecture and services.
- To gain knowledge in wireless Network layer and Wireless Transport Layer Issues
- To understand the WAP concepts.

COURSE OUTCOMES:

- Make use of simulation terminologies and their types.
- Create mathematical model using the principles of simulation and
- Compare the simulation of various modelling-Input/output.
- Evaluate the verification and validation of simulation model.
- Apply the simulation tools.

UNIT I WIRELESS COMMUNICATION 7

Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation - MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II WIRELESS LAN 9

IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop.

UNIT III MOBILE COMMUNICATION SYSTEMS 11

GSM-architecture-Location tracking and call setup- Mobility management- Handover- Security-GSM SMS – International roaming for GSM- call recording functions-subscriber and service data mgt –-Mobile Number portability -VoIP service for Mobile Networks – GPRS –Architecture-GPRS procedures-attach and detach procedures-PDP context procedure-combined RA/LA update procedures-Billing.

UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS 9

Mobile IP – Dynamic Host Configuration Protocol-Mobile Ad Hoc Routing Protocols– Multicast routing-TCP over Wireless Networks–Indirect TCP–Snooping TCP– Mobile TCP–Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective Retransmission–Transaction Oriented TCP-TCP over 2.5/3G wireless Networks

UNIT V APPLICATION LAYER 9

WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP user agent profile-caching model-wireless bearers for WAP - WML – WMLScripts – WTA – iMode – SyncML.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Jochen Schiller, “Mobile Communications”, Second Edition, Pearson Education, 2003.
2. William Stallings, “Wireless Communications and Networks”, Pearson Education, 2002.

REFERENCES

1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First 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", 1st Edition,Pearson Education, 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of simulation terminologies and their types.	H	M		L	H								a, b, d, e.
2	Create mathematical model using the principles of simulation and		M		M									
3	Compare the simulation of various modelling-Input/output.		L		M	M								
4	Evaluate the verification and validation of simulation model.		M		M	M								
5	Apply the simulation tools.	H	M		L	H								

L – Low, M - Medium, H –High.

12CS7H C# AND .NET FRAMEWORK **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS33 – OOPs
AIM
To provide an introduction to the .NET framework and enable the student to program in C#.

COURSE OBJECTIVES:
- To study basic and advanced features of the C# language.
- To create form based and web based applications.
- To study the internals of the .NET framework.

COURSE OUTCOMES:
- Make use of basic C# constructor, delegates and events.
- Design and analyze the use of language interfaces, inheritance familiar with .NET collections (sets, lists, dictionaries).
- Develop code and test small C# console and GUI applications.
- Building stand-alone applications in the .NET framework using C#.
- Create window based application programming with backend databases.

UNIT I OOPS CONCEPTS **9**
Review of OOP Concepts - Overview of .NET Framework - Basic Elements of C# -
Program Structure and simple Input and Output Operations – Operators and Expressions – Statements – Arrays and Structures.

UNIT II OVERLOADING **9**
Inheritance - Namespace – Polymorphism – Interface and Overloading – Multiple Inheritance – Property – Indexes – Delegates – Publish/Subscribe Design Patterns- Operator Overloading-Method Overloading

UNIT III C# CONCEPTS 9

C# Concepts for creating Data Structures - File Operation – File Management systems – Stream Oriented Operations- Multitasking – Multithreading – Thread Operation – Synchronization.

UNIT IV XML DATA AND CONTROLS 9

Working with XML – Techniques for Reading and Writing XML Data - Using XPath and Search XML - ADO.NET Architecture – ADO.NET Connected and Disconnected Models – XML and ADO.NET – Simple and Complex Data Binding– Data Grid View Class.

UNIT V BUILDING WEB SERVICES 9

Application Domains – Remoting – Leasing and Sponsorship - .NET Coding Design Guidelines –Assemblies – Security – Application Development – Web Services - Building an XML Web Service - Web Service Client – WSDL and SOAP – Web Service with Complex Data Types – Web Service Performance.

TOTAL: 45 PERIODS

TEXT BOOKS

1. S. Thamarai Selvi and R. Murugesan "A Textbook on C#", Pearson Education,2003.
2. Stephen C. Perry, "Core C# and .NET", Pearson Education,2006.

REFERENCES

1. Jesse Liberty, "Programming C#", Second Edition, O'Reilly Press, 2002.
2. Robinson et al, "Professional C#", Fifth Edition, Wrox Press, 2002.
3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw Hill, 2004.
4. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.
5. Thuan Thai and Hoang Q. Lam, ". NET Framework Essentials", Second Edition, O'Reilly, 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of basic C# constructor, delegates and events.	M	M		L	L								a, b, d, e, i.
2	Design and analyze the use of language interfaces, inheritance familiar with .NET collections (sets, lists, dictionaries).		H		H	M								
3	Develop code and test small C# console and GUI applications.	H	M		L	M				M				
4	Building stand-alone applications in the .NET framework using C#.		M		L	M								
5	Create window based application programming with backend databases.		M		L									

L – Low, M - Medium, H –High.

12CS7I SYSTEM MODELING AND SIMULATION

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS52 – Computer Networks

AIM

To understand the system, specify systems using natural models of computation, modeling techniques, prediction of behavior, and decision support.

COURSE OBJECTIVES:

- To attain generic learning outcomes and competences
- To understand the principles of simulation and create simulation model of various types.
- To evaluate the various mathematical models
- To learn the simulation tools and apply it.

COURSE OUTCOMES:

- Make use of simulation terminologies and their types.
- Create mathematical model using the principles of simulation and
- Compare the simulation of various modelling-Input/output.
- Evaluate the verification and validation of simulation model.
- Apply the simulation tools.

UNIT I INTRODUCTION TO SIMULATION 9

Introduction – Simulation Terminologies- Application areas – Model Classification – Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation - Simulation Examples.

UNIT II MATHEMATICAL MODELS 9

Statistical Models - Concepts – Discrete Distribution- Continuous Distribution – Poisson Process- Empirical Distributions- Queueing Models – Characteristics- Notation – Queueing Systems – Markovian Models- Properties of random numbers- Generation of Pseudo Random numbers- Techniques for generating random numbers- Testing random number generators- Generating Random-Variates- Inverse Transform technique – Acceptance-Rejection technique – Composition & Convolution Method.

UNIT III ANALYSIS OF SIMULATION DATA 9

Input Modeling - Data collection - Assessing sample independence – Hypothesizing distribution family with data - Parameter Estimation - Goodness-of-fit tests – Selecting input models in absence of data- Output analysis for a Single system – Terminating Simulations – Steady state simulations.

UNIT IV VERIFICATION AND VALIDATION 9

Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

UNIT V SIMULATION OF COMPUTER SYSTEMS AND CASE STUDIES 9

Simulation Tools – Model Input – High level computer system simulation – CPU – Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Jerry Banks and John Carson, " Discrete Event System Simulation", Fourth Edition, PHI, 2005.
2. Geoffrey Gordon, "System Simulation", Second Edition, PHI, 2006 (Unit – V).

REFERENCES

1. Frank L. Severance, " System Modeling and Simulation", Wiley, 2001.
2. Averill M.Law and W.David Kelton, "Simulation Modeling and Analysis", 3rd Edition,McGraw Hill, 2006.
3. Jerry Banks, "Handbook of Simulation: Principles, Methodology, Advances, Applications and Practice", Wiley, 1998.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of simulation terminologies and their types.	M	M			H								a, b, c, e.
2	Create mathematical model using the principles of simulation		L		M									
3	Compare the simulation of various modelling-					M								

	Input/output.													
4	Evaluate the verification and validation of simulation model.	L	L											
5	Apply the simulation tools.	M	M			H								

L – Low, M - Medium, H –High.

12CS7J **TCP/IP DESIGN AND IMPLEMENTATION** **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS52 – Computer Networks

AIM

To study about the internetworking concepts and functionalities of TCP and IP software and to design data structures for implementing those functionalities.

COURSE OBJECTIVES:

- To understand the IP addressing schemes which provides the base for Layer 2 and Layer 3 header field detection, error reporting and dynamic address mapping.
- To develop data structures for basic protocol functions of TCP/IP and to understand and use the various members in the respective structures.
- To design and implement data structures for maintaining multiple local and global timers that will govern over various modules of TCP and IP software.

