PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

CURRICULUM

CBCS REGULATIONS 2016

SEMESTER I

Course Code	Course Title	L	T	P	C
MA16101	Matrices and Calculus	3	2	0	4
EN16101	Technical English I	3	0	0	3
PH16101	Engineering Physics	3	0	0	3
CH16101	Engineering Chemistry I	3	0	0	3
CS16101	Computer Programming	3	0	0	3
EE16101	Basic Electrical and Electronics Engineering	3	0	0	3
PC16101	Physics and Chemistry Laboratory I	0	0	2	1
CS16102	Computer Programming Laboratory	0	0	2	1
GE16101	Engineering Practices Laboratory	0	0	4	2

SEMESTER II

Course Code	Course Title	L	T	P	C
MA16201	Differential Equations and Complex Analysis	3	2	0	4
EN16201	Technical English II	3	0	0	3
PH16201	Solid State Physics	3	0	0	3
CH16201	Engineering Chemistry II	3	0	0	3
ME16202	Engineering Graphics	3	2	0	4
CS16203	Data Structures and Algorithms	3	0	0	3
PC16201	Physics and Chemistry Laboratory II	0	0	2	1
CS16204	Data Structures and Algorithms Laboratory	0	0	2	1
EN16202	English Communication Skills Laboratory	0	0	2	1

MA 16101 **MATRICES AND CALCULUS** **3 2 0 4**
(Common to all branches)

OBJECTIVES

To enable students to

- understand the concepts of Eigen values and Eigen vectors of real matrices and its applications inthe process of diagonalization of real symmetric matrices.
- study applications of Rolle's and Mean Value Theorems and also to understand the concept ofmaxima and minima using derivatives.
- learn the concept of partial differentiation and its applications to maxima and minima offunctions of two or more variables.
- develop a thorough knowledge of definite and indefinite integrals
- learn the concepts of multiple integrals and their applications

UNIT I MATRICES **15**

Characteristic equation – Eigenvalues and Eigenvectors of a real matrix – Properties – Cayley-Hamilton theorem (excluding proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Quadratic form –Reduction of quadratic form to canonical form by orthogonaltransformation.

UNIT II DIFFERENTIAL CALCULUS **15**

Limit – Continuity, properties of limit and classification of discontinuities - Simple problems. Differentiation – Standard forms, Successive differentiation and Leibnitz theorem**.** Mean value theorem – Rolle's theorem – maxima, minima using first and second derivative tests.

UNIT III FUNCTIONS OF SEVERAL VARIABLES **15**

Partial derivatives – Euler's theorem for homogenous functions – Total derivatives –Differentiation of Implicit functions – Jacobians – Taylor's expansion – Maxima and Minima – Method of Lagrangian multipliers.

UNIT IV INTEGRAL CALCULUS **15**

Indefinite and definite integrals - Properties of integrals, Integration of simple function. Methods of Integration – Integration by parts – Reduction formulae involving exponential and trigonometric functions, Bernoulli'sformula.

UNIT V MULTIPLE INTEGRALS **15**

Double integration – Cartesian and polar coordinates – Change of order of integration – Triple integrationin Cartesian co-ordinates – Area as double integral – Volume as triple integral.

TOTAL : 75 PERIODS

OUTCOMES

At the end of this course, the students will be able to

- determine eigen values and eigen vectors and diagonalize real symmetric matrices.
- classify various types of functions involved in engineering fields, their differentiation techniquesand applications
- find partial derivatives and apply the same to find maxima and minima of two or more variables
- implement different methods of integration used in engineering problems
- execute suitable integration techniques to calculate surface areas and volumes.

TEXT BOOKS

1. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications,Delhi, (2011).
2. P.Jayakumar, and Dr.B.Kishokkumar "Matrices and Calculus", Global Publishers, Chennai.,(2015).
3. T. Veerarajan., "Engineering Mathematics", 3rd Edition, Tata McGraw Hill, (2011).

REFERENCES

1. Erwin Kreyszig., "Advanced Engineering Mathematics" 10th Edition, WileyPublications.
2. Dass, H.K., and Er. RajnishVerma, "Higher Engineering Mathematics", S. Chand Private Ltd.,(2011).
3. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education,(2012).
4. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2008).

Mapping of Course Outcomes with Programme Outcomes
(1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	-	-	-	-	-	-	1	2	3
CO2	3	3	2	3	-	-	-	-	-	-	-	1	2	3
CO3	3	2	2	3	-	-	-	-	-	-	-	1	2	3
CO4	3	2	3	1	-	-	-	-	-	-	-	1	2	3
CO5	3	2	2	2	-	-	-	-	-	-	-	1	2	3

PAVAI ENGINEERING COLLEGE, NAMAKKAL ★ AUTONOMOUS ★ Approved BOARD OF STUDIES Mathematics 06/05/2016

EN16101 **TECHNICAL ENGLISH I** **3 0 0 3**

(Common to all Branches)

COURSE OBJECTIVES

To enable students to

- impart knowledge about the importance of vocabulary and grammar.
- help the students of engineering and technology develop a strong base in the use of English.
- improve the reading skills of the students so as to enable them to communicate with confidence in English.
- develop their basic speaking skills in order to deliver impromptu talks, participate with confidence in conversations.
- enable students to write / draft effective essays and emails for effective communication.

UNIT I VOCABULARY & GRAMMAR 9

General Vocabulary - Prefixes & Suffixes - Words used as nouns and verbs - Comparative adjectives - Phrasal verbs- Acronyms - Abbreviations -Tenses - Active and Passive voice - Modal verbs and Probability - Cause and Effect expressions - Subject-verb agreement - Yes or no questions - Gerund and Infinitives - Imperative Sentences - Prepositions.

UNIT II LISTENING 9

Listening and transferring of information, listening to dialogues, listening to informal conversation- listening to short talks and answering questions- understanding the structure of conversations- telephone etiquettes - note taking.

UNIT III READING 9

Reading - Sub-Skills of reading - skimming - scanning - predicting - Reading comprehension - reading short passages in English and answering multiple choice questions / open-ended questions - Analyzing the use of language in advertisements - Interpreting Visual Information - Flow Chart, Pie Chart, (Transcoding).

UNIT IV WRITING 9

Informal letters - email communication - Developing hints - Writing Instructions, Recommendations – Note Making - Minutes of the Meeting - Use of cohesive devices and reference words - Essay writing - different types of essays - summary writing.

UNIT V SPEAKING 9

Self introduction - Personal information - Name, background, study details, areas of interest, hobbies, strengths and weaknesses, role model and future ambition -Role Play- Presentation on a given topic- Group Discussion skills- fundamentals of GD.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- use suitable vocabulary and grammar with confidence and express their ideas both in speech and writing.
- listen and comprehend classroom lectures, short talks and conversations.
- read, interpret and analyze a given text effectively, and use cohesive devices in spoken and written English.
- understand English and converse effectively.
- write flawless sentences, essays and letters.

TEXT BOOK

1. Mahalakshmi.S.N. English and Workbook for Engineers. V.K. Publications, Sivakasi. 2017.
2. Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering. Orient Blackswan, Chennai.2011.

REFERENCES

1. Raman, Meenakshi & Sangeetha Sharma. Technical Communication: Principles and practice. Oxford University Press, New Delhi. 2011.
2. Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi. 2001.
3. Rutherford, Andrea. J Basic Communication Skills for Technology. Pearson, New Delhi, 2001.

Mapping of Course Outcomes with Programme Outcomes

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs		Programme Outcomes (POs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	2	-	2	2	1	-	-
CO2	-	-	-	-	2	3	2	3	1	3	1	-	-	-
CO3	-	-	-	3	-	2	-	2	2	2	2	2	-	-
CO4	-	-	-	-	-	2	2	2	1	3	1	1	-	-
CO5	-	-	-	2	-	-	-	3	3	-	3	1	-	-

CS16102 **COMPUTER PROGRAMMING LABORATORY** **0 0 2 1**

(COMMON TO CSE/ECE /EEE/CHEMICAL/IT)

COURSE OBJECTIVES

- To be familiar with the use of word processing software.
- To get exposure in presentation and visualization tools.
- To understand the problem solving techniques and flow charts.
- To use Arrays, strings, functions, structures and unions.

LIST OF EXERCISES

a) Word Processing **10**

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

b) Spread Sheet **10**

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
8. Sorting and Import / Export features.

C Programming **10**

9. Data types, Expression Evaluation, Condition Statements.
10. Arrays
11. Structures and Unions
12. Functions
13. File Handling
14. Pointers

COURSE OUTCOMES

At the end of this course, the students will be able to

- execute the word processing programs.
- execute C programs for simple applications.
- develop recursive programs.
- develop recursive programs.

TOTAL PERIODS: 30

Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	**Programme Outcomes(POs)**												**Programme Specific Outcomes (PSOs)**	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3

DIFFERENTIAL EQUATIONS AND COMPLEX

MA 16201 **ANALYSIS** **3 2 0 4**

(Common to all branches)

OBJECTIVES

To enable students to

- discuss a wide range of basic mathematical methods for solving different types of problems arising in the fields of Science, Mathematics and Engineering.
- acquire sound knowledge in solving ordinary differential equations that model engineering problems.
- understand the concept of vector calculus, which is applied in all engineering disciplines.
- know the standard techniques of complex variable theory.
- learn the purpose of using transforms and to create a new domain

UNIT I ORDINARY DIFFERENTIAL EQUATIONS 15

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

UNIT II VECTOR CALCULUS 15

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields.–Vectorintegration – verifications of Green's, Gauss divergence and Stokes' theorem – simple applications.

UNIT III ANALYTIC FUNCTIONS 15

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equationand Sufficient conditions (excluding proofs) – Harmonic and orthogonal propertiesof analytic

UNIT IV COMPLEX INTEGRATION 15

Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula– Taylor and Laurent expansions – Singular points – Residues – Residue theorem –Contour integration.

UNIT V LAPLACE TRANSFORM 15

Laplace transform – Transform of elementary functions – Basic properties – Definition of Inverse Laplace transform as contour integral – Convolution theorem(excluding proof)– Initial and Final value theorems – Solution of linear ODE of second order with constant coefficientsusing Laplace transformation techniques.

TOTAL: 75 PERIODS

OUTCOMES

At the end of this course, the students will be able to

- solve differential equations
- study the basics of vector calculus comprising of gradient, divergence and curl and line, surface and volume integrals and the classical theorems.
- know the concepts of analytic functions and its properties and apply it in conformal mapping.
- gain knowledge in the basics of complex integration and the concept of contour integration which is an important tool for evaluation of certain integrals encountered in practice.
- solve Laplace transform and its properties and give sufficient exposure to the solution of certain linear differential equations.

TEXT BOOKS

1. Grewal. B.S, "Higher Engineering Mathematics", 41st Edition, Khanna Publications, Delhi,(2011).
2. P.Jayakumar, and Dr.B.Kishokkumar, "Differential Equations and Complex Analysis", Global Publishers, Chennai.,(2015).
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REFERENCES

1. Dass, H.K., and Er. RajnishVerma, "Higher Engineering Mathematics", S. Chand Private Ltd.,(2011).
2. T. Veerarajan., "Engineering Mathematics", 3rd Edition, Tata McGraw Hill, 2011.
3. Peter V. O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning, (2012).
4. Ramana B.V, "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, (2008).

Mapping of Course Outcomes with Programme Outcomes
(1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3	3	3
CO3	3	3	3	2	-	-	-	-	-	-	-	2	3	3
CO4	3	2	3	3	-	-	-	-	-	-	-	3	3	3
CO5	3	3	2	3	-	-	-	-	-	-	-	3	3	3

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EN16201 **TECHNICAL ENGLISH II** **3 0 0 3**

(Common to all Branches)

COURSE OBJECTIVES

To enable students to

- help the students of engineering and technology to enhance their ability to listen, read, write and speak English.
- comprehend and write essays and prepare short project reports related to their branches of specialization.
- enhance their ability to read and comprehend technical texts.
- make effective presentations on topics in engineering and technology.
- participate successfully in Group Discussions.

UNIT I VOCABULARY & GRAMMAR **9**

General Vocabulary- use of articles- different forms of a word (noun, verb) - Collocations - Fixed Expressions (adhere to, on the part of etc.)- Phrasal verbs - Compound nouns - Numerical Expressions - Direct and Indirect Speech - use of discourse markers - if conditionals- Cause and Effect expressions - Editing - Wh questions - One word substitution.

UNIT II LISTENING **9**

Listening to news and announcements, listening to telephone conversation- Listening to model interviews / TED Talks- Interview Techniques.

UNIT III READING **9**

Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading- Reading articles in newspapers, journals, manuals- critical reading.

UNIT IV WRITING **9**

Writing- Extended Definitions - Checklist, Recommendations -Formal letters- complaint letters, invitation letters- requisition letters - Writing a job application - Resume (Letter and Email format) - Technical Report Writing - (Industrial Visit, Accident, Feasibility & Project Reports) - Paragraph writing, Essay writing.

UNIT V SPEAKING **9**

Syllable - Stress- Intonation- Silent Letters - Presentations on a given topic - Mini presentation in small groups- group discussions- mock interviews.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Speak with clarity and confidence.
- Read, interpret and analyse a given text.
- Write comprehensive reports, job applications and draft effective e-mails.
- Make effective presentations using power point.
- Participate successfully in Group Discussions.

TEXT BOOKS

1. Mahalakshmi.S.N. English Workbook for Engineers, V.K. Publications, Sivakasi.2017.
2. Dhanavel, S.P. English and Communication Skills for Students of Science and Engineering. Orient Blackswan, Chennai.2011.

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3. Rutherford, Andrea. J Basic Communication Skills for Technology. Pearson, New Delhi. 2001.

Mapping of Course Outcomes with Programme Outcomes

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	2	-	2	2	1	-	-
CO2	-	-	2	-	-	3	2	3	1	3	-	-	-	-
CO3	-	-	-	3	-	2	-	2	2	2	2	2	-	-
CO4	-	-	-	-	-	2	2	2	1	3	-	-	-	-
CO5	-	-	-	2	-	-	-	3	3	3	3	-	-	-

PH16201 **SOLID STATE PHYSICS** **3 0 0 3**

(COMMON TO EEE / ECE / CSE / IT)

COURSE OBJECTIVES

To enable the students to

- gain knowledge in the conduction properties of metals.
- correlate better understanding of carrier concentration and its variation with temperature in different types of semiconductors.
- explain the different kinds of polarization mechanisms and applications of dielectric materials.
- discriminate the different types of magnetic materials and uses.
- classify the different types of optical materials and data storage techniques.

UNIT I CONDUCTING MATERIALS 9

Introduction: types of conducting materials- classical free electron theory: postulates- derivation of electrical conductivity. Thermal conductivity- derivation.Wiedemann-Franz law and its verification-merits and demerits of classical free electron theory. Quantum free electron theory: Fermi-Dirac distribution function and its variation with temperature – density of energy states –carrier concentration in metals-average energy of electrons at ok.

UNIT II SEMICONDUCTING MATERIALS 9

Introduction: direct and indirect band gap semiconductors- origin of band gapin solids (qualitative treatment only) - concept of effective mass of an electron and hole. Intrinsic semiconductor: expressions for density of electrons, holes, carrier concentration, Fermi level, electrical conductivity and band gap.

Extrinsic semiconductors: derivations for charge carrier in n-type and p-type semiconductors – variation of Fermi level with temperature and impurity concentration. Hall effect–theory and experimental determination of Hall coefficient – Applications.

UNIT III DIELECTRIC MATERIALS 9

Introduction: fundamental definitions in dielectrics–expressions for electronic andionic polarization mechanisms- orientation polarization (qualitative) – space charge polarization – Langevin – Debye equation – frequency and temperature effects on polarization. Internal field – expression for internal field (cubic structure) –Clausius–Mosotti equation–significance–dielectric loss –dielectric breakdown – various breakdown mechanisms with characteristics – applications of dielectric materials.

UNIT IV MAGETIC MATERIALS 9

Introduction: basis definitions – origin of magnetic moment –Bohr magnetion-magnetic materials: classification of dia,para,ferro magnetic materials. Ferro magnetic domains-energies involved in the growth of magnetic domains-hysteresis-explanation of hysteresis curve based on domain theory-soft and hard magnetic materials-ferrites-applications. Magneto resistance (MR) and giant magneto resistance (GMR).

UNIT V OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – absorption in metals, insulators & semiconductors –LED's: Organic LED's – polymer light emitting materials – plasma light emitting devices – LCD's: properties –twisted neamatic display – dynamic scattering display - comparison between LED and LCD. Optical data storage techniques: DVD, blue –ray disc and holographic data storage.

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of the course, the students will be able to

- select the metals required for specific applications in the area of engineering and technology.
- distinguish between different types of semiconductor and determination of Hall co-efficient.
- classify different kinds of polarization mechanism and uses.
- identify different magnetic materials and giant magneto resistance.
- relate the different types of optical materials and applications.

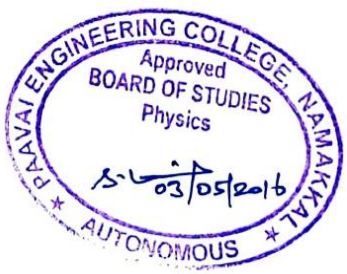
TEXT BOOKS

1. V.Rajendran, "Materials Science", Tata McGraw- Hill, New Delhi, 2011.
2. S.Vadivel, A.Pannerselvam, Solid State Physics, Jaitech Publications, 2015 (Revised edition).

REFERENCES

1. Charles Kittel, "Introduction to Solid State Physics", John Wiley & sons, 7th edition, Singapore (2007).
2. P.K.Palanisamy, Materials Science. SCITECH Publishers, 2011.
3. M.Arumugam, Materials Science. Anuradha publishers, 2010.
4. S.O.Pillai, Solid State Physics. New Age International(P) Ltd., publishers, 2009
5. T.Pradeep, "A Text Book of Nanoscience and Nanotechnology", Tata McGraw Hill, New Delhi, 2012

Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs		**Programmes Outcomes (POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	3	-	-	-	2	-	-	-	-	-	-	-
CO2	3	-	3	2	-	-	-	-	-	-	-	-	-	-
CO3	-	2	2	1	-	-	1	-	-	-	-	-	-	-
CO4	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	3	1	-	-	-	-	-	-	-	-	-	-



CS16203 **DATA STRUCTURES AND ALGORITHMS** **3 0 0 3**

(COMMON TO CSE / IT)

COURSE OBJECTIVES

- To understand the fundamental data structures and algorithms.
- To analyze theoretical analysis, and application of data structure.
- To learn linear data structures such as list, stack, and queue.
- To understand the methods of sorting, searching, hashing of algorithms
- To analyze the algorithms and their complexity

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 queueimplementation -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- AVL trees – binary heaps.

UNIT III HASHING AND SETS 9

Hashing –Separate Chaining – Open Addressing – Rehashing – Extendible Hashing – - Disjoint Set ADT - dynamic equivalence problem -smart union algorithms - path compression –applications of Sets.

UNIT IV GRAPHS 9

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

UNIT V ALGORITHM DESIGN AND ANALYSIS 9

Introduction to algorithm design techniques: Greedy algorithms, Divide and conquer, Dynamic programming, backtracking, branch and bound, Randomized algorithms – Introduction to algorithm analysis: asymptotic notations, recurrences – Introduction to NP-complete problems

TOTAL: 45 PERIODS

COURSE OUTCOMES

At the end of this course, the students will be able to

- gain knowledge in the various data structure concepts.
- implement abstract data types for linear data structures.
- apply the different linear data structures and find appropriate solutions for the problem.
- review various implementations and operation of priority queue.
- implement the concept of depth first search and bi-connectivity

TEXT BOOK

1. M. A. Weiss, “Data Structures and Algorithm Analysis in C”, Fourth Edition, Pearson Education, 2013.

REFERENCES

1. V. Aho, J. E. Hopcroft, and J. D. Ullman, ‘Data Structures and Algorithms′, PearsonEducation, 2009.
2. R. F. Gilberg, B. A. Forouzan, ‘Data Structures′, Second Edition, Thomson IndiaEdition, 2008.
3. M. Tenenbaum, Y. Langsam, and M. J. Augenstein, ‘Data Structures using C′,Pearson Education, 2007.
4. K.S. Easwarakumar, Object Oriented Data Structures using C++, Vikas Publishing House pvt.Ltd., 2010.
5. Sara Baase and A. Van Gelder, ‘Computer Algorithms′, Third Edition, Pearson Ed.,2011

WEB LINKS

1. http://www.nptel.ac.in/
2. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
3. https://www.youtube.com/watch?v=RpRRUQFbePU

Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	**Programme Outcomes(POs)**												**Programme Specific Outcomes (PSOs)**	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3
CO5	3	3	3	-	-	2	-	-	-	-	-	3	3	2

CS16204 **DATA STRUCTURE AND ALGORITHMS LAB** **0 0 2 1**

(COMMON TO CSE / IT)

COURSE OBJECTIVES

- To be familiar with c programming
- To implement abstract data types
- To implement singly and doubly linked lists.
- To implement sorting and searching algorithms.

