

**PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018**

**(AUTONOMOUS)**

**B.Tech. INFORMATION TECHNOLOGY**

**CURRICULUM**

**CBCS REGULATIONS 2016**

**SEMESTER I**

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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

**COURSE OBJECTIVES****To enable the students to**

- develop their knowledge in basic civil engineering practices such as plumbing, carpentry and its tool usages.
- practice some of mechanical basics such as welding, basic machining, sheet metal work, fitting.
- experience with basic electrical wiring circuits
- know about the electronic components, color coding signal generation, soldering practice..

**GROUP A (CIVIL AND MECHANICAL)****I CIVIL ENGINEERING PRACTICE****BUILDINGS**

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

**PLUMBING WORKS**

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

**CARPENTRY USING POWER TOOLS ONLY**

- a) Study of the joints in roofs, doors, windows and furniture.
- b) **Hands-on-exercise:**

**Wood work, joints by sawing, planing and cutting.**

**II MECHANICAL ENGINEERING PRACTICE****WELDING**

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

- Gas welding practice

### **BASIC MACHINING**

- Simple Turning, Facing, Thread cutting and Taper turning
- Drilling Practice

### **SHEET METAL WORK**

- Model making – Trays, funnels, etc.
- Different type of joints.

### **FITTING**

- Square fitting
- Vee – fitting models

### **DEMONSTRATION ON**

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

**TOTAL: 30 PERIODS**

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

### **III ELECTRICAL ENGINEERING PRACTICE**

1. Study of electrical tools and safety measures
2. Basic wiring practices - Stair-case wiring, Fluorescent lamp wiring and Residential house wiring
3. Measurement of electrical parameters such as voltage, current, power & power factor in RLC circuit.
4. Measurement of energy using single phase energy meter.
5. Earthing Practices & Measurement of earth resistance using megger.
6. Study of electrical equipments such as iron box, induction heater.

### **IV ELECTRONICS ENGINEERING PRACTICE**

1. Study of Electronic components and equipments – Resistor, color coding measurement of AC signal parameter (Peak-Peak, RMS, Period, and Frequency) using CRO.
2. Study of logic gates AND, OR, Ex-OR and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR.
6. Construction and verification of half adder circuit.

7. **Construction and verification of half subtractor circuit.**
8. Study of Telephone, F.M Radio and Cell Phone.

**TOTAL: 30 PERIODS**

### COURSE OUTCOMES

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

- use the tools for plumbing and carpentry works
- prepare models by -welding, machining, sheet metal and fitting
- construct electrical wiring circuit and demonstrate practically
- analyse the signal generation, solder the electronic components based on the circuits

### 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	PO 10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	-	-	-	1	-	-	1	2	3
CO2	2	2	2	2	2	-	-	-	1	-	-	1	2	3
CO3	2	2	2	2	2	-	-	-	1	-	-	1	2	3
CO4	2	2	2	2	2	-	-	-	1	-	-	1	2	3



**COURSE OBJECTIVES**

The students are able to

- study about the principles of electrochemistry.
- know the mechanism of corrosion and its control.
- learn the principles and generation of fuel cells and various storage batteries.
- embellish the usage of chemistry to exhibit engineering materials.
- study about the principles of chem -informatics and its applications.

**UNIT I ELECTROCHEMISTRY 9**

Electrochemical cells-types- reversible and irreversible cells – EMF –measurement of emf-Single electrode potential – Nernst Equation (derivation and problem) – reference electrodes – standard hydrogen electrode - calomel electrode – Ion selective electrode – glass electrode – measurement of pH – electrochemical series – significance -potentiometric titrations (redox –  $\text{Fe}^{2+}$  Vs dichromate).

**UNIT II CORROSION AND CORROSION CONTROL 9**

Corrosion-Causes-Types-Chemical corrosion - Pilling-Bedworth rule – electrochemical corrosion – mechanism - galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – preliminary treatment –Metallic and Non metallic coatings-Varnish-Lacquer-Hot dipping-Metal Cladding-Electroplating(Au)-Galvanizing-Tinning-Electroless plating (Ni)– Paints – constituents and function .

**UNIT III NONCONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES 9**

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

**UNIT IV ENGINEERING MATERIALS 9**

Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) – manufacture of alumina,

magnesite and zirconia bricks. Lubricants – mechanism of lubrication, liquid lubricants, - properties – viscosity index, flash and fire points, cloud and pour points, oiliness-Aniline point) – solid lubricants – graphite and molybdenum sulphide.

## UNIT V CHEMINFORMATICS

9

Definition – coordinate –bonds –bond length – bond angles – torsional angles – chemical structure – definition - conformation – representation of structural information – linear format – SMILEYF notation – MOL format – PDB format – storage of structural data in a database - structural keys – finger print - canonical structure – similarity search –sub structure search - application of chem-informatics in drugs designing.

**TOTAL : 45 PERIODS**

### COURSE OUTCOMES

- Understand the impact of engineering solutions in a global, economic, environmental and societal context .
- Knowing the rate of corrosion of a given metal in a given environment and identify appropriate control techniques to avoid corrosion.
- To recognize the energy densities of energy sources.
- Understand the Engineering materials and use these materials in various fields. Identify appropriate lubricant for different engineering applications.
- Understand the basics concept of dry designing by chem-informatics.

### TEXT BOOKS

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

### REFERENCE BOOKS

1. P.C. Jain and Monica Jain, “Engineering Chemistry” DhanpatRai Pub. Co., New Delhi, 15<sup>th</sup> Edition, 2008(Revised Edition 2012).
2. Bahl B.S.,Tuli G.D. and ArunBahl., Essential of Physical Chemistry, S.Chand& Co. Ltd., New Delhi (2010).
3. Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical chemistry, ShobanLalNagin Chand & Co., New Delhi (2008) .
4. R.Sivakumar and N.Sivakuamr, “Engineering Chemistry”, Tata McGraw-Hill publishing company limited, New Delhi, (2012).

5. RajarshiGuha and Andreas Bender “Computational approaches in chem-informatics and bioinformatics” Wiley Publishers, Cambridge (2011).

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



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**B.Tech. INFORMATION TECHNOLOGY**

**CURRICULUM**

**REGULATIONS 2016**

**(CHOICE BASED CREDIT SYSTEM)**

**SEMESTER III**

S.No	Category	Course Code	Course Title	L	T	P	C
<b>Theory</b>							
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
<b>Practical</b>							
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
<b>TOTAL</b>				<b>18</b>	<b>2</b>	<b>10</b>	<b>24</b>

**SEMESTER IV**

S.No	Category	Course Code	Course Title	L	T	P	C
<b>Theory</b>							
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
<b>Practical</b>							
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
<b>TOTAL</b>				<b>18</b>	<b>4</b>	<b>12</b>	<b>26</b>



**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 solving boundary 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 equations that 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 cosine series – 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 harmonic analysis 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

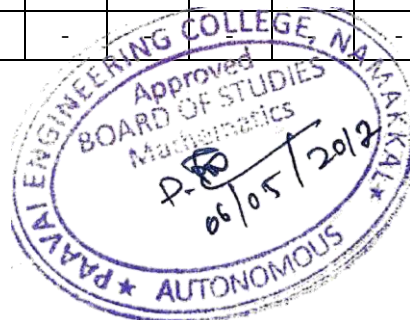
1. Larry C. Andrews, Bhimsen K. Shivamoggi, “Integral Transforms for Engineers”, SPIE OpticalEngineering press, Washington USA (1999).
2. Ramana.B.V., “Higher Engineering Mathematics”, Tata Mc-GrawHill Publishing Company limited, NewDelhi (2010).
3. Glyn James, “Advanced Modern Engineering Mathematics”, 3<sup>rd</sup> Edition, Pearson Education (2007).
4. Erwin Kreyszig., “Advanced Engineering Mathematics” 10<sup>th</sup> 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=4GHY8sRKPuU>
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



**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 virtual classes.
- 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-virtual function – pure virtual function.

**UNIT 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.

**TOTAL HOURS 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

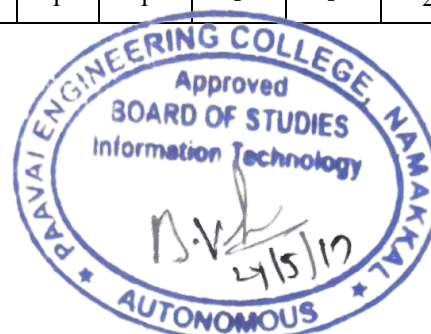
1. B.Trivedi, “Programming with ANSI C++”, Oxford University Press, 2007.
2. K.R.Venugopal, Rajkumar, T.Ravishankar, “Mastering C++ “,Tata McGraw Hill, 2007.
3. Robert Lafore, “Object Oriented Programming in Turbo C++”, Galgotia Publications, 2006
4. BjarneStroustrup, “The C++ Programming Language”, 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](http://thatchna.weebly.com/uploads/4/1/9/3/4193382/std_c_notes_03.pdf)
3. <https://www.youtube.com/watch?v=CzWZYwOvrcE>

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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



**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 and backtracking 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 - Knapsack Problem - Assignment problem. **Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication – Closest-Pair and Convex-Hull Problems.**

**UNIT III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE 9**

Computing a Binomial Coefficient – Warshall's and Floyd's algorithm – Optimal Binary Search Trees – Knapsack Problem 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 Stable Marriage 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/](http://nptel.ac.in/courses/106101060/)
2. [freevidelectures.com](http://freevidelectures.com) > Computer Science > IIT Bombay

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COs	Programme Outcomes(POs)													
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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



**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 symbol interference, 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

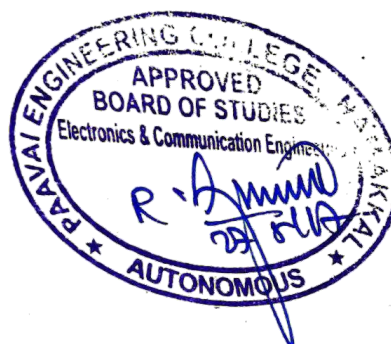
1. H.Taub, D L Schilling ,GSaha ,”Principles of Communication”3/e,2007.
2. B.P.Lathi,”Modern Analog and Digital Communication systems”, 3/e, Oxford University Press, 2007
3. Dennis Roddy, “Satellite Communications”, 4th Edition, McGraw Hill Professional, 2006.
4. Govind.P.Agarwal, “Fiber optic communication systems”, 3<sup>rd</sup> 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](http://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





**COURSE OBJECTIVES**

- to learn the basic concepts of boolean algebra and logic gates.
- to know about the analysis and design procedure for combinational circuits
- to familiarize the students with memory devices.
- to know about the analysis and design procedure for synchronous sequential circuits.
- to acquire knowledge about the analysis and design procedure of asynchronous sequential circuits.

**UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9**

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

**UNIT II COMBINATIONAL LOGIC 9**

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

**UNIT III MEMORY AND PROGRAMMABLE LOGIC 9**

Classification of memory-ROM organization-RAM-Static and Dynamic RAM-Memory decoding and expansion-Programmable logic devices-PLA,PAL.

**UNIT V SYNCHRONOUS SEQUENTIAL LOGIC 9**

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

**UNIT VI ASYNCHRONOUS SEQUENTIAL LOGIC 9**

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

**TOTAL PERIODS 45****COURSE OUTCOMES**

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

- understand the basic concept of boolean algebra and logic gates.
- design combinational logic circuits.
- evaluate the memory and programmable logic devices.
- analyze and design the synchronous sequential logic circuits.
- analyze and design the asynchronous sequential logic circuits.

## TEXT BOOK

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

## REFERENCES

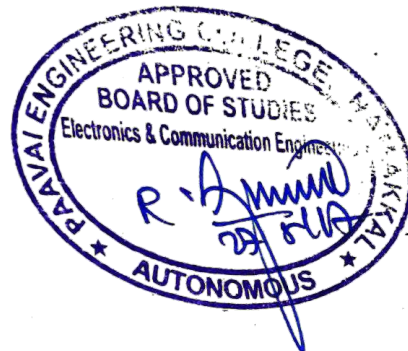
1. Charles H.Roth, Jr. "Fundamentals of Logic Design", 4th Edition, Jaico Publishing House, CengageEarning, 5th ed, 2005.
2. Donald D.Givone, "Digital Principles and Design", Tata McGraw-Hill, 2007.

## WEB LINKS

1. <http://nptel.ac.in/video.php?subjectid=117106086>
2. [http://www.electronics-tutorials.ws/combination/comb\\_1.html](http://www.electronics-tutorials.ws/combination/comb_1.html)

## CO-PO MAPPING:

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



**COURSE OBJECTIVES**

At the end of this course the student is expected

- To know the constituents of the environment and the precious resources in the environment.
- To conserve all biological resources.
- To understand the role of human being in maintaining a clean environment and useful environment for the future generations
- To maintain the ecological balance and preserve bio-diversity.
- 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 – Food resources: World food problems - changes caused by agriculture and overgrazing – effects of modern agriculture fertilizer-pesticide problems - water logging - salinity. Energy resources: Growing energy needs renewable and non renewable energy sources. 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 ( 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.

**UNIT III POLLUTION 9**

Pollution: Definition –air pollution - water pollution - soil pollution - marine pollution - noise pollution - thermal pollution – nuclear hazards. Solid waste management: Causes - effects - control measures of urban and industrial wastes. Role of an individual in prevention of pollution - pollution. 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 -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

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

- Know the relationship between the human population and environment.
- Understand the basic concepts of environment studies and natural resources.
- Gaining the knowledge about ecosystem and biodiversity.
- Have knowledge about causes, effects and control measures of various types of pollution.
- Understand the social issues and various environmental acts.

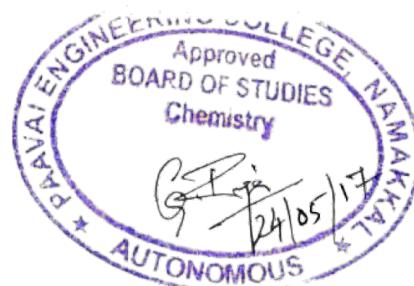
### TEXT BOOKS

1. Raman Sivakumar, Introduction to Environmental Science and Engineering, 2<sup>nd</sup>Edn, Tata McGraw Hill Education Private Limited, New Delhi,(2010).
2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw Hill, (2010).

### REFERENCES

1. S. Divan, Environmental Law and Policy in India, Oxford University Press, New Delhi, 2001.
2. A.K.De, Environmental Chemistry, VI edition, 2015 NewAge International (P) ltd Publication, New Delhi.
3. C.S.Rao, Environmental Pollution and Control engineering, V edition, NewAge International (P) ltd Publication, New Delhi 110002
4. Clair Nathan Sawyer, Perry L. McCarty, Gene F. Parkin, “Chemistry for Environmental Engineering and Sciences, V Edition, 2013, Tata McGraw Hill pub, New Delhi 110008

<b>Mapping of course outcome with Programme Outcomes</b> (S/M/W indicates strength of correlation) S-Strong-3, M-Medium=2, W-Weak=1.														
CO	Programmes Outcomes(POs)												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
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	-



**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.

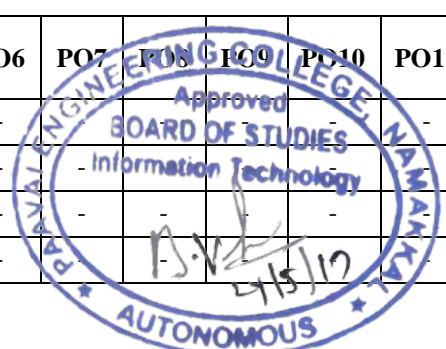
**RECOMMENDED SYSTEM/SOFTWARE**

**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



**COURSE OBJECTIVES**

- to develop the reading skills of the students and to familiarize them in skimming and scanning.
- to instill the communication concepts and enhance the students' conversational skills through various practice sessions .
- 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 the productive 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 or altering 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 specific information - Listening to recorded 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 Maitrey Printech Pvt. Ltd., Noida, 2014.

## 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. 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>

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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	-



**SEMESTER IV  
PROBABILITY AND QUEUEING THEORY**

**MA16401**

**3 2 0 4**

**(COMMON TO CSE & IT)**

**COURSE OBJECTIVES**

- to acquire knowledge of the random variables and manipulate.
- to understand the concepts of standard distributions methods.
- to analyse the relationship between the two random variables.
- to provide necessary basic concepts in probability and random processes related to communication engineering domain.
- to use various queuing theory models for real time situations.

**UNIT I      RANDOM VARIABLES      15**

Axioms of probability – Conditional probability – Total probability – Baye's theorem - Random variable- Probability mass function – Probability density function – Properties – Moments – Moment generating functions and their properties.

**UNIT II      STANDARD DISTRIBUTION      15**

Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions and their properties – Functions of a random variable.

**UNIT III      TWO DIMENSIONAL RANDOM VARIABLES      15**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables.

**UNIT IV      RANDOM PROCESS AND MARKOV CHAIN      15**

Classification – Stationary process – Poisson process – Markov Chain – Transition probabilities – Limiting Distributions.

**UNIT V      QUEUEING MODELS      15**

Markovian models – (M/M/1), (M/M/C), finite and infinite capacity – (M/G/1) queue – Pollaczek – Khintchine Formula.

**TOTAL PERIODS 75**

**COURSE OUTCOMES**

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

- understand the basic probability concepts.
- know the standard distribution for real time applications.
- acquire skills in handling situations involving more than one random variable and functions of random variables.
- evolve with respect to time in a probabilistic manner.
- acquire the fundamental skills to analyze queuing models and systems.

**TEXT BOOKS**

1. Gross, Donald Harris and M Carl, “ Fundamentals of Queuing Theory”, 3<sup>rd</sup> ed., Wiley Publications, New Delhi, 2008



- Ibe. O.C., “Fundamentals of Applied Probability and Random Processes”, Elsevier, 2<sup>nd</sup> Indian Reprint, 2010.
- T Veerarajan, “Probability, Statistics and Random Processes”, 2<sup>nd</sup> ed., Tata McGraw- Hill, New Delhi, 2008.