COURSE OUTCOMES:

- Analyze various network communication techniques related to network configuration and administration
- Depict the architecture of TCP/IP
- Develop solid client server applications using TCP/IP
- Implement IP routed network
- Analysis the QOS of any Network

UNIT I **INTRODUCTION** **9**

Internetworking concepts and architecture model – classful Internet address – CIDR – Subnetting and Supernetting – AARP – RARP- IP- IP Routing – ICMP – IPV6.

UNIT II **TCP** **9**

Services – header – connection establishment and termination – interactive data flow – bulk data flow – timeout and retransmission – persist timer – keep alive timer – futures and performance.

UNIT III **IP IMPLEMENTATION** **9**

IP global software organization – routing table – routing algorithms – fragmentation and reassembly – error processing (ICMP) – Multicast Processing (IGMP).

UNIT IV **TCP IMPLEMENTATION I** **9**

Data structure and input processing – transmission control blocks – segment format – comparision – finite state machine implementation – Output processing – mutual exclusion – computing the TCP Data length.

UNIT V **TCP IMPLEMENTATION II** **9**

Timers – events and messages – timer process – deleting and inserting timer event – flow control and adaptive retransmission – congestion avoidance and control – urgent data processing and push function.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Douglas E Comer, “Internetworking with TCP/IP Principles, Protocols and Architecture”,Vol 1 and 2, Vth Edition
2. W.Richard Stevans “TCP/IP Illustrated” Vol 1.2003.

REFERENCES

1. Forouzan, “ TCP/IP Protocol Suite” Second Edition, Tate MC Graw Hill, 2003.
2. W.Richard Stevens “TCP/IP Illustrated” Volume 2, Pearson Education 2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Analyze various network communication techniques related to network configuration and administration		M		M									a, b, d, e.
2	Depict the architecture of TCP/IP	H	L		M									
3	Develop solid client server applications using TCP/IP		M		M	H								
4	Implement IP routed network				M	M								
5	Analysis the QOS of any Network		M		H	M								

L – Low, M - Medium, H –High.

12CS7K SOFTWARE QUALITY ASSURANCE AND MANAGEMENT **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS64 - OOSE

AIM

This course covers the technical aspects of software testing, verification and validation.

COURSE OBJECTIVES:

- To understand the fundamentals of SQA and its metrics.
- To evaluate software development and test plans, solve software problems by finding program bugs and creating solutions.
- To use appropriate technological tools to analyze, test and automate the elements of software quality assurance.

COURSE OUTCOMES:

- Dispute the issue of Software Quality and the activities present in a typical software Quality and configuration Management process
- Generalize the software quality management concepts
- Analyze the quality assurance metrics such as TQM, QMS
- Design the purpose and scope of the quality management and assurance.
- Apply the origins and rationale behind the ISO 9000 standards

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management.

UNIT II MANAGING SOFTWARE QUALITY 9

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management.

UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis - Quality Management System (QMS) – Elements of QMS – Rayleigh model framework – Reliability Growth models for QMS – Complexity metrics and models – Customer satisfaction analysis.

UNIT IV SOFTWARE QUALITY PROGRAM 9

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning –An overview – Purpose & Scope.

UNIT V SOFTWARE QUALITY STANDARDIZATION 9

Software Standards – ISO 9000 Quality System Standards – Capability Maturity Model and the Role of

SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Mordechai Ben-Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V)
2. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc.(UNIT I and II)

REFERENCES

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", Third Edition, Artech House Publishers 2007
2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Dispute the issue of Software Quality and the activities present in a typical software Quality and configuration Management process	M				M						M		a, b, d, e, f g, j, k.
2	Generalize the software quality management concepts	M				L						M		
3	Analyze the quality assurance metrics such as TQM, QMS		M		M			M						
4	Design the purpose and scope of the quality manage-ment and assurance.				M		M							
5	Apply the origins and rationale behind the ISO 9000 standards						M				M			

L – Low, M - Medium, H –High.

12CS7L MULTICORE PROGRAMMING

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS6E – Parallel Programming

AIM

To learn about the techniques useful for programming parallel architectures in general and multi-core processors in particular.

COURSE OBJECTIVES:

- To realize the difference between programming for serial processors and parallel processors.
- To understand the challenges in parallel and multi-threaded programming.
- To learn about the various parallel programming paradigms, and solutions.

COURSE OUTCOMES:

- Make use of multiprocessors and scalability in Multicore programming.
- Create threads working in parallel environments without deadlock.
- Deal with various issues in multiprocessing system.
- Work with message passing interface models.
- Develop applications with multithreading concepts.

UNIT I INTRODUCTION TO MULTIPROCESSORS AND SCALABILITY ISSUES 9

Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level

parallelism. Parallel computer models –- Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture.

UNIT II PARALLEL PROGRAMMING 9

Fundamental concepts – Designing for threads – scheduling - Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

UNIT III OPEN MULTI-PROCESSING PROGRAMMING 9

Open Multi-Processing (OpenMP) – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues.

UNIT IV MESSAGE PASSING INTERFACE PROGRAMMING 9

Message Passing Interface (MPI) Model – collective communication – data decomposition – communicators and topologies – point-to-point communication – MPI Library.

UNIT V MULTITHREADED APPLICATION DEVELOPMENT 9

Algorithms, program development and performance tuning.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Shameem Akhter and Jason Roberts, "Multi-core Programming",Intel Press, 2006.
2. Michael J Quinn, Parallel programming in C with MPI and OpenMP, Tata McGraw Hill, 2003.

REFERENCES

1. John L. Hennessey and David A. Patterson, " Computer architecture – A quantitative approach", Morgan Kaufmann/Elsevier Publishers, 4th. Edition, 2007.
2. David E. Culler, Jaswinder Pal Singh, "Parallel computing architecture: A hardware/ software approach", Morgan Kaufmann/Elsevier Publishers, 1999.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of multiprocessors and scalability in Multicore programming.	H												a, b, d, e, i,
2	Create threads working in parallel environments without deadlock.	M	H		H	M								
3	Deal with various issues in multiprocessing system.		M		M									
4	Work with message passing interface models.	L	M		M									
5	Develop applications with multithreading concepts.		H		H	M				M				

L – Low, M - Medium, H –High.

12GE81 INTELLECTUAL PROPERTY RIGHTS (IPR) **L 3** **T 0** **P 0** **C 3**

CATEGORY: Elective

PREREQUISITE: Nil

AIM

To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.

COURSE OBJECTIVES:

- To introduce all aspects of the IPR Acts.
- To know how to protect IPR and about types of property.
- To include case studies to demonstrate the application of the legal concepts in Science, Engineering, Technology and Creative Design.
- To raise the awareness of Indian Patent Law and Practice.

COURSE OUTCOMES:

- Learn the role of intelectual property rights.
- Apply the fundamental legal principles relating to confidential information, copyright, patents, designs, trademarks and unfair competition.
- Solve complex intellectual property problems using law of intellectual property.
- Do registration of intellectual property rights at national, regional and international levels.
- Make use of legal aspects for intellectual property protection.

UNIT I **5**

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

UNIT II **10**

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

UNIT III **10**

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

UNIT IV **10**

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

UNIT V **10**

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. Subbaram N.R. "Handbook of Indian Patent Law and Practice ", S. Viswanathan Printers and Publishers Pvt. Ltd., 1998.

REFERENCES

1. Eli Whitney, United States Patent Number: 72X, Cotton Gin, March 14, 1794.
2. Intellectual Property Today: Volume 8, No. 5, May 2001, [www.iptoday.com].
3. Using the Internet for non-patent prior art searches, Derwent IP Matters, July 2000. www.ipmatters.net/features/000707_gibbs.html.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Learn the role of intellectual property rights.			M					M	L	H	M		c, f, g, h, i, j, k, l.
2	Apply the fundamental legal principles relating to confidential information, copyright, patents, designs, trademarks and unfair competition.						H		M			M	H	

3	Solve complex intellectual property problems using law of intellectual property.						H	M		L				
4	Do registration of intellectual property rights at national, regional and international levels.									M	L	M		
5	Make use of legal aspects for intellectual property protection.						H	M	M		L			

L – Low, M - Medium, H –High.

