MUTHAYAMMAL ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC, NBA & Affiliated to Anna University)

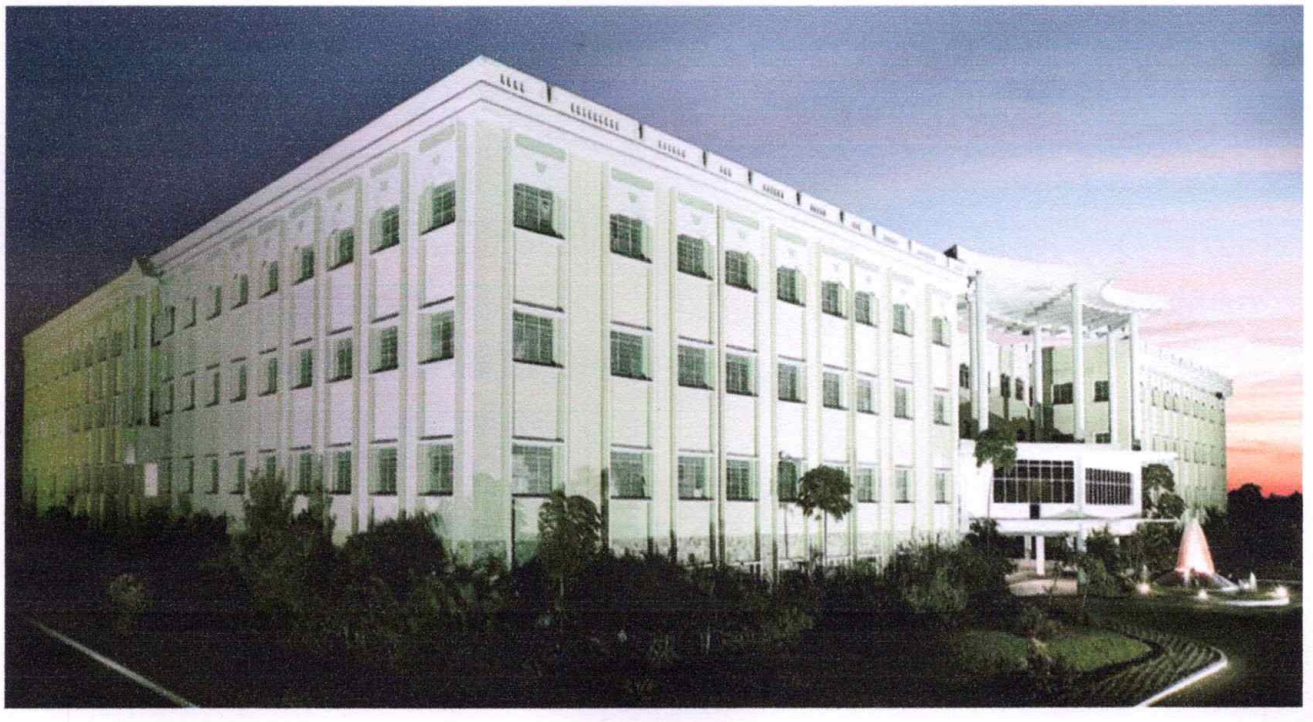
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu.

Curriculum/Syllabus

Programme Code : IT

Programme Name : B.Tech-Information Technology

Regulation : R-2016



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Rasipuram - 637 408, Namakkal Dt, Tamil Nadu.

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Estd. 2000

INSTUTION VISION &MISSION

INSTUTION VISION

To be a Centre of Excellence in Engineering, Technology and Management on par with International Standards.

INSTUTION MISSION

- To prepare the students with high professional skills and ethical values
- To impart knowledge through best practices
- To instill a spirit of innovation through Training, Research and Development
- To undertake continuous assessment and remedial measures
- To achieve academic excellence through intellectual, emotional and social stimulation

INSTUTIONMOTTO

Rural upliftment through Technical Education.

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DEPARTMENT VISION & MISSION

DEPARTMENT VISION

To impart quality technical education for students to excel in their professions with social and ethical values to achieve the global levelstandards

DEPARTMENT MISSION

- To impart high quality professional education that leads to global excellence.
- To empower the students with expertise in solving real world problems through emerging technologies.
- To facilitate the students with necessary skill sets to make them technically sound with strong ethical values and to promote research and development in the multidisciplinary fields of Engineering and Technology.