## REFERENCES

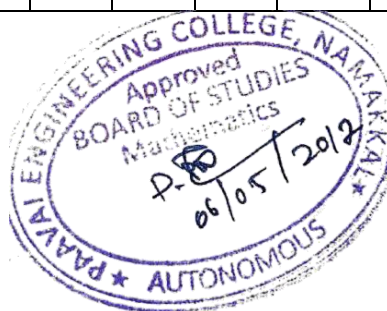
- Trivedi, K.S., “Probability and Statistics with Reliability, Queueing and Computer Science Applications”, PHI, New Delhi, 2<sup>nd</sup> Edition, 2009.
- Hwei Hsu, “Schaum’s Outline of Theory and Problems of Probability, Random Variables and Random Processes”, Tata McGraw Hill, New Delhi, 9<sup>th</sup> Reprint, 2010.
- Yates. R.D. and Goodman. D. J., “Probability and Stochastic Processes”, Wiley India Pvt.Ltd. Bangalore, 2<sup>nd</sup> Edition, 2012
- Venkatachalam.G, “Probability and Queueing Theory”, Hitech Publishing Company Pvt.Ltd., Chennai, 3<sup>rd</sup> Edition, 2012.

## WEB LINKS

- <https://www.youtube.com/watch?v=IYdiKeQ9xEI>
- <https://www.youtube.com/watch?v=xGkpXk-AnWU>
- <https://www.youtube.com/watch?v=1-rRtmNpdkU>
- [https://www.youtube.com/watch?v=J70dP\\_AECzQ](https://www.youtube.com/watch?v=J70dP_AECzQ)
- <http://172.16.100.200/NPTEL/displayvideo.html?type1=111105041%2Fmod01lec16.mp4>

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CO4	3	3	2	3	-	-	-	-	-	-	-	-	3	3
CO5	3	3	2	-	-	-	-	-	-	-	-	-	3	3



**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.

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

## REFERENCES

- K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
- Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.
- C. Thomas Wu, "An introduction to Object-oriented programming with Java", Fourth Edition, TataMcGraw-Hill Publishing Company Ltd., 2006.
- Gary Cornell and Cay S. Horstmann, Core Java Vol.1andVol.2,Sun Microsystems Press,2008
- Herbert Schildt, Java, A Beginner's Guide, Tata McGraw Hill,2007.

## WEB LINKS

- [www.javatpoint.com/java-oops-concepts](http://www.javatpoint.com/java-oops-concepts)
- [www.w3resource.com/java.../java-object-oriented-programming.php](http://www.w3resource.com/java.../java-object-oriented-programming.php)

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CO4	1	2	2	1	1	-	-	-	-	-	-	-	1	2
CO5	1	1	2	1	-	-	-	-	-	-	-	-	-	2



**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 system in 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>

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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



**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 –Additional I/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, Pearson Education, 2006.

### REFERENCES

1. Elmasri R. and Shamkant B. Navathe, “Fundamentals of Database Systems”, 6th Edition, Addison Wesley, 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](http://www.nptelvideos.in/2012/11/database-management-system.html)
2. [nptel.ac.in/courses/106106093](http://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



**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 cache memory .
- to expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

**UNIT I BASIC STRUCTURE OF COMPUTERS 9**

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – 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, Zvonko Vranesic and Safwat Zaky, "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, Pearson Education, 2005.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw 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>

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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



**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 to I/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

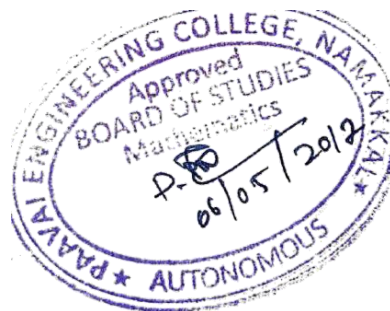
1. Douglas V. Hall, "Microprocessors and Interfacing, Programming and Hardware", TMH 2012
2. A.K. Ray & K.M. Bhurchandi, "Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing", Tata McGraw Hill, 2006.

## WEB LINKS

1. <http://nptel.ac.in/courses/108107029>
2. <https://www.youtube.com/watch?v=liRPvj7bFU>
3. [http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/microcontrollers/micro/ui/Course\\_home2\\_5.htm](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/>

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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



**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)													
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CO2	1	1	2	1	-	-	-	-	-	-	-	-	1	2
CO3	2	1	2	1	2	-	-	-	-	-	-	-	1	2
CO4	1	2	2	1	-	-	-	-	-	-	-	-	1	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 compiler

**HARDWARE:** Standalone desktops (or) Server supporting terminals.

**CO-PO MAPPING:**

<b>Mapping of Course Outcomes with Programme Outcomes</b> (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
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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



**PAAVAIENGINEERINGCOLLEGE,NAMAKKAL-637018**

**(AUTONOMOUS)**

**B.Tech. INFORMATION TECHNOLOGY**

**CURRICULUM**

**REGULATIONS 2016**

**(CHOICE BASED CREDIT SYSTEM)**

**SEMESTER – V**

S.No	Category	Course Code	Course Title	L	T	P	C
<b>Theory</b>							
1	ES	EC16506	Principles of Digital Signal Processing	3	2	0	4
2	PC	IT16501	Computer Networks	3	0	0	3
3	PC	IT16502	Object Oriented Analysis and Design	3	0	0	3
4	PC	IT16503	Internet Programming	3	0	0	3
5	PE	*****	Elective - I *	3	0	0	3
6	PC	IT16504	Software Engineering	3	0	0	3
<b>Practicals</b>							
7	PC	IT16505	Computer Networks and Internet Programming Laboratory	0	0	4	2
8	PC	IT16506	CASE Tools Laboratory	0	0	4	2
9	EE	EN16501	Career Development Laboratory I	0	0	2	1
<b>TOTAL</b>				<b>18</b>	<b>2</b>	<b>10</b>	<b>24</b>

**SEMESTER – VI**

S.No	Category	Course Code	Course Title	L	T	P	C
<b>Theory</b>							
1	PC	IT16601	Compiler Design	3	0	0	3
2	PC	IT16602	Graphics and Multimedia	3	0	0	3
3	PC	IT16603	Embedded Systems	3	0	0	3
4	HS	BA16254	Principles of Management	3	0	0	3
5	PE	*****	Elective – II*	3	0	0	3
6	OE	*****	Open Elective – I**	3	0	0	3
<b>Practicals</b>							
7	PC	IT16604	Graphics and Multimedia Laboratory	0	0	4	2
8	PC	IT16605	Compiler Design Laboratory	0	0	4	2
9	EE	EN16601	Career Development Laboratory II	0	0	2	1
<b>TOTAL</b>				<b>18</b>	<b>0</b>	<b>10</b>	<b>23</b>



### ELECTIVE-I

S.No	Category	Course Code	CourseTitle	L	T	P	C
1	PE	MA16151	Discrete Mathematics	3	0	0	3
2	PE	IT16151	Theory of Computation	3	0	0	3
3	PE	IT16152	Information CodingTechniques	3	0	0	3
4	PE	IT16153	User Interface Design	3	0	0	3
5	PE	IT16154	Artificial Intelligence	3	0	0	3

### ELECTIVE-II

S.No	Category	Course Code	CourseTitle	L	T	P	C
1	PE	IT16251	Open Source Software	3	0	0	3
2	PE	IT16252	Distributed Systems	3	0	0	3
3	PE	BA16351	Engineering Economics and Financial Accounting	3	0	0	3
4	PE	IT16253	TCP/IP Protocol Design and Implementation	3	0	0	3
5	PE	IT16254	System Software	3	0	0	3

### OPEN ELECTIVE-I

S.No	Category	Course Code	CourseTitle	L	T	P	C
1	OE	IT16901	Green Computing	3	0	0	3
2	OE	IT16902	Information Technology Essentials	3	0	0	3
3	OE	IT16903	Open Source Technologies	3	0	0	3

**COURSE OBJECTIVES**

To enable students to

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

- impart the knowledge about continuous and discrete time signals.

- create an understanding of Fourier Transform.
- examine the process of Quantization and the effects of finite Register Length
- determine and implement the appropriate type of design method for FIR filter.
- know different types of IIR filter structures.

**TEXT BOOK**

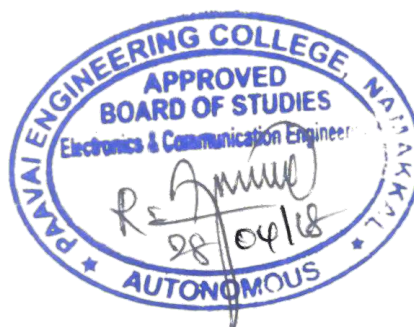
1. John G. Proakis and DimitrisG.Manolakis, “Digital Signal Processing – Principles, Algorithms &Applications”, Fourth Edition, Pearson Education, Prentice Hall, 2007.

**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.

**CO-PO MAPPING:**

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CO4	3	3	3	3	3	3	-	-	2	-	-	2	2	2
CO5	3	3	3	3	3	3	-	-	2	-	-	2	2	2



**COURSE OBJECTIVES**

To enable students to

- understand the division of network functionalities into layers.
- explain the following terms: computer network, LAN, WAN, MAN, internet, protocol, topology, media, peer-to-peer network, and server based network.
- be familiar with the components required to build different types of networks.
- be exposed to the required functionality at each layer.
- 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 the 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" tenth Edition, Pearson Education, 2014.

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CO4	3	3	3	2	3	-	-	-	-	-	-	2	3	3
CO5	3	3	3	2	-	-	-	2	-	-	-	-	-	3



**COURSE OBJECTIVES**

To enable students to

- learn the basics of Object Oriented analysis and design skills.
- learn the UML design diagrams.
- learn to map design to code.
- be exposed to the various testing techniques.
- understand the Object Oriented 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 the 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.
- create own logic for problem solving.

### 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 and Design Using UML", Fourth Edition, McGraw Hill Education, 2010.
2. Ali Bahrami, "Object Oriented Systems Development using the unified modeling language", 1st Edition, TMH, 2008.
3. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
4. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

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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



**COURSE OBJECTIVES**

To enable students to

- understand different Internet Technologies.
- implement Client side programs.
- design and implement server side programs using Servlets and JSP.
- understand XML.
- 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 the 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. UttamK.Roy, “Web Technologies”, Oxford University Press, 2011.
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.

## 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



**COURSE OBJECTIVES**

To enable students to

- learn Software life cycle models and system engineering process for developing a system from scratch.
- study the Software project management concepts.
- know about Prototyping techniques for requirement engineering process and to analyze data, functional and behavioral model.
- become familiar with Design levels of software engineering.
- study Software testing and technical metrics for verifying and validating the software.

**UNIT I SOFTWARE PROCESS****09**

The Evolving role of Software – Software – The changing Nature of Software – Legacy Software – A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment – Personal and Team Process Models. **Product and Process - Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – the Unified Process.**

**UNIT II SOFTWARE REQUIREMENTS****09**

Software Engineering Practice – communication Practice – Planning practice modeling practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering tasks – Initiating the requirements Engineering Process-Eliciting Requirements – Developing Use cases – Building the Analysis Models –Elements of the Analysis Model – Analysis pattern – Negotiating Requirements – Validating Requirements.

**UNIT III REQUIREMENTS ANALYSIS****09**

Requirements Analysis – Analysis Modeling approaches – data modeling concepts – Object oriented Analysis – Scenario based modeling – Flow oriented Modeling – Class based modeling – creating a behavior model.

**UNIT IV SOCIAL ISSUES AND ENVIRONMENT****09**

Design Engineering – Design process -Design Quality-Design model-Agile Methods – Extreme Programming-Rapid Application development – Software Prototyping- Software Reuse – The Reuse Landscape – Design Patterns – Generator-Based Reuse –Application Frameworks – Application System Reuse - Software Evolution Program Evolution Dynamics – Software Maintenance – Evolution Processes – Legacy system evolution Planning -Verification and Validation – Software Inspections – Automated Static analysis – Verification and Formal methods - **Software Testing – System Testing – Component Testing – Test case Design –Test Automation.**

## UNIT V SOFTWARE PROJECT MANAGEMENT

09

Software Cost Estimation – productivity – Estimation Techniques – Algorithmic Cost Modeling –Project Duration and Staffing - Process and Product Quality – Quality Assurance and Standards –Planning – Control- Software Measurement and Metrics - Process Improvement – Process Classification – Measurement –Analysis and Modeling –Change – The CMMI process improvement Framework - Configuration Management –Planning Change Management – Version and Release Management – System Building – CASE tools for configuration management.

**TOTAL PERIODS 45**

### COURSE OUTCOMES

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

- explore the strength and weakness of life cycle models such as water fall, incremental and spiral model.
- plan, schedule, identify the risk involved and track the development of project for ensuring the software quality.
- identify the functional and non-functional requirements for the project and use it to develop the project using life cycle model.
- apply design processes and concepts for architectural, data, software, user interface and real time systems design.
- verify, and validate the software applications using different types of testing like black box testing, structural testing, unit testing etc.

### TEXT BOOK

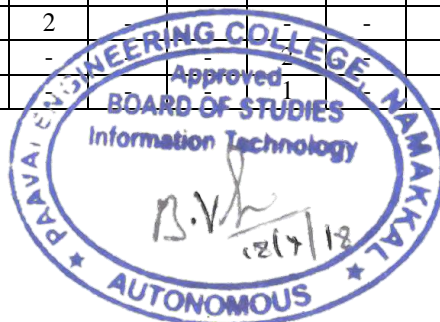
1. Roger Pressman,S, —Software Engineering: A Practitioner’s Approach”, Seventh Edition, McGraw Hill, 2010.

### REFERENCES

1. Ian Sommerville,“Software Engineering “, 9<sup>th</sup> Edition, Pearson Education Asia, 2011.
2. S.A. Kelkar, “Software Engineering, A Concise Study”, Prentice Hall of India, 2007.
3. Richard E. Fairley, “Principles of Software Engineering”, IEEE computer society press, 2010.
4. Shari Pfleeger, Joanne Atlee, “Software Engineering: Theory and Practice”, Fourth Edition,Pearson Education, 2010.
5. PankajJalote, “Software Engineering, A Precise Approach”, Wiley India, 2010.

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CO2	2	3	3	2	3	-	-	-	-	-	-	2	3	2
CO3	3	2	2	1	2	-	-	-	-	-	2	1	3	3
CO4	2	3	2	2	-	-	-	-	-	-	-	-	-	1
CO5	3	2	3	2	-	-	-	-	-	-	-	2	2	2



**COURSE OBJECTIVES**

To enable students to

- learn socket programming.
- different algorithms in Network layer.
- have hands on experience on various networking protocols.
- be familiar with Web page design using HTML/XML and style sheets.
- 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 the 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.

**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														
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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



## COURSE OBJECTIVES

To enable students to

- learn the basics of object oriented analysis and design skills.
- be exposed to the UML design diagrams.
- learn to map design to code.
- be familiar with the various testing techniques.
- 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. Bookbank.
3. Exam Registration.
4. Stock maintenance system.
5. Online course reservations 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 the course, students will be able to

- design and implement projects using OO 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)													
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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



**COURSE OBJECTIVES**

To enable students to

- learn the design principles of a Compiler.
- learn the various parsing techniques
- learn different levels of translation.
- learn how to optimize machine codes
- 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 the 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 and Tools”, 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 Elsevier Science, 2004.
4. Charles N. Fischer, Richard. J. LeBlanc, “Crafting a Compiler with C”, Pearson Education, 2008.

## 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	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



**COURSE OBJECTIVES**

To enable students to

- introduce the graphics mode, with the help of basic algorithms and methodologies.
- equip students with fundamental knowledge and basic technical competence in the field of computer graphics.
- provide an understanding of how a computer draws the fundamental graphics primitives.
- learn the implementation of Computer Graphics Algorithms.
- 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 the 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 McGraw Hill Edition, 8th edition 2011.
2. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.

## REFERENCES

1. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2 nd Edition, Pearson Education, 2003.
2. Nigel Chapman and Jenny Chapman, "Digital Multimedia", John Wiley & Sons Ltd.,2000.
3. John .F. Koegel Buford, "Multimedia Systems", Pearson education, 2005.

## 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
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CO4	2	1	3	2	-	-	-	1	-	-	-	-	2	2
CO5	2	3	2	1	-	-	-	-	-	-	-	2	-	3



**COURSE OBJECTIVES**

To enable students to

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

**UNIT I EMBEDDED COMPUTING 09**

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 09**

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

**UNIT III PROCESSES AND OPERATING SYSTEMS 09**

Multiple tasks and processes – Context switching – Scheduling policies – Inter process communication Mechanisms – Performance issues–Real time operating system - PSOS and VxWorks.

**UNIT IV EMBEDDED SOFTWARE 09**

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 09**

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

**TOTAL 45  
PERIODS**

**COURSE OUTCOMES**

At the end of the 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.
2. 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.

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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



**COURSE OBJECTIVES**

To enable students to

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

**UNIT I INTRODUCTION TO MANAGEMENT 09**

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 09**

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

**UNIT III ORGANIZING 09**

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 09**

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

**UNIT V CONTROLLING 09**

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

**TOTAL PERIODS 45**

**COURSE OUTCOMES**

At the end of the 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 Wehrich, Mark V. Cannice, Management a Global & Entrepreneurial Perspective, Tata McGraw-Hill Education, 2010.
2. James A.F. Stoner & R. Edward Freeman, Management, Prentice-Hall of India Private Limited, 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.

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CO4	-	-	-	-	2	3	-	2	3	3	-	1	3	-
CO5	3	-	3	3	2	3	-	-	-	-	3	3	2	3



**COURSE OBJECTIVES**

To enable students to

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



**COURSE OBJECTIVES**

To enable students to

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



**COURSE OBJECTIVES**

To enable students to

- understand their capabilities and enhance their grooming and show casing his /her capabilities to a prospective employer
- provide opportunity for the students to become acquainted with corporate opportunities relevant to their academic learning
- articulate their thoughts on a given topic –in English and also to make decent write ups in English on any given topic
- practice and score well in Aptitude tests conducted by corporate /prospective employers
- prepare for any group discussion evaluation or presenting their credentials during a face-to-face interview leading to selection and employment
- become a knowledge able person on the various evaluation processes leading to employment

**UNIT I CORPORATE READINESS 06**

**Business communication – Email, Paragraph, Letter Writing Skills - Public speaking skills : Rules of Public speaking skills;** Extempore, JAM - Inter and intra personal skills : Introduction ; Need for Inter and Intra personal skills in organizations –Stress management:Causes of stress and its impact,How to manage and distress,Circle of control,stress busters-Emotional Intelligence:What is emotional Intelligence,Why Emotional Intelligence Matters,Managing Emotions.