12IT7A INFORMATION SECURITY

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12IT65 – Cryptography and Network Security

AIM

To study the critical need for ensuring Information Security in Organizations.

COURSE OBJECTIVES:

- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security.

COURSE OUTCOMES:

- Analyse sevral requirements and operations to implement the systems using SDLC.
- Identify several methods to develop information systems and to manage its resources.
- Discover several ethical issues in information system.
- Test system quality to enhance it.
- Work and interact collaboratively in teams to examine the key aspects of information security.

UNIT I INTRODUCTION **9**

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.

UNIT II SECURITY INVESTIGATION **9**

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues.

UNIT III SECURITY ANALYSIS **9**

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk.

UNIT IV LOGICAL DESIGN **9**

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity.

UNIT V PHYSICAL DESIGN **9**

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Michael E Whitman and Herbert J Mattord, “Principles of Information Security”, Vikas Publishing House, New Delhi, 2003

REFERENCES

1. Micki Krause, Harold F. Tipton, “Handbook of Information Security Management”, Vol 1-3 CRC Press LLC, 2004.
2. Stuart Mc Clure, Joel Scrambray, George Kurtz, “Hacking Exposed”, Tata McGraw-Hill, 2003.
3. Matt Bishop, “Computer Security Art and Science”, Pearson/PHI, 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]

Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Analyse several requirements and operations to implement the systems using SDLC.	L	H		L	L				M		L	L	a, b, d, e, g, h, i, k, l.
2	Identify several methods to develop information systems and to manage its resources.	M	H		H	M								
3	Discover several ethical issues in information system.							H	H					
4	Test system quality to enhance it.				H	M		M		M				
5	Work and interact collaboratively in teams to examine the key aspects of information security.		M		M					H				

L – Low, M - Medium, H –High.

12IT73 SOFTWARE PROJECT MANAGEMENT **L T P C**
3 0 0 3

CATEGORY:
Elective **PRERE-** 12CS7K – Software quality Assurance and Management
QUISITE:

AIM

This course aims at the role of software developers in getting exposure on planning and controlling aspect of software development.

COURSE OBJECTIVES:

- To understand the roles of the project manager.
- To understand the threats and opportunities in project management.
- To gain Expertise in size, effort and cost estimation techniques.
- To understand the techniques available with which a project's aims and objectives, timetable, activities, resources and risks can be kept under control.
- To understand the social and political problems a project will encounter against which the technical problems pale into insignificance--and to begin to understand how to approach non-technical problems.
- To appreciate other management issues like team structure, group dynamics.

COURSE OUTCOMES:

- Perceive the importance of structured approach to project management for IT projects.
- Perceive the principles of the project life cycle
- Compare the various cost benefit evaluation techniques
- Estimate the project duration using network planning models.
- Analyze the earned value of a software project.
- Organize project team and handle the stress effectively

UNIT I INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II PROJECT EVALUATION 9

Strategic Assessment – Technical Assessment – Cost Benefit Analysis –Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT III ACTIVITY PLANNING 9

Objectives – Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

UNIT IV MONITORING AND CONTROL 9

Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring – Earned Value – Priortizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types Of Contract – Stages In Contract Placement – Typical Terms Of A Contract – Contract Management – Acceptance.

UNIT V MANAGING PEOPLE AND ORGANIZING TEAMS 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. Bob Hughes, Mike cotterell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

REFERENCES

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, "Software Project Management", Pearson Education, 1999.
3. Jalote, "Software Project Management in Practice", Pearson Education, 2002.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Perceive the importance of structured approach to project management for IT projects.	H												a, b, c, d, e, f, g, i, j, l.
2	Perceive the principles of the project life cycle	H	L		M									
3	Compare the various cost benefit evaluation techniques	H		M	H	M	L							
4	Estimate the project duration using network planning models.	H	L		M	H		M						
5	Analyze the earned value of a software project.	M				H		M						
6	Organize project team and handle the stress effectively	M		L						H	M		M	

L – Low, M - Medium, H –High.

12IT8F INTERNET OF THINGS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS52 – Computer Networks

AIM

To communicate the Internet Things by using RFID.

COURSE OBJECTIVES:

- To study the RFID basics.
- To learn the detailed concept of Passive Tags& Active tags.
- To extend the sensor, outline the issue with Semi passive Tag.
- To evaluate the problem with Active RFID tags.

COURSE OUTCOMES:

- Relate the RFID basics and categorize the Active and Passive tags.

- Make use of the operating frequencies in Passive Tags & Active tags.
- Distinguish active communication versum scatter communication.
- Evaluate the problem with Active RFID tags.
- Develop the NFC applications.

UNIT I INTRODUCTION 9

Introduction- RFID Basics – Passive RFID – Active RFID – Semi passive RFID Tag - Semi active RFID Tag

UNIT II PASSIVE TAGS 9

Passive Tags – How Back Scatter Communication works – Operating Frequencies: An overview –Magnetic coupling: Near-field – Electro Magnetic Coupling: Far - Field – Near Field and Far- Field : Some key points – Manufacturing issues with passive RFID tags – The EPC Gen-2 Protocol.

UNIT III ACTIVE AND SEMI PASSIVE RFID TAGS 9

Active communication versus scatter communication – Active Tags Conforming ISO 18000-7 – Sensors - Security – Increasing Battery Life – Extending Read Range – Equipping with Sensors – Outstanding issues with semi passive tags.

UNIT IV NEAR FIELD COMMUNICATION 9

Field Communication (NFC) – essentials – operating modes – developing NFC applications – security.

UNIT V CURRENT ISSUES 9

Current outstanding issues with passive RFID tags, Current outstanding problems with Active RFID Tags, Future of RFID.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Lu Yan,Yan Zhang, Laurence T.Yang, Huanshengning, ”Internet of Things” Auerbach Publications,2008.
2. Vedat Coskun, Kerem Ok, Busra Ozdenizci, “Near Field Communication (NFC): From Theory to Practice”, John Wiley & Sons Ltd., 2012.

REFERENCES

1. Sergeĭ Evdokimov, Benjamin Fabian, Oliver Günther,”RFID and the Internet of things Technology Applications and Security Challenges”.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
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Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Relate the RFID basics and categorize the Active and Passive tags.	H	M		M									a, b, d, e, i.
2	Make use of the operating frequencies in Passive Tags & Active tags.	H	M		L	H								
3	Distinguish active communication versum scatter communication.	H	M		M									
4	Evaluate the problem with Active RFID tags.	H	M		L	M								
5	Develop the NFC applications.	H	M		L	M				M				

L – Low, M - Medium, H –High.

12CS8A **HIGH SPEED NETWORKS** **L T P C 3 0 0 3**

CATEGORY: Elective

PREREQUISITE: 12CS52 – Computer Networks

AIM

To provide an understanding of the networking standards that can be adopted with the current day requirements of complex and voluminous content transfer over heterogeneous platforms.

COURSE OBJECTIVES

- To know about the various standards adopted for handling high traffic.
- To have a primitive level performance analysis for few network constraints for various amount traffic with different networking standards.
- To get a feel of designing a High speed network setup with specialized hardware and optimization approaches like parallelism and pipelining.

COURSE OUTCOMES:

- Recall the basics of circuit and packet switching and also to differentiate switching techniques.
- Construct LAN settings using different media.
- Measure &analyze the data flow in a network using queuing models.
- Apply error correction mechanism in a network using different protocol.
- Identify techniques to support real-time traffic and congestion control.

UNIT I HIGH SPEED NETWORKS 9

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection – ATM Cell – ATM Service Categories – AAL. High Speed LAN's: Fast Ethernet – Gigabit Ethernet– Fibre Channel – Wireless LAN's, WiFi and WiMax Networks applications, requirements – Architecture of 802.11.