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DEPARTMENT PROGRAM EDUCATIONAL OBJECTIVES, PROGRAM OUTCOMES & PROGRAM SPECIFIC OUTCOMES

PROGRAM EDUCATIONAL OBJECTIVES

The Information Technology Graduates should be able to

PEO1: To develop the students with programming skill sets with a sound foundation in mathematical, scientific and engineering fundamentals necessary for the core concepts focusing on knowledge up-gradation leading to technical innovations

PEO2: Capable of analyzing and specifying the requirements of the Information Technology system to design and develop using the contemporary tools.

PEO3: The Graduates of the programme will have the competencies for communicating, planning, coordinating, organizing and decision making and they will have interpersonal skills and ethical responsibility

PEO4: The graduates will practice and demonstrate the ability to use the Knowledge and expertise through the continuous performances which will contribute to the society through active engagement.

PROGRAM OUTCOMES

1. **Engineering Knowledge:**Graduates can apply mathematics, science, computing and engineering knowledge to Information Technology related problems.
2. **Problem Analysis:**An ability to analyze a problem interprets data and defines the computing system requirements which would be appropriate to the solution.
3. **Design/Development solutions:**An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs.
4. **Conduct investigations of complex problems:**An ability to apply creativity in the design of systems which would help to investigate the complex problem and provide software solution.
5. **Modern tool usage:**An ability to use the computing techniques, skills, and modern system tools necessary for practice as a Information Technology professional

6. **The engineer and society:**An ability to analyze the local and global impact of computing on individuals, organizations, and society.
7. **Environment and sustainability:** An ability to develop and use the software systems within realistic constraints environmental, health and safety, manufacturability and sustainability considerations.
8. **Ethics:**An Ability to understand of professional, ethical, legal, security and social issues and responsibilities.
9. **Individual and team work:**An ability to function effectively on teams and individually to accomplish a common goal.
10. **Communication:**An ability to communicate effectively with a range of audiences by written and oral.
11. **Project management and finance:**Ability to plan, organize and follow best practices and standards so that the project is completed as successfully by meeting performance, quality at CMM level, budget and time.
12. **Lifelong learning:**An ability to engage in Lifelong learning and continuing professional development.

PROGRAM SPECIFIC OUTCOMES

PSO1: The use of current application software; Gra duat e able to design, analysis, testing of computer application for the use in information engineering and technologies.

PSO2: Design the computer and information based system consists of digital electronics components, electrical components and micro controller devices effectively used for applications of microcomputer systems, telecommunications and digital signal propagation needed in data transport.

PSO3: Design database system with data mining, warehousing and data security by using big data and advanced security techniques and tools.

PSO4: An ability to evaluate and manage integrated Information Technology project and documentation of substantial scope.

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Estd. 2000

B.Tech.-INFORMATION TECHNOLOGY

GROUPINGOFCOURSES

1. HumanitiesandSocialSciences(HS)

S. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16SHA01	TechnicalEnglish	HS	5	3	2	0	4
2.	16SHA02	CommunicativeEnglish	HS	7	3	0	4	5
3.	16SHA03	BusinessEnglish	HS	5	3	2	0	4
4.	16SHA04	BasicsofJapanese	HS	5	3	2	0	4
5.	16SHA05	FunctionalJapanese	HS	5	3	2	0	4
6.	16SHA06	BasicsofGerman	HS	5	3	2	0	4
7.	16SHA07	FunctionalGerman	HS	5	3	2	0	4
8.	16SHA08	PrinciplesofManagementandEngineeringEthics	HS	3	3	0	0	3

2. BasicSciences(BS)

S. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16SHB01	Matrices,CalculusandDifferentialEquations	BS	5	3	2	0	4
2.	16SHB02	Complex Variables, LaplaceTransformsandVectorCalculus	BS	5	3	2	0	4
3.	16SHB03	TransformsandPartialDifferentialEquations	BS	5	3	2	0	4
4.	16SHB04	ProbabilityandRandomProcesses	BS	5	3	2	0	4
5.	16SHB05	ProbabilityandQueuingTheory	BS	5	3	2	0	4
6.	16SHB06	NumericalMethods	BS	5	3	2	0	4
7.	16SHB07	StatisticsandNumericalMethods	BS	5	3	2	0	4
8.	16SHB08	DiscreteMathematics	BS	5	3	2	0	4
9.	16SHB09	OperationsResearch	BS	5	3	2	0	4