**UNIT II INTERVIEW SKILLS 06**

**Interview Basics : General Selection process, Grooming, Dress code, Supporting Documents to carry - Resume Building : Impact of Powerful CV, Do's and don'ts in CV - Group Discussion : Introduction to GD, Important of Listening and Speaking skills, Do's and Don't in GD-** Face to face interview / Hire me: Rules for face to face interview,body language,Self Introduction-Psychometric Assessment:Importance of Psychometric assessment,Why psychometric assessment.

**UNIT III QUANTITATIVE APTITUDE 06**

Simplification-Time and work-Pipes and cisterns-Ratio and Proportion -Partnership

**UNIT IV QUANTITATIVE APTITUDE 06**

**Simple interest and Compound interest-Profit and loss-**Permutation and combination Probability-Calendar

**UNIT V LOGICAL AND VERBAL REASONING (VR) 1 06**

Seating arrangement–Direction-Arithmetic reasoning–Syllogisms-Making Judgments-Statements and conclusions-Matching definition-Cause and effect.

**TOTAL PERIODS 30**

## COURSE OUTCOMES

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

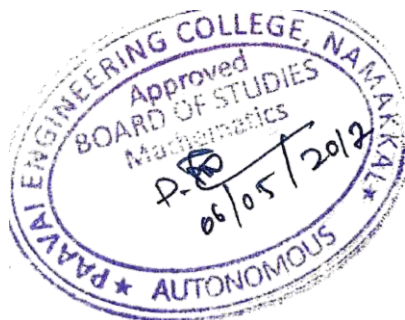
- demonstrate aptitude and reasoning skills
- enhance verbal and written ability
- improve his /her grooming and presentation skills
- interact effectively on any recent event/ happenings/current affairs.
- be a knowledgeable person on the various evaluation processes leading to employ and face the same with confidence.

## REFERENCES

1. Agarwal, R.S. "A Modern Approach to Verbal & Non Verbal Reasoning", S.Chand & Co Ltd, New Delhi.
2. Abhijit Guha, "Quantitative Aptitude", Tata-McGraw Hill.
3. Word Power Made Easy by Norman Lewis, W.R. Goyal Publications.
4. Johnson, D.W. Reaching Out – Interpersonal Effectiveness and Self-Actualization. Boston: Allyn and Bacon
5. Agarwal, R.S. "Objective General English", S.Chand & Co.
6. Infosys Campus Connect Program-students' guide for soft skills.
7. Mitra, Barun K. "Personality Development & Soft Skills", Oxford University

## 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)													
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CO1	3	2	2	3	3	1	-	-	-	-	-	-	3	2
CO2	-	2	3	-	2	-	2	-	-	-	-	-	3	2
CO3	3	2	2	2	-	-	1	-	-	-	-	-	2	3
CO4	3	2	2	-	-	1	-	-	-	-	2	-	2	3
CO5	2	3	3	2	1	3	3	1	-	1	2	-	2	3



PAAVAI ENGINEERING COLLEGE,NAMAKKAL-637018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

REGULATIONS 2015

CURRICULUM

SEMESTER VII

Course Code	Course Title	L	T	P	C
IT15701	Data Warehousing and Data Mining	3	0	0	3
IT15702	Cloud Computing	3	0	0	3
IT15703	Mobile Computing	3	0	0	3
*****	Elective – III	3	0	0	3
*****	Elective – IV	3	0	0	3
IT15704	Cloud Computing Laboratory	0	0	4	2
IT15705	Mobile Application Development Laboratory	0	0	4	2
IT15706	Mini Project	0	0	4	2
<b>TOTAL</b>		<b>15</b>	<b>0</b>	<b>12</b>	<b>21</b>

SEMESTER VIII

Course Code	Course Title	L	T	P	C
BA15151	Professional Ethics And Human Values	3	0	0	3
IT15801	Software Project Management	3	0	0	3
*****	Elective – V	3	0	0	3
*****	Elective – VI	3	0	0	3
IT15802	Project Work	0	0	12	6
<b>TOTAL</b>		<b>12</b>	<b>0</b>	<b>12</b>	<b>18</b>

**ELECTIVE – III**

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT15351	Adhoc and Sensor Networks	3	0	0	3
IT15352	C# And .Net Framework	3	0	0	3
IT15353	Software Quality Assurance	3	0	0	3
IT15354	Big Data and Analytics	3	0	0	3
IT15355	Information Retrieval	3	0	0	3

**ELECTIVE – IV**

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT15451	Advanced J2EE	3	0	0	3
IT15452	Agile Software Development	3	0	0	3
IT15453	Unix Internals	3	0	0	3
IT15454	Software Testing	3	0	0	3
IT15455	Soft Computing	3	0	0	3

**ELECTIVE – V**

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT15551	E-Commerce	3	0	0	3
BA15253	Total Quality Management	3	0	0	3
IT15552	Service Oriented Architecture	3	0	0	3
IT15553	Artificial Intelligence	3	0	0	3
IT15554	Social Network Analysis	3	0	0	3

**ELECTIVE – VI**

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
IT15651	Intellectual Property Rights	3	0	0	3
IT15652	Bio Informatics	3	0	0	3
IT15653	Digital Image Processing	3	0	0	3
IT15654	Digital Enterprise Resource Planning	3	0	0	3
IT15655	Internet of Things	3	0	0	3

**COURSE OBJECTIVES**

- to understand the fundamentals of Data Warehousing with its architecture.
- to understand the Data Warehousing Business Analysis concepts.
- to understand the Data Mining concepts and pre-processing methods.
- to understand the various Classification techniques in Data Mining.
- to understand the various Clustering methods in Data Mining

**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 multi relational OLAP – Categorization of OLAP 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– Data Preprocessing – Cleaning – Integration – Transformation – Reduction – Discretization - Concept Hierarchy Generation.

**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, TRENDS IN DATA MINING AND APPLICATIONS 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 HOURS 45**



## COURSE OUTCOMES

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

- understand the fundamentals of Data Warehousing with its architecture.
- learn Data Warehousing Business Analysis concepts.
- learn Data Mining concepts and Pre-processing methods.
- know the various classification techniques in Data Mining.
- know the various Clustering methods in Data Mining.

## TEXT BOOKS

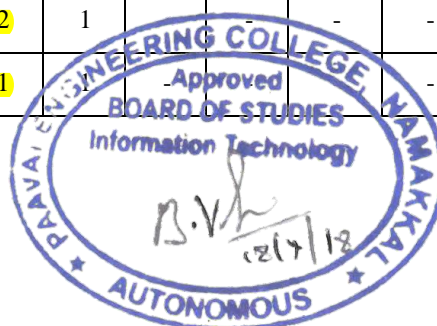
1. Alex Berson and Stephen J. Smith, — Data Warehousing, Data Mining & OLAP, Tata McGraw Hill, 2007.
2. Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques, 2nd Edition, Elsevier, 2011.

## REFERENCES

1. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, —Introduction To Data Mining, Person Education, 2007.
2. G. K. Gupta, —Introduction to Data Mining with Case Studies, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Daniel T. Larose, —Data Mining Methods and Models, Wiley-Interscience, 2006.
4. S. K. Mourya, Shalu Gupta, Data Mining and Data Warehousing, Alpha Science International Limited, 2013.
5. G. K. Gupta, Introduction to Data Mining With Case Studies, Eastern Economy, Third Edition 2013.

## 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)													
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CO1	3	2	2	-	-	-	-	-	-	-	-	-	3	2
CO2	3	3	2	1	-	-	-	-	-	-	-	3	3	2
CO3	3	3	2	1	2	-	-	-	-	-	-	-	3	1
CO4	3	2	-	-	1	2	1	-	-	-	-	2	3	2
CO5	3	3	2	1	1	1	1	-	-	-	-	1	3	1



**COURSE OBJECTIVES**

- to introduce the broad perceptiveness of cloud architecture and model
- to understand the concept of Virtualization
- to understand the features of cloud simulator
- to apply different cloud programming model as per need.
- to learn to design the trusted cloud Computing system

**UNIT I INTRODUCTION 9**

Introduction – Cloud Computing at a Glance - Historical Developments- Building Cloud Computing Environments - Computing Platforms and Technologies. Principles of Parallel and Distributed Computing - Eras of Computing - Elements of Parallel Computing and Distributed Computing -Technologies for Distributed Computing

**UNIT II VIRTUALIZATION 9**

Introduction - Characteristics of Virtualized Environments - Taxonomy of Virtualization Techniques - Virtualization and Cloud Computing - Pros and Cons of Virtualization - Technology Examples. Cloud Computing Architecture - Cloud Reference Model- **Types of Clouds - Economics of the Cloud - Open Challenges.**

**UNIT III CLOUD INFRASTRUCTURE 9**

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

**UNIT IV PROGRAMMING MODEL 9**

**Introduction to Hadoop Framework - Map reduce – Design of Hadoop file system, HDFS concepts. Cloud Software Environments -Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim**

**UNIT V SECURITY IN THE CLOUD 9**

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

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- compare the strengths and limitations of cloud computing
- identify the architecture, infrastructure and delivery models of cloud computing
- apply suitable virtualization concept.
- choose the appropriate Programming Models and approach.
- address the core issues of cloud computing such as security, privacy and interoperability

### TEXT BOOKS

1. RajkumarBuyya, Christian Vecchiola, S.TamaraiSelvi, Mastering Cloud Computing, TMGH, 2013.
2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Distributed and Cloud Computing, From Parallel Processing to theInternet of Things, Morgan Kaufmann Publishers, 2012.

### REFERENCES

1. John W.Rittinghouse and James F.Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2010.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, TMH, 2009.
3. Kumar Saurabh, Cloud Computing – insights into New-Era Infrastructure, Wiley India,2011
4. Ronald L. Krutz, Russell Dean Vines, Cloud Security – A comprehensive Guide to Secure Cloud Computing, Wiley – India, 2010.
5. John W.Rittinghouse and James F.Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2010

### CO-PO MAPPING:

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



**COURSE OBJECTIVES**

- to understand the basic concepts of mobile computing.
- to be familiar with the network protocol stack.
- to learn the basics of mobile telecommunication system.
- to be exposed to Ad-Hoc networks.
- to gain knowledge about different mobile platforms and application development.

**UNIT I INTRODUCTION 9**

Mobile Computing – Mobile Computing Vs. wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes.

**UNIT II MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER 9**

**Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization.**

Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

**UNIT III MOBILE TELECOMMUNICATION SYSTEM 9**

**Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS).**

**UNIT IV MOBILE AD-HOC NETWORKS 9**

Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – **Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols** – Vehicular Ad Hoc networks ( VANET) – MANET Vs VANET –Security.

**UNIT V MOBILE PLATFORMS AND APPLICATIONS 9**

Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems - Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure – Pros & Cons– Mobile Payment System – Security Issues.

**TOTAL HOURS 45**

**COURSE OUTCOMES**

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

- explain the basics of mobile telecommunication system.
- choose the required functionality at each layer for given application.

- identify solution for each functionality at each layer.
- use simulator tools and design Ad hoc networks.
- develop a mobile application.

**TEXT BOOK**

1. Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile Computing, PHI Learning Pvt. Ltd, New Delhi – 2012.

**REFERENCES**

1. Jochen H. Schller, –Mobile Communications, Second Edition, Pearson Education, New Delhi, 2007.
2. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. .UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile Computing, Springer, 2003.
4. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systems, Second Edition, TataMcGraw Hill Edition ,2006.

**CO-PO MAPPING:**

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COs	Programme Outcomes(POs)													
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CO3	3	3	2	1	2	-	1	-	-	-	-	2	3	1
CO4	3	3	-	1	1	1	1	-	-	-	-	2	3	2
CO5	3	3	-	1	1	1	1	-	-	-	-	2	3	2



**COURSE OBJECTIVES**

- to be exposed to tool kits of cloud environment.
- to Learn to run virtual machines of different configuration.
- to Learn to use Hadoop.
- to Apply Map-Reduce concept to applications.
- to build Private Cloud.

**LIST OF EXPERIMENTS**

Use Open Nebula or Equivalent software to set up the cloud and demonstrate the following experiments.

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 wordcount program to demonstrate the use of Map and Reduce tasks.
10. Setup a Private Cloud Using Open Nebula. Develop a simple application and make it available to the intended user.

**TOTAL: 60 HOURS**

**COURSE OUTCOMES**

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

- use the cloud tool kit.
- design and Implement applications on the Cloud.
- create virtual machines from available physical resources.
- implement Map-Reduce concept.

## LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

**SOFTWARE:** OpenNebula or Equivalent.

**HARDWARE:** 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														
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CO3	3	3	2	1	2	3	1	-	-	-	-	2	3	1
CO4	3	3	-	1	1	3	1	-	-	-	-	2	3	2



**COURSE OBJECTIVES**

- to know the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
- to understand how to work with various mobile application development frameworks
- to learn the basic and important design concepts and issues of development of mobile applications.
- to understand the capabilities and limitations of mobile devices.
- to gain knowledge about different mobile platforms.

**LIST OF EXPERIMENTS**

1. **Develop an application that uses GUI components, Font and Colours**
2. Develop an application that uses Layout Managers and event listeners.
3. **Develop a native calculator application.**
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi-threading
8. **Develop a native application that uses GPS location information.**
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. **Write a mobile application that creates alarm clock**

**TOTAL HOURS 60****COURSE OUTCOMES**

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

- design and Implement various mobile applications using emulators.
- deploy applications to hand-held devices
- exposed to technology and business trends impacting mobile applications
- competent with the characterization and architecture of mobile applications

**LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS**

**SOFTWARE** : Windows or Android or iOS or Equivalent Mobile Application Development Tool

**HARDWARE** : 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
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CO3	3	3	2	1	2	3	1	-	-	-	-	2	3	1
CO4	3	3	-	1	1	3	1	-	-	-	-	2	3	2



Two member team is identified to carry out mini project, the goal of mini project is either one can choose the final year project or technical skill enhancement. **Perform study the implementation issues, familiarize with the tools needed for implementation, study necessary simulation software (if any) and implement the initial phase of the project.** Three reviews needs to be conducted project report have to be submitted by the team. Final review will be conducted by the examiner.

**TOTAL: 60 HOURS**

### COURSE OUTCOMES

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

- Identify and formulate an IT related solution for an engineering problem.
- Analyze and review existing system.
- Choose appropriate design methodology for the problem.
- Communicate, demonstrate and document the work as a member and leader in a team.

### 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
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CO3	3	2	1	1	1	-	-	-	1	1	1	-	3	2
CO4	3	2	1	1	1	-	-	-	1	1	1	-	3	2



**COURSE OBJECTIVES**

- to study the basic issues in Professional Ethics.
- to appreciate the rights of others and to instill moral, social values and loyalty.
- to enable the student in their engineering profession who explore the ethical issues in technological society.
- to get ability to solve Global Issues.
- to understand humans' Safety, Responsibility and Rights.

**UNIT I HUMAN VALUES 9**

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

**UNIT II ENGINEERING ETHICS 9**

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

**UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9**

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

**UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9**

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

**UNIT V GLOBAL ISSUES 9**

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

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- propose possible solutions using articulated ethical theories.

- form opinions based on reasoned ethical positions, supported with facts and evidence.
- getawareness of the ethical component of daily engineering decisions.
- solve Global Issues.
- understand the Safety, Responsibility and Rights.

**TEXT BOOKS**

1. Mike Martin and Roland Schinzinger, —Ethics in Engineering, McGraw-Hill, New York 2007.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, —Engineering Ethics –Concepts and Cases, Thompson Learning, (2000).

**REFERENCES**

1. Charles D. Fleddermann, —Engineering Ethics, Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint).
1. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, —Business Ethics – An Indian Perspective, Biztantra, New Delhi, (2004).
2. John R Boatright, —Ethics and the Conduct of Business, Pearson Education, New Delhi, 2003.
3. Department of English and Foreign Languages SRM University, —Rhythm of Life, SRM Publications, 2013.
4. David Ermann and Michele S Shauf, —Computers, Ethics and Society, Oxford University Press, (2003).
5. Edmund G Seebauer and Robert L Barry, —Fundamentals of Ethics for Scientists and Engineers, Oxford University Press, Oxford.

**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	-	-	-	-	-	-	-	2	3	2
CO2	3	3	2	1	2	-	1	-	-	-	-	1	3	1
CO3	3	2	-	2	2	3	-	-	-	-	-	1	2	1
CO4	3	3	-	-	1	3	1	-	-	-	-	2	3	2
CO5	3	3	2	1	1	1	1	-	-	-	-	1	3	1



**COURSE OBJECTIVES**

- to understand the importance of project planning and project evaluation techniques.
- to acquire knowledge in software effort estimation and calculating the project duration.
- to analyze the risk and allocate the resources.
- to gain knowledge about the monitoring and controlling the software projects and its quality.
- to learn the fundamental concept of managing people and contracts.

**UNIT I INTRODUCTION TO PROJECT PLANNING AND EVALUATION 8**

Project Definition – Importance of Software Project Management – **Software Projects Vs. Other Projects** – **Activities Covered by SPM** – **Setting Objectives** – **Stepwise Project Planning** – **Cost Benefit Evaluation Techniques.**

**UNIT II SOFTWARE EFFORT ESTIMATION AND ACTIVITY PLANNING 10**

**Software Effort Estimation: Agile Methods – Extreme Programming** – Scrum - Problems with over and under estimates – **Software effort estimation techniques** – Bottom-up estimating – Top down estimating – Estimating by analogy – Albrecht function point analysis. **Activity Planning : Objectives of Activity planning - Project Schedules** – **Project and Activities** – **Sequencing and Scheduling** – Activity on Arrow Networks – Forward Pass – Backward Pass – Identifying Critical Path - Activity Float – Shortening Project Duration.

**UNIT III RISK MANAGEMENT AND RESOURCE ALLOCATION 9**

**Risk Management: Categories of Risk – A Framework for dealing Risk – Risk Identification – Risk Assessment – RiskPlanning - Risk Management – Risk Evaluation** -**Applying the PERT technique** – **Monte Carlo Simulation.** Resource Allocation: The nature of resources - Identifying Resource Requirements – Scheduling Resources – Creating critical paths – counting the cost - Publishing the resource schedule – The Scheduling Sequence.