UNIT II CONGESTION AND TRAFFIC MANAGEMENT 9

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

UNIT III TCP AND ATM CONGESTION CONTROL 9

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

UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 9

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

UNIT V PROTOCOLS FOR QOS SUPPORT 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. William Stallings, "High speed networks and internet", Second Edition, Pearson Education, 2002.

REFERENCES

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition , Jean Harcourt Asia Pvt. Ltd., , 2001.
2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press, Volume 1 and 2, 2003.
3. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band Telecommunication Networks", CRC Press, New York, 2004.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recall the basics of circuit and packet switching and also to differentiate switching techniques.	H												a, b, c, d, e.
2	Construct LAN settings using different media.	M	M		M									
3	Measure & analyze the data flow in a network using queuing models.		M		M	M								
4	Apply error correction mechanism in a network using different protocol.		M		H									
5	Identify techniques to support real-time traffic and congestion control.		H	M	L									

L – Low, M - Medium, H –High.

12CS8B ARTIFICIAL INTELLIGENCE AND ROBOTICS **L T P C**
3 0 0 3

CATEGORY: Elective

PREREQUISITE: 12CS7E – Soft Computing

AIM

Artificial Intelligence aims at developing computer applications, which encompasses perception, reasoning and learning and to provide an in-depth understanding of major techniques used to simulate intelligence applied in Robotics.

COURSE OBJECTIVES:

- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To study different Logics & Planning.
- To provide a basic exposition to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve perception, reasoning and learning.
- To manipulate the Robot Technology & its Applications.

COURSE OUTCOMES:

- Examine the fundamental concepts in Artificial Intelligence
- Classify different logics & Planning.
- Select a basic exposition to the goals and methods of Artificial Intelligence.
- Apply AI techniques for perception, reasoning and learning.
- Develop the Robot Technology for real world Applications.

UNIT I ARTIFICIAL INTELLIGENCE & INTELLIGENT AGENTS 9

Artificial Intelligence: Introduction to AI, History of AI, Emergence of Intelligent Agents. Intelligent Agents: PEAS Representation for an Agent, Agent Environments, Concept of Rational Agent, Structure of Intelligent agents, Types of Agents.

UNIT II KNOWLEDGE AND REASONING & PLANNING 9

Knowledge and Reasoning: A knowledge Based Agent, Introduction To Logic, Propositional Logic, Reasoning in Propositional logic, First Order Logic: Syntax and

Semantics, Extensions and Notational Variation, Inference in First Order Logic, Unification, Forward and backward chaining, Resolution. Planning: Planning problem, Planning with State Space Search, Partial Order Planning, Hierarchical Planning, Conditional Planning.

UNIT III LEARNING 9

Learning**:** Learning from Observations, General Model of Learning Agents, Inductive learning, learning Decision Trees, Introduction to neural networks, Perceptrons, Multilayer feed forward network, Application of ANN, Reinforcement Learning: Passive & Active Reinforcement learning.

UNIT IV ROBOTIC MANIPULATION 9

Robotic Manipulation: Fundamentals of Robot Technology, Automation and Robots, Classification, Application, Specification Notations.

UNIT V ROBOT PROGRAMMING & APPLICATIONS OF ROBOTICS 9

ROBOT Programming & Applications of Robotics: Robot Programming - Methods - interlocks textual languages. Characteristics of Robot level languages, characteristic of task level languages, Applications of Robotics.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2ndEdition, Pearson Publication.
2. Robert Shilling, Fundamentals of Robotics-Analysis and control, Prentice Hall of India.

REFERENCES

1. Robert J. Schalkolf, Artificial Inteilligence: an Engineering approach, McGraw Hill,1990.
2. Patrick H. Winston, Artificial Intelligence, 3rd edition, Pearson.
3. Fu, Gonzales and Lee, Robotics, McGraw Hill.
4. J.J, Craig, Introduction to Robotics, Pearson Education.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Examine the fundamental concepts in Artificial Intelligence	H	M											a, b, c, d, e, g.
2	Classify different logics & Planning.		M		L	M								
3	Select a basic exposition to the goals and methods of Artificial Intelligence.		M	L	M			M						
4	Apply AI techniques for perception, reasoning and learning.		L		M	H								
5	Develop the Robot Technology for real world Applications.		L		L	H								

L – Low, M - Medium, H –High.

12CS8C GRAPH THEORY

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS43 – Design and Analysis of Algorithms

AIM

To study the basic need for attaining graph by using Graph theory.

COURSE OBJECTIVES:

- To find the fundamental concepts in Graph such as Isomorphism, Components.
- To solve the problems using spanning Trees.
- To provide properties for Cut Sets, matrices & Directed graph.
- To write an algorithm for spanning Tree & Directed Circuit.
- To discuss various algorithm for Searching the Graph.

COURSE OUTCOMES:

- Relate trees and graphs to practical examples.

- Apply algorithmic techniques.
- Develop algorithms for various optimization problems on graphs.
- Identify graph theory techniques to practical problems in networking and communication.
- Make use of DFS algorithm technique.

UNIT I INTRODUCTION 9

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits – Connectedness–Components– Euler Graphs–Hamiltonian Paths and Circuits – Trees – Properties of trees – Distance and Centers in Tree – Rooted and Binary Trees.

UNIT II TREES, CONNECTIVITY, PLANARITY 9

Spanning trees – Fundamental Circuits – Spanning Trees in a Weighted Graph – Cut Sets – Properties of Cut Set – All Cut Sets – Fundamental Circuits and Cut Sets – Connectivity and Separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational and Geometric Graphs – Planer Graphs – Different Representation of
a Planer Graph.

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH 9

Incidence matrix – Submatrices – Circuit Matrix – Path Matrix – Adjacency Matrix – Chromatic Number – Chromatic partitioning – Chromatic polynomial – Matching – Covering – Four Color Problem – Directed Graphs – Types of Directed Graphs – Digraphs and Binary Relations – Directed Paths and Connectedness – Euler Graphs – Adjacency Matrix of a Digraph.

UNIT IV ALGORITHMS 9

Algorithms: Connectedness and Components – Spanning tree – Finding all Spanning Trees of a Graph – Set of Fundamental Circuits – Cut Vertices and Separability – Directed Circuits.

UNIT V ALGORITHMS 9

Algorithms: Shortest Path Algorithm – DFS – Planarity Testing – Isomorphism.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Narsingh Deo, "Graph Theory: With Application to Engineering and Computer Science", Prentice Hall of India, 2003.

REFERENCES

1. R.J. Wilson, "Introduction to Graph Theory", IV Edition, Pearson Education,2003.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)											Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Relate trees and graphs to practical examples.	M	H		L									a, b, d, e.
2	Apply algorithmic techniques.	M	H		L	M								
3	Develop algorithms for various optimisation problems on graphs.	L	M		L									
4	Identify graph theory techniques to practical problems in networking and communication.	L	M		L	M								
5	Make use of DFS algorithm technique.	M	L		L									

L – Low, M - Medium, H –High.

12CS8D **DIGITAL IMAGE PROCESSING** **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12CS51 – Digital Signal Processing

AIM

To inculcate a basic training in the processing of images for practical applications in the domain of medical, remoting sessions and in general.

COURSE OBJECTIVES:

- To introduce basic concepts in acquiring, storage and Process of images.
- To enhance the quality of images.
- To analyze the Feature for segmenting the images.
- To introduce case studies of Image Processing.

COURSE OUTCOMES:

- Illustrate the models and fundamentals of image processing.
- Apply image filtering techniques.
- Develop an application for image segmentation and motion segmentation.
- Infer various compression techniques and standards.
- Make use of video motion analysis.

UNIT I FUNDAMENTALS OF IMAGE PROCESSING 9

Introduction – Steps in Image Processing Systems – Image Acquisition – Sampling and Quantization – Pixel Relationships – Colour Fundamentals and Models, File Formats, Image operations – Arithmetic, Geometric and Morphological.

UNIT II IMAGE ENHANCEMENT 9

Spatial Domain Gray level Transformations Histogram Processing Spatial Filtering – Smoothing and Sharpening. Frequency Domain : Filtering in Frequency Domain – DFT – Smoothing and Sharpening filters – Homomorphic Filtering.

UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9

Detection of Discontinuities – Edge Operators – Edge Linking and Boundary Detection – Thresholding – Region Based Segmentation – Morphological WaterSheds – Motion Segmentation, Feature Analysis and Extraction.

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS 9

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Wavelet Transforms.Image Compression : Fundamentals – Models – Elements of Information Theory – Error Free Compression – Lossy Compression – Compression Standards.

UNIT V APPLICATIONS OF IMAGE PROCESSING 9

Image Classification–Image Recognition–Image Understanding–Video Motion Analysis–Image Fusion–Steganography–Digital Compositing–Mosaics–Color Image Processing.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing” Second Edition, Pearson Education, 2003.

REFERENCES

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Second Edition, Thomson Learning, 2001
2. Anil K.Jain, “Fundamentals of Digital Image Processing”, PHI, 2006.
3. Sanjit K. Mitra, & Giovanni L. Sicuranza, “Non Linear Image Processing”, Elsevier, 2007.
4. Richard O. Duda, Peter E. HOF, David G. Stork, “Pattern Classification” Wiley Student Edition, 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated Pos
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Illustrate the models and fundamentals of image processing.	M	H		M									a, b, d, e.
2	Apply image filtering techniques.		M		M	M								
3	Develop an application for image segmentation and motion segmentation.	M	M		H	L								
4	Infer various compression techniques and standards.	H	L		M	M								
5	Make use of video motion analysis.	L	M		M	M								

L – Low, M - Medium, H –High.

12CS8E KNOWLEDGE BASED DECISION SUPPORT SYSTEMS **L 3 T 0 P 0 C 3**

CATEGORY: Elective

PREREQUISITE: 12IT72 – Knowledge Management

AIM

The aim is to inculcate a basic Decision Making System.

COURSE OBJECTIVES:

- To model a Decision making system.
- To discuss about Data warehousing& Data mining.
- To analyze the Feature for Knowledge Management.
- To summarize the needs for IS in Internet.
- To implement a MSS in E-Business.

COURSE OUTCOMES:

- Recite the fundamental concepts of knowledge management.
- Identify the knowledge management system life cycle.
- Analyze various knowledge capturing techniques.
- Apply codification tools and testing procedures.
- Elucidate about knowledge transfer and sharing systems

UNIT I DECISION MAKING SYSTEMS **9**

Decision Making and computerized support: Management support systems. Decision making systems modeling - support.

UNIT II MODELING AND ANALYSIS **9**

Decision Making Systems – Modeling and Analysis – Business Intelligence – Data Warehousing, Data Acquisition - Data Mining. Business Analysis – Visualization – Decision Support System Development.

UNIT III KNOWLEDGE MANAGEMENT **9**

Collaboration, Communicate Enterprise Decision Support System & Knowledge management – Collaboration Com Technologies Enterprise information system – knowledge management.

UNIT IV ADVANCED INTELLIGENCE SYSTEM **9**

Intelligent Support Systems – AI & Expert Systems – Knowledge based Systems – Knowledge Acquisition , Representation & Reasoning, Advanced intelligence system – Intelligence System over internet.

UNIT V MANAGEMENT SUPPORT SYETEM **9**

Implementing MSS in the E-Business ERA – Electronic Commerce – integration, Impacts and the future management support systems.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Efraim Turban & Jay E. Aronson Ting-Peng Liang “Decision Support Systems & Intelligent Systems” – Seventh edition - Pearson/prentice Hall.
2. George M Marakas, “Decision support Systems”,2nd Edition,Pearson/prentice Hall.

REFERENCES

1. V.S. Janakiraman & K. Sarukesi, "Decision Support Systems"
2. Efrem G Mallach, "Decision Support systems and Data warehouse Systems"- McGraw Hill.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	As-sess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Recite the fundamental concepts of knowledge management.	M												a, b, d, e.
2	Identify the knowledge management system life cycle.	M	L		L									
3	Analyze various knowledge capturing techniques.		H		L	M								
4	Apply codification tools and testing procedures.		M		M	H								
5	Elucidate about knowledge transfer and sharing systems.	L	M		M									

L – Low, M - Medium, H –High.

12CS8F **BIG DATA ANALYTICS** **L 3** **T 0** **P 0** **C 3**

CATEGORY: Elective

PREREQUISITE: 12CS7A – Data Warehousing and Data Mining

AIM

To highlight and explore the need for big data.

COURSE OBJECTIVES:

- To study the standards and Risk.
- To evolutes the various analytic process, tools & methods.
- To plot the Scatter plots for data mining.
- To summarize the needs for IS in Internet.
- To implement a case studies for Logical Regression model.

COURSE OUTCOMES:

- Examine a mixture of structured, semi-structured and unstructured data.
- Evaluate analytics techniques for text, audio, video, and social media data.
- Build a data model for analyzing large data sets.
- Utilizes a variety of statistical, modeling, data mining, and machine learning techniques.
- Model nominal outcome variables using logical regression model.

UNIT I **INTRODUCTION** **9**

Big Data – Risk of Big Data – Need to Tame Big Data – Exploring big Data – Mixing with traditional data – Need for Standards.

UNIT II **ANALYTIC PROCESS** **9**

Evolution of Analytics Processes – The Analytic Sand box – Analytic data set – Enterprise Analytic set – Embedded Scoring – Wrap up.

UNIT III **TOOLS AND METHODS** **9**

The Evolution of Analytic Tools – Evolution of Analytic Methods.

UNIT IV **STATISTICAL MODELING** **9**

Statistical Modeling Analysis - Statistics & machine Learning – Statistical learning – scatter plots and smoothed scatter plot for two simple data mining methods.

UNIT V CASE STUDIES 9

Logistic Regression Model – Scoring a LRM in logistic Regression – Case Studies.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Bill Franks,"Taming the Big Data Tidal Wave Finding Opportunities in huge data streams with Advanced Analytics", John Wiley & Sons.
2. Ratner Bruce "Statistical Modeling and Analysis for Database Marketing", 2nd edition, CRC Press, 2012.

REFERENCES

1. Viktor Mayer Schonberger, Kenneth Cukier, "Big Data a revolution that will transform how we live,work and think",Houghton Mifflin Harcourt Publishing Company.
2. Kevin Roebuck,"Big Data : High Impact Strategies" Lightning Source Incorporated,2011.
3. Frank J. Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", John Wiley & Sons, 2013.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess. Tests (60%)	Assign/ Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Examine a mixture of structured, semi-structured and unstructured data.	M	H			H		H						a, b, c, d, e, g, i.
2	Evaluate analytics techniques for text, audio, video, and social media data.	M	M	L	M			H						
3	Build a data model for analyzing large data sets.	H	H	M	L	M				M				
4	Utilizes a variety of statistical, modeling, data mining, and machine learning techniques.	M	H		M	L								
5	Model nominal outcome variables using logical regression model.	L	M		L	M								

L – Low, M - Medium, H –High.

12GE82 INDIAN CONSTITUTION AND SOCIETY

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: Nil

AIM

To introduce the Constitution of India and Indian Political System.

COURSE OBJECTIVES:

- To have a knowledge on Constituent Assembly of India, fundamental rights and duties of Indian citizens
- To know about the structuring and functions of Union and State governments.
- To know the essential of courts in judicial system of India.
- To know about the Indian society and social structure.

COURSE OUTCOMES:

- Classify general knowledge and legal literacy and thereby to take up competitive examinations.
- Express state and central policies of fundamental duties.
- Elucidate Electrol process of special provisions.
- Identify power & functions of municipalities, panchayats & Cooperative societies.
- Argue about Indian constitution and society.

UNIT I INTRODUCTION 9

Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for citizens.

UNIT II UNION GOVERNMANT 9

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III STATE GOVERNMENT 9

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT IV INDIAN FEDERAL SYSTEM 9

Indian Federal System – Center – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India.

UNIT V SOCIETY 9

Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Durga Das Basu, "Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.
3. Maciver and Page, "Society:An Introduction Analysis ", Mac Milan India Ltd., New Delhi.
4. K.L.Sharma, (1997) "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi.