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 array-based circular queue and use it to simulate a producer-consumer problem.
5. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.
6. Implement binary search tree.
7. Implement priority queue using heaps
8. Implement hashing techniques.
9. Implement Dijkstra's algorithm using priority queues
10. Implement Greedy algorithm using C.
11. Implement Branch and bound, Divide and Conquer algorithm using C.

TOTAL PERIODS: 30

COURSE OUTCOMES

At the end of this course, the students will be able to

- design and execute C programs for stacks, queues, and linked lists.
- apply the different data structures concepts and find solutions to practical problems.
- gain in depth knowledge in searching and sorting programs.
- demonstrate array implementation of list ADT.

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COs	**Programme Outcomes(POs)**												**Programme Specific Outcomes (PSOs)**	
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3

PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

CURRICULUM

REGULATIONS 2016

(CHOICE BASED CREDIT SYSTEM)

SEMESTER III

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1	BS	MA16301	Transforms and Boundary Value Problems	3	2	0	4
2	PC	IT16301	Object Oriented Programming with C++	3	0	0	3
3	PC	IT16302	Design and Analysis of Algorithms	3	0	0	3
4.	ES	EC16307	Principles of Communication	3	0	0	3
5.	ES	EC16308	Digital Principles and System Design	3	0	0	3
6	BS	CH16301	Environmental Science and Engineering	3	0	0	3
Practical							
7.	PC	IT16305	Object Oriented Programming with C++ Laboratory	0	0	4	2
8.	ES	EC16309	Digital Laboratory	0	0	4	2
9.	HS	EN16301	Business English Course Laboratory	0	0	2	1
			TOTAL	**18**	**2**	**10**	**24**

SEMESTER IV

S.No	Category	Course Code	Course Title	L	T	P	C
Theory							
1.	BS	MA16401	Probability and Queuing Theory	3	2	0	4
2.	PC	IT16401	Java Programming	3	2	0	4
3.	PC	IT16402	Operating Systems	3	0	0	3
4.	PC	IT16403	Database Management Systems	3	0	0	3
5.	PC	IT16404	Computer Architecture	3	0	0	3
6.	ES	EC16408	Microprocessor and Microcontroller	3	0	0	3
Practical							
7.	PC	IT16405	Database Management Systems Laboratory	0	0	4	2
8.	PC	IT16406	Operating Systems Laboratory	0	0	4	2
9.	ES	EC16409	Microprocessor and Microcontroller Laboratory	0	0	4	2
			TOTAL	**18**	**4**	**12**	**26**

SEMESTER III

TRANSFORMS AND BOUNDARY VALUE PROBLEMS

MA16301 **3 2 0 4**

(COMMON TO ALL BRANCHES)

COURSE OBJECTIVES

- to introduce fourier series analysis which is central to many applications in engineering apart from solvingboundary value problems.
- to acquaint the student with Fourier transform techniques used in many engineering systems..
- to familiarize effective application of mathematical tools for the solutions of partial differential equationsthat model several physical processes.
- to apply one dimensional equation of heat conduction and study about wave equation.
- to learn and apply Z transform techniques for discrete time systems.

UNIT I FOURIER SERIES 15

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

UNIT II FOURIER TRANSFORMS 15

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 15

Formation of partial differential equations – Lagrange's linear equation – Solutions of standard four 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 15

Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction.

UNIT V Z - TRANSFORMS AND DIFFERENCE EQUATIONS 15

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

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of the course, students will be able to

- comprehend fourier series, their different possible forms and the frequently needed practical harmonicanalysis from discrete data.
- describe the concept of a function as a double integral under certain conditions and apply in the fourier transform pair and their properties.
- solve certain boundary value problems and apply the methods and results in engineering applications.
- employ partial differential equations to solve one dimensional wave and heat equations.
- demonstrate the knowledge of differential equations gained and solve them using Z transforms.

TEXT BOOKS

1. Veerarajan T., "Transforms and Partial Differential Equations", Tata McGraw Hill Education Pvt. Ltd.,New Delhi, Second reprint, 2012.
2. Narayanan S., Manickavasagam Pillai.T.K and Ramanaiah.G "Advanced Mathematics for EngineeringStudents" ,Vol. II & III, S.Viswanathan Publishers Pvt Ltd. 1998

REFERENCES

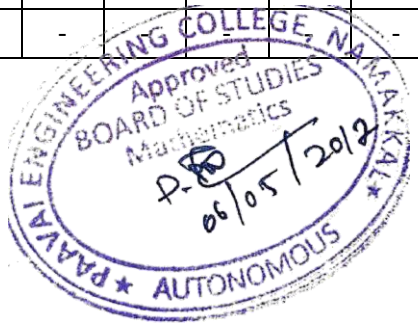
1. Larry C. Andrews, Bhimsen K. Shivamoggi, "Integral Transforms for Enginears", SPIE OpticalEngineering press, Washington USA (1999).
2. Ramana.B.V., "Higher Engineering Mathematics", Tata Mc-GrawHill Publishing Company limited, NewDelhi (2010).
3. Glyn James, "Advanced Modern Engineering Mathematics", 3rd Edition, Pearson Education (2007).
4. Erwin Kreyszig., "Advanced Engineering Mathematics" 10th Edition,Wiley Publications
5. Ray Wylie C and Barrett.L.C, "Advanced Engineering Mathematics", Tata McGraw Hill Education PvtLtd, Sixth Edition, New Delhi, 2012.

WEB LINKS

1. https://www.youtube.com/watch?v=coe-UA5ONI0
2. https://www.youtube.com/watch?v=gZNm7L96pfY
3. http://172.16.100.200/NPTEL/displayweb.html?type1=111103021%2F35.pdf
4. https://www.youtube.com/watch?v=4GHY8sRKPaU
5. http://172.16.100.200/NPTEL/displayweb.html?type1=111104031%2Flectures.pdf%23page%3D101.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3	3	3
CO3	3	3	3	2	-	-	-	-	-	-	-	2	3	3
CO4	3	2	3	3	-	-	-	-	-	-	-	3	3	3
CO5	3	3	2	3	-	-	-	-	-	-	-	3	3	3



IT16301 OBJECT ORIENTED PROGRAMMING WITH C++ 3 0 0 3

COURSE OBJECTIVES

- to get a clear understanding of object-oriented concepts.
- to understand object oriented programming through C++.
- to develop the problem solving skills by applying object-oriented concepts inheritance and virtualclasses.
- to create programs using streams and file handling
- to learn templates and exception handling in C++

UNIT I PRINCIPLES OF OOP 9

Programming Paradigms- Basic concepts and benefits of OOP- Structure of C++ program - Applications of C++- Tokens- Keywords- Identifiers-constants- variables - Data types - Basic, User defined ,Derived - Dynamic initialization -Reference variables- Scope resolution operator- Function Prototyping- Inline function- Default arguments – Function overloading.

UNIT II CLASSES, OBJECTS AND CONSTRUCTORS 9

Class specification- Static data members and member functions - Array of objects- Objects as function arguments - Friend functions- Returning objects- Local classes - Constructors – Parameterized constructors- Multiple Constructors- Constructors with default arguments-Copy constructors- Destructors - Operator Overloading-Overloading unary and binary operator.

UNIT III INHERITANCE AND VIRTUAL CLASS 9

Introduction – types- Single Inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance-Hybrid Inheritance. Virtual base class – Abstract class – this pointer-Dynamic binding-virtualfunction – pure virtual function.

NIT IV STREAMS AND FILE HANDLING 9

Stream classes- Formatted and unformatted I/O operations- Manipulators- File handling - File open and close-File pointers and their manipulators- Sequential and random access-Error Handling.

UNIT V TEMPLATES AND EXCEPTION HANDLING 9

Class templates-Function templates- overloading of template functions- Exception Handling: Exception handling mechanism-throwing mechanism- catching mechanism- rethrowing an exception. Standard Template Library.

TOTALHOURS 45

COURSE OUTCOMES

At the end of the course, students will be able to

- explain the object oriented concepts
- understand object oriented programming through C++.
- create programs using inheritance and virtual classes.
- develop programs using streams and file handling.
- know function and class template & way of handling exception.

TEXT BOOKS

1. E.Balagurusamy, "Object Oriented Programming with C++", Tata McGraw Hill, Sixth Edition, 2013

REFERENCES

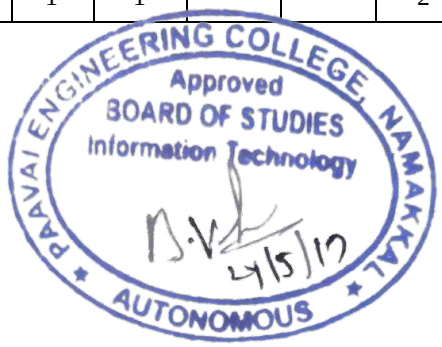
1. B.Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
2. K.R.Venugopal, Rajkumar, T.Ravishankar, "Mastering C++ ",Tata McGraw Hill, 2007.
3. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publications, 2006
4. BjarneStroustrup, "The C++ Programming Language", Pearson Education, Fourth Edition, 2013.
5. K.S. Easwarakumar, " Object Oriented Data Structures Using C++", Vikas Publication House Pvt Ltd,First Edition, 2000.

WEB LINKS

1. http://www.desy.de/gna/html/cc/Tutorial/tutorial.html
2. http://thatchna.weebly.com/uploads/4/1/9/3/4193382/std_c_notes_03.pdf
3. https://www.youtube.com/watch?v=CzWZYwOvrcE

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	-	-	-	-	-	-	-	-	-	-	-	2	3
CO2	3	2	-	-	-	-	-	-	1	1	-	-	2	3
CO3	3	2	-	-	-	-	-	-	1	1	-	-	2	2
CO4	3	2	-	-	-	-	-	-	1	1	-	-	2	3
CO5	3	2	-	-	-	-	-	-	1	1	-	-	2	2



IT16302 DESIGN AND ANALYSIS OF ALGORITHMS 3 0 0 3

COURSE OBJECTIVES

- to study the principles of algorithm design.
- to know the importance of computational complexity of the algorithm .
- to become familiar with dynamic programming, divide and conquer, branch and bound andbacktracking techniques.
- to understand the limitations of algorithm power.
- to study about Notions of P, NP, NPC, and NP-hard.

UNIT I INTRODUCTION 9

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving –Important Problem Types– Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms.

UNIT II BRUTE FORCE AND DIVIDE-AND-CONQUER 9

Brute Force –Closest-Pair and Convex-Hull Problems-Exhaustive Search - Traveling Salesman Problem - KnapsackProblem - Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex-HullProblems.

UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE 9

Computing a Binomial Coefficient– Warshall's and Floyd's algorithm – Optimal Binary Search Trees– KnapsackProblem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm- Huffman Trees.

UNIT IV ITERATIVE IMPROVEMENT 9

The Simplex Method-The Maximum-Flow Problem – Maxim Matching in Bipartite Graphs- The Stablemarriage Problem.

UNIT V LIMITATIONS OF ALGORITHM POWER 9

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems- Coping- with the Limitations – Backtracking - n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound - Assignment problem – Knapsack Problem – Traveling Salesman Problem.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course, the students will be able to

- discuss the significance of algorithms in problem solving process.
- analyze asymptotic runtime complexity of algorithms.
- describe and apply dynamic programming and divide and conquer algorithms.
- design efficient algorithms for new situations, using as building blocks the techniques learned.
- apply algorithm design techniques to solve certain NP-complete problems.

TEXT BOOK

1. AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, PearsonEducation, 2012.

REFERENCES

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.
3. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009.
4. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

WEB LINKS

1. nptel.ac.in/courses/106101060/
2. freevideolectures.com › Computer Science › IIT Bombay

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	-	2	1	-	2	1	1	1	2	3	1	-
CO2	3	3	1	2	2	-	2	-	-	-	2	3	2	-
CO3	3	3	1	2	2	-	2	-	-	-	2	3	2	2
CO4	3	3	1	2	2	-	2	-	-	-	2	3	2	1
CO5	3	3	1	2	2	-	2	-	-	-	2	3	2	1

EC16307 PRINCIPLES OF COMMUNICATION 3 0 0 3

COURSE OBJECTIVES

- to understand the different types of AM and FM Communication systems
- to gain knowledge in different digital modulation techniques for digital transmission.
- to study about base band transmission ISI and distortion free base band transmission.
- to know the different multiple access methods in wireless communication
- to acquire knowledge about Satellite and Optical Communication.

UNIT I ANALOG COMMUNICATION 9

Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation

UNIT II DIGITAL COMMUNICATION 9

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation.

UNIT III DIGITAL TRANSMISSION 9

Introduction, Pulse modulation, PCM – PCM sampling, sampling rate, signal to quantization noise rate, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission – Inter symbolinterference, eye patterns.

UNIT IV MULTIPLE ACCESS TECHNIQUES 9

Multiple access techniques – wireless communication, TDMA, FDMA and CDMA in wireless communication systems, Source coding of speech for wireless communications.

UNIT V SATELLITE AND OPTICAL COMMUNICATION 9

Satellite Communication Systems-Keplers Law, LEO and GEO Orbits, Link model-Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course, students will be able to

- compare AM and FM communication systems .
- evaluate different digital modulation techniques for digital transmission.
- analyze the concepts of digital communication and applications.
- apply the concept of different multiple access methods
- analyze the concepts of satellite and optical communication.

TEXT BOOKS

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

REFERENCES

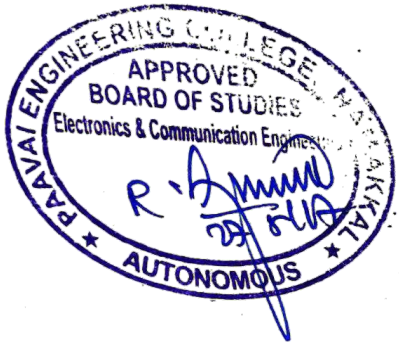
1. H.Taub, D L Schilling ,GSaha ,"Principles of Communication"3/e,2007.
2. B.P.Lathi,"Modern Analog and Digital Communication systems", 3/e, Oxford University Press, 2007
3. Dennis Roddy, "Satellite Communications", 4th Edition, McGraw Hill Professional, 2006.
4. Govind.P.Agarwal, "Fiber optic communication systems", 3rd edition, John Wiley & Sons Publications 2002.

WEB LINKS

1. https://www.youtube.com/watch?v=TPm0XSPxld8
2. www.nptel.ac.in/courses/106105080/pdf/M2L5.pdf
3. http://nptel.ac.in/courses/108101037/28
4. http://nptel.ac.in/courses/108101037/12

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	-	-	-	-	2	-	-	3	3	3
CO2	3	3	3	2	-	-	-	-	2	-	-	-	3	3
CO3	3	3	3	-	-	-	-	-	-	-	-	-	3	3
CO4	3	3	3	2	-	-	-	-	-	-	-	3	3	3
CO5	3	3	3	2	-	-	-	-	2	-	-	3	3	3



IT16305 OBJECT ORIENTED PROGRAMMING WITH C++ LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to know the fundamental knowledge of object oriented programming.
- to develop skills required to become a proficient C++ programmer.
- to transforming the physical problem domain into a hierarchy of objects.
- to apply OOP to solve simple engineering problems.
- to development of solution for complex problems in the real world.

LIST OF EXPERIMENTS

1. Write C++ Programs using Classes and Objects.
2. Write C++ classes with static members, methods with default arguments, friend functions.
3. Develop C++ Programs using Operator Overloading.
4. Develop C++ Programs using constructor, destructor, and copy constructor.
5. Develop C++ Programs Overload the new and delete operators.
6. Develop C++ Programs using Inheritance, Polymorphism and its types.
7. Develop C++ Programs using Arrays and Pointers.
8. Develop C++ Programs using Dynamic memory allocation.
9. Develop C++ Programs using Templates and Exceptions.
10. Develop C++ Programs using Sequential and Random access files.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course, the students will be able to

- design an object oriented program using classes and objects.
- apply inheritance to reuse the C++ code.
- apply polymorphism to extend the code and reduce the complexity of the program.
- implement files and streams in C++ programs.

RECOMMENDED SYSTEM/SOFTWARE

REQUIREMENTSSOFTWARE: Turbo C++.

HARDWARE: Flavor of any WINDOWS or LINUX and Standalone desktops 30 Nos.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	-	-	2	-	-	-	-	-	-	-	3	3
CO2	2	1	-	-	2	-	-	-	-	-	-	-	1	3
CO3	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	3

PAVAI ENGINEERING COLLEGE NAMAKKAL Approved BOARD OF STUDIES Information Technology 7/5/17 AUTONOMOUS

EN16301 BUSINESS ENGLISH COURSE LABORATORY 0 0 2 1

COURSE OBJECTIVES

- to develop the reading skills of the students and to familiarize them in skimmingand scanning.
- to instill the communication concepts and enhance the students' conversational skills through various practicesessions .
- to familiarize them with a variety of business correspondence.
- to develop the receptive skills such as listening and reading and to make the students well versed in theproductive skills (writing and speaking).
- to assist them in improving their vocabulary and comprehension of grammar.

UNIT I READING AND VOCABULARY 6

Understanding short, notices, messages - detailed comprehension of factual material- skimming & scanning skills - interpreting visual information- reading for gist and specific information - reading for grammatical accuracy and understanding of text structure - reading and information transfer.

UNIT II WRITING 9

Fixing appointments - asking for permission - giving instructions - apologizing and offering compensation - making oraltering reservations - dealing with requests - - giving information about a product

UNIT III LISTENING 6

Listening to short telephonic conversation - Listening to short conversation or monologue - Listening to specificinformation - Listening to recordered interview, discussion.

UNIT IV SPEAKING 9

Conversation between the interlocutor and the candidate - interaction in social contexts - A mini presentation by each candidate on a business theme - organising a larger unit of discourse – giving information and expressing opinions – interactive communication conversation between candidates followed by further prompting from the interlocutor-Expressing opinions- agreeing and disagreeing.

TOTAL PERIODS 30

COURSE OUTCOMES

At the end of the course, the students will be able to

- enrich the business vocabulary through reading.
- develop their pronunciation skills.
- speak effectively in English in various occasions.
- prepare flawless reports and proposals.

TEXT BOOKS

1. Cambridge BEC Preliminary, Self Study Edition, Cambridge University Press, New York, 2012
2. Whitby, Norman. Business Benchmark, Pre-intermediate to intermediate, Business Preliminary, Shree MaitreyPrintech Pvt. Ltd., Noida, 2014.

REFERENCES

1. Raman, Meenakshi&Sangeetha Sharma. Technical Communication: Principles and Practice Oxford UniversityPress, New Delhi. 2011.
2. Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi. 2005.
3. Rutherford, Andrea. J Basic Communication Skills for Technology. Pearson, New Delhi.

WEB SOURCE

1. http://www.cambridge.org/us/cambridgeenglish/catalog/cambridge-english-exams-ielts/business-benchmark

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	-	-	-	2	3	-	-	-	3	2	-	-	-	2
CO2	-	-	1	1	2	-	-	-	3	2	-	-	1	2
CO3	-	-	2	2	-	-	1	1	3	2	-	2	-	2
CO4	-	-	-	-	-	3	1	2	3	2	2	3	2	-

IT16401 JAVA PROGRAMMING 3 2 0 4

COURSE OBJECTIVES

- to understand the concepts of object oriented programming.
- to understand the concepts of inheritance.
- to develop an application in event driven programming.
- to develop an application in generic programming.
- to develop an application in concurrent programming.

UNIT I OBJECT-ORIENTED PROGRAMMING – FUNDAMENTALS 15

Review of OOP - Objects and classes in Java – defining classes – methods –access specifies – static members– constructors – finalize method – Arrays – Strings -Packages – Java Doc comments.

UNIT II OBJECT-ORIENTED PROGRAMMING – INHERITANCE 15

Inheritance – class hierarchy – polymorphism – dynamic binding – final keyword –abstract classes – the Objectclass – Reflection – interfaces – object cloning – inner classes – proxies.