**UNIT IV MONITORING AND CONTROLLING OF PROJECTS AND ITS QUALITY 9**

Monitoring and Controlling of Software Projects : Collecting the data – Visualizing Progress - Cost monitoring - Earned value analysis – Prioritizing monitoring. Software Quality : The importance of Software Quality – Software Quality Definition – ISO9126 – Product Vs. Process Quality Management – Process Capability Models – Techniques to help enhance software quality.

**UNIT V MANAGING PEOPLE AND CONTRACTS 9**

Managing people : Selection Process – instruction in the best methods – Motivational theories : Maslows Hierarchy ofNeeds – The Oldham-Hackman Job characteristic model – Becoming a Team – Decision Making. Managing Contracts: Types of Contract – Stages in contract placement – Typical

terms of a Contract.

**TOTAL HOURS 45**

**COURSE OUTCOMES**

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

- select the project by applying various evaluation techniques.
- find the project duration by scheduling the activities.
- evaluate the risk and allocate the resources accordingly.
- monitor the progress of project and find the quality of project.
- motivate people and establishing a contract.

**TEXT BOOKS**

1. Bob Hughes, Mike Cotterell, "software project management", Fifth edition, TataMcGrawHill, 2004.
2. Watts s humphrey, "Managing the Software Process", PearsoneducationInc.2006.

**REFERENCES**

1. Nina.sgodbole, "software quality assurance: principles and practices", alpha science international ltd, 2004.
2. Gordon g schulmeyer," handbook of software quality assurance", 3rd edition, attach house publishers, 2007.
3. Ramesh, gopaldaswamy, "managing global projects", TataMcGrawHill,2001.

**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	-	-	-	-	-	-	-	2	3	2
CO2	3	3	2	1	2	-	1	-	-	-	-	2	3	2
CO3	3	2	2	2	2	3	1	-	-	-	-	1	3	1
CO4	3	3	-	1	1	3	1	-	-	-	-	2	3	2
CO5	3	3	2	1	1	1	1	-	-	-	-	1	3	1



**COURSE 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 prepare 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.

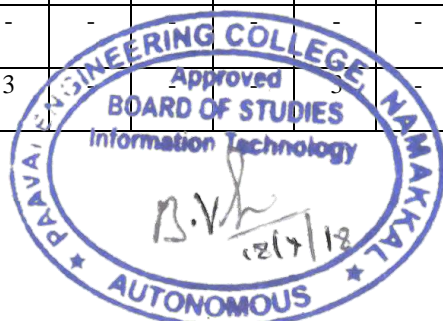
**TOTAL: 180 PERIODS****COURSE OUTCOMES**

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

- Identify and formulate an IT related solution for an engineering problem.
- Analyze and review existing system.
- Choose appropriate design methodology for the problem.
- Communicate, demonstrate and document the work as a member and leader in a team.

**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	1	-	-	-	-	-	-	-	3	2
CO2	3	3	-	1	-	-	-	-	-	-	-	-	1	2
CO3	-	-	-	-	-	-	-	-	3	-	3	-	1	2
CO4	-	-	3	-	-	-	-	-	-	1	-	-	3	3



**OBJECTIVES**

Enable the 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 for inculcating 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. Kenneth H. Rosen, "Discrete Mathematics and its Applications (with Combinatorics and Graph Theory)", 6th Edition, Tata McGraw -Hill, 5th Reprint 2008.
2. Trembly J.P and Manohar.R, "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw-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,"Discrete Mathematics and its Applications", 3rd Edition, Khanna Publishers, 2008.
3. T.Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics", Tata McGraw -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



**COURSE OBJECTIVES**

To enable students to

- Design DFA AND NFA
- Identify different formal language classes and their relationships.
- Design grammars and recognizers for different formal languages.
- Prove or disprove theorems in automata theory using its properties.
- 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 – Closure

Properties of CFL. Simplifying Context Free Grammars – Normal forms – Chomsky Normal Form and Greibach Normal Form – Pumping Lemma for CFL.

**UNIT IV TURING MACHINES AND PUSHDOWN AUTOMATA****9**

Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG – Deterministic Pushdown Automata – Turing Machines – Programming Techniques for TM.

**UNIT V UNDECIDABILITY****9**

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Universal Turing Machine – Rice theorem – post correspondence problem – classes of P and NP problems.

**TOTAL PERIODS 45****COURSE OUTCOMES**

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

- Design grammars 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 and automata
- 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. J. Martin, “Introduction to Languages and the Theory of computation” ThirdEdition, Tata McGraw Hill, 2007.

### 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



**COURSE OBJECTIVES**

To enable students to

- Understand the basic classes of compression techniques.
- Know how to apply compression techniques to practical situations.
- Apply the ideas of entropy and information content.
- Analysis coding techniques will perform in different situations.
- 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, Linear Predictive 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 and decoder - 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 the 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 Cryptography”, TMH 2007.
2. Fred Halsall, “Multimedia Communications: Applications, Networks, Protocols and Standards”, Pearson 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.

### 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



**COURSE OBJECTIVES**

To enable students to

- learn about graphical system.
- study about design standards.
- learn about the controls used in windows.
- study about the multimedia.
- 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 InteractionSpeed –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 the 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 BOOK

1. Wilbent. O. Galitz, "The Essential Guide To User Interface Design", John Wiley & Sons, 2016.

## REFERENCES

1. Alan Cooper, "The Essential Of User Interface Design", Wiley – Dream Tech Ltd., 2002.
2. Theo Mandel, "The Elements of User Interface Design", John Wiley and Sons Ltd, 2007.

## 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)													
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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



**COURSE OBJECTIVES**

To enable students to

- learn the methods of different problem solving and searching.
- know the concepts of knowledge representation.
- understand about inferring the knowledge.
- know the concepts of planning and learning.
- understand about the expert system.

**UNIT I INTRODUCTION 9**

Introduction to AI-Problem formulation, Problem Definition - Production systems, Control strategies Searchstrategies.Problem characteristics, Production system characteristics –Specialized productions system- **Problemsolving methods -Problem graphs, Matching, Indexing and Heuristic functions – Hill Climbing-Depth first andBreathfirst,Constraints satisfaction** – Related algorithms, Measure of performance and analysis of search algorithms.

**UNIT II REPRESENTATION OF KNOWLEDGE 9**

Game playing – Knowledge representation, Knowledge representation using Predicate logic, **Introduction to predicatecalculus, Resolution, Use of predicate calculus, Knowledge representation using other - Structured representation ofknowledge.**

**UNIT III KNOWLEDGE INFERENCE 9**

Knowledge representation -Production based system, Frame based system. Inference – Backward logic chaining,Forward chaining, Rule value approach, Fuzzy reasoning.

**UNIT IV PLANNING AND MACHINE LEARNING 9**

Basic plan generation systems – Strips –Advanced plan generation systems – **K strips - Strategic explanations - Why,Why not and how explanations.** Learning- Machine learning, adaptive Learning.

**UNIT V Expert Systems 9**

Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition– Meta knowledge, Heuristics, Typical expert systems – MYCIN, DART, XOON-Expert systems shells.

**TOTAL HOURS 45**

**COURSE OUTCOMES**

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

- demonstrate awareness of intelligent agents and problem solving using uninformed, informed and local search methods .
- develop knowledge about usage of propositional logic and first order logic for making inferences.
- use the knowledge and the process of inference to derive new facts.
- describe the use of planning and explain about various learning methods.
- design and develop the expert system.



## TEXT BOOKS

1. Kevin Night and Elaine Rich, Nair B, “Artificial Intelligence (SIE)”, McGraw Hill- 2008. (Units-I,II,IV & V)
2. Dan W. Patterson, “Introduction to AI and ES”, Pearson Education, 2007. (Unit-III).

## REFERENCES

1. Peter Jackson, “Introduction to Expert Systems”, 3rd Edition, Pearson Education, 2007.
2. Stuart Russel and Peter Norvig “AI – A Modern Approach”, 2nd Edition, Pearson Education 2007.
3. DeepakKhemani “Artificial Intelligence”, Tata McGraw Hill Education 2013.

## 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)												PSO1	PSO2
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CO1	3	2	3	3	3	-	-	-	-	-	2	2	3	1
CO2	3	2	3	2	3	-	-	-	-	-	-	2	-	2
CO3	3	3	3	3	2	-	-	-	-	-	1	2	-	3
CO4	3	2	2	3	-	-	-	3	-	-	2	-	2	1
CO5	2	3	2	3	3	-	-	1	-	-	3	-	-	2



**COURSE OBJECTIVES**

To enable students to

- understand the basics of open source software.
- gain the knowledge MySQL open source database.
- be able to familiar with Server-side programming language PHP.
- be able to implement and design the advanced Concepts in PHP
- exposing the students to the concepts of R programming.

**UNIT I INTRODUCTION 9**

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources-Open source operating systems: LINUX: Introduction –General Overview – The Linux shell and filestructure: the Shell – The shellscripts and programming- shell configuration.

**UNIT II MYSQL 9**

MySQL: 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 INTRODUCTION TO PHP 9**

PHP : Features, Working with variables , Storing data in variables– Operator and flow control – String and arrays - Creating Functions – Arrays.

**UNIT IV ADVANCED PHP 9**

Object oriented Programming -File handling and data storage – Working with database – Sessions, cookies and FTP.

**UNIT V R PROGRAMMING 9**

Preview of some important data structure – Vectors- Matrices and arrays – Lists – Data Frames –R programming Structure: Control Structure – Function and scoping issues –Recursive. String Manipulation.

**TOTAL HOURS 45**

**COURSE OUTCOMES**

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

- configure the shell commands and programming
- demonstrate the working with MYSQL.
- demonstrate the simple application in PHP
- create strong application in PHP
- develop a simple problem-solving application in R programming.

## TEXT BOOKS

1. Richard Petersen, "The complete Reference Linux ", Tata McGraw Hill Edition, Sixth edition 2010.
2. Steve Suchring, —MySQL Bible, John Wiley, 2002.
3. Steven Holzner, "PHP: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Norman Matloff ,” The Art of R Programming: A Tour of Statistical Software Design” ,1st Edition,2011.

## REFERENCES

1. Mark G. Sobell. "Practical Guide to Fedora and Red HatEnterpriseLinux", 6 th Edition, Prentice Hall, 2011.
2. RasmusLerdorf and Levin Tatroe, "Programming PHP", O'Reilly 3rd Edition ,2011.
3. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2007
4. B.Mahendran, Understanding FOSS, GNU Developers, 2009.
5. VikramVaswani, "MYSQL: The Complete Reference", 2nd Edition, Tata McGraw -Hill Publishing Company Limited, Indian Reprint 2009.

## 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)												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
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



**COURSE OBJECTIVES**

To enable students to

- provide knowledge on principles and practice underlying in the design of distributed systems.
- layout foundations of Distributed Systems.
- introduce the idea of middleware and related issues.
- understand in detail the system level and support required for distributed system.
- 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 data representation 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 method invocation.** Case study: Java RMI - Group communication - Publish-subscribe systems - Message queues –Sharedmemory 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-peer Middleware - Routing Overlays - Overlay case studies: Pastry, Tapestry- Distributed File Systems - Introduction - File service architecture - 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 the course, students will be able to

- articulate the principles and standard practices underlying the design of distributed and parallel 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. George Coulouris, 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.

### 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)												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
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



**COURSE OBJECTIVES**

To enable students to

- know the fundamentals of managerial economics.
- be familiar with demand and supply analysis.
- understand the production and cost analysis.
- describe the various financial accounting techniques.
- 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 - Demand Forecasting - 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 uses of production function.** Cost Concepts - Cost function - Determinants of cost - Short run and Long run cost curves- Cost Output Decision - Estimation of Cost.

**UNIT IV FINANCIAL ACCOUNTING****9**

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

**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 the course, students will be able to

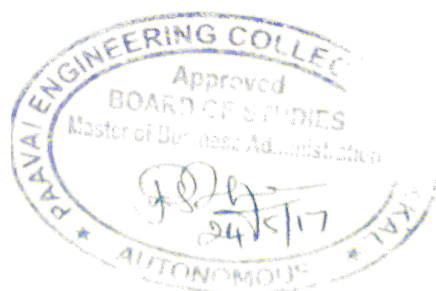
- acquire knowledge in the basic concepts of Managerial Economics.
- identify the role demand and supply analysis.
- understand the Production and cost analysis.
- know the applications of financial accounting.
- be familiar with the scope capital budgeting

## 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, NewDelhi, 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.

## CO-PO MAPPING:

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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



**COURSE OBJECTIVES**

To enable students to

- understand the IP addressing schemes.
- know the fundamentals of network design and implementation.
- analysis 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 addresses – CIDR – Subnetting 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 – error processing (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 the 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,



Edition2006.

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.

### CO-PO MAPPING:

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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



**COURSE OBJECTIVES**

To enable students to

- understand the relationship between system software and machine architecture.
- know the sign and implementation of assemblers.
- understand the major concept of loader and linker.
- have an understanding of macro processors.
- understand the major concept of Interactive debugging systems and software tools.

**UNIT I INTRODUCTION 9**

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

**UNIT II ASSEMBLERS 9**

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures -

Machine Multi dependent assembler features - Instruction formats and addressing modes – Program relocation – Machine Independent assembler features - Literals – Symbol-defining statements – Expressions - One pass 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 data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters – Macro within Macro - 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 the 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”, 3<sup>rd</sup> 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”, Second Revised Edition, Tata McGraw-Hill, 2000.

### 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



**COURSE OBJECTIVES**

To enable students to

- gain knowledge in Green IT fundamentals and strategies
- study about Green business process management and green enterprise architecture
- understand the structure of green grid framework
- learn the Socio-cultural aspects of green IT
- figure out environmentally responsible business strategies.

**PREREQUISITES:** Awareness of Energy and Environment is preferred

**UNIT I FUNDAMENTALS 9**

Green IT fundamentals: Business, IT, and the environment – Green computing: Carbon foot print – scoop on power – **Green IT strategies: Drivers, Dimensions, and Goals – Environmentally responsible business: Policies, Practices and Metrics.**

**UNIT II GREEN ASSETS AND MODELING 9**

Green Assets: Buildings, data centers, networks and devices – Green business process management: Modeling, optimization and collaboration – Green enterprise architecture – Environmental intelligence – Green supply chains – Green information systems: Design and development models.

**UNIT III GRID FRAMEWORK 9**

**Virtualizing of IT systems – Role of electric utilities, telecommuting, teleconferencing and teleporting – Materials recycling –** Best ways for green PC – Green data center – Green grid framework

**UNIT IV GREEN COMPLIANCE 9**

Socio-cultural aspects of green IT – Green enterprise transformation roadmap – Green Compliance: protocols, standards and audits – Emergent carbon issues: technologies and future.

**UNIT V CASE STUDIES 9**

The Environmentally Responsible Business Strategies (ERBS) – Case study scenarios for trial runs – Case studies – Applying green IT strategies and applications to a home, hospital, packaging industry and telecom sector.

**TOTAL PERIODS 45**

## COURSE OUTCOMES

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

- realize the impact of green computing in IT
- identify green assets and model them
- analyze the green grid framework.
- work with green compliance and standards
- work with green business management tools

## TEXT BOOKS

1. BhuvanUnhelkar, "Green IT Strategies and Applications-Using Environmental Intelligence", CRC Press, June 2011.
2. Woody Leonhard, Katherrine Murray, "Green Home computing for dummies", August 2009.

## REFERENCES

1. Alin Gales, Michael Schaefer, Mike Ebberts, "Green Data Center: steps for the Journey",
2. Shoff/IBM rebook, 2011.
3. John Lamb, "The Greening of IT", Pearson Education, 2009.
4. Jason Harris, "Green Computing and Green IT- Best Practices on regulations & industry", Lulu.com, 2008.
5. Carl speshocky, "Empowering Green Initiatives with IT", John Wiley & Sons, 2010
6. Wu Chun Feng (editor), "Green computing: Large Scale energy efficiency", CRC Press, 2012.

## CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
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CO2	3	3	2	1	1	-	-	-	-	-	-	2	3	2
CO3	3	2	3	2	1	1	-	-	-	-	-	2	3	2
CO4	3	2	2	2	1	-	-	-	-	-	-	2	3	2
CO5	3	2	2	1	-	-	-	-	-	-	-	2	2	2



**COURSE OBJECTIVES**

To enable students to

- understand various applications related to Information Technology.
- know scripting languages.
- acquire knowledge about Networks and its working principles.
- understand cell phone communication technology.
- study various applications related to Information Technology

**UNIT I WEB ESSENTIALS 9**

Creating a Website - Working principle of a Website - Browser fundamentals - Authoring tools - **Types of servers: Application Server - Web Server - Database Server**

**UNIT II SCRIPTING ESSENTIALS 9**

Need for Scripting languages - Types of scripting languages - Client side scripting - **Server side scripting - PHP - Working principle of PHP** - PHP Variables - Constants - Operators – Flow Control and Looping - Arrays - Strings - Functions - File Handling - PHP and MySQL - PHP and HTML - Cookies - Simple PHP scripts

**UNIT III NETWORKING ESSENTIALS 9**

Fundamental computer network concepts - Types of computer networks - - **Network layers - TCP/IP model** - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components

**UNIT IV MOBILE COMMUNICATION ESSENTIALS 9**

**Cell phone working fundamentals** - Cell phone frequencies & channels - Digital cell phone components - Generations of cellular networks - Cell phone network technologies / architecture - Voice calls & SMS

**UNIT V APPLICATION ESSENTIALS 9**

Creation of simple interactive applications - Simple database applications – **Multimedia applications - Design and development of information systems** – Personal Information System – Information retrieval system – Social networking applications

**TOTAL PERIODS 45**

## COURSE OUTCOMES

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

- design and deploy web-sites
- design and deploy simple web-applications
- create simple database applications
- develop information system
- describe the basics of networking and mobile communications

## TEXT BOOKS

- 1.Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5" Third Edition, 'REILLY, 2014..
2. James F. Kurose, "Computer Networking: A Top-Down Approach", Sixth Edition, Pearson, 2012.