REFERENCES

1. Sharma, Brij Kishore, " Introduction to the Constitution of India:, Prentice Hall of India, New Delhi.
2. U.R.Gahai, "Indian Political System ", New Academic Publishing House, Jalaendhar.
3. R.N. Sharma, "Indian Social Problems ", Media Promoters and Publishers.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
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Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Classify general knowledge and legal literacy and thereby to take up competitive examinations.			M			M		H	M	M	L		c, f, g, h, i, j, k, l.
2	Express state and central policies of fundamental duties.						H		L			M	M	
3	Elucidate Electrol process of special provisions.						H	M		M				
4	Identify power & functions of municipalities, panchayats & Cooperative societies.									L	M	M		
5	Argue about Indian constitution and society.						H	M	L		M			

L – Low, M - Medium, H –High.

12IT7B BIO INFORMATICS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS34 – Data Structures

AIM

By using the well-tested and successful approach of problem-based learning, students will learn through applying the strategies and tools used in bioinformatics to topical problems drawn from ongoing research and applications in a variety of fields.

COURSE OBJECTIVES:

- To emphasize how to use the computer as a tool for biomedical research.
- To study and understand the various modeling techniques that are used for modeling biological data.
- To explore visualization techniques for DNA and RNA molecules.
- To be aware of the micro array technology for genome expression study.

COURSE OUTCOMES:

- Write about UNIX basic commands and Perl programming.
- Express about Biological databases and management of databases with the help of Technology.
- Analyze sequences using sequence analysis tools such as BLAST and FASTA
- Illustrate about Neural networks and Machine learning
- Analyze phylogenetic relationship between sequences
- Alert about Cellular computing, System Biology and Microarray analysis.

UNIT I INTRODUCTION 9

Introduction to molecular biology – the genetic material – gene structure – protein structure – chemical bonds – molecular biology tools – genomic information content.

UNIT II PATTERN MATCHING 9

Data searches – simple alignments – gaps – scoring matrices – dynamic programming – global and local alignments – database searches – multiple sequence alignments Patterns for substitutions – estimating substitution numbers – evolutionary rates – molecular clocks – evolution in organelles.

UNIT III PHYLOGENETIC TREE ANALYSIS 9

Phylogenetics – history and advantages – phylogenetic trees – distance matrix methods – maximum likelihood approaches – multiple sequence alignments –Parsimony – ancestral sequences – strategies for faster searches – consensus trees – tree confidence – comparison of phylogenetic methods – molecular phylogenies.

UNIT IV GENOMICS 9

Genomics – prokaryotic genomes: prokaryotic gene structure – GC content – gene density – eukaryotic genomes: gene structure – open reading frames – GC content – gene expression – transposition – repeated elements – gene density.

UNIT V PROTEOMICS 9

Amino acids–polypeptide composition–secondary structure–tertiary and quaternary structure – algorithms for modeling protein folding–structure prediction – predicting RNA secondary structures Proteomics–protein classification–experimental techniques–inhibitors and drug design– ligand screening–NMR structures – empirical methods and prediction techniques – post-translational modification prediction.

TOTAL: 45 PERIODS

TEXT BOOKS

1. D. E. Krane and M. L. Raymer, "Fundamental concepts of Bioinformatics", Pearson Education, 2003.

REFERENCES

1. Arthur M. Lesk, "Introduction to Bioinformatics", Second Edition, Oxford University Press, 2005.
2. T. K. Attwood, D. J. Parry-Smith, and S. Phukan, "Introduction to Bioinformatics", Pearson Education, 1999.
3. Vittal R. Srinivas, "Bioinformatics – A Modern Approach", Prentice-Hall of India Pvt. Ltd., 2005.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Write about UNIX basic commands and Perl programming.	M	M		M									a, b, d, e.
2	Express about Biological databases and management of databases with the help of Technology.		H		M	M								
3	Analyze sequences using sequence analysis tools such as BLAST and FASTA		L		H	M								
4	Illustrate about Neural networks and Machine learning	H	L		M									
5	Analyze phylogenetic relationship between sequences		M		L									
6	Alert about Cellular computing, System Biology and Microarray analysis.		M		M									

L – Low, M - Medium, H – High.

12IT8J SPEECH SIGNAL PROCESSING **L 3 T 0 P 0 C 3**

CATEGORY: Elective

PREREQUISITE: 12CS7C – Natural Language Processing

AIM

To introduce the characteristics of Speech signals and the related time and frequency domain methods for speech analysis and speech compression.

COURSE OBJECTIVES:

- To introduce the models for speech production
- To develop time and frequency domain techniques for estimating speech parameters
- To introduce a predictive technique for speech compression
- To understand speech recognition, synthesis and speaker identification.

COURSE OUTCOMES:

- Make use of the models for speech production
- Develop time domain techniques for estimating speech parameters
- Utilize frequency domain techniques for estimating speech parameters
- Relate a linear predictive technique for speech compression
- Illustrate speech recognition, synthesis and speaker identification.

UNIT I MECHANICS OF SPEECH 9

Speech production: Mechanism of speech production, Acoustic phonetics – Digital models for speech signals - Representations of speech waveform: Sampling speech signals, basics of quantization, delta modulation, and Differential PCM – Auditory perception: psycho acoustics.

UNIT II TIME DOMAIN METHODS FOR SPEECH PROCESSING 9

Time domain parameters of Speech signal – Methods for extracting the parameters Energy, Average Magnitude, Zero crossing Rate – Silence Discrimination using ZCR and energy – Short Time Auto Correlation Function – Pitch period estimation using Auto Correlation Function.

UNIT III FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING 9

Short Time Fourier analysis: Fourier transform and linear filtering interpretations, Sampling rates - Spectrographic displays - Pitch and formant extraction - Analysis by Synthesis - Analysis synthesis systems: Phase vocoder, Channel Vocoder - Homomorphic speech analysis: Cepstral analysis of Speech, Formant and Pitch Estimation, Homomorphic Vocoders

UNIT IV LINEAR PREDICTIVE ANALYSIS OF SPEECH 9

Basic Principles of linear predictive analysis – Auto correlation method – Covariance method – Solution of LPC equations – Cholesky method – Durbin's Recursive algorithm – Application of LPC parameters – Pitch detection using LPC parameters – Formant analysis – VELP – CELP.

UNIT V APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING 9

Algorithms: Dynamic time warping, K-means clustering and Vector quantization, Gaussian mixture modeling, hidden Markov modeling - Automatic Speech Recognition: Feature Extraction for ASR, Deterministic sequence recognition, Statistical Sequence recognition, Language models - Speaker identification and verification – Voice response system – Speech synthesis: basics of articulatory, source-filter, and concatenative synthesis – VOIP.

TOTAL: 45 PERIODS

TEXT BOOKS

1. L. R. Rabiner and R. W. Schaffer, "Digital Processing of Speech signals", Prentice Hall, 1978.
2. Ben Gold and Nelson Morgan, "Speech and Audio Signal Processing", John Wiley and Sons Inc., Singapore, 2004.

REFERENCES

1. Quatieri, "Discrete-time Speech Signal Processing", Prentice Hall, 2001.
2. L.R. Rabiner and B. H. Juang, "Fundamentals of speech recognition", Prentice Hall, 1993.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar /Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

	Course Outcomes (COs)	Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of the models for speech production	H	M		L	H								a, b, d, e.
2	Develop time domain techniques for estimating speech parameters	H	H		M	L								
3	Utilize frequency domain techniques for estimating speech parameters	H	H		M	L								
4	Relate a linear predictive technique for speech compression	H	M		M	M								
5	Illustrate speech recognition, synthesis and speaker identification.	H	M		L	M								

L – Low, M - Medium, H –High.

12CS8G MOBILE APPLICATION DEVELOPMENT

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS72 – Mobile and Pervasive Computing

AIM

To provide students with the tools and knowledge necessary to create Java applications that can run on mobile devices.

COURSE OBJECTIVES:

- To understand the J2ME architecture and development environment
- To develop the aspects of mobile programming that make it unique from programming for other platforms
- To learn how to build Java Mobile Application using J2 ME.
- To obtain knowledge on Records and Connection Framework and Communication using HTTP.