UNIT III EVENT-DRIVEN PROGRAMMING 15

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 15

Motivation for generic programming – generic classes – generic methods – generic code and virtual machine– inheritance and generics – reflection and generics – exceptions –exception hierarchy – throwing andcatching exceptions – Stack Trace Elements -assertions – logging.

UNIT V CONCURRENT PROGRAMMING 15

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

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of the course, the students will be able to

- understand the needs of object oriented programming.
- differentiate the functionalities of object oriented approach and procedural languages.
- demonstrate the concepts of event-driven programming.
- exhibit the concepts of generic programming using Java .
- perform the concepts of concurrent programming.

TEXT BOOKS

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, Eighth Edition, SunMicrosystems Press, 2008.

2. Herbert Schildt, Java2-CompleteReference, Tata McGraw Hill, 2011.

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, PearsonEducation, 2000.
3. C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, TataMcGraw-Hill Publishing Company Ltd., 2006.
4. Gary Cornell and Cay S. Horstmann, Core Java Vol.1andVol.2,Sun Microsystems Press,2008
5. Herbert Schildt, Java, A Beginner's Guide, Tata McGraw Hill,2007.

WEB LINKS

1. www.javatpoint.com/java-oops-concepts
2. www.w3resource.com/java.../java-object-oriented-programming.php

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	1	1	-	-	-	-	-	-	-	-	2	1
CO2	2	1	1	2	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	2	3	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	1	-	-	-	-	-	-	-	1	2
CO5	1	1	2	1	-	-	-	-	-	-	-	-	-	2

IT16402 **OPERATING SYSTEMS** **3 0 0 3**

COURSE OBJECTIVES

- to study the basic concepts and functions of operating systems.
- to understand the structure and functions of OS.
- to learn about Processes, Threads and Scheduling algorithms.
- to understand the principles of concurrency and Deadlocks.
- to learn various memory management schemes.

UNIT I INTRODUCTION **9**

Introduction: Computer system organization - Introduction to operating systems – operating system structures – Services - System calls – System programs. Processes: Process concept – Process scheduling – Operations on Processes –Cooperating processes – Inter process communication – Communication in client-server systems.Threads: Multi-threading models – Threading issues. Case Study: Pthreads library.

UNIT II PROCESS MANAGEMENT AND DEADLOCK **10**

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

UNIT III MEMORY MANAGEMENT **9**

Main Memory: Background – Swapping – Contiguous memory allocation –Paging – Segmentation – Segmentation with paging. Virtual Memory: Background –Demand paging – Page replacement – Allocation offrames –Thrashing. Case Study: Memory management in windows and Solaris.

UNIT IV FILE SYSTEMS **9**

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

UNIT V I/O SYSTEMS AND MASS STORAGE MANAGEMENT **8**

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

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course, the students will be able to

- design various scheduling algorithms.
- apply the principles of concurrency.

- design deadlock, prevention and avoidance algorithms.
- compare and contrast various memory management schemes.
- schedule and manage the disk effectively .

TEXT BOOK

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Ninth Edition, Wiley India Pvt Ltd,2013.

REFERENCES

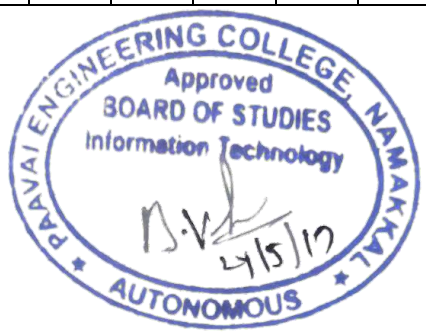
1. Andrew S. Tanenbaum, "Modern Operating Systems", Fourth Edition, Pearson Education, 2014.
2. William Stallings, "Operating Systems – internals and design principles", Prentice Hall, 7thEdition,2011.
3. Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2007.
4. Andrew S. Tannenbaum&Albert S. Woodhull, "Operating System Design and Implementation", Prentice Hall, 3rd Edition, 2006.
5. Gary J.Nutt, "Operating Systems", Pearson/Addison Wesley, 3rd Edition, 2004.

WEB LINKS

1. http://nptel.ac.in/courses/106108101
2. http://www.learnerstv.com

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	3	-	-	-	-	-	-	1	-	-	-	2	1
CO2	3	3	3	-	3	-	-	-	1	-	-	1	2	1
CO3	2	3	3	-	3	-	-	-	1	-	1	2	2	1
CO4	2	3	3	-	3	-	-	-	1	-	2	3	2	1
CO5	3	3	-	-	-	-	-	-	3	3	2	3	1	3



IT16403 DATABASE MANAGEMENT SYSTEMS 3 0 0 3

COURSE OBJECTIVES

- to learn the fundamentals of database management systems.
- to make the students understand the relational model.
- to familiarize the students with ER diagrams.
- to expose the students to SQL.
- to familiarize the students with the different types of databases.

UNIT I INTRODUCTION 9

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

UNIT II RELATIONAL MODEL 9

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

UNIT III DATABASE DESIGN 9

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/ Code 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 – SQLFacilities 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 PERIODS 45

COURSE OUTCOMES

At the end of the course, the students will be able to

- describe basic concepts of database system.
- design a data model and schemas in RDBMS.
- analyze functional dependencies for designing a robust database.
- apply SQL for business related problems.

- implement transactions, Concurrency control, and be able to do database recovery

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, "Database System Concepts", Sixth Edition,
2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems",Eighth Edition, PearsonEducation, 2006.

REFERENCES

1. Elmasri R. and Shamakant B. Navathe, "Fundamentals of Database Systems", 6th Edition, AddisionWesley , 2011.
2. Atul Kahate, "Introduction to Database Management Systems", Pearson Education, New Delhi, 2006.
3. Raghu Ramakrishnan, "Database Management Systems", Fourth Edition, Tata Mc Graw Hill, 2010.
4. G.K.Gupta, "Database Management Systems", Tata Mc Graw Hill, 2011.
5. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, "Database Systems: The Complete Book",Pearson Education, Second Edition, 2008

WEB LINKS

1. www.nptelvideos.in/2012/11/database-management-system.html
2. nptel.ac.in/courses/106106093

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	1	1	1	-	-	-	-	-	-	-	-	2	-
CO2	1	2	3	2	-	-	-	-	-	-	-	-	1	2
CO3	1	3	2	2	1	-	-	-	-	-	-	-	1	2
CO4	1	2	2	2	1	-	-	-	-	-	-	-	1	2
CO5	1	2	2	1	2	-	-	-	-	-	-	-	1	2

IT16404 COMPUTER ARCHITECTURE 3 0 0 3

COURSE OBJECTIVES

- to make students understand the basic structure and operation of digital computer.
- to familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- to expose the students to the concept of pipelining.
- to understand the concept of virtual and catch memory .
- to expose the students with different ways of communicating with I/O devices and standard I/Ointerfaces.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

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

UNIT II BASIC PROCESSING UNIT & ALU OPERATIONS 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization– Hardwired control– Micro programmed control – ALU-Addition and subtraction–Multiplication–Division.

UNIT III PIPELINING & PARALLELISM 9

Basic concepts – Data hazards – Instruction hazards – Structural Hazards-Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling-Instruction-level- parallelism –Parallel processing challenges – Flynn's classification –Hardware multithreading- Hardware support for exposing parallelism

UNIT IV MEMORY SYSTEM 9

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

UNIT V I/O ORGANIZATION 9

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

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course, the students will be able to

- understand instruction and addressing modes.
- design arithmetic and logic unit.
- design and analyses pipelined control units.
- evaluate performance of memory systems.
- understand parallel processing architectures.

TEXT BOOKS

1. David A. Patterson and John L. Hennessey, "Computer organization and design', Morgan Kauffman/ Elsevier, Fifth edition, 2014.
2. Carl Hamacher, ZvonkoVranesic and SafwatZaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2012.

REFERENCES

1. William Stallings "Computer Organization and Architecture" , Seventh Edition , Pearson Education,2006.
2. Vincent P. Heuring, Harry F. Jordan, "Computer System Architecture", Second Edition, PearsonEducation, 2005.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, TataMcGraw Hill, 1998.

WEB LINKS

1. http://courses.cs.vt.edu/csonline/OS/Lessons/
2. http://www.linux-tutorial.info/modules.php?name=MContent&pageid=4

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	2	-	-	-	-	-	-	-	2	2	2
CO2	3	2	2	3	2	-	-	-	-	-	-	2	2	2
CO3	3	2	1	2	2	-	-	-	-	2	-	2	-	2
CO4	3	3	2	3	2	-	-	-	-	2	-	3	-	2
CO5	2	3	2	3	2	-	-	-	-	2	-	3	2	2

EC16408 MICROPROCESSOR AND MICROCONTROLLER 3 0 0 3

COURSE OBJECTIVES

- to study the architecture of 8086 microprocessor.
- to learn the various addressing modes and instruction set of 8086.
- to acquire the knowledge of interfacing of I/O and memory with 8086 microprocessor
- to study the architecture of 8051 microcontroller.
- to learn about interfacing of keyboard and other devices with microcontroller.

UNIT I THE 8086 MICROPROCESSOR 9

Introduction to Microprocessor, Bus– Address bus, Data bus and control bus, Connecting Microprocessor toI/O devices, Introduction to 8086 – Microprocessor architecture, 8086 signals.

UNIT II 16 BIT MICROPROCESSOR INSTRUCTION SET AND ASSEMBLY 9

Addressing modes –Basic configuration and Interrupts – Instruction set and assembler directives – Assembly language programming.

UNIT III I/O INTERFACING 9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller

UNIT IV MICROCONTROLLER 9

Architecture of 8051 – Signals – Special Function Registers(SFRs) - I/O Ports – Memory –Interrupts – Instructionset – Addressing Modes – Assembly language programming.

UNIT V SYSTEM DESIGN USING MICROCONTROLLER 9

Case studies – Traffic light control, washing machine control, DC Motor – Stepper Motor – Keyboard Interfacing- ADC, DAC – External Memory Interface.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of the course, students will be able to

- explain the concepts of 8086 microprocessor.
- Implement programs on 8086 microprocessor.
- Interface various I/O circuits with 8086 microprocessor.
- Implement programs on 8051 microcontroller.
- design 8051 microcontroller based systems.

TEXT BOOKS

1. Krishna Kant, “Microprocessors and Microcontrollers Architecture, programming and systemdesign using 8085, 8086, 8051 and 8096”. PHI 2007.
2. Kenneth J.Ayala, “The 8051 Microcontroller Architecture, Programming and applications”,Second edition, Penram International.

REFERENCES

1. DoughlasV.Hall, “Microprocessors and Interfacing, Programming and Hardware”,TMH2012
2. A.K.Ray& K.M Bhurchandi, “Advanced Microprocessor and Peripherals – Architecture, Programmingand Interfacing”, Tata McGraw Hill, 2006.

WEB LINKS

1. http://nptel.ac.in/courses/108107029
2. https://www.youtube.com/watch?v=liRPtvj7bFU
3. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course_home2_5.htm
4. http://nptel.ac.in/courses/117104072/
5. https://www.smartzworld.com/notes/microprocessors-and-microcontrollers-mpmc/

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO3	3	2	2	2	2	2	2	-	-	-	-	-	3	3
CO4	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO5	3	2	2	2	2	2	2	-	-	-	-	-	3	3

IT16405 DATABASE MANAGEMENT SYSTEMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to learn to create and use a database.
- to be exposed to different types of database applications.
- to develop conceptual understanding of database management system.
- to understand how a real world problem can be mapped to schemas.
- to develop understanding of different applications and constructs of SQL PL/SQL.

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).
    a) Personal Information System.
    b) Web Based User Identification System.
    c) Timetable Management System.
    d) Hotel Management System

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course, the students will be able to

- design and implement a database schema for a given problem-domain.
- populate and query a database.
- create and maintain tables using PL /SQL.
- prepare forms and reports.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Front end: VB/VC ++/JAVA or Equivalent

Back end: Oracle / SQL / MySQL/ PostGress / DB2 or Equivalent

HARDWARE: Standalone desktops (or) Server supporting terminals.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	2	3	1	1	-	-	-	-	-	-	-	1	2
CO2	1	1	2	1	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	1	2	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	-	-	-	-	-	-	-	-	1	2

IT16406 OPERATING SYSTEMS LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to implement scheduling algorithms.
- to learn to use the file allocation and organization strategies.
- to be familiar with implementation of deadlock avoidance & detection algorithms.
- to implement page replacement algorithms.
- to be exposed to process creation and inter process communication.

LIST OF EXPERIMENTS

1. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority.
2. Simulate all file allocation strategies: a) Sequential b) Indexed c) Linked.
3. Implement the producer – consumer problem using semaphores.
4. Simulate all File Organization Techniques:

   a) Single level directory b) Two level c) Hierarchical d) DAG.
5. Simulate Bankers Algorithm for Dead Lock Avoidance.
6. Simulate an Algorithm for Dead Lock Detection.
7. Simulate all page replacement algorithms a) FIFO b) LRU c) Optimal.
8. Simulate Shared memory and IPC.
9. Simulate Paging Technique of memory management.
10. Implement Threading & Synchronization Applications.
11. Simulate the following CPU scheduling algorithms: a) Round Robin b) SJF c) FCFS d) Priority.
12. Simulate all file allocation strategies: a) Sequential b) Indexed c) Linked.
13. Implement the producer – consumer problem using semaphores.
14. Simulate all File Organization Techniques:

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course, the students will be able to

- compare the performance of various CPU scheduling algorithm.
- implement file allocation and organization strategies.
- implement deadlock avoidance, and detection algorithms.
- critically analyze the performance of the various page replacement algorithms.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Standalone desktops (or) Server with C / C++ / Java / Equivalent complier

HARDWARE: Standalone desktops (or) Server supporting terminals.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	1	1	1	-	-	-	1	-	-	-	2	1
CO2	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO3	3	3	3	1	3	-	-	-	1	-	1	2	2	1
CO4	3	3	3	1	3	-	-	-	1	-	2	3	2	1

EC16409 MICROPROCESSOR AND MICROCONTROLLER LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to implement the assembly language programming of 8086 and 8051.
- to experiment the interface concepts of various peripheral devices with the processor.
- to impart the knowledge about the instruction set.
- to understand the basic idea about the data transfer schemes and its applications.
- to develop skill in simple program writing for 8051 & 8086 and applications.

Assembly Language programming using 8086 and MASM

1. Basic arithmetic and Logical operations.
2. Move a data block without overlap.
3. String manipulations
4. Sorting and searching

Interfacing with 8086 microprocessor

5. Stepper motor control.
6. Key board and Display.
7. Serial interface
8. Parallel interface

Programming using 8051 microcontroller

9. Basic arithmetic and Logical operations.
10. ADC and DAC interfacing.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of the course, students will be able to

- write assembly language programmes for various applications.
- interface different peripherals with microprocessor.
- execute programs in 8086 and 8051.
- simulate programs in MASM

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes(POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO2	3	2	2	2	2	-	-	-	-	-	-	-	3	3
CO3	3	2	2	2	2	2	2	-	-	-	-	-	3	3
CO4	3	2	2	2	2	-	-	-	-	-	-	-	3	3

PANAVAI ENGINEERING COLLEGE, NAMAKKAL
Approved BOARD OF STUDIES
Mathematics
06/05/2022
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PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

REGULATIONS 2015

CURRICULUM

SEMESTER V

Course Code	Course Title	L	T	P	C
IT15501	Computer Networks	3	0	0	3
IT15502	Object Oriented Analysis and Design	3	0	0	3
IT15503	Internet Programming	3	0	0	3
*******	Elective I	3	0	0	3
CH15501	Environmental Science and Engineering	3	0	0	3
EC15508	Principles of Digital Signal Processing	3	2	0	4
IT15504	Computer Networks and Internet Programming Laboratory	0	0	4	2
IT15505	Case Tools Laboratory	0	0	4	2
EN15501	Career Development Laboratory I	0	0	2	1

SEMESTER VI

Course Code	Course Title	L	T	P	C
IT15601	Compiler Design	3	0	0	3
IT15602	Graphic and Multimedia	3	0	0	3
IT15603	Cryptography and Network Security	3	2	0	4
IT15604	Embedded Systems	3	0	0	3
*******	Elective II	3	0	0	3
BA15254	Principles of Management	3	0	0	3
IT15606	Compiler Design Laboratory	0	0	4	2
IT15607	Graphic and Multimedia Laboratory	0	**0**	4	2
EN15601	Career Development Laboratory II	0	0	2	1

LIST OF ELECTIVES

ELECTIVE I

Course Code	Course Title	L	T	P	C
MA15151	Discrete Mathematics	3	2	0	4
IT15151	Automata Languages and Computation	3	0	0	3
IT15152	Information Coding Techniques	3	0	0	3
IT15153	Software Architecture	3	0	0	3
IT15154	User Interface Design	3	0	0	3

ELECTIVE II

Course Code	Course Title	L	T	P	C
IT15251	Free and Open Source Software	3	0	0	3
IT15252	Distributed Systems	3	0	0	3
BA15351	Engineering Economics and Financial Accounting	3	0	0	3
IT15253	TCP/IP Protocol Design and Implementation	3	0	0	3
IT15254	System Software	3	0	0	3

SEMESTER V

IT15501 COMPUTER NETWORKS 3 0 0 3

COURSE OBJECTIVES

- to understand the division of network functionalities into layers.
- to explain the following terms: computer network, LAN, WAN, MAN, internet, protocol, topology, media, peer-to-peer network, and server based network.
- to be familiar with the components required to build different types of networks.
- to be exposed to the required functionality a teach layer.
- to learn the flow control and congestion control algorithms.

UNIT I FUNDAMENTALS & PHYSICAL LAYER 09

Data communication - Networks - Network models - Layer tasks - The OSI Model - Layers in the OSI model - TCP/IP protocol suit - Data and signals - Transmission media - Switching.

UNIT II DATA LINK LAYER 09

Error detection and correction - Data link control – Framing – HDLC - Multiple access - Wireless LAN's: Standard Ethernet - Fast Ethernet - Gigabit Ethernet - 802.11 - Bluetooth.

UNIT III NETWORK LAYER 09

Logical address (IP4, IP6) - Internet protocol: Internetworking (IP4, IP6) - Transitions from IP4 to IP6 – ICMP –IGMP – Forwarding - Unicasting routing protocol (Distance Vector Routing, Link State Routing) – Multi casting routing protocol.

UNIT IV TRANSPORT LAYER 09

Duties of Transport Layer - UDP – TCP - Congestion control and Quality of Service - Techniques to Improve QoS.

UNIT V APPLICATION LAYER 09

Electronic Mail (SMTP, POP3, IMAP, MIME) - File Transfer Protocol - WWW – HTTP– DNS.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- have a good understanding of the OSI reference model.
- have experience in designing communication protocols.
- analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies.
- expose TCP/IP protocol suite.
- design and build a network using routers.

TEXT BOOK

1. Behrouz A. Forouzan, "Data Communication and Networking", Fifth Edition, Tata McGraw – Hill, 2012.

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.
2. James F. Kurose, Keith W. Ross, "Computer Networking - A Top-Down Approach Featuring the Internet", Fifth Edition, Pearson Education, 2009.
3. Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, 2010.
4. William Stallings,"Data and Computer Communication"tenthEdition,Pearson Education, 2014.

WEB LINKS

1. http://nptel.ac.in/courses/106105081/1

2.https://www.tutorialspoint.com/computer_fundamentals/computer_network

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	3	2	-	-	-	-	-	-	-	-	3	2
CO2	2	2	3	3	-	-	-	-	-	2	-	-	2	3
CO3	3	3	3	2	3	-	-	-	-	-	-	2	2	3
CO4	3	3	3	2	3	-	-	-	-	-	-	2	3	3
CO5	3	3	3	2	-	-	-	2	-	-	-	-	-	3

IT15502 OBJECT ORIENTED ANALYSIS AND DESIGN 3 0 0 3

COURSE OBJECTIVES

- to learn the basics of OO analysis and design skills.
- to learn the UML design diagrams.
- to learn to map design to code.
- to be exposed to the various testing techniques.
- to understand the OO concepts for new projects.

UNIT I UML DIAGRAMS 09

Introduction to OOAD – Unified Process • UML diagrams – Use Case – Class Diagrams – Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

UNIT II DESIGN PATTERNS 09

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller • Design Patterns – creational • factory method • structural – Bridge – Adapter • behavioral – Strategy – observer.