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10.	16SHB21	EngineeringPhysics	BS	6	2	0	4	4
11.	16SHB22	MaterialScience	BS	3	3	0	0	3
12.	16SHB23	PhysicsforElectricalEngineering	BS	3	3	0	0	3
13.	16SHB24	PhysicsforMechanicalEngineering	BS	3	3	0	0	3
14.	16SHB31	EngineeringChemistry	BS	5	3	0	2	4
15.	16SHB32	EnvironmentalScienceand Engineering	BS	3	3	0	0	3

3. EngineeringScience(ES)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16ITC01	Fundamentals of Computing and Programming	ES	6	2	0	4	4
2.	16ITC02	Advanced C Programming	ES	6	2	0	4	4
3.	16ITC03	Basics of Civil and Mechanical Engineering	ES	4	4	0	0	4
4.	16ITC04	Basics of Electrical and Electronics Engineering	ES	3	3	0	0	3
5.	16ITC05	Engineering Graphics	ES	4	0	0	4	2
6.	16ITC06	Engineering Practices for Computer Sciences	ES	4	0	0	4	2
7.	16ITC07	Electrical Drives and Control	ES	5	3	0	2	4
8.	16ITC08	Engineering Mechanics	ES	5	3	2	0	4
9.	16ITC09	Microprocessor and Microcontrollers	ES	5	3	0	2	4
10.	16ITC10	Object Oriented Programming	ES	6	2	0	4	4
11.	16ITC11	Data Structures	ES	6	2	0	4	4
12.	16ITC12	Electron Devices	ES	6	2	0	4	4
13.	16ITC13	Circuit Theory	ES	6	2	0	4	4
14.	16ITC14	Digital Principles and System Design	ES	6	2	0	4	4
15.	16ITC15	Fundamentals of Nano Technology	ES	6	2	0	4	4

4. ProfessionalCore(PC)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16ITD01	Advanced Java Programming	PC	5	3	0	2	4
2.	16ITD02	Design and Analysis of Algorithms	PC	3	3	0	0	3

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3.	16ITD03	Database Management Systems	PC	5	3	0	2	4
4.	16ITD04	Object Oriented Software Engineering	PC	3	3	0	0	3
5.	16ITD05	Operating Systems	PC	5	3	0	2	4
6.	16ITD06	Object Oriented Analysis and Design	PC	5	3	0	2	4
7.	16ITD07	Computer Networks	PC	5	3	0	2	4
8.	16ITD08	Principles of Compiler Design	PC	5	3	0	2	4
9.	16ITD09	Cryptography and Network Security	PC	5	3	2	0	4
10.	16ITD10	Computer Organization	PC	5	3	2	0	4
11.	16ITD11	Computer Graphics and Multimedia	PC	5	3	0	2	4
12.	16ITD12	Analog and Digital Communication	PC	3	3	0	0	3
13.	16ITD13	Mobile and Pervasive Computing	PC	5	3	0	2	4
14.	16ITD14	Cloud Computing	PC	3	3	0	0	3
15.	16ITD15	Web Technology	PC	5	3	0	2	4
16.	16ITD16	Wireless Communication	PC	3	3	0	0	3
17	16ITD17	Embedded Programming	PC	3	3	0	0	3
18	16ITD18	Software Architecture	PC	3	3	0	0	3
19	16ITD19	Distributed Systems	PC	5	3	2	0	4
20	16ITD20	High Speed Networks	PC	3	3	0	0	3
21	16ITD21	IOT And Applications	PC	3	3	0	0	3

5. ProfessionalElective(PE)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16ITE01	C# and .Net Framework	PE	5	3	2	0	4
2.	16ITE02	Software Project Management	PE	3	3	0	0	3
3.	16ITE03	Software Testing	PE	5	3	2	0	4
4.	16 ITE04	Artificial Intelligence	PE	3	3	0	0	3
5.	16 ITE05	Ethical Hacking and Cyber Security	PE	3	3	0	0	3
6.	16 ITE06	Soft Computing	PE	4	4	0	0	4
7.	16 ITE07	Real Time Systems	PE	3	3	0	0	3