COURSE OUTCOMES:

- Identify mobile development challenges like memory and processor limitations, intermittent network access, and limited battery power

- Make use of application for J2ME
- Design J2ME software for multiple platforms
- Implement applications using J2ME Patterns including object oriented design
- Develop Android applications

UNIT I J2ME OVERVIEW AND SMALL COMPUTING TECHNOLOGY 9

Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices. Small Computing Technology**:** Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

UNIT II J2ME ARCHITECTURE AND DEVELOPMENT ENVIRONMENT 9

J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit.

UNIT III J2ME BEST PRACTICES AND PATTERNS 9

The Reality of Working in a J2ME World, Best Practices Commands, Items, and Event Processing:J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

UNIT IV HIGH-LEVEL & LOW LEVEL DISPLAY SCREENS 9

Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class, Low-Level Display Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation.

UNIT V MOBILE OPERATING SYSTEMS AND ANDROID APPLICATION DEVELOPMENT 9

Mobile Operating Systems - Linux Based Operating Systems - Windows Based Operating Systems – Other Operating Systems. Android application Development – Introduction – background – developing for android, mobile devices – android development tools – application life cycle – Externalizing resources – creating user interfaces – files, saving state and preferences – databases and content providers.

TOTAL: 45 PERIODS

TEXT BOOKS

1. James Keogh, “J2ME: The Complete Reference”, Tata McGrawHill, 2003.
2. Reto Meier, “Professional Android 2 Application Development” , Wiley Inc,2010
3. Arash Habibi Lashkari, Mohammadreza Moradhaseli, “Mobile Operating Systems and Programming”, VDM Publishing, 2011.

REFERENCES

1. Michael Juntao Yuan, “Enterprise J2ME: Developing Mobile Java Applications”, Pearson Education, 2004
2. Ray Rischpater, “Beginning Java ME Platform”, Apress, 2009
3. Sing Li, Jonathan B. Knudsen, “Beginning J2ME: From Novice to Professional”, 3rd Edition, Apress, 2005
4. J. Knudsen, “Kicking Butt with MIDP and MSA: Creating Great Mobile Applications” 1st edition, Pearson.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar /Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Identify mobile development challenges like memory and processor limitations,	H	M	M	L									a, b, c, d, e, i.

	intermittent network access, and limited battery power													
2	Make use of application for J2ME		L		M	H								
3	Design J2ME software for multiple platforms		M		M	H								
4	Implement applications using J2ME Patterns including object oriented design		H		M	M								
5	Develop Android applications		M		L	M				M				

L – Low, M - Medium, H –High.

12CS8H ADVANCED DATABASE TECHNOLOGY

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS44 – Database Management Systems

AIM

Advanced database aims at providing an understanding of the principles used in the design of different kinds of data models. It is also deals with the Transaction management of these different databases.

COURSE OBJECTIVES:

- To understand about different data models that can be used for specialized applications
- To make the students to get familiarized with transaction management of advanced database models
- To develop in-depth knowledge about web and intelligent database systems.
- To provide an introductory concept about the way in which data can be stored in multimedia databases.

COURSE OUTCOMES:

- Apply query optimization principles for data models.
- Design distributed database schema using principles of fragmentation and allocation.
- Make use of object oriented database concepts.
- Work with different types of enhanced data models.
- Illustrate current issues in various databases.

UNIT I RELATIONAL MODEL ISSUES 9

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

UNIT II DISTRIBUTED DATABASES 9

Parallel Databases – Inter and Intra Query Parallelism – Distributed Database Features – Distributed Database Architecture – Fragmentation – Distributed Query Processing – Distributed Transactions Processing – Concurrency Control – Recovery – Commit Protocols.

UNIT III OBJECT ORIENTED DATABASES 9

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks – Recovery – POSTGRES – JASMINE – GEMSTONE - ODMG Model.

UNIT IV EMERGING SYSTEMS 9

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases- XML and Web Databases.

UNIT V CURRENT ISSUES 9

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

TOTAL: 45 PERIODS

TEXT BOOKS

1. Thomas Connolly and Carlolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, 3rd Edition, Pearson Education 2003.

REFERENCES

1. R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2006.
2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, 5th Edition, Tata McGraw Hill, 2006.
3. C.J.Date, A.Kannan, S.Swamynathan, “An Introduction to Database Systems”, 8th Edition, Pearson Education, 2006.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar /Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Apply query optimization principles for data models.	H												a, b, c, d, e.
2	Design distributed database schema using principles of fragmentation and allocation.	M	M	L	M									
3	Make use of object oriented database concepts.	H	L		M	L								
4	Work with different types of enhanced data models.		M		H	M								
5	Illustrate current issues in various databases.		M		M	H								

L – Low, M - Medium, H –High.

12CS8I MULTIMEDIA SYSTEMS **L T P C**
3 0 0 3

CATEGORY: Elective
PREREQUISITE: 12IT63 – Web Technology

AIM

- Introduce students to the different media used in multimedia systems.
- Introduce students to the design issues related to multimedia systems.

COURSE OBJECTIVES:

- Identify the media used in multimedia systems and to assess their relative advantages and disadvantages relative to both user and system points of view.
- Introduce the designing for the world wide web.
- Identify the various tools used for manipulating multimedia building blocks.

COURSE OUTCOMES:

- Make use of computer hardware and software technologies for making multimedia.
- Analyze various multimedia tools.
- Apply the core multimedia technologies and standards
- Infer the multimedia networking and communication systems Support.
- Design multimedia building blocks for World Wide Web.

UNIT I INTRODUCTION **9**

Definition - CD-ROM and multimedia. Multimedia applications: business - schools - homes - public places and virtual reality. Introduction to making of multimedia: hardware - software - creativity - and organization.

UNIT II MULTIMEDIA TOOLS **9**

Macintosh and windows production platforms - 3-d modeling and animation - image-editing tools - sound editing tools - animation - video - and digital movie tools - linking multimedia objects - office suites - word processors - spread sheets - databases - presentation tools. Authoring tools - Card and Page-based authoring tools - Icon Based authoring tools - time based authoring tools - object oriented authoring tools - cross platform-authoring tools

UNIT III MULTIMEDIA BUILDING BLOCKS **9**

Text: About fonts and faces - text in multimedia - computers and text - Font editing and design tools - Hypermedia and Hypertext.
Sound: Multimedia system sounds - MIDI versus digital audio - digital audio - making MIDI audio - audio file format - working with sounds in windows - working with sounds on the Macintosh-NIFF-Adding sounds to

multimedia-Towards professional sounds – production.

Images: Making still images - Colors - Image file format. Animation: Principals of animation - Making animation that works. Video: How video works - Broadcast video standards - Integrating computers and television - Shooting and Editing - Video tips - Recoding formats - Digital video

UNIT IV MULTIMEDIA AND THE INTERNET 9

Internet fundamentals: Internetworking - Connections - Internet services - The World Wide Web - Tools for the World Wide Web: Web serves - Web browsers - Web page makers and Site builders - Plug-ins and Delivery vehicles - Beyond HTML.

UNIT V DESIGNING FOR THE WORLD WIDE WEB 9

Working on web - Text for web - Images for web - Sound for web - Animation for web.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Tay Vaughan, Multimedia: Making It Work, 8th edition, McGraw Hill 2011

REFERENCES

1. K. Andleigh and K. Thakkrar, Multimedia System Design, PHI
2. Ralf stein Metz and Klara Nahrstedt, Multimedia: Computing, Communication & Application, PHI.
3. Steve Rimmer, Advanced multimedia programming, McGraw Hill.
4. Fred T.Hofstetter, Multimedia Literacy, McGraw Hill.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar /Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Make use of computer hardware and software technologies for making multimedia.	M	L		M									a, b, c, d, e.
2	Analyze various multimedia tools.	L	M		L	H								
3	Apply the core multimedia technologies and standards	M	M		M									
4	Infer the multimedia networking and communication systems Support.	M	L		L									
5	Design multimedia building blocks for world wide web.		M	M	L	H								

L – Low, M - Medium, H –High.