UNIT III CASE STUDY 09

Case study – the Next Gen POS system, Inception • Use case Modeling • Relating Use cases – include, extend and generalization • Elaboration • Domain Models • Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies • Aggregation and Composition.

UNIT IV APPLYING DESIGN PATTERNS 09

System sequence diagrams • Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement • UML class diagrams • UML interaction diagrams • Applying GoF design patterns.

UNIT V CODING AND TESTING 09

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- design and implement projects using OO concepts.
- use the UML analysis and design diagrams.
- Apply appropriate design patterns.
- Create code from design.
- Compare and contrast various testing techniques.

TEXT BOOK

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object•Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

REFERENCES

1. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis andDesignUsingUML", Fourth Edition, Mc•Graw Hill Education, 2010.
2. Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Erich Gamma, and ElementsofReusableObject•Oriented Software", Addison•Wesley, 1995.
3. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language",Thirdedition, Addison Wesley, 2003.
4. Paul C. Jorgensen, "Software Testing:• A Craftsman's Approach", Third Edition, AuerbachPublications,Taylor and Francis Group, 2008.

WEB LINKS

1. http://nptel.ac.in/courses/106105153/
2. http://www.tutorialspoint.com/object_oriented_analysis_design/

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	3	3	-	2	-	-	-	-	-	2	-	3
CO2	2	3	3	2	3	-	-	-	-	-	-	3	3	2
CO3	3	3	3	2	2	-	-	2	-	-	2	3	2	2
CO4	3	3	3	3	2	-	-	2	-	-	2	3	3	2
CO5	3	2	3	2	3	-	-	2	-	-	-	3	2	3

IT15503 INTERNET PROGRAMMING 3 0 0 3

COURSE OBJECTIVES

- to understand different internet technologies.
- to implement client side programs.
- to design and implement server side programs using Servlets and JSP.
- to understand XML.
- to be exposed to java specific web services architecture.

UNIT I WEBSITES BASICS, HTML 5, CSS 3, WEB 2.0 09

Web 2.0 : Basics – RIA Rich Internet Applications – Collaborations tools – Understanding websites and web servers: Understanding Internet – Difference between websites and web server- Internet technologies Overview – Understanding the difference between internet and intranet; HTML and CSS: HTML 5.0 , XHTML, CSS 3.

UNIT II CLIENT SIDE PROGRAMMING 09

Java Script : An introduction to JavaScript – JavaScript DOM Model - Date and Objects - Regular Expressions - Exception Handling – Validation - Built-in objects - Event Handling - DHTML with JavaScript.

UNIT III SERVER SIDE PROGRAMMING 09

Servlets : Java Servlet Architecture - Servlet Life Cycle - Form GET and POST actions - Session Handling- Understanding Cookies - Installing and Configuring Apache Tomcat Web Server. **Database Connectivity:** JDBC perspectives - JDBC program example – JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL) - Creating HTML forms by embedding JSP code.

UNIT IV PHP & XML 09

An introduction to PHP : PHP - Using PHP - Variables - Program control- Built-in functions - Connecting to Database – Using Cookies - Regular Expressions. XML: Basic XML - Document Type Definition - XML Schema DOM and Presenting XML - XML Parsers and Validation - XSL and XSLT Transformation - News Feed (RSS and ATOM).

UNIT V INTRODUCTION TO AJAX and WEB SERVICES 09

Client Server Architecture - XML Http Request Object - Call Back Methods. Web Services: Introduction - Java web services Basics – Creating – Publishing - Testing and Describing a Web services (WSDL) - Consuming a web service - Database Driven web service from an application – SOAP.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- create a basic website using HTML and Cascading Style Sheets.
- design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms.
- design and implement server side programs using servlets and JSP.
- present data in XML format.
- design rich client presentation using AJAX.

TEXT BOOK

1. Deitel and Deitel and Nieto, "Internet and World Wide Web – How to Program", Prentice Hall, 5th Edition, 2011.

REFERENCES

1. Stephen Wynkoop and John Burke "Running a Perfect Website", QUE, 2nd Edition,1999.
2. Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
3. Jeffrey C and Jackson, "Web Technologies A Computer Science Perspective", Pearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J., "Web Technology", Prentice Hall of India, 2011.
5. Uttam K.Roy, "Web Technologies", Oxford University Press, 2011.

WEB LINKS

1. http://nptel.ac.in/courses/106105084/13
2. http://www.cs.ccsu.edu/~stan/classes/CS110/CS110-FA10.html

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	-	-	-	-	-	-	-	1	-	3
CO2	2	2	3	3	3	-	-	-	-	-	-	2	2	3
CO3	3	2	3	3	3	-	-	-	-	-	2	1	3	3
CO4	2	3	2	2	-	-	-	2	-	-	-	-	-	3
CO5	2	1	2	1	-	-	-	1	-	-	-	2	1	1

CH 15501 **ENVIRONMENTAL SCIENCE AND ENGINEERING** **3 0 0 3**

(Common to ECE, MCT & IT branches)

COURSE OBJECTIVES

To enable students to

- know the constituents of the environment and the precious resources in the environment.
- conserve all biological resources.
- understand the role of human being in maintaining a clean environment and useful environment for the future generations
- acquire knowledge about ecological balance and preserve bio-diversity.
- understand the role of government and non-government organizations in environment management.

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 9

Environment: Definition- scope - importance – need for public awareness. Forest resources: Use –over exploitation- deforestation - case studies- mining - effects on forests and tribal people. Water resources: Use – over utilization of surface and ground water- floods – drought - conflicts over water. Mineral resources-Use – 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. Land resources: Land as resource- land degradation - soil erosion. Role of an individual in conservation of natural resources.

UNIT II ECOSYSTEMS AND BIODIVERSITY 9

Concept of an ecosystem: Structure and function of an ecosystem – producers - consumers –decomposers– energy flow in the ecosystem – ecological succession – food chains - food webs and ecological pyramids. Types of ecosystem: Introduction - characteristic features - forest ecosystem – grassland ecosystem – desert ecosystem - aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

Biodiversity: Introduction– definition (genetic - species –ecosystem) diversity. Value of biodiversity: Consumptive use - productive use – social values – ethical values - aesthetic values. Biodiversity level: Global - national - 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.

UNIT III POLLUTION 9

Pollution: Definition –air pollution - water pollution - soil pollution - marine pollution - noise pollution -thermal pollution – nuclearhazards. Solid waste management: Causes - effects - control measures of urban and industrial wastes. Role of an individual in prevention of pollution - pollution case studies. Disaster management: Floods – earthquake - cyclone- landslides. Electronic waste-Sources-Causes and its effects.

UNIT IV SOCIAL ISSUES AND ENVIRONMENT 9

Sustainable development : Unsustainable to sustainable development – urban problems related to energy. Water conservation - rain water harvesting - watershed management. Resettlement and rehabilitation of people.Environmental ethics: Issues - possible solutions – climate change - global warming and its effects on flora and fauna - acid rain - ozone layer depletion - nuclear accidents - nuclear holocaust - wasteland reclamation. consumerism and waste products. Environment protection act: Air (Prevention and Control of Pollution) act– water (Prevention and control of Pollution) act – wildlife protection act – forest conservation act – issues involved in enforcement of environmental legislation.

UNIT V HUMAN POPULATION AND ENVIRONMENT **9**

Human population: Population growth - variation among nations – population explosion – family welfare programme and family planning – environment and human health– Human rights – value education – HIV/ AIDS Swine flu – women and child welfare. Role of information technology in environment and human health.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, the students will be able to

- explain the relationship between the human population and environment.
- elaborate the basic concepts of environment studies and natural resources.
- gain the knowledge about ecosystem and biodiversity.
- Have knowledge about causes, effects and control measures of various types ofpollution.
- Understand the social issues and various environmentalacts.

TEXT BOOKS

1. Raman Sivakumar, Introduction to Environmental Science and Engineering, 2nd Edn, Tata McGraw Hill Education Private Limited, New Delhi,(2010).
2. Benny Joseph, "Environmental Science and Engineering", Tata McGraw Hill, (2010).

REFERENCES

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad India,2010 .
2. S. Divan, Environmental Law and Policy in India, Oxford UniversityPress, New Delhi, 2001.
3. K.D. Wager, Environmental Management, W.B. Saunders Co., Philadelphia, USA, 1998.
4. W.P. Cunningham, Environmental Encyclopedia, Jaico Publising House, Mumbai, 2004.
5. Clair Nathan Sawyer, Perry L. McCarty, Gene F. Parkin, "Chemistry for Environmental

Mapping of course outcome with Programme Outcomes
(S/M/W indicates strength of correlation) S-Strong-3, M-Medium=2 , W-Weak=1.

CO	Programmes Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	1	3	3	2	-	-	3	1	-
CO2	-	-	2	-	-	1	-	3	-	2	-	3	1	-
CO3	2	-	2	-	2	1	-	3	-	2	-	3	1	-
CO4	2	2	2	-	2	1	3	3	-	2	-	3	1	-
CO5	-	2	-	-	-	1	3	3	2	2	-	2	1	-

PAAVAI ENGINEERING COLLEGE, NAMAKKAL
Approved
BOARD OF STUDIES
Chemistry
24/05/17
AUTONOMOUS

EC15508 PRINCIPLES OF DIGITAL SIGNAL PROCESSING 3 2 0 4

COURSE OBJECTIVES

- to introduce signals, systems, time and frequency domain concepts and the associated mathematical tools that are fundamental to all DSP techniques.
- to introduce discrete Fourier transform and its applications.
- to teach the design of infinite and finite impulse response filters for filtering undesired signals.
- to provide a thorough understanding and working knowledge of design, implementation, analysis and comparison of digital filters for processing of discrete time signals.
- to introduce signal processing concepts in systems having more than one sampling frequency

UNIT I SIGNALS AND SYSTEMS 15

Basic elements of DSP – concepts of frequency in Analog and Digital Signals – sampling theorem – Discrete – time signals, systems – Convolution

UNIT II FREQUENCY TRANSFORMATIONS 15

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

UNIT III IIR FILTER DESIGN 15

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

UNIT IV FIR FILTER DESIGN 15

Structures of FIR – Linear phase FIR filter – Fourier Series - Filter design using windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency sampling techniques.

UNIT V FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS 15

Binary fixed point and floating point number representations – Comparison - Quantization noise truncation and rounding – quantization noise power - input quantization error - coefficient quantization error – limit cycle oscillations - dead band - Overflow error - signal scaling.

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of this course, students will be able to

- impart the knowledge about continuous and discrete time signals.
- evaluate fourier transform and its properties.
- examine the process of Quantization and the effects of finite Register Length
- implement the appropriate type of design method for FIR filter.

- compare the different types of IIR filter structures.

TEXT BOOK

1. John G. Proakis and DimitrisG.Manolakis, "Digital Signal Processing – Principles, Algorithms &Applications", Fourth Edition, Pearson Education, Prentice Hall, 2007.

REFERENCES

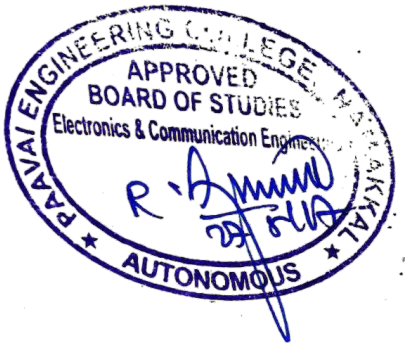
1. Ramesh babu "Digital Signal Processing" Second Edition,2007.
2. Emmanuel C.Ifeachor, and Barrie.W.Jervis, "Digital Signal Processing", Second Edition, Pearson Education, Prentice Hall, 2002.
3. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Third Edition, Tata McGrawHill, 2007.

WEB LINKS

1. http://nptel.ac.in/courses/108102047/10
2. https://www.allaboutcircuits.com › ... › Digital Signal Processing

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	3	3	3	-	-	2	-	-	2	2	2
CO2	3	3	3	3	3	3	-	-	2	-	-	2	2	2
CO3	3	3	3	3	3	3	-	-	2	-	-	2	2	2
CO4	3	3	3	3	3	3	-	-	2	-	-	2	2	2
CO5	3	3	3	3	3	3	-	-	2	-	-	2	2	2



IT15504 **COMPUTER NETWORKS AND INTERNET PROGRAMMING LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

- to learn socket programming.
- to different algorithms in Network layer.
- to have hands on experience on various networking protocols.
- to be familiar with Web page design using HTML/XML and style sheets.
- to learn to create dynamic web pages using server side scripting.

LIST OF EXPERIMENTS FOR COMPUTER NETWORKS

1. Implementation of Stop and Wait protocol and sliding window protocol..
2. Write a code to simulate ARP protocol.
3. Write a code to simulate RARP protocol.
4. Example applications using TCP sockets.
5. Example applications using UDP sockets.

LIST OF EXPERIMENTS FOR INTERNET PROGRAMMING

1. Create a web page with the following using HTML
    i. To embed a map in a web page.
    ii. To fix the hot spots in that map .
    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. Write programs in Java using sockets to implement the following:
    i. HTTP request
    ii. FTP
    iii. SMTP
    iv. POP3
5. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of this course , students will be able to

- identify and understand various techniques and modes of transmission.
- describe data link protocols, multi-channel access protocols and IEEE 802 standards for LAN.
- design Web pages using HTML/XML and style sheets .
- create dynamic web pages using server side scripting.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Java, Dream Weaver or Equivalent, MySQL or Equivalent, Apache Server Turbo C, C++.

HARDWARE: Flavor of any WINDOWS or LINUX and Standalone desktops 30 Nos.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (PO)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	3	3	-	-	-	-	-	-	-	1	-	3
CO2	3	2	3	2	3	-	-	-	-	-	-	2	3	3
CO3	2	2	3	3	3	-	-	-	-	-	2	1	3	2
CO4	2	1	2	1	-	-	-	1	-	-	-	2	2	2

IT15505 **CASE TOOLS LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

- to learn the basics of object oriented analysis and design skills.
- to be exposed to the UML design diagrams.
- to learn to map design to code.
- to be familiar with the various testing techniques.
- to understand the concepts of program creativity.

LIST OF EXPERIMENTS

TO DEVELOP A MINI-PROJECT BY FOLLOWING THE 9 EXERCISES LISTED BELOW.

1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer

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.
14. Library Management System.
15. Student Information System.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of this course, students will be able to

- design and implement projects using object oriented concepts.
- use the UML analysis and design diagrams.
- apply appropriate design patterns.
- compare and contrast various testing techniques

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit

HARDWARE: Flavor of any WINDOWS and Standalone desktops 30 Nos.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	3	2	-	-	-	-	-	-	-	1	-	3
CO2	3	1	2	2	3	-	-	-	-	-	-	3	3	3
CO3	2	2	3	3	1	-	-	-	-	-	2	2	2	2
CO4	2	2	3	1	-	-	-	2	-	-	-	3	-	1

SEMESTER VI

IT15601 COMPILER DESIGN 3 0 0 3

COURSE OBJECTIVES

- to learn the design principles of a Compiler.
- to learn the various parsing techniques
- to learn different levels of translation.
- to learn how to optimize machine codes
- to learn how to effectively generate machine codes.

UNIT I INTRODUCTION TO COMPILERS 05

Translators - Compilation and Interpretation - Language processors - The Phases of Compiler – Errors Encountered in Different Phases - The Grouping of Phases - Compiler Construction Tools – Programming Language basics.

UNIT II LEXICAL ANALYSIS 09

Need and Role of Lexical Analyzer - Lexical Errors - Expressing Tokens by Regular Expressions- Converting Regular Expression to DFA- Minimization of DFA-Language for Specifying Lexical Analyzers-LEX-Design of Lexical Analyzer for a sample Language.

UNIT III SYNTAX ANALYSIS 10

Need and Role of the Parser-Context Free Grammars - Top Down Parsing -General Strategies- Recursive Descent Parser Predictive Parser -LL(1) Parser-Shift Reduce Parser-LR Parser - LR (0)Item- Construction of SLR Parsing Table - Introduction to LALR Parser – Error Handling and Recovery in Syntax Analyzer-YACC-Design of a syntax Analyzer for a Sample Language.

UNIT IV SYNTAX DIRECTED TRANSLATION & RUN TIME ENVIRONMENT 12

Syntax directed Definitions - Construction of Syntax Tree – Bottom - up Evaluation of S-Attribute Definitions- Design of predictive translator – Type Systems - Specification of a simple type checker- Equivalence of Type Expressions-Type Conversions. RUN-TIME ENVIRONMENT: Source Language Issues - Storage Organization- Storage Allocation - Parameter Passing- Symbol Tables- Dynamic Storage Allocation - Storage Allocation in FORTAN.

UNIT V CODE OPTIMIZATION AND CODE GENERATION 09

Principal Sources of Optimization -DAG - Optimization of Basic Blocks -Global Data Flow Analysis -Efficient Data Flow Algorithms-Issues in Design of a Code Generator – A Simple Code Generator Algorithm.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- design and implement a prototype compiler.

- use the knowledge of patterns, tokens & regular expressions for solving a problem in the field of data mining.
- apply the various optimization techniques.
- describe the runtime structures used to represent constructs in typical programming languages.
- use the different compiler construction tools.

TEXT BOOK

1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, "Compilers – Principles, Techniques andTools", 2nd Edition, Pearson Education, 2007.

REFERENCES

1. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, "Advanced Compiler Design and Implementation, "Morgan Kaufmann Publishers –Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers ElsevierScience, 2004.
4. Charles N. Fischer, Richard. J. LeBlanc, "Crafting a Compiler with C", Pearson Education, 2008.

WEB LINKS

1. nptel.ac.in/courses/106108052/1
2. https://www.tutorialspoint.com/compiler_design/compiler_design_pdf_version.htm

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of corelation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	3	2	1	-	-	-	-	-	-	1	3	1
CO2	1	2	-	3	-	1	-	-	-	-	-	2	-	2
CO3	3	-	1	3	2	-	-	-	-	-	2	1	-	3
CO4	2	2	-	2	-	-	-	2	-	-	-	-	-	2
CO5	3	1	2	1	3	-	-	1	-	-	-	3	-	3

IT15602 GRAPHICS AND MULTIMEDIA 3 0 0 3

COURSE OBJECTIVES

- to introduce the graphics mode, with the help of basic algorithms and methodologies.
- to equip students with fundamental knowledge and basic technical competence in the field of computer graphics.
- to provide an understanding of how a computer draws the fundamental graphics primitives.
- to learn the implementation of Computer Graphics Algorithms.
- to learn the principles and different components of multimedia. learn the devices and tools for generating and representing multimedia.

UNIT I FUNDAMENTALS 09

Introduction to Computer Graphics - Raster and vector graphics systems - Output primitives - points and lines - line drawing algorithms - loading the frame buffer - line function - circle and ellipse generating algorithms – Pixel addressing and object geometry - filled area primitives - anti-aliasing.

UNIT II 2D-3D REPRESENTATION AND MANIPULATION 09

2D Transformation: Translation, rotation, scaling, reflection and shearing - Matrix and homogeneous coordinates - Composite 2D transformations - 2D Viewing - Clipping : line, polygon and text clipping. 3D Transformation: Translation, rotation, scaling, reflection, shearing -Composite 3D transformation - 3D Viewing - Projection - 3D clipping – Case Study.

UNIT III VISIBLE SURFACE DETECTION AND COLOR MODELS 09

Back face detection - Depth buffer method - A-Buffer method - Scan line method - Depth sorting method - BSP -Tree method - Area Subdivision method - Octree method - Ray casting - Curved surfaces - Wireframe methods - Visibility Detection Functions - Color Models - RGB, CMY, HSV, HLS, CIE models.

UNIT IV INTRODUCTION TO MULTIMEDIA 09

Branch - overlapping Aspects of Multimedia - Content - Global Structure - Multimedia: Media and Data Streams - Medium - Main Properties of a Multimedia System - Traditional Data Stream Characteristics - Data Streams Characteristics for Continuous Media - Information Units - Virtual Reality.

UNIT V AUDIO, VIDEO AND ANIMATION 09

Basic principles of animation - Sound Concepts - Music - Speech - Computer-based Animation - Data Compression - storage Space - Coding Requirements - Source - Entropy and Hybrid Coding - Some Basic Compression Techniques - JPEG, H.261, MPEG, DVI.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- design two dimensional graphics and two dimensional transformations.
- design three dimensional graphics and three dimensional transformations.

- apply color models and clipping techniques to graphics.
- create basic multimedia presentations.
- design animation sequences.