## REFERENCES

- 1.GottapuSasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012
- 2.R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.
- 3.it-ebooks.org

## CO-PO MAPPING:

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



**COURSE OBJECTIVES**

To enable students to

- be exposed to the context and operation of open source software communities and associated software projects
- learn the fundamentals of SQL.
- learn PHP programming language.
- understand Python programming language
- learn Perl programming language

**UNIT I INTRODUCTION****9**

Introduction to Open Sources – Need of Open Sources – Advantages of Open Sources – Application of Open Source – Open Source Operating Systems : Linux – Introduction – General Overview – **Kernel Mode and User Mode – Process – Advanced Concepts – Scheduling** – Personalities – Cloning – Signals – Development with Linux .

**UNIT II OPEN SOURCE DATABASE****9**

Introduction to MySQL – Setting up Account – Starting, Terminating and Writing SQL Programs – Record Selection Technology – Working with Strings – Date and Time – Sorting Query Results – Generating Summary – Working with Metadata – Using Sequences – My SQL and Web

**UNIT III OPEN SOURCE PROGRAMMING LANGUAGES****9**

Introduction to PHP Hypertext Processor(PHP) – Programming in Web Environment – Variables – Constants – Data Type – Operators – Statements – Functions – Arrays – Object Oriented Programming (OOP) – String Manipulation and Regular Expression – File Handling and Data Storage – PHP and SQL Database – PHP and Lightweight Directory Access Protocol (LDAP) – PHP Hypertext Processor (PHP) Connectivity – Sending and Receiving E-mails – Debugging and Error Handling – Security – Templates

**UNIT IV PYTHON****9**

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

**UNIT V PERL****9**

Perl Backgrounder – Perl Overview – Perl Parsing Rules – Variables and Data – Statements and



**COURSE OUTCOMES**

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

- understand open domain standards.
- create simple database applications.
- work and develop projects with popular open source software tools.
- understand the object oriented concepts for implementation.
- use the language, components and tools for developing Perl applications.

**REFERENCES**

1. Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata MCGraw Hill, Indian Reprint 2009.
2. VikramVaswani, “MYSQL: The Complete Reference”, 2nd Edition, Tata MCGraw Hill, Indian Reprint, 2009.
3. Remycard, Eric Dumas & Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2003.
4. Steve Suchring, “MySQL Bible”, John Wiley, 2002.
5. RasmusLerdorf& Levin Tatroe, “Programming PHP”, O’Reilly, 2002.
6. Wesley J.Chun , “ Core Python Programming ”, Prentice Hall, 2001.
7. Martin C.Brown, “Perl : The Complete Reference”, 2nd Edition, Tata McGraw Hill, Indian Reprint, 2009.

**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)												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
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CO2	2	3	3	-	3	-	-	-	-	-	-	2	1	2
CO3	3	3	2	3	2	-	-	-	-	-	-	2	2	2
CO4	2	3	3	2	-	-	-	-	-	-	-	1	1	2
CO5	3	3	2	2	-	-	-	-	-	-	-	1	1	2



## ELECTIVE - III

IT15351

ADHOC AND SENSOR NETWORKS

3 0 0 3

### COURSE OBJECTIVES

- to learn the fundamentals of various networks and its architecture.
- to learn the different types of MAC protocols.
- to be familiar with different types of adhoc routing protocols.
- to be expose to the TCP issues in adhoc networks.
- to learn the architecture and protocols of wireless sensor networks.

### UNIT I INTRODUCTION 9

Fundamentals of Wireless Communication Technology – The Electromagnetic Spectrum – Radio propagationMechanisms – Characteristics of the Wireless Channel - mobile ad hoc networks (MANETs) and wireless sensornetworks (WSNs) : concepts and architectures. Applications of AdHocand Sensor networks. Design Challengesin Ad hoc and Sensor Networks.

### UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS 9

Issues in designing a MAC Protocol - Classification of MAC Protocols - Contention based protocols- Contentionbased protocols with Reservation Mechanisms – Contention based protocols with Scheduling Mechanisms – channel MAC-IEEE 802.11.

### UNIT III ROUTING PROTOCOLS AND TRANSPORT LAYER IN AD HOC WIRELESS NETWORK 9

Issues in designing a routing and Transport Layer protocol for Adhoc networks – proactive routing, reactivexrouting (on-demand), hybrid routing - Classification of Transport Layer solutions - TCP over AdhocwirelessNetworks.

### UNIT IV WIRELESS SENSOR NETWORKS (WSNS) AND MAC PROTOCOLS 9

Single node architecture: hardware and software components of a sensor node – WSN Network architecture: typical network architectures - data relaying and aggregation strategies - MAC layer protocols: self - organizing, Hybrid TDMA/FDMA and CSMA based MAC- IEEE 802.15.4.

### UNIT V WSN ROUTING, LOCALIZATION & QOS 9

WSN routing – OLSR- Localization – Indoor and Sensor Network Localization-absolute and relative localization, Triangulation - QOS in WSN-Energy Efficient Design-Synchronization-Transport Layer issues.

**TOTAL HOURS 45**

### COURSE OUTCOMES

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

- explain the concepts, network architectures and applications of ad hoc and wireless sensor networks.
- describe the unique issues in ad-hoc/sensor networks.
- analyze the protocol design issues of ad hoc and sensor networks.
- design routing protocols for ad hoc and wireless sensor networks with respect to some protocol design Issues.
- evaluate the Quos related performance measurements of ad hoc and sensor networks.

### TEXT BOOK

1. C. Siva Ram Murthy, and B. S. Manoj, —Ad Hoc Wireless Networks: Architectures and Protocols —,Prentice Hall Professional Technical Reference, 2008.

### REFERENCES

1. Carlos De MoraesCordeiro, Dharma PrakashAgrawal —Ad Hoc & Sensor Networks: Theory and applications, World Scientific Publishing Company, 2006.
2. Feng Zhao and LeonidesGuibas, –Wireless Sensor Networks, Elsevier Publication – 2002.
3. Holger Karl and Andreas Willig —Protocols and Architectures for Wireless Sensor Networks, Wiley,2005.
4. KazemSohraby, Daniel Minoli, &TaiebZnati, –Wireless Sensor Networks-Technology, Protocols, and Application.
5. John Wiley, 2007. Anna Hac, —Wireless Sensor Network Designs, John Wiley, 2003.

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CO2	3	3	2	1	-	-	-	-	-	-	-	-	3	2
CO3	3	3	2	1	-	-	-	-	-	-	-	-	3	1
CO4	3	2	-	-	1	3	1	-	-	-	-	2	3	2
CO5	3	3	2	1	1	1	1	-	-	-	-	1	3	1



**COURSE OBJECTIVES**

- to impart the fundamental concepts of C# and .NET.
- to know the object oriented aspects of C#.
- to learn about Application development in .NET.
- to learn about the database connectivity for applications with ADO.NET.
- to know the working of distributed applications.

**UNIT I BASICS OF C# AND .NET 9**

Introducing C# – Understanding .NET – Overview of C# – Literals – Variables – Data Types – Operators – Expressions – Control statements – Methods – Arrays – Strings – Structures – Enumerations.

**UNIT II OBJECT ORIENTED ASPECTS OF C# 9**

Classes – Objects – Inheritance – Properties – Indexers – Polymorphism – Interfaces – Operator Overloading – Delegates – Events – Collections – Errors and Exceptions.

**UNIT III APPLICATION DEVELOPMENT ON .NET 9**

Building Windows Applications – Windows Form Controls – Common Dialog Box – Creating User Controls – Components – ADO.NET Architecture – Accessing Data with ADO.Net – Storage and Retrieval of BLOB Objects – Crystal Report.

**UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 9**

Programming Web Applications With Web Forms – Web Controls and Properties – Cascading Style Sheet – Web User Controls – Data Bound Controls – Programming Web Services – Introduction to Windows Communication Foundation Services: Hosting Windows Communication Foundation Services - Self Hosting Windows Communication Foundation Services - Sessions, Instancing and Concurrency in WCF Services - Transactions in WCF Services

**UNIT V CLR AND THE .NET FRAMEWORK 9**

Assemblies – Versioning – Attributes – Reflection – Viewing Meta Data – Type Discovery – Reflection on Type– Marshaling – Remoting – Garbage Collection – Security in .NET.

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- implement the basic and advanced features of C# and .NET.
- understand the object oriented aspects of C#.

- develop windows applications using .NET.
- design web based applications using .NET.
- comprehend CLR and the .Net framework.

### TEXT BOOK

1. Herbert Scheldt, -The Complete Reference: C# 4.0, Tata McGraw Hill, 2012.

### REFERENCES

1. Andrew Troelsen , —Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
2. Ian Griffiths, Matthew Adams, Jesse Liberty, —Programming C# 4.0, Sixth Edition, O’Reilly, 2010.
3. E. Balagurusamy, —Programming in C# - A Primer, Third Edition, Tata McGraw-Hill,2010.
4. Charles Petzold, —Preogramming in the key of C# – A Primer for Aspiring Programmers, Microsoft Press US; 1 edition (6 August 2003)

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



**COURSE OBJECTIVES**

- to this course introduces concepts, metrics, and models in software quality assurance.
- to the course covers components of software quality assurance systems before, during, and after software development.
- to it presents a framework for software quality assurance and discuss individual components in the framework such as planning, reviews, testing, configuration management, and so on.
- to it also discusses metrics and models for software quality as a product, in process, and in maintenance.
- to the course will include case studies and hands on experiences. Students will develop an understanding of software quality and approaches to assure software quality.

**UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9**

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management.

**UNIT II MANAGING SOFTWARE QUALITY 9**

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management.

**UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9**

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis.

**UNIT IV SOFTWARE QUALITY PROGRAM 9**

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance planning – An Overview – Purpose & Scope.

**UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9**

Software Standards–ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA inSoftware Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM.

**TOTAL HOURS 45**

**COURSE OUTCOMES**

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

- the student will be able to identify benefits of and the needs to enforce software quality.
- the students will be able to differentiate between quality control, quality management and quality assurance

- the student will be able to understand and discuss the benefits, needs and techniques of software reviews, software testing, configuration management and software metrics.
- critically evaluate alternative standards, models and techniques aimed at achieving quality assurance in a variety of software development environments.
- understand and apply key quality assurance techniques tailored for specific software development environments.

### TEXT BOOKS

1. Mordechai Ben-Menachem / Garry S Marliss, —Software Quality, Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V).
2. Watts S Humphrey, — Managing the Software Process, Pearson Education Inc.(UNIT I and II).

### REFERENCES

1. Gordon GSchulmeyer, —Handbook of Software Quality Assurance, Third Edition, Artech House Publishers 2007.
2. Nina S Godbole, —Software Quality Assurance: Principles and Practice, Alpha Science International, Ltd, 2004.
3. Boriz Beizer, —Software Testing Techniques, 2<sup>nd</sup> Edition, Dream Tech, 2009.
4. Aditya P. Mathur, —Foundations of Software Testing, Pearson, 2008.
5. Mauro Pezze and Mical Young, —Software Testing and Analysis process, Principles, and Techniques, John Wiley 2008.

### CO-PO MAPPING:

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



**COURSE OBJECTIVES**

- to understand the Big Data and Hadoop.
- to acquire knowledge of HDFS and YARN.
- to provide Map reduce concepts and Interfacing.
- to gain knowledge about Eco system.
- to learn the fundamental concept of Data Analytics with R.

**UNIT I INTRODUCTION TO BIG DATA AND HADOOP 8**

Types of Digital Data, Introduction to Big Data, Big Data Analytics, Big data Technology landscape- History of Hadoop, Apache Hadoop, Analyzing - Data with Unix tools, analyzing Data with Hadoop, Hadoop Streaming, IBM Big Data Strategy, Introduction to Infosphere Big Insights and Big Sheets.

**UNIT II HDFS(Hadoop Distributed File System) 10**

HDFS Architecture- Daemons Related to HDFS – Working with HDFS Command – **Special Features of Hadoop** Processing Data with Hadoop –Managing Resources and Applications with YARN- Introduction- Limitation of Hadoop1.0- Hadoop 2: HDFS- Hadoop 2: YARN.

**UNIT III MAP REDUCE 9**

Introduction- How Map Reduce Works- Types- Formats -Map Reduce Example- Word Count Example- Anatomy of a Map Reduce Job - Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Using Java, Map Reduce Features.

**UNIT IV HADOOP ECO SYSTEM 9**

**Pig** : Introduction to PIG, Execution Modes of Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators. **Mango DB: Recap of NoSQL databases - MongoDB – CRUD** - MongoDB- Arrays, Java Scripts, Cursors, Map Reduce Programming, **Aggregations** **Hive** : Hive Shell, HiveServices, Hive Metastore, Comparison with Traditional Databases, Hive QL, Tables, Querying Data and User Defined Functions. **Hbase**: HBasics, Concepts, Clients, Example, Hbase Versus RDBMS. **Cassandra**: Cassandra- CQLSH - CRUD, Counter, List, Set, Map, Tracing **Big SQL** : Introduction

**UNIT V DATA ANALYTICS WITH R 9**

Machine Learning: Introduction, **Supervised Learning, Unsupervised Learning, Collaborative Filtering.** **Big Data Analytics with BigR.**

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- identify Big Data, Hadoop and its Business Implications.



- list the components of Hadoop Distributed File System.
- manage Map Reduce in Hadoop Environment.
- develop Big Data Solutions using Hadoop Eco System.
- apply Machine Learning Techniques using R.

### TEXT BOOKS

1. Tom White —Hadoop: The Definitive Guide Third Edit on, O'reily Media, 2012.
2. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

### REFERENCES

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, —Big Data and Business Analytics| Auerbach Publications, CRC press (2013)
3. Tom Plunkett, Mark Hornick, —Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle REnterprise and Oracle R Connector for Hadoop|, McGraw-Hill/Osborne Media (2013), Oracle press.
4. Anand Rajaraman and Jeffrey David Ulman, —Mining of Massive Datasets|, Cambridge University Press, 2012.

### CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
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CO1	2	2	-	-	-	-	-	-	-	-	-	1	3	1
CO2	2	-	-	2	-	-	-	-	-	-	-	1	3	1
CO3	2	-	-	-	2	-	-	-	-	-	-	1	3	3
CO4	-	-	-	-	3	-	-	-	-	-	-	1	3	2
CO5	-	2	-	-	3	-	-	-	-	-	-	1	3	2



**COURSE OBJECTIVES**

- to learn information retrieval strategies.
- to understand information retrieval techniques.
- to able to understand web based information retrieval techniques.
- to understand the concepts and techniques of retrieval utilities.
- to learn the concepts of parallel and distributed information retrieval.

**UNIT I RETRIEVAL STRATEGIES 9**

Vector Space Model – Probabilistic Retrieval Strategies – Language Models – Inference Networks  
 Extended Boolean Retrieval – Latent Semantic Indexing – Neural Networks – Genetic Algorithms  
 Fuzzy Set Retrieval.

**UNIT II RETRIEVAL UTILITIES 9**

Relevance Feedback – Clustering – Passage - based Retrieval – N - grams – Regression Analysis –  
 Thesauri – Semantic Networks – Parsing.

**UNIT III CROSS-LANGUAGE INFORMATION RETRIEVAL 9**

Introduction – Crossing the Language Barrier – Cross-Language Retrieval strategies – Cross Language  
 Utilities – Efficiency - Inverted Index – Query Processing – Signature Files – Duplicate Document  
 Detection. Integrating Structured Data and Text: Relational Model – Historical Progression –  
 Relational Application – Semi-Structured Search – Multi-dimensional Data Model – Mediators.

**UNIT IV PARALLEL AND DISTRIBUTED INFORMATION RETRIEVAL 9**

Parallel Information Retrieval: Parallel Text Scanning – Parallel Indexing – Clustering and  
 Classification – Parallel Systems Distributed Information Retrieval: Theoretical Model – Web Search –  
 Result Fusion – Peer-to-Peer Information Systems – Architectures.

**UNIT V WEB BASED RETRIEVAL 9**

Web Search Basics – Indexing – Query Processing – Crawling– Ranking – Link Analysis: Page rank,  
 Hubs and Authorities (HITS).

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- explain information retrieval system strategies.
- compare various types of retrieval utilities.
- explain cross – language information retrieval strategies.
- summarize various steps involved in information retrieval techniques.

- identify various web based information retrieval techniques using modern tools.

### TEXT BOOK

1. David A. Grossman, Ophir Frieder, —Information Retrieval: Algorithms, and Heuristics, Academic Press, Second Edition, 2008.

### REFERENCES

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, —Introduction to Information Retrieval, Cambridge University Press, Cambridge, England, 2009.
2. Ricardo Baeza-Yate, Berthier Ribeiro-Neto, —Modern Information Retrieval, Pearson Education Asia, 2012.
3. G.G. Chowdhury, —Introduction to Modern Information Retrieval, Neal-Schuman Publishers, Third Edition, 2010.
4. Daniel Jurafsky and James H. Martin, —Speech and Language Processing, Second Edition, Pearson Education, 2009.
5. Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, —Text Information Retrieval Systems, Academic Press, Third Edition, 2007.

### 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	-	3	3
CO2	3	3	2	-	2	-	-	2	-	2	2	2	2	3
CO3	3	-	-	1	2	2	2	-	2	-	1	2	3	2
CO4	3	2	2	2	2	2	2	2	3	2	2	2	2	2
CO5	3	2	-	2	2	-	2	-	2	3	-	2	3	3



## ELECTIVE - IV

IT15451

ADVANCED J2EE

3 0 0 3

### COURSE OBJECTIVES

- to learn the concepts of programming in J2EE.
- to be able to develop websites using J2EE.
- to be able to understand create a Java server page.
- to gain the knowledge about Enterprise Bean.
- to know about security provided by Java.

### UNIT I J2EE OVERVIEW

9

Distributed Multi-tiered Applications - J2EE Containers – Web Services Support – Packaging Applications – Development Roles - J2EE APIs - Sun Java System Application – Server Platform Edition 8 – Understanding XML: Introduction to XML - Generating XML Data.

### UNIT II GETTING STARTED WITH WEB APPLICATIONS

9

Web Application Life Cycle – Web modules - Web Application Examples. Java Servlet Technology: What is a Servlet? – Servlet Life Cycle – Sharing Information – Creating and Initializing a Servlet - Writing Service Methods– Filtering Requests and Responses - Invoking Other Web Resources - Accessing the Web Context - Maintaining Client State - Finalizing a Servlet - The Example Servlet.