12CS8J QUANTUM COMPUTING L 3 T 0 P 0 C 3

CATEGORY: Elective

PREREQUISITE: 12CS6C – Distributed and Grid Systems

AIM

To introduce students to the basics of the quantum model of computation. The model will be used to study algorithms for searching and factorisation. Issues in the complexity of computation will also be explored.

COURSE OBJECTIVES:

- To understand the quantum model of computation and how it relates to quantum mechanics;
- To be familiar with some basic quantum algorithms and their analysis.
- To see how the quantum model relates to classical models of computation.

COURSE OUTCOMES:

- Develop circuit model of computation and functions of operators

- Evaluate Quantum Circuit model for transformations
- Develop quantum teleporation and quantum algorithms
- Analyze the order finding problem and quantum amplitude
- Make use of black box model and quantum error correction

UNIT I FOUNDATION 9

Overview of traditional computing – Church-Turing thesis – circuit model of computation – reversible computation – quantum physics – quantum physics and computation – Dirac notation and Hilbert Spaces – dual vectors – operators – the spectral theorem – functions of operators – tensor products – Schmidt decomposition theorem.

UNIT II QUBITS AND QUANTUM MODEL OF COMPUTATION 9

State of a quantum system – time evolution of a closed system – composite systems – measurement – mixed states and general quantum operations – quantum circuit model – quantum gates – universal sets of quantum gates – unitary transformations – quantum circuits.

UNIT III QUANTUM ALGORITHMS – I 9

Superdense coding – quantum teleportation – applications of teleportation – probabilistic versus quantum algorithms – phase kick-back – the Deutsch algorithm – the Deutsch- Jozsa algorithm – Simon's algorithm – Quantum phase estimation and quantum Fourier Transform – eigen value estimation.

UNIT IV QUANTUM ALGORITHMS – II 9

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

UNIT V QUANTUM COMPUTATIONAL COMPLEXITY AND ERROR CORRECTION 9

Computational complexity – black-box model – lower bounds for searching – general black-box lower bounds – polynomial method0020– block sensitivity – adversary methods – classical error correction – classical three-bit code – fault tolerance – quantum error correction – three- and nine-qubit quantum codes – fault-tolerant quantum computation.

TOTAL: 45 PERIODS

TEXT BOOKS

1. P. Kaye, R. Laflamme, and M. Mosca, “An introduction to Quantum Computing”, Oxford University Press, 1999.

REFERENCES

1. V. Sahni, “Quantum Computing”, Tata McGraw-Hill Publishing Company, 2007

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Develop circuit model of computation and functions of operators	M	L		L									a, b, d, e.
2	Evaluate Quantum Circuit model for transformations		M		M									
3	Develop quantum teleporation and quantum algorithms		L		M									
4	Analyze the order finding problem and quantum amplitude		L		M									
5	Make use of black box model and quantum error correction		L		M	M								

L – Low, M - Medium, H –High.

12CS8K AGENT BASED INTELLIGENT SYSTEMS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS6C – Distributed and Grid Systems

AIM

This course focuses on agent system architecture and infrastructure from a software engineering viewpoint.

COURSE OBJECTIVES:

- To understand the basic concepts of intelligent agents and problem solving.
- To learn about the knowledge representation and reasoning.
- To develop an agent-based system for a particular task
- To gain knowledge in planning agents and higher level agents.

COURSE OUTCOMES:

- Examine the fundamental concepts in Artificial Intelligence & game Playing.
- Classify different logics & Knowledge representation methods.
- Make use of role of various planning agents in agent based Intelligence.
- Recite different approaches in Agents systems.
- Choose higher level agents in different learning methods.

UNIT I INTRODUCTION 9

Definitions - Foundations - History - Intelligent Agents-Problem Solving-Searching - Heuristics - Constraint Satisfaction Problems - Game playing.

UNIT II KNOWLEDGE REPRESENTATION AND REASONING 9

Logical Agents-First order logic-First Order Inference-Unification-Chaining- Resolution Strategies-Knowledge Representation-Objects-Actions-Events.

UNIT III PLANNING AGENTS 9

Planning Problem-State Space Search-Partial Order Planning-Graphs-Nondeterministic Domains-Conditional Planning-Continuous Planning-MultiAgent Planning.

UNIT IV AGENTS AND UNCERTAINITY 9

Acting under uncertainty – Probability Notation-Bayes Rule and use – Bayesian Networks-Other Approaches-Time and Uncertainty-Temporal Models- Utility Theory - Decision Network – Complex Decisions.

UNIT V HIGHER LEVEL AGENTS 9

Knowledge in Learning-Relevance Information-Statistical Learning Methods- Reinforcement Learning-Communication-Formal Grammar-Augmented Grammars- Future of AI.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Stuart Russell and Peter Norvig, "Artificial Intelligence - A Modern Approach", 2nd Edition, Prentice Hall, 2002.

REFERENCES

1. Michael Wooldridge, "An Introduction to Multi Agent System", John Wiley, 2002.
2. Patrick Henry Winston, Artificial Intelligence, 3rd Edition, AW, 1999.
3. Nils.J.Nilsson, Principles of Artificial Intelligence, Narosa Publishing House, 1992.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Assign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Examine the fundamental concepts in Artificial Intelligence & game Playing.	M			H									a, b, d, e.
2	Classify different logics & Knowledge representation methods.		H		M	H								
3	Make use of role of various planning agents in agent based Intelligence.	M				H								
4	Recite different approaches in Agents systems.	M				M								
5	Choose higher level agents in different learning methods.		M		M	L								

L – Low, M - Medium, H –High.

12IT8E DESIGN PATTERNS

L	T	P	C
3	0	0	3

CATEGORY: Elective

PREREQUISITE: 12CS6B – Advanced Java Programming

AIM

This course focuses on types of design patterns and utilizes patterns in programming projects.

COURSE OBJECTIVES:

- To have an idea on design patterns and problem solving.
- To understand the concepts of Creational Patterns.
- To gain knowledge in structural and behavioral patterns.

COURSE OUTCOMES:

- Use design patterns to keep code quality high without overdesign.
- Choose creational patterns to make systems independent objects.
- Apply structural patterns to compose classes and objects into larger structures.
- Design the behavioural pattern to manage algorithms and assign responsibilities to objects
- Combine different patterns so that they work together in a software design

UNIT I INTRODUCTION 9

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT II DESIGNING A DOCUMENT EDITOR 9

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

UNIT III CREATIONAL PATTERNS 9

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT IV STRUCTURAL PATTERN 9

Structural Pattern Part-I: Adapter, Bridge, Composite, Structural Pattern Part-II : Decorator, Facade, Flyweight, Proxy.

UNIT V BEHAVIORAL PATTERN 9

Behavioral Patterns Part-III (cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns.

TOTAL: 45 PERIODS

TEXT BOOKS

1. Design Patterns, Erich Gamma, Pearson Education.

REFERENCES

1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III, Mark Grand, Wiley DreamTech.

4. Head First Design Patterns, Eric Freeman, Oreilly spd
5. Design Patterns Explained, Alan Shalloway, Pearson Education.

Evaluation Criteria & Marks	Continuous Assessment (25)			End Semester Examination	Total Marks
	Assess.Tests (60%)	Asign/Seminar/ Miniproj (30%)	Attendance (10%)		
	15	7.5	2.5	75 [Min Pass: 37]	100 [Min Pass: 50]
Attendance Mark	91% and above – 10, 85-90% - 8, 81-84% - 6, 76-80% - 4, 75% - 2				
Grade Criteria	S(90-100), A(81-89), B(71-80), C(61-70), D(56-60), E(50-55), U (<50)-Fail				

Course Outcomes (COs)		Programme Outcomes (POs)												Associated POs
		a	b	c	d	e	f	g	h	i	j	k	l	
1	Use design patterns to keep code quality high without overdesign.	M	H		M									a, b, d, e.
2	Choose creational patterns to make systems independent objects.		M		H	M								
3	Apply structural patterns to compose classes and objects into larger structures.	M	L		M									
4	Design the behavioural pattern to manage algorithms and assign responsibilities to objects	M	H		M									
5	Combine different patterns so that they work together in a software design	M	L		H									

L – Low, M - Medium, H –High.