TEXT BOOKS

1. Tay Vaughan, "Multimedia - Making it work", Tata Mc Graw Hill Edition, 8th edition 2011.

REFERENCES

1. Andleigh PK and Thakrar K . “Multimedia Systems Design”, Prentice Hall.,1995.
2. Walter Worth John .A, "Multimedia Technology and Applications", Ellis Horowood Ltd, 1991.
3. Nigel Chapman and Jenny Chapman, "Digital Multimedia", John Wiley & Sons Ltd.,2000.
4. John .F. Koegel Buford, "Multimedia Systems", Pearson education, 2005.

WEB LINKS

1. nptel.ac.in/courses/117105083
2. https://www.cs.cf.ac.uk/Dave/Multimedia/node12.html

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	1	3	-	-	-	-	-	-	-	2	-	2
CO2	1	3	2	1	2	-	-	-	-	-	-	3	3	3
CO3	3	2	1	3	2	-	-	-	-	-	2	-	-	3
CO4	2	1	3	2	-	-	-	1	-	-	-	-	2	2
CO5	2	3	2	1	-	-	-	-	-	-	-	2	-	3

IT15603 CRYPTOGRAPHY AND NETWORK SECURITY 3 2 0 4

COURSE OBJECTIVES

- to understand OSI security architecture and classical encryption techniques.
- to Identify and relate mathematical concepts to security trends.
- to describe and analyze modern symmetric key ciphers likeDES, AES and asymmetric key cipher RSA.
- to Implement and test various authentication techniques.
- to examine the functionality and workingprinciples of various security applications.

UNIT I INTRODUCTION AND NUMBER THEORY 15

Introduction - OSI security architecture – Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography) FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields - Modular arithmetic - Euclid‟s algorithm - Finite fields- Polynomial Arithmetic – Prime numbers - Fermat‟s and Euler‟s theorem - Testing for primality - The Chinese remainder theorem- Discrete logarithms.

UNIT II BLOCK CIPHERS AND PUBLIC KEY CRYPTOGRAPHY 15

Data Encryption Standard - Block cipher principles - block cipher modes of operation - Advanced Encryption Standard (AES) - Triple DES-Blowfish - RC5 algorithm. **Public key cryptography:** Principles of public key. Cryptosystems -The RSA algorithm-Key management – Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNITIII HASH FUNCTIONS AND DIGITAL SIGNATURES 15

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 – SHA – HMAC – CMAC – Digital signature and authentication protocols – DSS.

UNITIV SECURITY PRACTICE AND SYSTEM SECURITY 15

Authentication applications – Kerberos – X.509 Authentication services – Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology - Types of Firewalls – Firewall designs – SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewallsdesign principles – Trusted system.

UNIT V E-MAIL, IP AND WEB SECURITY 15

E-mail Security: Security Services for E-mail – attacks possible through E-mail – establishing keys privacy- authentication of the source - Message Integrity – Non – repudiation - Pretty Good Privacy (PGP) - S/MIME. **IPSecurity:** Overview of IPSec – IP and IPv6 - Authentication Header-Encapsulation Security Payload (ESP)- Internet Key Exchange (Phases of IKE, ISAKMP / IKE Encoding). Web Security: SSL / TLS Basic Protocol- computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3- Exportability - Encoding- Secure Electronic Transaction (SET).

TOTAL PERIODS 75

COURSE OUTCOMES

At the end of this course, students will be able to

- compare various cryptographic techniques.
- apply the different cryptographic operations of public key cryptography.
- implement and test various authentication techniques.
- design secure applications.
- inject secure coding in the developed applications.

TEXT BOOKS

1. William Stallings, Cryptography and Network Security, 4th Edition, Prentice Hall, New Delhi,2006.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.(UNIT V).

REFERENCES

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.

WEB LINKS

1. nptel.ac.in/courses/106105031
2. https://www.tutorialspoint.com/cryptography

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
Cos	**Programme Outcomes(Pos)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	-	2	-	-	-	-	-	-	-	3	2	1
CO2	3	3	2	1	1	-	-	-	-	-	-	1	3	2
CO3	1	2	-	2	1	-	-	-	-	-	-	1	1	1
CO4	2	2	3	1	1	-	-	-	-	1	-	1	1	3
CO5	2	1	-	2	-	-	-	2	-	-	-	-	2	2

PAAVAI ENGINEERING COLLEGE NAMAKKAL
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Information Technology
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AUTONOMOUS

IT15604 EMBEDDED SYSTEMS 3 0 0 3

COURSE OBJECTIVES

- to have knowledge about the basic functions of embedded systems.
- to have knowledge about the basic working of a microcontroller system and its programming in assembly language.
- to provide experience to integrate hardware and software for microcontroller applications systems.
- to introduce students to the modern embedded systems and to show how to understand and program such systems using a concrete platform built around.
- to introduce students modern embedded processor like the Intel ATOM.

UNIT I EMBEDDED COMPUTING 9

Challenges of Embedded Systems – Embedded system design process. Embedded processors – 8051 Microcontroller - 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 – Inter process 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 DEVELOPMENT 9

Design issues and techniques – Case studies – Complete design of example embedded systems.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- describe the differences between the general computing system and the embedded system, also recognize the classification of embedded systems.
- become aware of the architecture of the ATOM processor and its programming aspects (assembly Level).
- become aware of interrupts, hyper threading and software optimization.
- design real time embedded systems using the concepts of RTOS.
- analyze various examples of embedded systems based on ATOM processor.

TEXT BOOK

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

REFERENCES

1. Steve Heath, “Embedded System Design”, Elsevier, 2005.
2. Muhammed Ali Mazidi, Janice GillispieMazidi and Rolin D. McKinlay, “The 8051 Microcontroller and Embedded Systems”, Pearson Education, Second edition, 2007.

WEB LINKS

1. nptel.ac.in/courses/108102045
2. https://www.tutorialspoint.com/embedded_systems/es_overview.htm

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak													
COs	**Programme Outcomes (POs)**												
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	3	2	-	-	-	-	-	-	-	3	-	2
CO2	2	2	-	2	2	-	-	-	-	-	-	-	-	3
CO3	2	1	2	3	1	-	-	-	-	-	1	3	2	-
CO4	3	2	3	1	2	-	-	2	-	-	-	-	-	3
CO5	1	3	3	2	-	-	-	-	-	-	2	2	-	1

BA15254 PRINCIPLES OF MANAGEMENT 3 0 0 3

COURSE OBJECTIVES

- to understand history and development of management thought.
- to know the planning activities in management.
- to understand organizing, dimensions of organization structure, and choosing the right structural form.
- to know how to manage human resources.
- to understand various methods and techniques of control.

UNIT I INTRODUCTION TO MANAGEMENT 9

Management: Meaning – Scope - Managerial Roles. Management – Science - Art or Profession - Universality of Management - Ancient roots of management theory; Classical schools of management thought; Behavioral School - Quantitative School - Systems Approach - Contingency Approach - Contemporary Management thinkers & their contribution.

UNIT II PLANNING 9

Characteristics of planning - Planning Process - Types of plans - Decision making - Decision making tools - Group decision making - Forecasting & MBO.

UNIT III ORGANIZING 9

Organizational structure and design - types of organizational structures – authority – delegation - decentralization and reengineering - Organization Size – Technology – Environment – Power – control - choosing the right structural Form.

UNIT IV MANAGING HUMAN RESOURCES 9

Human resource planning – Recruitment – selection - training & development - performance appraisal - managing change - compensation and employee welfare - Leadership theory - Motivation Theory - Communication.

UNIT V CONTROLLING 9

Nature of organizational control - control process - Methods and techniques of control - Designing control systems.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- demonstrate history and development of management thought.
- exhibit the planning activities in management.
- know organizing, dimensions of organization structure, and choosing the right structural form.
- gain knowledge how to manage human resources.
- develop various methods and techniques of control.

TEXT BOOKS

1. Heinz Weihrich, Mark V. Cannice, Management a Global & Entrepreneurial Perspective, Ta McGraw-Hill Education, 2010.
2. James A.F. Stoner & R. Edward Freeman, Management, Prentice-Hall of India Private Limite New Delhi, 5/e, 2010.

REFERENCES

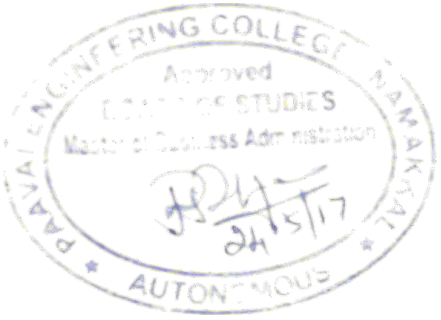
1. John R. Schermerhorn, Jr., Daniel G. Bachrach, Management, Wiley India, 13/e, 2015.
2. Joseph L Massie, Essentials of Management, Prentice-Hall India, New York, 4/e, 2013.
3. S.A.Sherlekar, Management, Himalaya Publications, Mumbai, 1/e, 2012.
4. L.M. Prasad, Principles of Management, Sultan Chand & Sons, New Delhi, 9/e, 2015.
5. Peter Drucker, Management, Harper Row, 2005.

WEB LINKS

1. https://www.slideshare.net/ersmbalu/principles-of-management-lecture-notes
2. mbaexamnotes.com/principles-of-management.html
3. https://www.cliffsnotes.com/study-guides/principles-of-management

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	-	-	2	-	-	1	-	-	-	2	-
CO2	2	3	-	-	3	-	2	3	2	0	1	3	1	-
CO3	-	3	2	3	-	3	3	-	-	-	-	2	2	3
CO4	-	-	-	-	2	3	-	2	3	3	-	1	3	-
CO5	3	-	3	3	2	3	-	-	-	-	3	3	2	3



IT15606 COMPILER DESIGN LABORATORY 0 0 4 2

COURSE OBJECTIVES

- to be exposed to compiler writing tools.
- to learn to implement the different Phases of compiler.
- to be familiar with control flow and data flow analysis.
- to learn simple optimization techniques.

LIST OF EXPERIMENTS

1. Study of LEX and YACC
2. Lexical Analysis using LEX.
3. Syntax Analysis using YACC
4. Construction of NFA from a given regular expression.
5. Construction of minimized DFA from a given regular expression.
6. Implementation of Symbol Table.
7. Implementation of Shift Reduce Parsing Algorithm.
8. Construction of LR Parsing Table.
9. Generation of Code for a given Intermediate Code.
10. Implementation of Code Optimization techniques.

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of this course, students will be able to

- implement the different Phases of compiler using tools.
- analyze the control flow and data flow of a typical program.
- optimize a given program.
- generate an assembly language program equivalent to a source language program.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Turbo C,LEX and YACC,UNIX.

HARDWARE: Flavor of any WINDOWS and UNIX. Standalone desktops 30 Nos.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of corelation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	3	2	-	-	-	-	-	-	-	3	-	2
CO2	2	2	-	2	2	-	-	-	-	-	-	-	-	3
CO3	2	1	2	3	1	-	-	-	-	-	1	3	2	-
CO4	3	2	3	1	2	-	-	2	-	-	-	-	-	3

IT15607 GRAPHICS AND MULTIMEDIALABOROTARY 0 0 4 2

COURSE OBJECTIVES

- to understand the need of developing graphics applications.
- to learn the hardware involved in building graphics applications.
- to learn algorithmic development of graphics primitives like: line, circle, ellipse, polygon etc.
- to learn the representation and transformation of graphical images and pictures.
- to illustrate the impact of animations.

LIST OF EXPERIMENTS

1. Implementation of Line Drawing Algorithms a) DDA b) Bresenham
2. Implementation of Bresenham's Circle and Ellipse Generation Algorithm
3. Implementation of Two Dimensional Transformations
4. Composite 2D Transformations
5. Implementation of Cohen-Sutherland Line Clipping Algorithm
6. Implementation of 3D Transformations
7. Composite 3D Transformations
8. Animation using Image Effects Generator.
9. Game development using Flash
10. Video Editing

TOTAL PERIODS 60

COURSE OUTCOMES

At the end of this course, students will be able to

- draw basic shapes such as lines, circle and ellipse.
- perform processing of basic shapes by various processing algorithms /techniques.
- apply the transformations to the basic shapes.
- design animation sequences

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Adobe Flash Player, Dreamweaver, Photoshop 7.0.

HARDWARE: Flavor of any WINDOWS and UNIX. Standalone desktops 30 Nos.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	1	3	2	-	-	-	-	-	-	-	3	-	2
CO2	2	2	-	2	2	-	-	-	-	-	-	-	-	3
CO3	2	1	2	3	1	-	-	-	-	-	1	3	2	-
CO4	1	3	3	2	-	-	-	-	-	-	2	2	-	1

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

R-2013

B.TECH INFORMATION TECHNOLOGY

I - VIII SEMESTERS CURRICULUM AND SYLLABUS

SEMESTER I

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS6151	Technical English – I	3	1	0	4
2.	MA6151	Mathematics – I	3	1	0	4
3.	PH6151	Engineering Physics – I	3	0	0	3
4.	CY6151	Engineering Chemistry – I	3	0	0	3
5.	GE6151	Computer Programming	3	0	0	3
6.	GE6152	Engineering Graphics	2	0	3	4
PRACTICALS						
7.	GE6161	Computer Practices Laboratory	0	0	3	2
8.	GE6162	Engineering Practices Laboratory	0	0	3	2
9.	GE6163	Physics and Chemistry Laboratory - I	0	0	2	1
		TOTAL	**17**	**2**	**11**	**26**

SEMESTER II

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS6251	Technical English – II	3	1	0	4
2.	MA6251	Mathematics – II	3	1	0	4
3.	PH6251	Engineering Physics – II	3	0	0	3
4.	CY6251	Engineering Chemistry – II	3	0	0	3
5.	CS6201	Digital Principles and System Design	3	0	0	3
	CS6202	Programming and Data Structures I	3	0	0	3
PRACTICALS						
7.	GE6262	Physics and Chemistry Laboratory - II	0	0	2	1
8.	IT6211	Digital Laboratory	0	0	3	2
9.	IT6212	Programming and Data Structures Laboratory I	0	0	3	2
		TOTAL	**18**	**2**	**8**	**25**

SEMESTER III

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA6351	Transforms and Partial Differential Equations	3	1	0	4
2.	CS6301	Programming and Data Structures II	3	0	0	3
3.	CS6302	Database Management Systems	3	0	0	3
4.	CS6303	Computer Architecture	3	0	0	3
5.	CS6304	Analog and Digital Communication	3	0	0	3
6.	GE6351	Environmental Science and Engineering	3	0	0	3
PRACTICAL						
7.	IT6311	Programming and Data Structures Laboratory II	0	0	3	2
8.	IT6312	Database Management Systems Laboratory	0	0	3	2
9.	IT6313	Digital Communication Laboratory	0	0	3	2
		TOTAL	**18**	**1**	**9**	**25**

SEMESTER IV

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA6453	Probability and Queuing Theory	3	1	0	4
2.	EC6504	Microprocessor and Microcontroller	3	0	0	3
3.	CS6402	Design and Analysis of Algorithms	3	0	0	3
4.	CS6401	Operating Systems	3	0	0	3
5.	CS6403	Software Engineering	3	0	0	3
PRACTICAL						
6.	IT6411	Microprocessor and Microcontroller Laboratory	0	0	3	2
7.	IT6412	Operating Systems Laboratory	0	0	3	2
8.	IT6413	Software Engineering Laboratory	0	0	3	2
		TOTAL	**15**	**1**	**9**	**22**

SEMESTER V

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	CS6551	Computer Networks	3	0	0	3
2.	IT6501	Graphics and Multimedia	3	0	0	3
3.	CS6502	Object Oriented Analysis and Design	3	0	0	3
4.	IT6502	Digital Signal Processing	3	1	0	4
5.	IT6503	Web Programming	3	1	0	4
6.	EC6801	Wireless Communication	3	0	0	3
PRACTICAL						
7.	IT6511	Networks Laboratory	0	0	3	2
8.	IT6512	Web Programming Laboratory	0	0	3	2
9.	IT6513	Case Tools Laboratory	0	0	3	2
		TOTAL	**18**	**2**	**9**	**26**

SEMESTER VI

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	CS6601	Distributed Systems	3	0	0	3
2.	IT6601	Mobile Computing	3	0	0	3
3.	CS6659	Artificial Intelligence	3	0	0	3
4.	CS6660	Compiler Design	3	0	0	3
5.	IT6602	Software Architectures	3	0	0	3
6.		Elective I	3	0	0	3
PRACTICAL						
7.	IT6611	Mobile Application Development Laboratory	0	0	3	2
8.	IT6612	Compiler Laboratory	0	0	3	2
9.	GE6674	Communication and Soft Skills - Laboratory Based	0	0	4	2
		TOTAL	**18**	**0**	**10**	**24**

SEMESTER VII

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	IT6701	Information Management	3	0	0	3
2.	CS6701	Cryptography and Network Security	3	0	0	3
3.	IT6702	Data Ware Housing and Data Mining	3	0	0	3
4.	CS6703	Grid and Cloud Computing	3	0	0	3
5.		Elective II	3	0	0	3
PRACTICAL						
6.	IT6711	Data Mining Laboratory	0	0	3	2
7.	IT6712	Security Laboratory	0	0	3	2
8.	IT6713	Grid and Cloud Computing Laboratory	0	0	3	2
		TOTAL	**15**	**0**	**9**	**21**

SEMESTER VIII

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	IT6801	Service Oriented Architecture	3	0	0	3
2.		Elective III	3	0	0	3
3.		Elective IV	3	0	0	3
		Elective V	3	0	0	3
PRACTICAL						
4.	IT6811	Project Work	0	0	12	6
		TOTAL	**12**	**0**	**12**	**18**

TOTAL NO. OF CREDITS: 187

LIST OF ELECTIVES

SEMESTER VI – ELECTIVE I

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
1.	IT6001	Advanced Database Technology	3	0	0	3
2.	IT6002	Information Theory and Coding Techniques	3	0	0	3
3.	CS6001	C# and .Net Programming	3	0	0	3
4.	GE6757	Total Quality Management	3	0	0	3
5.	CS6012	Soft Computing	3	0	0	3
6.	GE6084	Human Rights	3	0	0	3

Web Sources:
http://www.slideshare.net/rohitjsh/presentation-on-group-discussion
http://www.washington.edu/doit/TeamN/present_tips.html
http://www.oxforddictionaries.com/words/writing-job-applications
http://www.kent.ac.uk/careers/cv/coveringletters.htm
http://www.mindtools.com/pages/article/newCDV_34.htm

IT6701 INFORMATION MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

- To expose students with the basics of managing the information
- To explore the various aspects of database design and modelling,
- To examine the basic issues in information governance and information integration
- To understand the overview of information architecture.

UNIT I DATABASE MODELLING, MANAGEMENT AND DEVELOPMENT 9

Database design and modelling - Business Rules and Relationship; Java database Connectivity (JDBC), Database connection Manager, Stored Procedures. Trends in Big Data systems including NoSQL - Hadoop HDFS, MapReduce, Hive, and enhancements.

UNIT II DATA SECURITY AND PRIVACY 9

Program Security, Malicious code and controls against threats; OS level protection; Security – Firewalls, Network Security Intrusion detection systems. Data Privacy principles. Data Privacy Laws and compliance.

UNIT III INFORMATION GOVERNANCE 9

Master Data Management (MDM) – Overview, Need for MDM, Privacy, regulatory requirements and compliance. Data Governance – Synchronization and data quality management.

UNIT IV INFORMATION ARCHITECTURE 9

Principles of Information architecture and framework, Organizing information, Navigation systems and Labelling systems, Conceptual design, Granularity of Content.

UNIT V INFORMATION LIFECYCLE MANAGEMENT 9

Data retention policies; Confidential and Sensitive data handling, lifecycle management costs. Archive data using Hadoop; Testing and delivering big data applications for performance and functionality; Challenges with data administration;

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to:

- Cover core relational database topics including logical and physical design and modeling
- Design and implement a complex information system that meets regulatory requirements; define and manage an organization's key master data entities
- Design, Create and maintain data warehouses.
- Learn recent advances in NOSQL , Big Data and related tools.