### UNIT III JAVA SERVER PAGES TECHNOLOGY

9

What is a JSP Page? – The Life Cycle of a JSP Page - Creating Static Content - Creating Dynamic Content - Expression Language - Java Beans Components - Using Custom Tags - Reusing Content in JSP Pages - Transferring Control to Another Web Component - Including an Applet – Java server Pages Standard Tag Library: Using JSTL - Core Tag Library – XML Tag Library - Internationalization Tag Library - SQL Tag Library - Functions.

### UNIT IV ENTERPRISE BEANS

9

What is an Enterprise Bean? – What is a Session Bean? - What is an Entity Bean? - What is a Message - Driven Bean? - Defining Client Access with Interfaces - The Contents of an Enterprise Bean - Naming Conventions for Enterprise Beans - The Life Cycles of Enterprise Beans. Getting Started With Enterprise Beans : Creating the J2EE Application -Creating the Enterprise Bean - Creating the Application Client – Creating the Web Client -Specifying the Web Client’s Context Root - Deploying the J2EE Application - Running the Application Client -Running the Web Client.

### UNIT V SECURITY

9

Understanding Login Authentication - HTTP basic authentication - Form based login

authentication - Client certificate authentication - Mutual authentication - Digest authentication.

The Java Message service API: Overview - Basic JMS API concepts - The JMS API programming model. HTTP OVERVIEW: HTTP Requests - HTTP Responses.

**TOTAL HOURS 45**

### COURSE OUTCOMES

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

- explain the Java platform and XML applications.
- integrate Servlets, JSP and JDBC and build a web application.
- develop web applications using Servlets and JSP.
- build Enterprise Applications using Session Bean, Entity Bean and MDB.
- to know the security levels in Java.

### TEXT BOOK

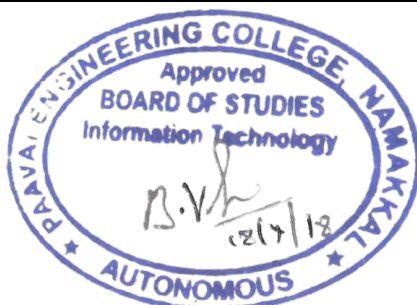
1. Herbert Schildt, Java -The Complete Reference, Tata McGraw-Hill, Seventh Edition(2008).

### REFERENCES

1. Alur Deepak, Malks Dan and Crupi John, Core J2EE Patterns: Best Practices and Design Strategies, Prentice Hall India (2001).
2. Jim Keogh, J2EE-The Complete Reference; Tata Mcgraw-Hill, Edition(2002).
3. Austin and Pawlan, Advanced Programming for JAVA 2 Platform, Pearson Education (2004).
4. Geary M. David, Core JSTL Mastering the JSP standard Tag Library, Pearson Education(2007).

### CO-PO MAPPING:

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CO2	-	3	2	1	3	-	-	-	-	-	-	-	-	2
CO3	-	3	3	-	3	2	-	-	-	-	-	-	-	2
CO4	-	-	-	-	-	2	-	-	-	-	-	-	2	-
CO5	-	-	2	3	-	2	-	-	-	2	-	3	2	-



**COURSE OBJECTIVES**

- to learn about the fundamentals of Agile.
- to study about agile scrum framework.
- to know about agile testing.
- to know about agile software design and development.
- to know the current trends of industry.

**UNIT I FUNDAMENTALS OF AGILE****9**

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

**UNIT II AGILE SCRUM FRAMEWORK****9**

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

**UNIT III AGILE TESTING****9**

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

**UNIT IV AGILE SOFTWARE DESIGN AND DEVELOPMENT****9**

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

**UNIT V INDUSTRY TRENDS****9**

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

**COURSE OUTCOMES**

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

- understand the background and driving forces for taking an Agile approach to software development.
- understand the business value of adopting Agile approaches and Agile development practices.
- drive development with unit tests using Test Driven Development.
- apply design principles and refactoring to achieve Agility.
- deploy automated build tools, version control and continuous integration and Perform testing activities within an Agile project.

**REFERENCES**

1. Ken Schawber, Mike Beedle, —Agile Software Development with Scrum —, Pearson , 21 Mar 2008.
2. By Robert C. Martin, Agile Software Development, Principles, Patterns and Practices —, Prentice ,25 Oct 2002.
3. Lisa Crispin, Janet Gregory, Agile Testing: A Practical Guide for Testers and Agile Teams —, Wesley, 30 Dec 2008.
4. Alistair Cockburn, —Agile Software Development: The Cooperative Game —, Addison Wesley, 19 Oct 2006.
5. Mike Cohn, —User Stories Applied: For Agile Software —, Addison Wesley, 1 Mar 2004.

**CO-PO MAPPING:**

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
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CO1	2	1	-	-	-	-	-	-	-	-	-	-	3	1
CO2	2	1	-	-	-	-	-	-	-	2	-	-	2	1
CO3	2	1	-	-	-	-	-	-	-	2	-	-	2	1
CO4	2	1	-	-	-	-	-	-	-	1	-	-	2	-
CO5	2	1	-	-	-	-	-	-	-	-	-	-	2	1



**COURSE OBJECTIVES**

- to understand about the Operating System of Unix.
- to be able to various file system in UNIX OS.
- to learn the concept of System calls, file system, Process management.
- to know about the processes and its various working principles.
- to study the different Memory Management techniques and Input output operation of Unix Operating system.

**UNIT I OVERVIEW 8**

General Overview of the System : History - System structure - User perspective - Assumptions about the buffer Cache: Buffer headers -Structure of the buffer pool - Scenarios for retrieval of a buffer - Reading and writing diskblocks.

**UNIT II FILE SUBSYSTEM 8**

Internal representation of files: Inodes - Structure of a regular file - Directories - Conversion of a path name to anInodes - Super block - Inodes assignment to a new file.

**UNIT III SYSTEM CALLS FOR THE FILE SYSTEM 10**

Open - Read - Write - File and record locking - Adjusting the position of file I/O - Lseek - Close - File creation -Changing directory, root, owner, mode - stat and fstat - Pipes - Dup - Mounting and unmounting file systems -Link – unlink.

**UNIT IV PROCESSES 10**

Process states and transitions - Layout of system memory - The context of a process .Process Control : Processcreation - Signals – Process termination – user id of a process –The Shell - System boot and the INIT process -Process Scheduling-algorithm - scheduling parameters.

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

Memory Management Policies: Swapping-allocation swap space - swapping processes out - fork swap-expansionSwap -swapping processes in. The I/O Subsystem: Driver Interface - Inter process communication-process tracing

**FOR FURTHER READING:**

Allocation of disk blocks - Advantages and disadvantages of the buffer cache - Creation of special files –otherprograms - Streams-sockets

**TOTAL HOURS 45**



## COURSE OUTCOMES

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

- understand the structure of Unix operating System and execute its basic commands.
- understand the structure of file system of UNIX OS.
- describe system calls, buffer management and kernel functionalities in UNIX OS.
- implement the concepts of files system and authentication process.
- apply memory management policies and I/O subsystems in developing Unix environment.

## REFERENCES

1. Maurice J. Bach, The Design of the Unix Operating System, 1st Edition, Pearson Education, reprint 2015.
2. UreshVahalia, Unix Internals The New Frontiers, Pearson Education, 2010.
3. S. J. Leffler, M. K. Mckusick, M. J. .Karels and J. S. Quarterman. The Design and Implementation of the 4.4 Operating System, Addison Wesley, 1996.

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CO3	2	3	2	3	-	-	-	-	-	-	-	-	2	-
CO4	2	-	3	2	3	-	-	-	-	-	-	-	2	-
CO5	2	3	3	3	-	-	-	-	-	2	3	-	2	1



**COURSE OBJECTIVES**

- to understand standard principles to check the occurrence of defects and its removal.
- to learn the various designs of test cases.
- to know the behavior of the testing techniques to detect the errors in the software.
- to be familiar with test management
- to learn the functionality of automated testing tools.

**UNIT I INTRODUCTION 9**

Testing as an Engineering Activity –Testing as a Process –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 Repository.

**UNIT II TEST CASE DESIGN 9**

Test case Design Strategies –Using Black Box 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.

**UNIT III LEVELS OF TESTING 9**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests. The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – scenario testing – defect bash elimination - System Testing – types of system testing – Acceptance testing – performance testing - Regression Testing – internationalization testing – ad-hoc testing -Alpha – Beta Tests – testing OO systems – usability and accessibility testing.

**UNIT IV TEST MANAGEMENT 9**

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

**UNIT V TEST AUTOMATION 9**

Software test automation – skills needed for automation – scope of automation – design and architecture for automation– requirements for a test tool – challenges in automation- Test metrics and measurements –project, progress and productivity metrics– **Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – testing maturity model.**

**TOTAL HOURS 45**

### COURSE OUTCOMES

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

- understand the role of tester in software organization.
- document test plan and test cases designed.
- identify suitable tests to be carried out.
- understand the technology tools that can reduce paper waste and carbon footprint by user.
- explore the test automation concepts and tools.

### TEXT BOOKS

1. SrinivasanDesikan and Gopaldaswamy Ramesh, — Software Testing – Principles and Practices, Pearson education, 2006.
2. AdityaP.Mathur, —Foundations of Software Testing, Pearson Education,2008.

### REFERENCES

1. Boris Beizer, —Software Testing Techniques, Second Edition,Dreamtech, 2003.
2. Edward Kit , Software Testing in the Real World – Improving the Process, Pearson Education,1995.
3. Ron Patton, —Software Testing, Second Edition, Sams Publishing, Pearson Education, 2007.
4. Ilene Burnstein, —Practical Software Testing, Springer International Edition, 2003.

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CO3	3	3	3	2	1	2	2	1	2	-	-	1	2	1
CO4	3	3	2	1	-	1	2	-	2	2	2	-	2	1
CO5	3	2	3	2	3	1	2	1	2	2	2	-	2	2



**COURSE OBJECTIVES**

- To understand the features of neural network and its applications.
- To learn the concepts of supervised learning.
- To know about the feedback neural networks and self-organizing feature maps.
- To study the fuzzy logic components.
- To gain knowledge insight onto Genetic Algorithms.

**UNIT I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS 9**

Characteristics, structure and working of biological neural network-models of neuron-functional units in a for pattern recognition task - Soft Computing Constituents – From Conventional AI to Computational Intelligence.

**UNIT II FEEDFORWARD NEURAL NETWORKS 9**

**SUPERVISED LEARNING - I:** Perceptron - Learning and memory, Learning algorithms, Error correction and gradient decent rules, Perceptron learning algorithms. **SUPERVISED LEARNING-II:** Back propagation, Multilayered network architectures, Back propagation learning Algorithm, Applications of feed forward neural networks.

**UNIT III FEEDBACK NEURAL NETWORKS & SELF ORGANIZING FEATURE MAP 9**

Introduction, Associative learning, Hopfield network, Error performance in Hopfield networks, simulated annealing, Boltzmann machine and Boltzmann learning, state transition diagram and false minima problem, stochastic update, simulated annealing, Boltzmann machine, bidirectional associative memory, Self-organization, generalized learning laws, competitive learning, vector quantization, self-organizing feature map, applications self-organizing feature map.

**UNIT IV FUZZY LOGIC 9**

Fuzzy set theory –crisp sets, fuzzy sets, Crisp relations, Fuzzy relations – Fuzzification – Defuzzification – Fuzzy rules – Membership function – Decision- making logic – Introduction to Neuro - fuzzy system - Adaptive fuzzy system, Applications of fuzzy logic control.

**UNIT V GENETIC ALGORITHMS 9**

Goals of optimization-Genetic algorithm and search space, operators, generational cycle, stopping condition, constraints, classification, genetic programming, multilevel optimization and applications of Genetic Algorithm.

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- describe the essentials of artificial neural network and soft computing.
- describe supervised learning and its applications.
- gain knowledge on feedback neural networks.
- define fuzzy systems and use fuzzy logic.
- understand genetic algorithm concepts and Write Genetic Algorithm to solve the optimization problem.

### TEXT BOOK

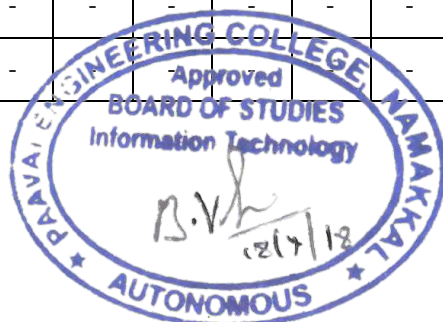
1. S.N.Sivanandam and S.N.Deepa, Principles of Soft computing, Wiley India Edition, 2nd Edition, 2013
2. S. Rajasekaran, VijaylakshmiPari (2003), Neural networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications, Prentice Hall of India, New Delhi, India. Rob Farber, —CUDA design and developmentl, Morgan Haufmann, 2011.

### REFERENCES

1. Genetic Algorithms BY —David E. Goldberg| Pearson Education.
2. Timothy J. Ross, \_Fuzzy Logic with Engineering Applications’, Tata McGraw Hill, 1997.
3. Yegnanarayana (2006), Artificial Neural Networks, Prentice Hall of India, New Delhi, India.
4. Neural Networks and Learning Machines By —Simon Haykin|3rd Edition, Phi Publication.. B. Chapman, G. Jost, and Ruud van der Pas, —Using OpenMPl, MIT Press, 2008.
5. Lotfi A. Zadeh(1997), Soft computing and Fuzzy Logic, World Scientific Publishing Co., Inc. River Edge, NJ, USA.

### 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	3	-	-	-	-	-	-	-	-	-	1	3
CO2	2	2	3	-	-	-	-	-	-	-	-	-	1	3
CO3	2	2	3	-	-	-	-	-	-	-	-	-	1	3
CO4	1	1	2	-	-	-	-	-	-	-	-	-	1	-
CO5	2	2	3	-	-	-	-	-	-	-	-	-	-	3



## ELECTIVE-V

IT15551

E - COMMERCE

3 0 0 3

### COURSE OBJECTIVES

- to make Cyber world safer, better managed and easy for the common man, E-commerce companies.
- to Stop victimizing the innocent.
- to promote the e-commerce transactions by making it Safe and Secure.
- to enhance the confidence level of the common people to carry e-commerce activities like online transactions, purchases, auctioning.
- to look toward a next generation approach to security engineering by Research.

### UNIT I INTRODUCTION

9

History of E- Commerce – Overview of E- Commerce framework – E- Business models – Network infrastructure - Role of Internet – E- commerce and World wide Web.

### UNIT II INFRASTRUCTURE FOR E COMMERCE

9

Packet switched networks – TCP/IP protocol script – Internet utility programmers – SGML, HTML and XML – Web client and Servers – Web client/server architecture – intranet and extranets.

### UNIT III WEB BASED TOOLS FOR E COMMERCE

9

Web server – performance evaluation - web server software feature sets – web server software and tools – web protocol - search engines – intelligent agents –EC software – web hosting – cost analysis.

### UNIT IV SECURITY

9

Internet security standards – secure electronic payment protocols ; cryptography and authentication – security issues -encryption techniques; e commerce payment mechanisms –SET protocol – electronic check – electronic cash; E- commerce Ethics, regulations and social responsibility.

### UNIT V INTELLIGENT AGENTS

9

Definition and capabilities – limitation of agents – security – web based marketing – search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues-e-shopping-online money transaction.

**TOTAL HOURS 45**

### COURSE OUTCOMES

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

- Understand the various aspects of E-Commerce.

- Analyze the technical backbone of internet behind in E-Commerce.
- Develop a website for e-commerce.
- Identify the major security issues associated with Internet.
- Explore the issues in electronic money transactions.

### TEXT BOOKS

1. Ravi Kalakota and Andrew B Whinston, — Frontiers of Electronic Commerce—, Pearson Education Asia 1999.
2. Marilyn Greenstein and Todd M Feinman , |Electronic commerce: Security, Risk Management and Control- Tata McGraw- Hill , 2000.
3. KameshK.Bajaj and DebjaniNag,E-Commerce the Cutting Edge of Business, Tata McGraw Hill, 2005.

### REFERENCES

1. EfraimTurvanJ.Lee, David kug and chung, —Electronic commerce| Pearson Education Asia 2001.
2. Brenda Kienew E commerce Business Prentice Hall, 2000.
2. Judy Strauss and Raymond Frost , —E Marketing—, PHI, 2002.
3. Brenda Kienan ,— Managing e Commerce Business| , PHI,2001.
4. Vivek Sharma and Rajiv Sharma , —Developing e Commerce Sites – an integrated approach—, Pearson Education Asia,2000.

### CO-PO MAPPING:

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COs	Programme Outcomes(POs)													
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CO1	3	3	2	3	2	3	3	2	-	2	2	2	3	3
CO2	3	3	3	2	1	-	2	2	-	2	2	2	3	3
CO3	3	2	2	2	2	2	3	2	2	-	1	2	3	2
CO4	3	1	2	2	2	2	3	2	3	2	2	2	3	2
CO5	3	2	1	2	-	-	2	-	2	3	-	2	3	3



**COURSE OBJECTIVES**

- To describe the basic concepts in Quality Management, Customer orientation and retention.
- To facilitate the understanding of Quality Management principles and process.
- To discuss the techniques in Six Sigma, Bench marking and FMEA.
- To understand the basic concepts in Quality Function Development and TPM.
- To become familiar with Quality System, Quality Auditing and HR practices.

**UNIT I INTRODUCTION****9**

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Quality statements - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Costs of quality.

**UNIT II TQM PRINCIPLES****9**

Leadership - Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Quality circles Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

**UNIT III TQM TOOLS AND TECHNIQUES I****9**

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

**UNIT IV TQM TOOLS AND TECHNIQUES II****9**

Control Charts - Process Capability - Concepts of Six Sigma - Quality Function Development (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

**UNIT V QUALITY SYSTEMS****9**

Need for ISO 9000 - ISO 9001-2008 Quality System - Elements, Documentation, Quality Auditing - QS 9000 - ISO 14000 - Concepts, Requirements and Benefits - TQM Implementation in manufacturing and service Return on Investment - Personnel management. Recruitment, selection and training - Technology in Agri sectors.

**TOTAL HOURS 45****COURSE OUTCOMES**

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



- Discuss the basic concepts in Quality Management, Customer orientation and retention.
- Describe the principles and process of Quality Management.
- Implement the quality control techniques in Six Sigma, Bench marking and FMEA.
- Explain the basic concepts in Quality Function Development and TPM.
- Understand the elements in Quality System, Quality Auditing and HR practices.

### TEXT BOOKS

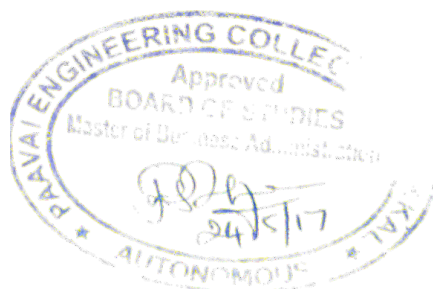
1. Dale H. Besterfield, et al., "Total quality Management", Third Edition, Pearson Education Asia, Indian Reprint, 2006.
2. D.R Kiran, "Total quality Management", Butterworth-Heinemann, 2016.

### REFERENCES

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8<sup>th</sup> Edition, First Indian Edition, Cengage Learning, 2012.
2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
3. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.
4. Dennis AuBuchon, Understanding the Concept of Quality, Pronoun, 2017.
5. Donna C. S. Summers, Quality, Pearson, 5th edition, 2009.

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CO4	3	2	2	-	2	-	-	2	3	2	2	2	3	2
CO5	3	2	-	2	-	-	2	-	2	3	-	2	3	3



**COURSE OBJECTIVES**

- to gain understanding of the basic principles of service orientation.
- to learn service oriented analysis techniques.
- to learn technology underlying the service design.
- to learn advanced concepts such as service composition, orchestration and Choreography.
- to know about various WS-\* specification standards.

**UNIT I BASICS OF SOA 9**

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate -Principles of service orientation.

**UNIT II WEB SERVICES 9**

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer.

**UNIT III SERVICE DESIGN 9**

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task-centric business service design.

**UNIT IV SOA PLATFORM BASICS 9**

SOA platform basics – SOA support in J2EE – Java API for XML-based web services(JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries(JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE).

**UNIT V BUILDING SOA-BASED APPLICATIONS 9**

WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS-Security.

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- the student will be able to identify benefits of and the needs to enforce software quality.
- the students will be able to differentiate between quality control, quality management and

quality assurance.

- the student will be able to understand and discuss the benefits, needs and techniques of software reviews, software testing, configuration management and software metrics.
- critically evaluate alternative standards, models and techniques aimed at achieving quality assurance in a variety of software development environments.
- understand and apply key quality assurance techniques tailored for specific software development environments.

**TEXT BOOK**

1. Thomas Erl—Service-Oriented Architecture: Concepts, Technology, and Design, Pearson Education, 2005.

**REFERENCES**

1. Thomas Erl, —SOA Principles of Service Design —(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.
2. Newcomer, Lomow, —Understanding SOA with Web Services, Pearson Education, 2005.
3. Sandeep Chatterjee, James Webber, —Developing Enterprise Web Services, An Architect’s Guide, Pearson Education, 2005.
4. Dan Woods and Thomas Mattern, —Enterprise SOA Designing IT for Business Innovation, O’REILLY, First Edition, 2006.

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CO3	3	1	2	1	2	2	3	2	2	-	2	3	3	2
CO4	3	2	3	2	2	2	3	2	3	2	2	2	3	2
CO5	3	2	2	2	-	-	2	-	2	3	-	2	3	3



**COURSE OBJECTIVES**

- to learn the methods of different problem solving and searching.
- to know the concepts of knowledge representation.
- to understand about inferring the knowledge.
- to know the concepts of planning and learning.
- to understand about the expert system.

**UNIT I INTRODUCTION 9**

Introduction to AI-Problem formulation, Problem Definition - Production systems, Control strategies Searchstrategies.Problem characteristics, Production system characteristics –Specialized productions system- Problemsolving methods -Problem graphs, Matching, Indexing and Heuristic functions – Hill Climbing-Depth first andBreathfirst,Constraints satisfaction – Related algorithms, Measure of performance and analysis of search algorithms.

**UNIT II REPRESENTATION OF KNOWLEDGE 9**

Game playing – Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicatecalculus, Resolution, Use of predicate calculus, Knowledge representation using other - Structured representation ofknowledge.

**UNIT III KNOWLEDGE INFERENCE 9**

Knowledge representation -Production based system, Frame based system. Inference – Backward logic chaining,Forward chaining, Rule value approach, Fuzzy reasoning.

**UNIT IV PLANNING AND MACHINE LEARNING 9**

Basic plan generation systems – Strips –Advanced plan generation systems – K strips - Strategic explanations - Why,Why not and how explanations. Learning- Machine learning, adaptive Learning.

**UNIT V Expert Systems 9**

Expert systems – Architecture of expert systems, Roles of expert systems – Knowledge Acquisition– Meta knowledge, Heuristics, Typical expert systems – MYCIN, DART, XOON-Expert systems shells.

**TOTAL  
HOURS 45**

**COURSE OUTCOMES**

At end of this course , students will be able to

- demonstrate awareness of intelligent agents and problem solving using uninformed, informed and local search methods .

- develop knowledge about usage of propositional logic and first order logic for making inferences.
- use the knowledge and the process of inference to derive new facts.
- describe the use of planning and explain about various learning methods.
- design and develop the expert system.

### TEXT BOOKS

1. Kevin Night and Elaine Rich, Nair B, —Artificial Intelligence (SIE)ll, McGraw Hill- 2008.  
(Units-I,II,IV & V)
2. Dan W. Patterson, —Introduction to AI and ESll, Pearson Education, 2007. (Unit-III).

### REFERENCES

1. Peter Jackson, —Introduction to Expert Systemsll, 3rd Edition, Pearson Education, 2007.
2. Stuart Russel and Peter Norvig —AI – A Modern Approachll, 2nd Edition, Pearson Education 2007.
3. DeepakKhemani —Artificial Intelligencell, Tata McGraw Hill Education 2013.

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CO2	3	-	-	2	1	-	2	-	-	2	-	2	S	3
CO3	3	-	-	1	-	-	3	2	2	-	1	-	3	2
CO4	3	2	-	2	2	2	3	-	3	2	-	2	3	2
CO5	3	2	1	2	-	-	2	-	2	3	-	2	3	3



**COURSE OBJECTIVES**

- to understand the components of the social network
- to model and visualize the social network
- to mine the users in the social network
- to understand the evolution of the social network
- to mine the interests of the users

**UNIT-I INTRODUCTION 9**

Introduction to Web - Limitations of current Web – Development of Semantic Web –Emergence of the Social Web – Statistical Properties of Social Networks -Network analysis -Development of Social Network Analysis - Key concepts and measures in network analysis -Discussion networks - Blogs and online communities - Web-based networks

**UNIT-II MODELING AND VISUALIZATION**

Visualizing Online Social Networks - A Taxonomy of Visualizations - Graph Representation - Centrality- Clustering - Node-Edge Diagrams - Visualizing Social Networks with Matrix-Based Representations- Node-Link Diagrams - Hybrid Representations - Modeling and aggregating social network data – Ontological representation of social individuals and relationships.

**UNIT-III MINING COMMUNITIES 9**

Aggregating and reasoning with social network data, Advanced Representations – Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks - Evaluating Communities – Core Methods for Community Detection and Mining - Applications of Community Mining Algorithms - Node Classification in Social Networks

**UNIT-IV EVOLUTION 9**

Evolution in Social Networks – Framework - Tracing Smoothly Evolving Communities -Models and Algorithms for Social Influence Analysis - Influence Related Statistics – Social Similarity and Influence - Influence Maximization in Viral Marketing - Algorithms and Systems for Expert Location in Social Networks - Expert Location without Graph Constraints- with Score Propagation – Expert Team Formation - Link Prediction in Social Networks -Feature based Link Prediction.

**UNIT-V TEXT AND OPINION MINING 9**

Text Mining in Social Networks -Opinion extraction – Sentiment classification and clustering - Temporal sentiment analysis - Irony detection in opinion mining - Wish analysis – Product review mining – Review Classification – Tracking sentiments towards topics over time

**TOTAL HOURS 45**

## COURSE OUTCOMES

At end of this course, students will be able to

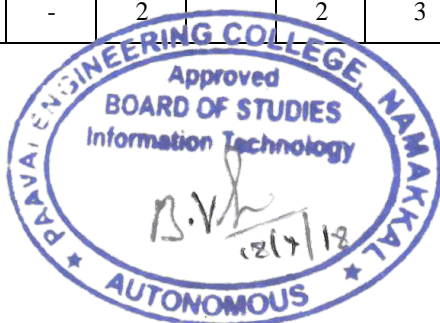
- explain about the internal components of the social networks.
- model and visualize the social network
- outline the features of community mining
- explain about the evolution of social networks
- summarize the algorithms and systems for Expert Location in Social Networks

## REFERENCES

1. Charu C. Aggarwal, —Social Network Data Analytics, Springer, 2011
2. Peter Mika, —Social Networks and the Semantic Web, Springer, 1st edition, 2007.
3. Borko Furht, —Handbook of Social Network Technologies and Applications, Springer, First edition, 2010.
4. Guandong Xu, Yanchun Zhang and Lin Li, —Web Mining and Social Networking –Techniques and applications, Springer, 1st edition, 2011.
5. Lee Giles, Mark Smith, John Yen, —Advances in Social Network Mining and Analysis, Springer, 2010.
6. Ajith Abraham, Aboul Ella Hassanien, Václav Snášel, —Computational Social Network Analysis: Trends, Tools and Research Advances, Springer, 2009.
7. Toby Segaran, —Programming Collective Intelligence, O'Reilly, 2012

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CO1	3	2	2	3	2	3	2	2	-	3	2	2	3	3
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CO3	3	-	-	1	-	2	-	-	3	-	1	-	3	2
CO4	3	2	-	2	2	2	3	2	3	2	2	-	3	2
CO5	3	2	1	2	-	-	2	2	2	3	-	2	3	3



## ELECTIVE – VI

IT15651

INTELLECTUAL PROPERTY RIGHTS

3 0 0 3

### COURSE OBJECTIVES

- to understand the basic types of Intellectual property.
- to understand the Framework of Strategic Management of Intellectual Property (IP).
- to recognize the relevant criteria for generating and protecting.
- to explain how to derive value from IP and leverage its value in new product and service development.
- to academic/scientific works/studies recognize the intellectual property likely to be produced in the academic and professional environment.

### UNIT I INTRODUCTION

9

Introduction - Invention and Creativity – Intellectual Property – Importance –Types of IPRs- Protection of IPR – Basic types of property. Movable Property ii. Immovable Property and iii. Intellectual Property- Patents.

### UNIT II THE LAW OF TRADEMARK AND COPYRIGHT

9

Introduction to Trade mark – Trade mark Registration Process – Post registration Procedures – Trade mark maintenance - Transfer of Rights - Inter parts Proceeding- Infringement - Dilution of Trade mark – Trademarks claims –International Trade mark Law Introduction to Copyrights – Principles of Copyright -The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration –International Copyright Law.

### UNIT III THE LAW OF TRADE SECRETS AND UNFAIR COMPETITION

9

Introduction to Trade Secret – Maintaining Trade Secret – Physical Security –Employee Limitation – Employee confidentiality agreement - Trade Secret Law -Unfair Competition – Trade Secret Litigation – Breach of Contract –Applying State Law.

### UNIT IV PATENT AND INTERNATIONAL CONVENTION

9

Concept of Patent- Procedure for Filing of Patent Application and types of Applications- Procedure for Opposition-Revocation of Patents- Patent Agent- Qualification and Registration Procedure-Preparation of Patent document-Recent Developments in Patent System International convention relating to Intellectual Property – Establishment of WIPO – Mission and Activities -General Agreement on Trade and Tariff (GATT)- Indian Position Vs. WTO and Strategies – Indian IPR legislations – commitments to WTO - Case Studies – Patents - Basmati rice – Turmeric – Neem.

### UNIT V NEW DEVELOPMENTS IN COPYRIGHT LAW

9

Protection for Computer Programs- Copyright Protection for Automated Databases- Domain Name Protection-Objectives- domain name and Intellectual Property- Registration of domain names- disputes under Intellectual Property Rights- Jurisdictional Issues- International Perspective-Copyright in the



Electronic age-Digital Millennium Copyright Act-Musical Notes-Recent Development in Copyright Law-Terms of the Trade-Vessel Hull Protection - Semiconductor Chip Protection.

**TOTAL HOURS 45**

**COURSE OUTCOMES**

At end of this course, students will be able to

- infer the fundamental legal principles relating to patents.
- express the use of copyrights and trademarks.
- interpret the laws of trade secrets and unfair competition.
- paraphrase the procedures for filing patents.
- recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product And technology development.

**TEXT BOOK**

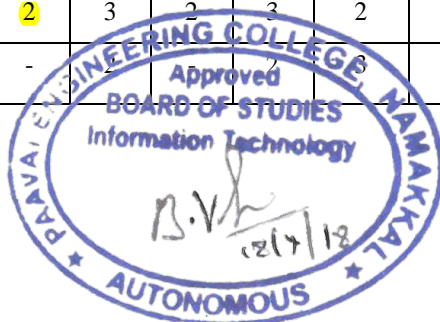
1. Deborah E. Bo choux, —Intellectual Property Rights, Cengage Learning India Private Ltd, 2005.

**REFERENCES**

1. Subbaram N.R., —Handbook of Indian Patent Law and Practicel, S.Viswanathan Printers and Publishers Pvt.Ltd.,1998.
2. PrabuddhaGanguli, —Intellectual Property Rights, TMH, 2001.
3. Rachna Singh Puri&ArvindViswanathan, —Practical Approach to Intellectual Property Rights, I.K.International Publishing House Pvt.Ltd.
4. Narayanan P., —Law of Copyright and Industrial Designs,Eastern law House, Delhi 2010.
5. Wadehra B.L., —Law Relating to Patents,TradeMarks,Copyright Designs & Geographical Indications, Universal law Publishing Pvt. Ltd., India 2000.
6. Krishnamurthy G.V.G., —The Law of Trademarks, Copyright, Patents and Designl.

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CO5	3	2	1	1	-	-	2	2	2	2	-	2	3	3



**COURSE OBJECTIVES**

- to emphasize how to use the computer as a tool for biomedical research.
- to understand the use of Databases and Data mining concepts in the field of biology.
- to understand the various modeling techniques that are used for modeling biological data.
- to explore visualization techniques for DNA and RNA molecules.
- to be aware of the microarray technology for genome expression study.

**UNIT I INTRODUCTION****9**

Need for Bioinformatics technologies – Overview of Bioinformatics technologies – Structural bioinformatics – Data format and processing – secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.

**UNIT II DATA WAREHOUSING AND DATAMINING IN BIOINFORMATICS****9**

Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics.

**UNIT III MODELING FOR BIOINFORMATICS****9**

Hidden markov modeling for biological data analysis – Sequence identification – Sequence classification – multiple alignment generation – Comparative modeling – Protein modeling – genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling.

**UNIT IV PATTERN MATCHING AND VISUALIZATION****9**

Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

**UNIT V MICROARRAY ANALYSIS****9**

Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark – Tradeoffs.

**TOTAL HOURS 45****COURSE OUTCOMES**

At end of this course, students will be able to

- know how to use the computer as a tool for biomedical research.
- understand the use of Databases and Data mining concepts in the field of biology.
- know the various modeling techniques that are used for modeling biological data.
- explore visualization techniques for DNA and RNA molecules.
- aware of the microarray technology for genome expression study.

### TEXT BOOKS

1. Yi-Ping Phoebe Chen (Ed), —BioInformatics Technologies|, First Indian Reprint, Springer Verlag, 2007.
2. Zoe Iacroux and Terence Critchlow, —BioInformatics – Managing Scientific data|, First Indian Reprint, Elsevier, 2004.

### REFERENCES

1. Zoe Lacroix and Terence Critchlow, —Bioinformatics – Managing Scientific Data|, First Edition, Elsevier, 2004.
2. Bryan Bergeron, —Bio Informatics Computing|, Second Edition, Pearson Education, 2003.
3. Arthur M Lesk, —Introduction to Bioinformatics|, Second Edition, Oxford University Press, 2005.

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CO1	3	3	1	3	2	3	1	2	-	1	2	1	3	3
CO2	3	3	2	2	1	-	2	2	-	2	2	2	3	3
CO3	3	1	2	1	2	3	3	1	2	-	1	2	3	2
CO4	3	2	2	2	2	2	3	2	3	2	2	1	3	2
CO5	3	2	1	2	-	-	2	-	2	3	-	2	3	3



**COURSE OBJECTIVES**

- Understand the fundamentals of image processing.
- Gain knowledge on various Image enhancement techniques.
- Know the various Image restoration techniques.
- Understand the needs of various Image compression techniques.
- Gain knowledge about the segmentation, representation and description

**UNIT I INTRODUCTION 9**

Origin of Digital Image processing – fundamental steps in image processing – Components of Image processing system – Visual perception – Light and EM spectrum – Image sensing and acquisition – Image sampling and Quantization – relationship between pixels.

**UNIT II IMAGE ENHANCEMENT 9**

Spatial Domain: Gray level transformation – Histogram processing – Arithmetic / Logic operations – Spatial filtering – smoothing filters – sharpening filters Frequency Domain: Fourier transform – smoothing frequency domain filters – sharpening filters – Homographic filtering.

**UNIT III IMAGE RESTORATION 9**

Model of Image degradation/ restoration process – Noise models – mean filters – order statistics-adaptive filters — band reject – band pass – notch – optimum notch filters – Linear, position invariant degradations – establishing degradation functions – Inverse filtering – Weiner – least Square – Geometric mean filters.

**UNIT IV IMAGE COMPRESSION 9**

Fundamentals – Image compression models – error free compression: variable length coding- Lossless predictive coding– Bit plane coding - Lossy compression- Image compression standards.

**UNIT V IMAGE SEGMENTATION, REPRESENTATION & DESCRIPTION 9**

Segmentation: Detection of discontinuities – Edge linking & Boundary detection – Threshold – region based segmentation. Representation & Description: Chain codes – Polygonal approximations – signatures, Boundary segments – Skeletons; Boundary Description, Fourier descriptors – Regional descriptors- Recognition based on matching.

**TOTAL HOURS 45****COURSE OUTCOMES**

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

- discuss and describe the digital image fundamentals, describe how digital images are represented.
- apply image enhancement techniques and describe the underlying mathematical principles.
- apply image restoration techniques..
- analyze the constraints in image processing when dealing with larger data sets and use image compression techniques.
- describe and apply the concepts of feature detection and contour finding algorithms in the field of biomedical imaging to other engineering disciplines.