TEXT BOOKS:

1. Alex Berson, Larry Dubov MASTER DATA MANAGEMENT AND DATA GOVERNANCE, 2/E, Tata McGraw Hill, 2011
2. Security in Computing, 4/E, Charles P. Pfleeger, Shari Lawrence Pfleeger, Prentice Hall; 2006
3. Information Architecture for the World Wide Web; Peter Morville, Louis Rosenfeld ; O'Reilly Media; 1998

REFERENCES:

1. Jeffrey A. Hoffer, Heikki Topi, V Ramesh - MODERN DATABASE MANAGEMENT, 10 Edition, PEARSON, 2012
2. http://nosql-database.org/ Next Gen databases that are distributed, open source and scalable.
3. http://ibm.com/big-data - Four dimensions of big data and other ebooks on Big Data Analytics
4. Inside Cyber Warfare: Mapping the Cyber Underworld- Jeffrey Carr, O'Reilly Media; Second Edition 2011

CS6701 CRYPTOGRAPHY AND NETWORK SECURITY L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand OSI security architecture and classical encryption techniques.
- Acquire fundamental knowledge on the concepts of finite fields and number theory.
- Understand various block cipher and stream cipher models.
- Describe the principles of public key cryptosystems, hash functions and digital signature.

UNIT I INTRODUCTION & NUMBER THEORY 10

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY 10

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. **Public key cryptography:** Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT III HASH FUNCTIONS AND DIGITAL SIGNATURES 8

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – EI Gamal – Schnorr.

UNIT IV SECURITY PRACTICE & SYSTEM SECURITY 8

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V E-MAIL, IP & WEB SECURITY **9**

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. **IPSecurity:** Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). **Web Security:** SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

TOTAL: 45 PERIODS

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Compare various Cryptographic Techniques
- Design Secure applications
- Inject secure coding in the developed applications

TEXT BOOKS:

1. William Stallings, Cryptography and Network Security, 6th Edition, Pearson Education, March 2013. (UNIT I,II,III,IV).
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002. (UNIT V).

REFERENCES:

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles Pfleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.
8. http://nptel.ac.in/.

IT6702 DATA WAREHOUSING AND DATA MINING **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be familiar with the concepts of data warehouse and data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.

UNIT I DATA WAREHOUSING **9**

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 9

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 9

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 9

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 Back propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction.

UNIT V CLUSTERING AND TRENDS IN DATA MINING 9

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – K-means– 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

OUTCOMES:

After completing this course, the student will be able to:

- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

TEXT BOOKS:

1. Alex Berson and Stephen J.Smith, “Data Warehousing, Data Mining and OLAP”, Tata McGraw – Hill Edition, Thirteenth Reprint 2008.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques”, Third Edition, Elsevier, 2012.

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. Aja, “Insight into Data Mining Theory and Practice”, Eastern Economy Edition, Prentice Hall of India, 2006.
3. G. K. Gupta, “Introduction to Data Mining with Case Studies”, Eastern Economy Edition, Prentice Hall of India, 2006.
4. Daniel T.Larose, “Data Mining Methods and Models”, Wiley-Interscience, 2006.

REFERENCES:

1. Jason Venner, “Pro Hadoop- Build Scalable, Distributed Applications in the Cloud”, A Press, 2009
2. Tom White, “Hadoop The Definitive Guide”, First Edition. O’Reilly, 2009.
3. Bart Jacob (Editor), “Introduction to Grid Computing”, IBM Red Books, Vervante, 2005
4. Ian Foster, Carl Kesselman, “The Grid: Blueprint for a New Computing Infrastructure”, 2nd Edition, Morgan Kaufmann.
5. Frederic Magoules and Jie Pan, “Introduction to Grid Computing” CRC Press, 2009.
6. Daniel Minoli, “A Networking Approach to Grid Computing”, John Wiley Publication, 2005.
7. Barry Wilkinson, “Grid Computing: Techniques and Applications”, Chapman and Hall, CRC, Taylor and Francis Group, 2010.

IT6711 DATA MINING LABORATORY L T P C
0 0 3 2

OBJECTIVES:

The student should be made to:

- Be familiar with the algorithms of data mining,
- Be acquainted with the tools and techniques used for Knowledge Discovery in Databases.
- Be exposed to web mining and text mining

LIST OF EXPERIMENTS:

1. Creation of a Data Warehouse.
2. Apriori Algorithm.
3. FP-Growth Algorithm.
4. K-means clustering.
5. One Hierarchical clustering algorithm.
6. Bayesian Classification.
7. Decision Tree.
8. Support Vector Machines.
9. Applications of classification for web mining.
10. Case Study on Text Mining or any commercial application.

TOTAL : 45 PERIODS

OUTCOMES:

After completing this course, the student will be able to:

- Apply data mining techniques and methods to large data sets.
- Use data mining tools.
- Compare and contrast the various classifiers.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE:

WEKA, RapidMiner, DB Miner or Equivalent

HARDWARE

Standalone desktops 30 Nos

IT6712	SECURITY LABORATORY	L T P C 0 0 3 2

OBJECTIVES:

The student should be made to:

- Be exposed to the different cipher techniques
- Learn to implement the algorithms DES, RSA,MD5,SHA-1
- Learn to use tools like GnuPG, KF sensor, Net Strumbler

LIST OF EXPERIMENTS

1. Implement the following SUBSTITUTION & TRANSPOSITION TECHNIQUES concepts:
   a) Caesar Cipher
   b) Playfair Cipher
   c) Hill Cipher
   d) Vigenere Cipher
   e) Rail fence – row & Column Transformation
2. Implement the following algorithms
   a) DES
   b) RSA Algorithm
   c) Diffiee-Hellman
   d) MD5
   e) SHA-1
3. Implement the SIGNATURE SCHEME - Digital Signature Standard
4. Demonstrate how to provide secure data storage, secure data transmission and for creating digital signatures (GnuPG).
5. Setup a honey pot and monitor the honeypot on network (KF Sensor)
6. Installation of rootkits and study about the variety of options
7. Perform wireless audit on an access point or a router and decrypt WEP and WPA.(Net Stumbler)
8. Demonstrate intrusion detection system (ids) using any tool (snort or any other s/w)

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to

- Implement the cipher techniques
- Develop the various security algorithms
- Use different open source tools for network security and analysis

LAB EQUIPMENTS FOR A BATCH OF 30 STUDENTS:

SOFTWARE:

C / C++ / Java or equivalent compiler

GnuPG, KF Sensor or Equivalent, Snort, Net Stumbler or Equivalent

HARDWARE:

Standalone desktops -30 Nos.

(or)

Server supporting 30 terminals or more.

IT6713 **GRID AND CLOUD COMPUTING LABORATORY** **L T P C**
0 0 3 2

OBJECTIVES:

The student should be made to:

- Be exposed to tool kits for grid and cloud environment.
- Be familiar with developing web services/Applications in grid framework
- Learn to run virtual machines of different configuration.
- Learn to use Hadoop

LIST OF EXPERIMENTS:

GRID COMPUTING LAB:

Use Globus Toolkit or equivalent and do the following:

1. Develop a new Web Service for Calculator.
2. Develop new OGSA-compliant Web Service.
3. Using Apache Axis develop a Grid Service.
4. Develop applications using Java or C/C++ Grid APIs
5. Develop secured applications using basic security mechanisms available in Globus Toolkit.
6. Develop a Grid portal, where user can submit a job and get the result. Implement it with and without GRAM concept.

CLOUD COMPUTING LAB:

Use Eucalyptus or Open Nebula or equivalent to set up the cloud and demonstrate.

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Find procedure to set up the one node Hadoop cluster.
7. Mount the one node Hadoop cluster using FUSE.
8. Write a program to use the API's of Hadoop to interact with it.
9. Write a word count program to demonstrate the use of Map and Reduce tasks.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course, the student should be able to

- Use the grid and cloud tool kits.
- Design and implement applications on the Grid.
- Design and Implement applications on the Cloud.

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS:

SOFTWARE:

Globus Toolkit or equivalent
Eucalyptus or Open Nebula or equivalent to

HARDWARE

Standalone desktops 30 Nos

IT6811 **PROJECT WORK** **L T P C**
0 0 12 6

OBJECTIVES:

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 180 PERIODS

OUTCOMES:

- On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.

IT6001 **ADVANCED DATABASE TECHNOLOGY** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be familiar with a commercial relational database system (Oracle) by writing SQL using the system.
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.

UNIT I PARALLEL AND DISTRIBUTED DATABASES **9**

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies**.**

UNIT II OBJECT AND OBJECT RELATIONAL DATABASES **9**

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies.

UNIT III XML DATABASES **9**

XML Databases: XML Data Model – DTD - XML Schema - XML Querying – Web Databases – JDBC – Information Retrieval – Data Warehousing – Data Mining.

UNIT IV MOBILE DATABASES **9**

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Mobile Database Recovery Schemes.

LIST OF ELECTIVES

ELECTIVE I

Course Code	Course Title	L	T	P	C
MA15151	Discrete Mathematics	3	2	0	4
IT15151	Automata Languages and Computation	3	0	0	3
IT15152	Information Coding Techniques	3	0	0	3
IT15153	Software Architecture	3	0	0	3
IT15154	User Interface Design	3	0	0	3

ELECTIVE II

Course Code	Course Title	L	T	P	C
IT15251	Free and Open Source Software	3	0	0	3
IT15252	Distributed Systems	3	0	0	3
BA15351	Engineering Economics and Financial Accounting	3	0	0	3
IT15253	TCP/IP Protocol Design and Implementation	3	0	0	3
IT15254	System Software	3	0	0	3

ELECTIVE I

MA15151 DISCRETE MATHEMATICS 3 2 0 4

OBJECTIVES

To enable students to

- Introduce students to ideas and techniques from discrete mathematics that are widely used in science and engineering.
- Make the students to think logically and mathematically and apply these techniques in solving problems.
- Provide the foundation forim bedding logical reasoning in computer science.
- Develop recursive algorithms based on mathematical induction.
- Know basic properties of relations.

UNIT I PROPOSITIONAL CALCULUS 9

Propositions - Logical connectives - Compound propositions - Conditional and conditional propositions –Truth tables - Tautologies and contradictions - Contrapositive – Logical equivalences and implications - DeMorgan"s Laws - Normal forms - Principal conjunctive and disjunctive normal forms-Rules of inference-Arguments – Validity of arguments.

UNIT II PREDICATE CALCULUS 9

Predicates - Statement function - Variables - Free and bound variables - Quantifiers -Universe of discourse - Logical equivalences and implications for quantified statements -Theory of inference - The rules of universal specification and generalization - Validity of arguments.

UNIT III SET THEORY 9

Basic concepts - Notations - Subset - Algebra of sets - The power set - Ordered pairs and Cartesian product - Relations on sets - Types of relations and their properties – Relational matrix and the graph of relation-Partitions Equivalence relations.

UNIT IV FUNCTIONS 9

Definitions of functions - Classification of functions - Type of functions - Examples -Composition of functions - Inverse functions - Binary and n - ary operations – Characteristic function of a set-Hashing functions –Recursive functions-Permutation functions.

UNIT V LATTICE THEORY 9

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

TOTAL PERIODS 45

OUTCOMES

At the end of the course, students will be able to

- Construct mathematical arguments using logical connectives and quantifiers.
- Verify the correctness of an argument using propositional and predicate logic and truth tables.

- Demonstrate the ability to solve problems using counting techniques and combinatorics Construct proofs using direct proof, proof by contraposition, proof by contradiction,and proof by cases.
- Perform operations on discrete structures such as sets, functions, relations, and sequences.
- Understand the concepts of Boolean algebra.

TEXTBOOKS

1. KennethH.Rosen,"DiscreteMathematicsanditsApplications(withCombinatoricsandGraph Theory)",6thEdition, TataMcGraw -Hill,5th Reprint 2008.
2. Trembly J.P and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", TataMcGraw-Hill,35th Reprint 2008.

REFERENCES

1. Ralph.P.Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction",4th Edition, Pearson Education, 2002.
2. A.Tamilarasi,A.M.Natarajan,"DiscreteMathematicsanditsApplications",3rdEdition,KhannaPublishers, 2008.
3. T.Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics", TataMcGraw -Hill, 2007.

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation)3-strong,2-Medium,1-Weak														
COs	**Programme Outcomes(POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	3	-	-	-	-	-	-	-	-	3	3	3
CO4	2	2	3	3	-	-	-	-	-	-	-	2	3	3
CO5	3	3	3	-	-	-	-	-	-	-	-	3	3	3

IT15151 AUTOMATA LANGUAGES AND COMPUTATION **3 0 0 3**

COURSE OBJECTIVES

- to introduce concepts in automata theory and theory of computation.
- to identify different formal language classes and their relationships.
- to design grammars and recognizers for different formal languages.
- to prove or disprove theorems in automata theory using its properties.
- to determine the decidability and intractability of computational problems.

UNIT I AUTOMATA **9**

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

UNIT II REGULAR EXPRESSIONS AND LANGUAGES **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) – Anundecidable problem that is RE –Undecidable Problems about Turing Machine – Post's Correspondence Problem – The classes Pand NP.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- designgrammars and automata (recognizers) for different language classes.
- acquire a fundamental understanding of the core concepts in automata theory and formal languages.
- identify formal language classes and prove language membership properties
- prove and disprove theorems establishing key properties of formal languages andautomata
- acquire a fundamental understanding of core concepts relating to the theory of computation and computational models including decidability

TEXT BOOK

1. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory,Languages and Computations", second 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", ThirdEdition, Pearson Education, 2007.
3. Raymond Greenlaw an H.James Hoover, " Fundamentals of Theory of Computation, Principles and Practice",Morgan Kaufmann Publishers, 1998.
4. MichealSipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.
5. J. Martin, "Introduction to Languages and the Theory of computation" ThirdEdition, Tata McGraw Hill,2007.

WEB LINK

1. www.nptelvideos.in/2012/11/theory-of-computation.html

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	1	1	2	1	-	-	-	-	-	-	2	2	2
CO2	1	2	1	2	2	-	-	-	-	-	-	2	-	1
CO3	1	1	2	2	2	-	-	-	-	-	2	2	1	1
CO4	2	1	1	2	-	-	-	2	-	-	2	-	-	2
CO5	2	2	2	2	-	-	-	2	-	-	2	-	2	2

IT15152 INFORMATION CODING TECHNIQUES 3 0 0 3

COURSE OBJECTIVES

- to understand the basic classes of compression techniques.
- to know how to apply compression techniques to practical situations.
- to applythe ideas of entropy and information content.
- to analysis coding techniques will perform in different situations.
- to understand the current state of the area for both data compression and channel coding.

UNIT I INFORMATION THEORY 9

Information – Entropy, Information rate, classification of codes, Kraft McMillan inequality, Source coding theorem, Shannon – Fanon coding, Huffman coding, Extended Huffman coding - Joint and conditional entropies, Mutual information - Discrete memory less channels – BSC, BEC – Channel capacity, Shannon limit.

UNIT II SOURCE CODING: TEXT, AUDIO AND SPEECH 9

Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 - Speech: Channel Vocoder,LinearPredictive Coding.

UNIT III SOURCE CODING: IMAGE AND VIDEO 9

Image and Video Formats– GIF, TIFF, SIF, CIF, QCIF – Image compression: READ, JPEG – Video Compression: Principles-I,B,P frames, Motion estimation, Motion compensation, H.261, MPEG standard .

UNIT IV ERROR CONTROL CODING: BLOCK CODES 9

Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes - Syndrome calculation, Encoder anddecoder - CRC .

UNIT V ERROR CONTROL CODING: CONVOLUTIONAL CODES 9

Convolution codes – code tree, trellis, state diagram - Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding .

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- apply knowledge of advanced principles to the analysis of electrical and computer engineering problems.
- apply knowledge of advanced techniques to the design of electrical and computer engineering systems.
- apply the appropriate industry practices, emerging technologies, state-of- the-art design techniques, software tools, and research methods of solving electrical and computer engineering problems.
- maintain life-long learning and continue to be motivated to learn new subject.

- understand new subjects that are required to solve problems in industry without being dependent on a classroom environment.

TEXT BOOKS

1. R Bose, "Information Theory, Coding and Crptography", TMH 2007.
2. Fred Halsall, "Multidedia Communications: Applications, Networks, Protocols and Standards", Perason Education Asia, 2002.

REFERENCES

1. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 2006.
2. S Gravano, "Introduction to Error Control Codes", Oxford University Press 2007.
3. Amitabha Bhattacharya, "Digital Communication", TMH 2006.

WEB LINKS

1. nptel.ac.in/courses/117101053
2. https://wiki.metakgp.org/w/EC60083_:_Information_Theory_And_Coding_Techniques

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	1	2	1	2	1	-	-	-	-	-	-	1	-	1
CO2	1	2	1	1	2	-	-	-	-	-	-	2	-	1
CO3	2	1	1	1	1	-	-	-	-	-	2	1	2	1
CO4	1	1	2	2	-	-	-	2	-	-	1	-	-	1
CO5	1	1	2	1	-	-	-	1	-	-	2	-	-	2

IT15153 SOFTWARE ARCHITECTURE 3 0 0 3

COURSE OBJECTIVES

- to understand the fundamentals of architectures.
- to understand software architectural requirements and drivers.
- to be exposed to architectural styles and views.
- to be familiar with architectures for emerging technologies.
- to understand the creativity of the software's.

UNIT I INTRODUCTION AND ARCHITECTURAL DRIVERS 9

Introduction –What is software architecture? – Standard Definitions – Architectural structures – Influence of software architecture on organization-both business and technical – Architecture Business Cycle-Introduction –Functional requirements – Technical constraints – Quality Attributes.

UNIT II QUALITY ATTRIBUTE WORKSHOP 9

Quality Attribute Workshop – Documenting Quality Attributes – Six part scenarios – Case studies.

UNIT III ARCHITECTURAL VIEWS 9

Introduction – Standard Definitions for views – Structures and views - Representing views-available notations –Standard views – 4+1 view of RUP, Siemens 4 views, SEI's perspectives and views – Case studies**.**

UNIT IV ARCHITECTURAL STYLES 9

Introduction – Data flow styles – Call-return styles – Shared Information styles - Event styles – Case studies for each style.

UNIT V DOCUMENTING THE ARCHITECTURE 9

Good practices – Documenting the Views using UML – Merits and Demerits of using visual languages Need for formal languages - Architectural Description Languages – ACME – Case studies. Special topics: SOA andWeb services – Cloud Computing – Adaptive structures.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- explain influence of software architecture on business and technical activities.
- identify key architectural structures.
- use styles and views to specify architecture.
- design document for a given architecture.
- meet the demands of the industry.

TEXT BOOKS

1. Len Bass, Paul Clements, and Rick Kazman, "Software Architectures Principles and Practices",2nd Edition, Addison-Wesley,2003.
2. Anthony J Lattanze, "Architecting Software Intensive System. A Practitioner's Guide", Auerbach Publications,2010.

REFERENCES

1. Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Reed Little, Paulo Merson,Robert Nord, and Judith Stafford, "Documenting Software Architectures. Views and Beyond", 2ndEdition, Addison-Wesley, 2010.
2. Paul Clements, Rick Kazman, and Mark Klein, "Evaluating software architectures: Methods and case studies. Addison-Wesley, 2001.
3. Rajkumar Buyya, James Broberg, and Andrzej Goscinski, "Cloud Computing. Principles and Paradigms", John Wiley & Sons, 2011.
4. Mark Hansen, "SOA Using Java Web Services", Prentice Hall, 2007.

WEB LINKS

1. www.sei.cmu.edu/architecture
2. https://www.tutorialspoint.com/software_architecture_design/key_principles.htm

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	1	1	-	-	-	-	-	-	-	-	1	2
CO2	3	2	2	1	-	-	-	-	-	-	-	-	1	2
CO3	2	2	1	-	-	-	-	-	-	-	-	-	1	2
CO4	3	2	2	2	-	-	-	-	-	-	-	-	1	2
CO5	3	2	1	1	-	-	-	-	-	-	-	-	1	2

IT15154 USER INTERFACE DESIGN 3 0 0 3

COURSE OBJECTIVES

- to learn about graphical system.
- to study about design standards.
- to learn about the controls used in windows.
- to study about the multimedia.
- to perform various test in windows layout.

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-WebSystems– 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 Accessibility– Icons–Image– Multimedia – Coloring.

UNIT V WINDOWS LAYOUT-TEST 9

Prototypes – Kinds of Tests – Retest – Information Search – Visualization – Hypermedia – WWW– SoftwareTools.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- identify and define key terms related to user interface.
- understand the design standards.
- explain the user interface design process.
- implement the multimedia effects.
- perform various test in windows layout.

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.