### TEXT BOOKS

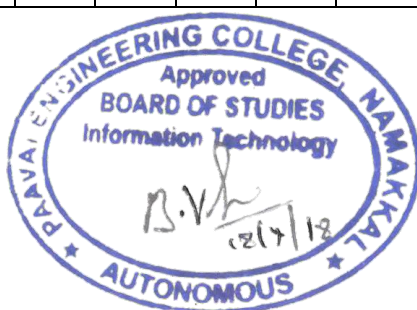
1. Rafael C. Gonzalez, Richard E. Woods, —Digital Image Processingl , 2<sup>nd</sup> edition , Pearson Education, 2007.
2. Anil Jain K. —Fundamentals of Digital Image Processingl, PHI Learning Pvt. Ltd., 2011.

### REFERENCES

1. S.Annadurai, R.Shanmugalakshmi, —Fundamentals of Digital Image Processingl, Pearson Education, 2007.
2. William K Pratt, —Digital Image Processingl, John Willey, 2002.
3. Malay K. Pakhira, —Digital Image Processing and Pattern Recognitionl, First Edition, PHI Learning Pvt. Ltd., 2011.
4. Milan Sonka, Vaclav Hlavac, Roger Boyle Image Processing. Analysis, and Machine Vision (Second Edition,2003).
5. ChandaDuttaMagundar Digital Image Processing and Application, Prentice Hall of India, 2006.

### CO-PO MAPPING:

Mapping of Course Outcomes with Programme Outcomes (3/2/1 indicates strength of correlation) 3-Strong,2-Medium,1-Weak														
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CO4	3	2	2	2	2	2	3	2	3	2	2	1	3	2
CO5	3	2	1	2	-	-	2	-	2	3	-	2	3	3





systems.

- have the knowledge of the different types of management information systems; • Understand the processes of developing and implementing information systems.
- be aware of the ethical, social, and security issues of information systems.
- understand the role of information systems in organizations, the strategic management processes, and the implications for the management.
- develop an understanding of how various information systems work together to accomplish the information objectives of an organization.

### TEXT BOOKS

1. Alexis Leon, —ERP DEMYSTIFIED!, Tata McGraw Hill, Second Edition, 2008.
2. Mary Sumner, —Enterprise Resource Planning!, Pearson Education, 2007.

### REFERENCES

1. Jim Mazzullo, ISAP R/3 for Everyone!, Pearson, 2007.
2. Jose Antonio Fernandez, — The SAP R/3 Handbook!, Tata McGraw Hill, 1998.
3. Biao Fu, —SAP BW: A Step-by-Step Guide!, First Edition, Pearson Education, 2000.
4. <http://www.itbusinessbook.com>

### CO-PO MAPPING:

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CO4	3	2	2	2	2	2	3	2	3	2	2	2	3	2
CO5	3	2	1	2	-	-	2	-	2	3	-	2	3	3



**COURSE OBJECTIVES**

- to understand why IoT are so important today in Internet.
- to evaluate the role of the major types of information systems in developing business environment and their functions.
- to assess the impact of the Internet and Internet technology on their Area of interest and its protocols.
- to identify the major challenges in identifying the devices and cloud offerings.
- to define and analyses the DATA Analytics with case study.

**UNIT I INTRODUCTION TO IoT 9**

Introduction -Definition and Characteristics of IoT —Physical design of IoT- Logical design of IoT- IoT enabling technologies- IoT levels and Deployment templates

**UNIT II DEVELOPING INTERNET OF THINGS 9**

IoT design methodology - Motivation for using Python- Logical Design using Python - Data Types & Data Structures — Control Flow — Functions — Modules — Packages — File Handling — Date/Time Operations — Classes — Python Packages of Interest for IoT - Case Study on Weather Monitoring.

**UNIT III DOMAIN SPECIFIC IoTS 9**

Home Automation — Cities — Environment — Energy — Retail — Logistics — Agriculture — Industry — Health and Lifestyle — IoT and M2M – IoT Protocols – MQTT, CoAP, AMQP.

**UNIT IV IoT PHYSICAL DEVICES, ENDPOINTS, PHYSICAL SERVERS AND CLOUD OFFERINGS 9**

IoT Device — Raspberry Pi — Raspberry Interfaces — Programming Raspberry Pi with Python — Other IoT Devices —Cloud Storage Models and Communication APIs - WAMP — Xively Cloud for IoT— Django — Amazon Web Services for IoT — SkyNetIoT Messaging Platform -Case Study on smart parking and air pollution monitoring

**UNIT V DATA ANALYTICS FOR IoT 9**

Introduction — Apache Hadoop — Using HadoopMapReduce for Batch Data Analysis — Apache Oozie — Apache Spark — Apache Storm — Using Apache Storm for Real-time Data Analysis — Case Study on weather monitoring.

**TOTAL HOURS 45****COURSE OUTCOMES**

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



- understand the basic concepts and technologies used in the field of management information systems.
- have the knowledge of the different types of management information systems; • Understand the processes of developing and implementing information systems.
- be aware of the ethical, social, and security issues of information systems.
- understand the role of information systems in organizations, the strategic management processes, and the implications for the management.
- develop an understanding of how various information systems work together to accomplish the information objectives of an organization.

## REFERENCES

1. Arshdeep Bahga, Vijay Madiseti, —Internet of Things – A hands-on approach, Universities Press, 2015.
2. Charalampos Doukas, Building Internet of Things With the Arduino: Volume 1 —, published by Createspace, 2012
3. Andrian McEwen, Hakim Cassimally, " Designing the Internet of Things", 1st edition, John Wiley & Sons Ltd, 2014.
4. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", 1st edition, CRC Press, 2013

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CO4	3	2	2	2	2	2	2	2	3	2	2	2	2	2
CO5	3	2	-	2	2	-	2	-	2	3	-	2	3	3



**PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018**

**(AUTONOMOUS)**

**B.TECH. INFORMATION TECHNOLOGY**

**ONE CREDIT CURRICULUM**

**REGULATIONS 2016**

**CHOICE BASED CREDIT SYSTEM**

**List of the one credit courses**

<b>S.No</b>	<b>Category</b>	<b>Course Code</b>	<b>Course Title</b>
1	OCC	IT16951	Amcat (Online Placement Aptitude Certification)
2	OCC	IT16952	e-litmus(Online Placement Aptitude Certification)
3	OCC	IT16953	Nasscom nas-tech(Online Placement Aptitude Certification)
4	OCC	IT16954	I-pat (Online Placement Aptitude Certification)
5	OCC	IT16955	NPTEL / Swayam (Online courses)
6	OCC	IT16956	Spoken Tutorial -Advanced C++
7	OCC	IT16957	Spoken Tutorial- Java Business Application
8	OCC	IT16958	Spoken Tutorial -Linux &Ubuntu
9	OCC	IT16959	Spoken Tutorial -BOSS Linux
10	OCC	IT16960	Spoken Tutorial -PHP & MySQL
11	OCC	IT16961	Oracle – SQL fundamentals
12	OCC	IT16962	Oracle – Java Fundamentals
13	OCC	IT16963	CCNA – Certification
14	OCC	IT16964	SCJP / OCPJP – Sun Certified Java Programmer / Oracle Certified Professional Java Programmer
15	OCC	IT16965	Android application Development
16	OCC	IT16966	PC Hardware and Trouble shooting
17	OCC	IT16967	Linux System Administration
18	OCC	IT16968	Cyber Security

### **COURSE OBJECTIVES**

To enable students to

- understand the basic concepts and functions of operating systems and knowledge on relational model and create and manipulate with SQL Commands.
- understand the basics of networking and protocols.

### **COURSE CONTENT**

**Operating System and Computer Architecture** - Basics of OS and Computer Architecture, Process Management and Synchronization and Memory and I/O Management. **DBMS** - Data model, Relational Algebra and SQL, Normalization, Architecture and Indexing.

**Computer Networks** - Basics of networking and communication, OSI, TCP/IP layers and protocols and Network Devices and Routing Algorithms.

**TOTAL PERIODS: 30**

### **COURSE OUTCOMES**

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

- write queries in structural query language to manipulate relational databases.
- design database with networking and communication.

### **TEXT BOOKS**

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

### **COURSE OBJECTIVES**

To enable students to

- understand the importance of sections like numerical ability and reasoning ability.
- understand the ability verbal usage paragraph based questions.

### **COURSE CONTENT**

eLitmus Syllabus for Quantitative Aptitude- Number Systems - Coordinate Geometry – Logarithms - Quadratic Equations - Time, Speed and Distance – Geometry - Permutation and Combination. Logical Reasoning - Data Tabulation based Questions - Arrangement Based Problems - crypt arithmetic Problem - Bar Graphs/Pie Charts. Verbal Ability - Questions Related To Grammatical Concepts - Reading Comprehension - Paragraph Based Questions.

**TOTAL PERIODS: 30**

### **COURSE OUTCOMES**

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

- solve problems on quantitative aptitude.
- solve verbal questionnaire.

### **TEXT BOOK**

1. Crypt arithmetic Division Problems, “A Complete Guide for eLitmus Exam.

**COURSE OBJECTIVES**

To enable students to

- understand the quantitative sections and enable problem solving.
- improve the technical knowledge in subjects related to Computer Science Engineering.

**COURSE CONTENT**

Verbal ability - Articles, reading comprehension, prepositions, and synonyms - Analytical Ability: Data sufficiency, series and pattern completion, conceptualization, Venn diagram, puzzles Programming Fundamentals -SDLC, Algorithm, flowcharts.5.Learning Ability Test: Learning abilities. Written English Test - Introduction to Databases, Relationships, ER Diagrams, Constraints and Keys, Normalization, Indexing, Performance, Locking, Database Structures and Processes, Process Management, Deadlocks, Memory management, OS File Management, OS Security fundamentals, IO Management, Device Management, Network Technology, Network Topology, OSI Reference model, Protocols, Client Server Architecture, Linked Lists, Trees, Stacks, Queues, Dynamic Memory Allocation, Sorting and Searching Algorithms, Structures, Software Life Cycle(SDLC), Requirements Analysis, Design, Coding, Levels of Testing, Implementation, Maintenance, Development Models

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- solve problems from numerical, reasoning and verbal ability.
- deal with the basics of all technical topics included.

**TEXT BOOK**

1. “Strategic Alliance between NASSCOM and NIIT focusing on skill development”, NIIT.

**COURSE OBJECTIVES**

To enable students to

- understand the numerical ability problems on series.
- understand topics like geometry, SI and CI, probability.

**COURSE CONTENT**

Numeric Series Problem - Difference based Series - Common Rule Series - Pair Wise Series - Interleaved Series - Power based Series - Exotic Series. Math Word Problems - Ratios and Percentages - Work and Time - Ipat Geometry - Mixtures and Compounds - Interest and Probability.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- solve numerical ability problems on number series.
- solve problems on the topic geometry, work and time, percentage, SI CI, probability.

**TEXT BOOK**

1. IBM IPAT, "JobTestPrep".

**COURSE OBJECTIVES**

To enable students to

- acquire knowledge about database and query creations.
- understand the DDL statement and manage the tables.

**COURSE CONTENT**

Retrieving Data using the SQL SELECT Statement - Restricting and Sorting Data - Using Single-Row Functions to Customize Output - Using Conversion Functions and Conditional Expressions - Reporting Aggregated Data Using the Group Functions - Displaying Data From Multiple Tables - Using Subqueries to Solve Queries - Using the SET Operators - Manipulating Data - Using DDL Statements to Create and Manage Tables - Creating Other Schema Objects.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- gain knowledge about database and query creations
- understand the statements to create and manage tables.

**TEXT BOOK**

1. John J.Patrick, "SQL Fundamentals", Third edition 2018.

**COURSE OBJECTIVES**

To enable students to

- acquire knowledge on different problem solving techniques.
- demonstrate data persistency using files.

**COURSE CONTENT**

**JAVA**-History and philosophy of Java-Understand Java's contribution to the Internet-Understand the importance of byte code- Know the Java buzzwords-Understand the foundational principles of object-oriented programming-Use variables, Use the if and for -control statements-Create blocks of code - Know the java keywords-Understand the rules for Java identifiers- Create, compile, and run a simple Java program.

**ORACLE**- Database design using SQL-Basic SQL syntax and the rules for constructing valid SQL statements -design, implement, and demonstrate a database solution for a business or organization.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- gain knowledge about different Problem solving techniques.
- understand basic concepts of java programs.

**TEXT BOOKS**

1. Herbert Schildt, "Java The Complete Reference", 8th Edition, McGraw - Hill Osborne Media, 2018.



**COURSE OBJECTIVES**

To enable students to

- understand the basics of networking and implementation of WAN links.
- understand the concepts in network management.

**COURSE CONTENT**

Introduction – Network works – Purpose and functions of network devices – components – TCP/IP models – Voice Over IP and Video Over IP – network and Internet Communication – LAN/WAN operation and features – Troubleshoot switch with VLANs – interswitch communication – Ethernet networks – Traffic management – Cisco switches – Ping – traceroute – telnet – SSH. Switching Technologies- VIP, RSTP, VLAN, PVSTP. Benefits of private and public IP addressing. Basic router operation – Routing on Cisco devices – Implementation of WAN links.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- know the basics of networking.
- explain the concepts involved in bridging.

**TEXT BOOK**

1. Cisco 7304 Network Service Engine Installation and Configuration.

### **COURSE OBJECTIVES**

To enable students to

- apply data types and various utility classes in java programs
- understand the manipulate data and exception.

### **COURSE CONTENT**

Java Basics - scope of variables - Working with Java Data Types - Using Operators and Decision Constructs - Creating and Using Arrays - Using Loop Constructs - Working with Methods and Encapsulation - Working with Inheritance - Handling Exceptions - Working with Selected classes from the Java API - Manipulate data using the String Builder - unchecked exceptions, and Errors - try-catch block - features and components of Java.

**TOTAL PERIODS: 30**

### **COURSE OUTCOMES**

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

- create applications using inheritance, packages and interfaces.
- work with string and API framework.

### **TEXT BOOK**

1. Kathy Sierra, Bert Bates “SCJP Sun Certified Programmer for Java 6 Study Guide Books”.

**COURSE OBJECTIVES**

To enable students to

- acquire knowledge on different android app life cycle and components.
- understand the debugging android development environment and play store.

**COURSE CONTENT**

Android App life cycle and its main components - Create a graphical user interface (GUI) - Implement a custom application theme - Define a RecyclerView item list - Implement menu-based or drawer navigation - Integrate code from an external support library - Schedule a time-sensitive task using alarms - Schedule a background task using Job Scheduler - Designing and building a functional Android application - Debugging Android applications using different tools and plugins - Setting up and understanding your Android Development Environment - Register and publishing on Play Store.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- understand about different android app life cycle and components.
- understand the debugging android development environment and play store.

**TEXT BOOK**

1. John Horton, “Android Programming for Beginners”, Second Edition, 2011.

**COURSE OBJECTIVES**

To enable students to

- understand the concept of computer organization and device controllers.
- understand the virtual memory and LSI.

**COURSE CONTENT**

Introduction - Computer Organization - Number Systems and Codes - Memory - ALU Instruction prefetch - Interrupts - I/O Techniques - Device Controllers - Error Detection Techniques - Microprocessor - Personal Computer Concepts - Advanced System Concepts - Microcomputer Concepts - OS - Multitasking and Multiprogramming - Virtual Memory - Cache Memory - Modern PC and User. Microprocessor and Firmware - Programmable LSI's - Bus Faults - Faults Elimination process - Systematic Troubleshooting - Symptoms observation and analysis - fault diagnosis - fault rectification - Troubleshooting levels.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- develop and implement the concept of number system and codes.
- implement the microprocessor and firmware.

**TEXT BOOKS**

1. B. Govindarajalu, "IBM PC Clones Hardware, Troubleshooting and Maintenance", 2/E, TMH.

**COURSE OBJECTIVES**

To enable students to

- understand the concept of Linux System.
- understand about linux OS

**COURSE CONTENT**

Introduction – Host security-Network Security-Security polices-Detecting break-Ins-Internet Security resources-Encryption-security Tools.

**TOTAL PERIODS: 30**

**COURSE OUTCOMES**

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

- implement the concept linux system installation
- implement the basic commands.

**TEXT BOOKS**

1. Tom Adelstein, Bill Lubanovic, “Linux System Administration”.

**COURSE OBJECTIVES**

To enable the students to

- Exhibit knowledge to secure corrupted systems, protect personal data, and secure computer networks in an Organization.
- Develop cyber security strategies and policies

**UNIT I RECONNAISSANCE AND SCANNING 5**

Introduction – Security Fundamentals – Whois Lookup – Reverse IP Lookup – IP Grabbing – Subdomain Enumeration – Web Archives – CDN – Social Media Enumeration – Nmap – Port Scanning – Scan Techniques – Services Enumeration – OS Analysis

**UNIT II SYSTEM AND MALWARE ATTACKS 5**

Windows OS Hacking – Grub Bypassing – Metasploit – Meterpreter – Null Session Enumeration – Remote Code Execution – Payload Architectures – Payload Creation – Msfvenom – Post Exploitation – UAC Bypass – Virus & Trojan Creation

**UNIT III NETWORK SECURITY 5**

Active Sniffing – Passive Sniffing – ARP Poisoning – Ettercap – Bettercap – Phishing – SE Toolkit – DoS & DDoS Attack

**UNIT IV WIRELESS AND SECURITY DEVICES 7**

WiFi – WiFi Technologies – WiFi Encryption – Hashing – Brute Forcing – Dictionary Attacks – Rainbow Tables – Password Cracking Tools – Fern WiFi Cracker – Airmon-ng – Airodump-ng – Aircrack-ng – Firewall & UTM – Installation & Configuration

**UNIT V WEB AND WEB APPLICATION SECURITY 8**

Session Cookies – User Data Manipulation – Burp Suite – SQL Injection – Reflected & Stored XSS – CSRF – Click Jacking – Owasp Top 10

**TOTAL PERIODS 30**

**COURSE OUTCOMES**

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

- Analyze and evaluate the cyber security needs of an organization.
- Implement cyber security solutions and use of cyber security, information assurance, and cyber/computer forensics software/tools.