REFERENCE

1. Alan Cooper, “The Essential Of User Interface Design”, Wiley – Dream Tech Ltd., 2002.

WEB LINKS

1. nptel.ac.in/courses/106105087/20
2. https://www.tutorialspoint.com/software.../software_user_interface_design.htm

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	3	3	2	-	-	-	-	-	-	2	3	2
CO2	2	3	3	2	3	-	-	-	-	-	-	2	-	3
CO3	2	3	3	2	2	-	-	-	-	-	2	3	2	2
CO4	2	3	2	2	-	-	-	2	-	-	2	-	-	1
CO5	3	3	2	3	-	-	-	2	-	-	3	-	1	2

ELECTIVE II

IT15251 FREE AND OPEN SOURCE SOFTWARE 3 0 0 3

COURSE OBJECTIVES

- to understand the basics of open source operating systems.
- to gain the knowledge of working with linux platform and open source database.
- to be familiar with programming languages PHP, Perl, Python.
- to learn some important FOSS tools and techniques.
- to be familiar with participating in a FOSS project.

UNIT I INTRODUCTION 9

Introduction to open sources – Need of Open Sources– Advantages of Open Sources –Application of pen mode – Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals –Development with Linux.

UNIT II OPEN SOURCE DATABASE 9

Introduction – Setting up account –Starting, terminating and writing your own SQL programs – Record selection. Technology – Working with strings –Date and Time – Sorting Query Results – Generating Summary – Working with metadata – Using sequences –MySQL and Web

UNIT III OPEN SOURCE PROGRAMMING LANGUAGES 9

PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP –String Manipulation and regular expression – File handling and data PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging anderror handling – Security –Templates.

UNIT IV PYTHON 9

Syntax and Style – Python Objects – Numbers – Sequences – Strings –Lists and Tuples – Dictionaries –OOP – Conditionals and Loops – Files – Input and Output –Errors and Exceptions – Functions – Modules – Classes and Execution Environment.

UNIT V PERL 9

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- install and run open-source operating systems.
- gather information about Free and open source software projects from software release and from sites inthe internet.
- build and modify one or more Free and open source software packages
- develop programs using PHP, Perl, Python and MySQL.
- contribute software to interact with freeand opens source software development projects.

TEXT BOOKS

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2003.
2. Steve Suchring, “MySQL Bible”, John Wiley, 2002.

REFERENCES

1. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O‟Reilly, 2002.
2. Wesley J. Chun, “Core Phython Programming”, Prentice Hall, 2001.
3. Martin C. Brown, “Perl: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

WEB LINKS

1. http://nptel.ac.in/courses/117108124/
2. https://www.youtube.com/watch?v=gD4KOy2XjKY

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	2	-	-	-	-	-	-	2	3	2
CO2	2	3	3	-	3	-	-	-	2	-	-	2	1	2
CO3	3	3	2	3	2	-	-	-	-	-	3	2	2	2
CO4	2	3	3	2	-	-	-	2	-	-	2	-	-	1
CO5	3	3	2	2	-	-	-	2	-	-	3	-	-	2

IT15252 **DISTRIBUTED SYSTEMS** **3 0 0 3**

COURSE OBJECTIVES

- to provide knowledge on principles and practice underlying in the design of distributed systems.
- to layout foundations of distributed systems.
- to introduce the idea of middleware and related issues.
- to understand in detail the system level and support required for distributed system.
- to understand the issues involved in studying data and design of distributed algorithms.

UNIT I INTRODUCTION 9

Introduction - Examples of Distributed Systems - Trends in Distributed Systems - Focus on resource sharing - Challenges. Case study: World Wide Web.

UNIT II COMMUNICATION IN DISTRIBUTED SYSTEM 9

System Model - Inter process Communication the API for internet protocols - External datarepresentation and Multicast communication. Network virtualization: Overlay networks. Case study: MPI.

UNIT III REMOTE METHOD INVOCATION AND OBJECTS 9

Remote Invocation – Introduction - Request-reply protocols - Remote procedure call - Remote methodinvocation. Case study: Java RMI - Group communication - Publish-subscribe systems -Message queues– Shared memory approaches –Distributed objects - Case study: CORBA - from objects to components.

UNIT IV PEER TO PEER SERVICES AND FILE SYSTEM 9

Peer–to-peer Systems - Introduction - Napster and its legacy - Peer-to-peerMiddleware - Routing Overlays -Overlay case studies: Pastry, Tapestry- Distributed File Systems - Introduction – File servicearchitecture - Andrew File system.

UNIT V SYNCHRONIZATION AND REPLICATION 9

Introduction - Clocks, events and process states - Synchronizing physical clocks- Logical time and logical clocks-Global states - Coordination and Agreement– Introduction - Distributed mutual exclusion - Elections - Transactions and Concurrency Control -Transactions -Nested transactions - Locks – Optimistic concurrency control - Timestamp ordering -Distributed deadlocks - Replication - Case study - Coda.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- articulate the principles and standard practices underlying the design of distributed andparallel systems.
- explain the core issues of distributed and parallel systems.
- appreciate the difficulties in implementing basic communication in parallel and distributed systems.

- have knowledge on the substantial difficulty in designing parallel and distributed algorithms in comparison to centralized algorithms.
- appreciate the issues in distributed operating system, resource management and fault tolerance.

TEXT BOOK

1. GeorgeCoulouris, Jean Dollimore, Tim Kindberg,"Distributed Systems Concepts and Design" Fifth edition – 2011- Addison Wesley.

REFERENCES

1. Tanenbaum A.S.,Van Steen M.,"Distributed Systems: Principles and Paradigms", Pearson Education ,2007.
2. Liu M.L.,"Distributed Computing, Principles and Applications", Pearson and education,2004.

WEB LINKS

1. http://nptel.ac.in/courses/106106107/
2. http://freevideolectures.com/Course/2493/Computer-Systems-Laboratory-Colloquium/17

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	3	-	-	-	2	-	-	2	1	3
CO2	3	2	1	-	3	-	-	-	-	-	-	2	3	2
CO3	2	1	3	3	2	-	-	-	3	-	2	-	2	2
CO4	3	3	2	1	2	-	-	2	2	-	-	-	1	-
CO5	2	3	3	2	-	-	-	-	-	-	-	-	3	2

BA15351 ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING 3 0 0 3

COURSE OBJECTIVES

- to know the fundamentals of managerial economics.
- to be familiar with demand and supply analysis.
- to understand the production and cost analysis.
- to describe the various financial accounting techniques.
- to understand the significance of capital budgeting.

UNIT I INTRODUCTION 9

Managerial Economics - Relationship with other disciplines - Firms: Types, objectives and goals – Managerial decisions - Decision analysis.

UNIT II DEMAND & SUPPLY ANALYSIS 9

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

UNIT III PRODUCTION AND COST ANALYSIS 9

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

UNIT IV FINANCIAL ACCOUNTING 9

Final Accounts – Trading Accounts – Profit and Loss Accounts – Balance sheet - Cash flow analysis - Funds flowAnalysis.

UNIT V CAPITAL BUDGETING 9

Investments - Risks and return evaluation of investment decision - Average rate of return - Payback Period – Net Present Value - Internal rate of return.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- acquire knowledge in the basic concepts of managerial economics.
- identifythe role demand and supply analysis.
- understand the production and cost analysis.
- knowthe applications of financial accounting.
- be familiar with the scope capital budgeting

REFERENCES

1. G S Gupta, " Managerial Economics", Tata McGraw-Hill Education, 2011
2. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited,New Delhi, 2004
3. G S Gupta, Samuel Paul, V. L. Mote, "Managerial Economics – Concepts and Cases" McGraw Hill Education, New Delhi, 2004

4. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition, 2005.

5. N. Gregory Mankiw, Principles of Economics, 3rd edition, Thomson learning, New Delhi,2007.

WEB LINKS

1. www.managementstudyguide.com
2. www.economicsconcepts.com
3. www.economist.com

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	2	2	-	-	2	-	-	1	-	-	-	2	-
CO2	2	3	-	-	3	-	2	3	2	2	1	3	-	-
CO3	-	3	2	3	-	3	3	-	2	-	-	2	-	3
CO4	-	-	-	-	2	2	-	2	3	2	-	1	2	-
CO5	3	-	3	3	2	2	-	-	-	-	3	3	2	3

IT15253 TCP / IP PROTOCOL DESIGN AND IMPLEMENTATION 3 0 0 3

COURSE OBJECTIVES

- to understand the IP addressing schemes.
- to knowthe fundamentals of network design and implementation.
- to analysis the design and implementation of TCP/IP networks.
- to understand on network management issues.
- to learn to design and implement network applications.

UNIT I INTRODUCTION 9

Internetworking concepts and architecture model – classful Internet addresses – CIDR – Subletting and Super.netting – AARP – RARP- IP- IP Routing – ICMP – IPV6.

UNIT II TRANSMISSION CONTROL PROTOCOL 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 –errorprocessing (ICMP) – Multicast Processing (IGMP).

UNIT IV TCP IMPLEMENTATION I 9

Data structure and input processing – transmission control blocks – segment format – comparison– finite state machine implementation – Output processing – mutual exclusion –computing the computing the TCP Datalength.

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 PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- design and implement TCP/IP networks
- explain network management issues.
- design and implement network applications & develop data structures for basic protocol functions of TCP/IP.
- apply the members in the respective structures. .
- design and implement data structures for maintaining multiple local and global time.

TEXT BOOKS

1. Douglas E Comer,"Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1, Edition 2006.
2. W.Richard Stevens "TCP/IP Illustrated" Vol 1. Pearson Education, 2003.

REFERENCES

1. Forouzan, “TCP/IP Protocol Suite” Second Edition, Tata MC Graw Hill, 2003.
2. W.Richard Stevens “TCP/IP Illustrated” Volume 2, Pearson Education 2003.

WEB LINKS

1. http://nptel.ac.in/courses/106105082/35
2. http://freevideolectures.com/Course/2308/Internet-Technology/3

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs))**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	3	2	2	-	-	-	3	-	3	3	2	3
CO2	3	3	3	2	1	-	-	-	-	-	-	-	2	3
CO3	3	2	2	2	2	-	-	-	-	-	-	2	2	2
CO4	3	3	2	2	-	-	-	2	-	-	-	-	-	1
CO5	3	2	2	3	-	-	-	2	-	-	2	-	-	2

IT15254 **SYSTEM SOFTWARE** **3 0 0 3**

COURSE OBJECTIVES

- to understand the relationship between system software and machine architecture.
- to know thesign and implementation of assemblers.
- to understand the major concept of loader and linker.
- to have an understanding of macroprocessors.
- to understand the major concept of interactive debugging systems and software tools.

UNIT I INTRODUCTION 9

System softwareand 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 Multi dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine Independent assembler features - Literals –Symbol-defining statements – Expressions - Onepass assemblers and pass assemblers - Implementation example - MASM assembler.

UNIT III LOADERS AND LINKERS 9

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

UNIT IV MACRO PROCESSORS 9

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and datastructures - Machine-independent macro processor features -Concatenation of Macro Parameters – Generation of Unique Labels–Conditional Macro Expansion – Keyword Macro Parameters – Macro withinMacro-Implementation example -MASM Macro Processor – ANSI C Macro language

UNIT V SYSTEM SOFTWARE TOOLS 9

Text editors - Overview of the Editing Process - User Interface – Editor Structure. -Interactive debugging systems -Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

TOTAL PERIODS 45

COURSE OUTCOMES

At the end of this course, students will be able to

- identify the approach of machine architecture.
- compare assembler and macro assemblers and understand the concepts of machine independent loader.
- implement and contrast the concept of linker.
- apply systematic procedure for interactive debugging system.
- understand the concept system software tools.

TEXT BOOK

1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd Edition, Pearson Education Asia, 2006.

REFERENCES

1. John J. Donovan "Systems Programming", Tata McGraw-Hill Edition, 2000.
2. John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2000.
3. D. M. Dhamdhere, "Systems Programming and Operating Systems", SecondRevised Edition, Tata McGraw-Hill, 2000.

WEB LINKS

1. http://nptel.ac.in/courses/106106092/2
2. http://freevideolectures.com/Course/2277/Computer-Organization/2

CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
COs	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2	3	2	2	3	-	-	-	-	-	-	2	3	2
CO2	3	2	2	2	3	-	-	-	-	-	-	-	-	2
CO3	3	3	2	2	3	-	-	-	-	-	-	-	3	3
CO4	3	2	3	2	-	-	-	-	-	-	2	-	-	2
CO5	3	2	3	3	-	-	-	-	-	-	-	-	2	3

ANNA UNIVERSITY, CHENNAI

AFFILIATED INSTITUTIONS

R-2013

B.TECH INFORMATION TECHNOLOGY

I - VIII SEMESTERS CURRICULUM AND SYLLABUS

SEMESTER I

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS6151	Technical English – I	3	1	0	4
2.	MA6151	Mathematics – I	3	1	0	4
3.	PH6151	Engineering Physics – I	3	0	0	3
4.	CY6151	Engineering Chemistry – I	3	0	0	3
5.	GE6151	Computer Programming	3	0	0	3
6.	GE6152	Engineering Graphics	2	0	3	4
PRACTICALS						
7.	GE6161	Computer Practices Laboratory	0	0	3	2
8.	GE6162	Engineering Practices Laboratory	0	0	3	2
9.	GE6163	Physics and Chemistry Laboratory - I	0	0	2	1
		TOTAL	**17**	**2**	**11**	**26**

SEMESTER II

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	HS6251	Technical English – II	3	1	0	4
2.	MA6251	Mathematics – II	3	1	0	4
3.	PH6251	Engineering Physics – II	3	0	0	3
4.	CY6251	Engineering Chemistry – II	3	0	0	3
5.	CS6201	Digital Principles and System Design	3	0	0	3
	CS6202	Programming and Data Structures I	3	0	0	3
PRACTICALS						
7.	GE6262	Physics and Chemistry Laboratory - II	0	0	2	1
8.	IT6211	Digital Laboratory	0	0	3	2
9.	IT6212	Programming and Data Structures Laboratory I	0	0	3	2
		TOTAL	**18**	**2**	**8**	**25**

SEMESTER III

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA6351	Transforms and Partial Differential Equations	3	1	0	4
2.	CS6301	Programming and Data Structures II	3	0	0	3
3.	CS6302	Database Management Systems	3	0	0	3
4.	CS6303	Computer Architecture	3	0	0	3
5.	CS6304	Analog and Digital Communication	3	0	0	3
6.	GE6351	Environmental Science and Engineering	3	0	0	3
PRACTICAL						
7.	IT6311	Programming and Data Structures Laboratory II	0	0	3	2
8.	IT6312	Database Management Systems Laboratory	0	0	3	2
9.	IT6313	Digital Communication Laboratory	0	0	3	2
		TOTAL	**18**	**1**	**9**	**25**

SEMESTER IV

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	MA6453	Probability and Queuing Theory	3	1	0	4
2.	EC6504	Microprocessor and Microcontroller	3	0	0	3
3.	CS6402	Design and Analysis of Algorithms	3	0	0	3
4.	CS6401	Operating Systems	3	0	0	3
5.	CS6403	Software Engineering	3	0	0	3
PRACTICAL						
6.	IT6411	Microprocessor and Microcontroller Laboratory	0	0	3	2
7.	IT6412	Operating Systems Laboratory	0	0	3	2
8.	IT6413	Software Engineering Laboratory	0	0	3	2
		TOTAL	**15**	**1**	**9**	**22**

SEMESTER V

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	CS6551	Computer Networks	3	0	0	3
2.	IT6501	Graphics and Multimedia	3	0	0	3
3.	CS6502	Object Oriented Analysis and Design	3	0	0	3
4.	IT6502	Digital Signal Processing	3	1	0	4
5.	IT6503	Web Programming	3	1	0	4
6.	EC6801	Wireless Communication	3	0	0	3
PRACTICAL						
7.	IT6511	Networks Laboratory	0	0	3	2
8.	IT6512	Web Programming Laboratory	0	0	3	2
9.	IT6513	Case Tools Laboratory	0	0	3	2
		TOTAL	**18**	**2**	**9**	**26**

SEMESTER VI

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	CS6601	Distributed Systems	3	0	0	3
2.	IT6601	Mobile Computing	3	0	0	3
3.	CS6659	Artificial Intelligence	3	0	0	3
4.	CS6660	Compiler Design	3	0	0	3
5.	IT6602	Software Architectures	3	0	0	3
6.		Elective I	3	0	0	3
PRACTICAL						
7.	IT6611	Mobile Application Development Laboratory	0	0	3	2
8.	IT6612	Compiler Laboratory	0	0	3	2
9.	GE6674	Communication and Soft Skills - Laboratory Based	0	0	4	2
		TOTAL	**18**	**0**	**10**	**24**

SEMESTER VII

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	IT6701	Information Management	3	0	0	3
2.	CS6701	Cryptography and Network Security	3	0	0	3
3.	IT6702	Data Ware Housing and Data Mining	3	0	0	3
4.	CS6703	Grid and Cloud Computing	3	0	0	3
5.		Elective II	3	0	0	3
PRACTICAL						
6.	IT6711	Data Mining Laboratory	0	0	3	2
7.	IT6712	Security Laboratory	0	0	3	2
8.	IT6713	Grid and Cloud Computing Laboratory	0	0	3	2
		TOTAL	**15**	**0**	**9**	**21**

SEMESTER VIII

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	IT6801	Service Oriented Architecture	3	0	0	3
2.		Elective III	3	0	0	3
3.		Elective IV	3	0	0	3
		Elective V	3	0	0	3
PRACTICAL						
4.	IT6811	Project Work	0	0	12	6
		TOTAL	**12**	**0**	**12**	**18**

TOTAL NO. OF CREDITS: 187

LIST OF ELECTIVES

SEMESTER VI – ELECTIVE I

S.NO.	COURSE CODE	COURSE TITLE	L	T	P	C
1.	IT6001	Advanced Database Technology	3	0	0	3
2.	IT6002	Information Theory and Coding Techniques	3	0	0	3
3.	CS6001	C# and .Net Programming	3	0	0	3
4.	GE6757	Total Quality Management	3	0	0	3
5.	CS6012	Soft Computing	3	0	0	3
6.	GE6084	Human Rights	3	0	0	3

IT6003 **MULTIMEDIA COMPRESSION TECHNIQUES** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand error–control coding.
- Understand encoding and decoding of digital data streams.
- Be familiar with the methods for the generation of these codes and their decoding techniques.
- Be aware of compression and decompression techniques.
- Learn the concepts of multimedia communication.

UNIT I MULTIMEDIA COMPONENTS **9**

Introduction - Multimedia skills - Multimedia components and their characteristics - Text, sound, images, graphics, animation, video, hardware.

UNIT II AUDIO AND VIDEO COMPRESSION **9**

Audio compression–DPCM-Adaptive PCM –adaptive predictive coding-linear Predictive coding-code excited LPC-perpetual coding Video compression –principles-H.261-H.263-MPEG 1, 2, and 4.

UNIT III TEXT AND IMAGE COMPRESSION **9**

Compression principles-source encoders and destination encoders-lossless and lossy compression-entropy encoding –source encoding -text compression – static Huffman coding dynamic coding – arithmetic coding –Lempel Ziv-Welsh Compression-image compression.

UNIT IV VOIP TECHNOLOGY **9**

Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service- CODEC Methods- VOIP applicability.

UNIT V MULTIMEDIA NETWORKING **9**

Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications-distributing multimedia-beyond best effort service-secluding and policing Mechanisms-integrated services-differentiated Services-RSVP.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Design an application with error–control.
- Use compression and decompression techniques.
- Apply the concepts of multimedia communication.

TEXT BOOKS:

1. Fred Halshall “Multimedia Communication - Applications, Networks, Protocols and Standards”, Pearson Education, 2007.
2. Tay Vaughan, “Multideai: Making it Work”, 7th Edition, TMH 2008 98.
3. Kurose and W.Ross” Computer Networking “a Top down Approach, Pearson Education 2005.

REFERENCES:

1. Marcus Goncalves “Voice over IP Networks”, Mc Graw Hill 1999.
2. KR. Rao,Z S Bojkovic, D A Milovanovic, “Multimedia Communication Systems: Techniques, Standards, and Networks”, Pearson Education 2007.
3. R. Steimnetz, K. Nahrstedt, “Multimedia Computing, Communications and Applications”, Pearson Education Ranjan Parekh, “Principles of Multimedia”, TMH 2007.

IT6004	SOFTWARE TESTING	L T P C 3 0 0 3

OBJECTIVES:

The student should be made to:

- Expose the criteria for test cases.
- Learn the design of test cases.
- Be familiar with test management and test automation techniques.
- Be exposed to test metrics and measurements.

UNIT I INTRODUCTION 9

Testing as an Engineering Activity – Testing as a Process – Testing axioms – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention strategies.

UNIT II TEST CASE DESIGN 9

Test case Design Strategies – Using Black Bod Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – 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 – code complexity testing – Evaluating Test Adequacy Criteria.

UNIT III LEVELS OF TESTING 9

The need for Levers 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 – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

UNIT IV TEST AMANAGEMENT 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 TEST AUTOMATION 9

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

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to

- Design test cases suitable for a software development for different domains.
- Identify suitable tests to be carried out.
- Prepare test planning based on the document.
- Document test plans and test cases designed.
- Use of automatic testing tools.
- Develop and validate a test plan.

TEXT BOOKS:

1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2006.
2. Ron Patton, " Software Testing", Second Edition, Sams Publishing, Pearson Education, 2007.

REFERENCES:

1. Ilene Burnstein, " Practical Software Testing", Springer International Edition, 2003.
2. Edward Kit," Software Testing in the Real World – Improving the Process", Pearson Education, 1995.
3. Boris Beizer," Software Testing Techniques" – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
4. Aditya P. Mathur, "Foundations of Software Testing _ Fundamental Algorithms and Techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

IT6005 DIGITAL IMAGE PROCESSING L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn digital image fundamentals
- Be exposed to simple image processing techniques
- Be familiar with image compression and segmentation techniques
- Learn to represent image in form of features

UNIT I DIGITAL IMAGE FUNDAMENTALS 8

Introduction – Origin – Steps in Digital Image Processing – Components – Elements of Visual Perception – Image Sensing and Acquisition – Image Sampling and Quantization – Relationships between pixels - color models

UNIT II IMAGE ENHANCEMENT 10

Spatial Domain: Gray level transformations – Histogram processing – Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering – **Frequency Domain:** Introduction to Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal, Butterworth and Gaussian filters

UNIT III IMAGE RESTORATION AND SEGMENTATION 9

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering **Segmentation:** Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation- Morphological processing- erosion and dilation

UNIT IV WAVELETS AND IMAGE COMPRESSION 9

Wavelets – Subband coding - Multiresolution expansions - **Compression:** Fundamentals – Image Compression models – Error Free Compression – Variable Length Coding – Bit-Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

UNIT V IMAGE REPRESENTATION AND RECOGNITION 9

Boundary representation – Chain Code – Polygonal approximation, signature, boundary segments – Boundary description – Shape number – Fourier Descriptor, moments- Regional Descriptors – Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching.

TOTAL: 45 PERIODS

IT6007 **FREE AND OPEN SOURCE SOFTWARE** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be exposed to the context and operation of free and open source software (FOSS) communities and associated software projects.
- Be familiar with participating in a FOSS project
- Learn scripting language like Python or Perl
- Learn programming language like Ruby
- Learn some important FOSS tools and techniques

UNIT I PHILOSOPHY **9**

Notion of Community--Guidelines for effectively working with FOSS community--, Benefits of Community based Software Development --Requirements for being open, free software, open source software –Four degrees of freedom - FOSS Licensing Models - FOSS Licenses – GPL- AGPL- LGPL - FDL - Implications – FOSS examples.

UNIT II LINUX **9**

Linux Installation and Hardware Configuration – Boot Process-The Linux Loader (LILO) - The Grand Unified Bootloader (GRUB) - Dual-Booting Linux and other Operating System - Boot-Time Kernel Options- X Windows System Configuration-System Administration – Backup and Restore Procedures-Strategies for keeping a Secure Server.

UNIT III PROGRAMMING LANGUAGES **9**

Programming using languages like Python or Perl or Ruby

UNIT IV PROGRAMMING TOOLS AND TECHNIQUES **9**

Usage of design Tools like Argo UML or equivalent, Version Control Systems like Git or equivalent, – Bug Tracking Systems- Package Management Systems

UNIT V FOSS CASE STUDIES **9**

Open Source Software Development - Case Study – Libreoffice -Samba

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to:

- Install and run open-source operating systems.
- Gather information about Free and Open Source Software projects from software releases and from sites on the internet.
- Build and modify one or more Free and Open Source Software packages.
- Use a version control system.
- Contribute software to and interact with Free and Open Source Software development projects.

TEXT BOOK:

1. Ellen Siever, Stephen Figgins, Robert Love, Arnold Robbins, “Linux in a Nutshell”, Sixth Edition, OReilly Media, 2009.

REFERENCES:

1. Philosophy of GNU URL: http://www.gnu.org/philosophy/.
2. Linux Administration URL: http://www.tldp.org/LDP/lame/LAME/linux-admin-made-easy/.
3. The Python Tutorial available at http://docs.python.org/2/tutorial/.
4. Perl Programming book at http://www.perl.org/books/beginning-perl/.
5. Ruby programming book at http://ruby-doc.com/docs/ProgrammingRuby/.
6. Version control system URL: http://git-scm.com/.
7. Samba: URL : http://www.samba.org/.
8. Libre office: http://www.libreoffice.org/.

IT6008 **NETWORK PROGRAMMING AND MANAGEMENT** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Learn the basics of socket programming using TCP Sockets.
- Learn about Socket Options.
- Learn to develop Macros for including Objects In MIB Structure.
- Understand SNMPv1, v2 and v3 protocols & practical issues.

UNIT I SOCKETS AND APPLICATION DEVELOPMENT **9**

Introduction to Socket Programming - System Calls - Address conversion functions - 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 -TCP echo client/server with I/O Multiplexing

UNIT II SOCKET OPTIONS **9**

Socket options - getsockopt and setsockopt functions - Generic socket options - IP socket options - ICMP socket options - TCP socket options - Multiplexing TCP and UDP sockets - SCTP Sockets - SCTP Client/server - Streaming Example - Domain name system - gethostbyname, gethostbyaddr, getservbyname and getservbyport functions - Protocol Independent functions in TCP Client/Server Scenario

UNIT III ADVANCED SOCKETS **9**

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

UNIT IV SIMPLE NETWORK MANAGEMENT **9**

SNMP network management concepts - SNMPv1 - Management information - MIB Structure - Object syntax - Standard MIB's - MIB-II Groups - SNMPv1 protocol and Practical issues.

UNIT V SNMP V2, V3 AND RMO **9**

Introduction to SNMPv2 - SMI for SNMPV2 - Protocol - SNMPv3 - Architecture and applications - Security and access control model - Overview of RMON.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to:

Develop programs using TCP Sockets.

- Use Socket Options.
- Develop Macros for including Objects In MIB Structure.
- Use SNMPv1, v2 and v3 protocols.

TEXT BOOKS:

1. W. Richard Stevens, "UNIX Network Programming Vol-I", Third Edition, PHI Pearson Education, 2003.
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Third Edition, Pearson Edition, 2009.

REFERENCE:

1. D.E. Comer, "Internetworking with TCP/IP Vol- III: Client-Server Programming and Application BSD Sockets Version", Second Edition, Pearson Edition, 2003.

Web sources:
1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

CS6503 THEORY OF COMPUTATION L T P C
3 0 0 3

OBJECTIVES:
The student should be made to:
- Understand various Computing models like Finite State Machine, Pushdown Automata, and Turing Machine.
- Be aware of Decidability and Un-decidability of various problems.
- Learn types of grammars

UNIT I FINITE AUTOMATA 9
Introduction- Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with €- moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without €-moves – Equivalence of finite Automaton and regular expressions –Minimization of DFA- - Pumping Lemma for Regular sets – Problems based on Pumping Lemma.

UNIT II GRAMMARS 9
Grammar Introduction– Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF

UNIT III PUSHDOWN AUTOMATA 9
Pushdown Automata- Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL – problems based on pumping Lemma.

UNIT IV TURING MACHINES 9
Definitions of Turing machines – Models – Computable languages and functions –Techniques for Turing machine construction – Multi head and Multi tape Turing Machines - The Halting problem – Partial Solvability – Problems about Turing machine- Chomskian hierarchy of languages.

UNIT V UNSOLVABLE PROBLEMS AND COMPUTABLE FUNCTIONS 9
Unsolvable Problems and Computable Functions – Primitive recursive functions – Recursive and recursively enumerable languages – Universal Turing machine. MEASURING AND CLASSIFYING COMPLEXITY: Tractable and Intractable problems- Tractable and possibly intractable problems - P and NP completeness - Polynomial time reductions.

TOTAL: 45 PERIODS

OUTCOMES:
At the end of the course, the student should be able to:
- Design Finite State Machine, Pushdown Automata, and Turing Machine.
- Explain the Decidability or Undecidability of various problems

TEXT BOOKS:

1. Hopcroft J.E., Motwani R. and Ullman J.D, "Introduction to Automata Theory, Languages and Computations", Second Edition, Pearson Education, 2008. (UNIT 1,2,3).
2. John C Martin, "Introduction to Languages and the Theory of Computation", Tata McGraw Hill Publishing Company, New Delhi, Third Edition, 2007. (UNIT 4,5).

REFERENCES:

1. Mishra K L P and Chandrasekaran N, "Theory of Computer Science - Automata, Languages and Computation", Third Edition, Prentice Hall of India, 2004.
2. Harry R Lewis and Christos H Papadimitriou, "Elements of the Theory of Computation", Second Edition, Prentice Hall of India, Pearson Education, New Delhi, 2003.
3. Peter Linz, "An Introduction to Formal Language and Automata", Third Edition, Narosa Publishers, New Delhi, 2002.
4. Kamala Krithivasan and Rama. R, "Introduction to Formal Languages, Automata Theory and Computation", Pearson Education 2009.

IT6009 WEB ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the characteristics of web applications
- Learn to Model web applications
- Be aware of Systematic methods
- Be familiar with the testing techniques for web applications

UNIT I INTRODUCTION TO WEB ENGINEERING AND REQUIREMENTS ENGINEERING 9

Motivation, Categories of Web Applications, Characteristics of Web Applications, Product-related Characteristics, Usage related Characteristics, Development-related Characteristic, Evolution of web engineering - Requirements Engineering Activities RE Specifics in Web Engineering, Principles for RE of Web Applications, Adapting RE Methods to Web Application Development, Requirement Types, Notations, Tools

UNIT II WEB APPLICATION ARCHITECTURES & MODELLING WEB APPLICATIONS 10

Introduction- Categorizing Architectures, Specifics of Web Application Architectures, Components of a Generic Web Application Architecture, Layered Architectures, 2-Layer Architectures, N-Layer Architectures Data-aspect Architectures, Database-centric Architectures, Architectures for Web Document Management, Architectures for Multimedia Data Modeling Specifics in Web Engineering, Levels, Aspects, Phases Customization, Modeling Requirements, Hypertext Modeling, Hypertext Structure Modeling Concepts, Access Modeling Concepts, Relation to Content Modeling, Presentation Modeling, Relation to Hypertext Modeling, Customization Modeling, Relation to Content, Hypertext, and Presentation Modeling

UNIT III WEB APPLICATION DESIGN 10

Introduction, Web Design from an Evolutionary Perspective, Information Design, Software Design: A Programming Activity, Merging Information Design and Software Design, Problems and Restrictions in Integrated Web Design, A Proposed Structural Approach, Presentation Design, Presentation of Nodes and Meshes, Device-independent Development, Approaches, Inter action Design, User Interaction User Interface Organization, Navigation Design, Designing a Link Representation, Designing Link Internals, Navigation and Orientation, Structured Dialog for Complex Activities, Interplay with Technology and Architecture, Functional Design.

UNIT IV TESTING WEB APPLICATIONS 8

Introduction, Fundamentals, Terminology, Quality Characteristics, Test Objectives, Test Levels, Role of the Tester, Test Specifics in Web Engineering, Test Approaches, Conventional Approaches, Agile Approaches, Test Scheme, Three Test Dimensions, Applying the Scheme to Web Applications, Test Methods and Techniques, Link Testing, Browser Testing, Usability Testing, Load, Stress, and Continuous Testing, Testing Security, Test-driven Development, Test Automation, Benefits and Drawbacks of Automated Test, Test Tools.

UNIT V WEB PROJECT MANAGEMENT 8

Understanding Scope, Refining Framework Activities, Building a Web Team, Managing Risk, Developing a Schedule, Managing Quality, Managing Change, Tracking the Project. Introduction to node JS - web sockets.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to:

- Apply the characteristics of web applications.
- Model web applications.
- Design web applications.
- Test web applications.

TEXT BOOKS:

1. Gerti Kappel, Birgit Proll, “Web Engineering”, John Wiley and Sons Ltd, 2006.
2. Roger S. Pressman, David Lowe, “Web Engineering”, Tata McGraw Hill Publication, 2007.
3. Guy W. Lecky-Thompson, “Web Programming”, Cengage Learning, 2008.

REFERENCES:

1. Chris Bates, “Web Programming: Building Internet Applications”, Third Edition, Wiley India Edition, 2007
2. John Paul Mueller, “Web Development with Microsoft Visual Studio 2005”, Wiley Dream tech, 2006.

GE6083 DISASTER MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don’ts during various types of Disasters.

CS6702 **GRAPH THEORY AND APPLICATIONS** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be familiar with the most fundamental Graph Theory topics and results.
- Be exposed to the techniques of proofs and analysis.

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 **8**

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.

UNIT IV PERMUTATIONS & COMBINATIONS **9**

Fundamental principles of counting - Permutations and combinations - Binomial theorem - combinations with repetition - Combinatorial numbers - Principle of inclusion and exclusion - Derangements - Arrangements with forbidden positions.

UNIT V GENERATING FUNCTIONS **10**

Generating functions - Partitions of integers - Exponential generating function – Summation operator - Recurrence relations - First order and second order – Non-homogeneous recurrence relations - Method of generating functions.

TOTAL: 45 PERIODS

OUTCOMES:

Upon Completion of the course, the students should be able to:

- Write precise and accurate mathematical definitions of objects in graph theory.
- Use mathematical definitions to identify and construct examples and to distinguish examples from non-examples.
- Validate and critically assess a mathematical proof.
- Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
- Reason from definitions to construct mathematical proofs.

TEXT BOOKS:

1. Narsingh Deo, “Graph Theory: With Application to Engineering and Computer Science”, Prentice Hall of India, 2003.
2. Grimaldi R.P. “Discrete and Combinatorial Mathematics: An Applied Introduction”, Addison Wesley, 1994.

UNIT V VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS 9

Graph theory - Centrality - Clustering - Node-Edge Diagrams - Matrix representation - Visualizing online social networks, Visualizing social networks with matrix-based representations - Matrix and Node-Link Diagrams - Hybrid representations - Applications - Cover networks - Community welfare - Collaboration networks - Co-Citation networks.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student should be able to:

- Develop semantic web related applications.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

TEXT BOOKS:

1. Peter Mika, "Social Networks and the Semantic Web", , First Edition, Springer 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

REFERENCES:

1. Guandong Xu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking – Techniques and applications", First Edition Springer, 2011.
2. Dion Goh and Schubert Foo, "Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively", IGI Global Snippet, 2008.
3. Max Chevalier, Christine Julien and Chantal Soulé-Dupuy, "Collaborative and Social Information Retrieval and Access: Techniques for Improved user Modelling", IGI Global Snippet, 2009.
4. John G. Breslin, Alexandre Passant and Stefan Decker, "The Social Semantic Web", Springer, 2009.

IT6010 BUSINESS INTELLIGENCE L T P C
3 0 0 3

OBJECTIVES:

The student should be made to:

- Be exposed with the basic rudiments of business intelligence system
- understand the modeling aspects behind Business Intelligence
- understand of the business intelligence life cycle and the techniques used in it
- Be exposed with different data analysis tools and techniques

UNIT I BUSINESS INTELLIGENCE 9

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT II KNOWLEDGE DELIVERY 9

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III EFFICIENCY **9**

Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

UNIT IV BUSINESS INTELLIGENCE APPLICATIONS **9**

Marketing models – Logistic and Production models – Case studies.

UNIT V FUTURE OF BUSINESS INTELLIGENCE **9**

Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to

- Explain the fundamentals of business intelligence.
- Link data mining with business intelligence.
- Apply various modeling techniques.
- Explain the data analysis and knowledge delivery stages.
- Apply business intelligence methods to various situations.
- Decide on appropriate technique.

TEXT BOOK:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.

REFERENCES:

2. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
3. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.
4. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012.
5. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.
6. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

CS6013	FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT	L T P C 3 0 0 3

OBJECTIVE:

This program can be offered with all Undergraduate programs/courses for all engineering streams. The FSIPD program aims to improve student's awareness and understanding of the basic concepts involved in Integrated product Development (IPD) by providing exposure to the key product development concepts. Students, who complete this program, will stand a better chance to be considered for jobs in the Engineering industry.

COURSE OBJECTIVES:

After completing this program, the student will be able to obtain the technical skills needed to effectively play the entry level design engineer role in an engineering organization.

IT6012 **TCP/IP DESIGN AND IMPLEMENTATION** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the IP addressing schemes .
- Understand the fundamentals of network design and implementation
- Understand the design and implementation of TCP/IP networks
- Understand on network management issues
- Learn to design and implement network applications.

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 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

OUTCOMES:

Upon completion of the course, the student should be able to:

- Design and implement TCP/IP networks.
- Explain network management issues.
- Design and implement network applications.
  Develop data structures for basic protocol functions of TCP/IP.
- Apply the members in the respective structures.
- Design and implement data structures for maintaining multiple local and global timers.

TEXT BOOKS

1. Douglas E Comer,"Internetworking with TCP/IP Principles, Protocols and Architecture", Vol 1, Vth Edition 2006 and Vol 2, IIIrd Edition, 1999.
2. W.Richard Stevens "TCP/IP Illustrated" Vol 1. Pearson Education, 2003.

REFERENCES

1. Forouzan, " TCP/IP Protocol Suite" Second Edition, Tata MC Graw Hill, 2003.
2. W.Richard Stevens "TCP/IP Illustrated" Volume 2, Pearson Education 2003

IT6013 **SOFTWARE QUALITY ASSURANCE** **L T P C**
3 0 0 3

OBJECTIVES:

The student should be made to:

- Understand the basic tenets of software quality and quality factors.
- Be exposed to the Software Quality Assurance (SQA) architecture and the details of SQA components.
- Understand of how the SQA components can be integrated into the project life cycle.
- Be familiar with the software quality infrastructure.
- Be exposed to the management components of software quality.

UNIT I INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE 9

Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall's quality model – SQA system and architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.

UNIT II SQA COMPONENTS AND PROJECT LIFE CYCLE 9

Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.

UNIT III SOFTWARE QUALITY INFRASTRUCTURE 9

Procedures and work instructions - Templates - Checklists – 3S developmenting - Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

UNIT IV SOFTWARE QUALITY MANAGEMENT & METRICS 9

Project process control – Computerized tools - Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics – Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.

UNIT V STANDARDS, CERTIFICATIONS & ASSESSMENTS 9

Quality manangement standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies - Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

TOTAL: 45 PERIODS

OUTCOMES:

At the end of the course the students will be able to:

- Utilize the concepts in software development life cycle.
- Demonstrate their capability to adopt quality standards.
- Assess the quality of software product.
- Apply the concepts in preparing the quality plan & documents.

TEXT BOOK:

1. Daniel Galin, “Software Quality Assurance”, Pearson Publication, 2009.

REFERENCES:

1. Alan C. Gillies, “Software Quality: Theory and Management”, International Thomson Computer Press, 1997.
2. Mordechai Ben-Menachem “Software Quality: Producing Practical Consistent Software”, International Thompson Computer Press, 1997.

MG6088 SOFTWARE PROJECT MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

- To outline the need for Software Project Management
- To highlight different techniques for software cost estimation and activity planning.

UNIT I PROJECT EVALUATION AND PROJECT PLANNING 9

Importance of Software Project Management – Activities Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II PROJECT LIFE CYCLE AND EFFORT ESTIMATION 9

Software process and Process Models – Choice of Process models - mental delivery – Rapid Application development – Agile methods – Extreme Programming – SCRUM – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points - COCOMO II A Parametric Productivity Model - Staffing Pattern.

UNIT III ACTIVITY PLANNING AND RISK MANAGEMENT 9

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Monitoring – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical patterns – Cost schedules.

UNIT IV PROJECT MANAGEMENT AND CONTROL 9

Framework for Management and control – Collection of data Project termination – Visualizing progress – Cost monitoring – Earned Value Analysis- Project tracking – Change control- Software Configuration Management – Managing contracts – Contract Management.

UNIT V STAFFING IN SOFTWARE PROJECTS 9

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Ethical and Programmed concerns – Working in teams – Decision making – Team structures – Virtual teams – Communications genres – Communication plans.

TOTAL: 45 PERIODS

OUTCOMES:

- At the end of the course the students will be able to practice Project Management principles while developing a software.