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8.	16 ITE08	Wireless Sensor Networks	PE	4	4	0	0	4
9.	16 ITE09	Network Programming and Management	PE	3	3	0	0	3
10.	16 ITE10	Information Security	PE	3	3	0	0	3
11.	16 ITE11	Python Programming	PE	5	3	2	0	4
12.	16 ITE12	Social Networks	PE	3	3	0	0	3
13.	16 ITE13	Business Intelligence	PE	3	3	0	0	3
14.	16 ITE14	Data Warehousing and Data Mining	PE	5	3	2	0	4
15.	16 ITE15	Information Retrieval Techniques	PE	3	3	0	0	3
16.	16 ITE16	Agile Technology	PE	5	3	2	0	4
17.	16 ITE17	Parallel Algorithm	PE	5	3	2	0	4
18.	16 ITE18	Service Oriented Architecture	PE	3	3	0	0	3
19.	16ITE19	Salesforce CRM and Platform	PE	5	3	0	2	4
20.	16ITE20	Natural Language Processing	PE	3	3	0	0	3
21.	16ITE21	Data Analytics	PE	3	3	0	0	3
22.	16ITE22	Big Data Technology	PE	3	3	0	0	3
23.	16ITE23	Advanced Data Mining and Visualization	PE	3	3	0	0	3

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6. EmployabilityEnhancementCourses(EEC)

Sl. No.	Course Code	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16ITF01	Project work-Phase I	EEC	6	0	0	6	3
2.	16ITF02	Project work -Phase II	EEC	30	0	0	30	15
3.	16ITF03	Comprehension	EEC	4	0	0	4	2
4.	16ITF04	Design Project	EEC	4	0	0	4	2
5.	16ITF05	Technical Seminar	EEC	4	0	4	0	2
6.	16ITF06	Entrepreneurship Development	EEC	3	3	0	0	3
7.	16ITF07	Soft Skills	EEC	4	2	2	0	3
8.	16ITF08	Professional Practices	EEC	6	0	0	6	3

7. Open Electives (OE)

Sl. No.	CourseCode	CourseTitle	Category	Contact Hours	Instruction Hours/Week			C
					L	T	P	
1.	16MEE14	Industrial Robotics	OE	3	3	0	0	3
2.	16MEE20	Power Plant Engineering	OE	3	3	0	0	3
3.	16MED23	Total Quality Management	OE	3	3	0	0	3
4.	16ECE06	Telecommunication Switching Systems	OE	3	3	0	0	3
5.	16ECE15	Mobile Ad-Hoc Networks	OE	3	3	0	0	3
6.	16CED14	Water Supply Engineering	OE	3	3	0	0	3
7.	16CEE15	Building Services	OE	3	3	0	0	3

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Department	Information Technology
Programme	B.Tech – Information Technology

SEMESTER–I

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16SHA02	Communicative English	HS	3	0	4	5	7
2.	16SHB01	Matrices, Calculus and Ordinary Differential Equations	BS	3	2	0	4	5
3.	16SHB21	Engineering Physics	BS	2	0	4	4	6
4.	16SHB32	Environmental Science and Engineering	BS	3	0	0	3	3
5.	16ITC01	Fundamentals of Computing and Programming	ES	2	0	4	4	6
6.	16ITC04	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	3
7	16ITC06	Engineering Practices for Computer Sciences	ES	0	0	4	2	4
TotalCredits							**25**	

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Department	Information Technology
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SEMESTER–II

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16SHA01	Technical English	HS	3	2	0	4	5
2.	16SHB02	Complex variables, Laplace Transforms and Vector Calculus	BS	3	2	0	4	5
3.	16SHB22	Material Science	BS	3	0	0	3	3
4.	16SHB31	Engineering Chemistry	BS	2	0	4	4	6
5.	16ITC05	Engineering Graphics	ES	0	0	4	2	4
6.	16ITC02	Advanced C Programming	ES	2	0	4	4	6
7.	16ITC14	Digital Principles and System Design	ES	2	0	4	4	6
TotalCredits							**25**	

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SEMESTER–III

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16SHB03	Transforms and Partial Differential Equations	BS	3	2	0	4	5
2.	16ITD05	Operating Systems	PC	3	0	2	4	5
3.	16ITD10	Computer Organization	PC	3	2	0	4	5
4.	16ITC10	Object Oriented Programming	ES	2	0	4	4	6
5.	16ITC11	Data Structures	ES	2	0	4	4	6
6.	16ITD12	Analog and Digital Communication	PC	3	0	0	3	3
TotalCredits							23	

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SEMESTER–IV

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16SHB05	Probability and Queuing Theory	BS	3	2	0	4	5
2.	16ITD03	Database Management Systems	PC	3	0	2	4	5
3.	16ITC09	Microprocessor and Microcontrollers	ES	3	0	2	4	5
4.	16ITD04	Object Oriented Software Engineering	PC	3	0	0	3	3
5.	16ITD07	Computer Networks	PC	3	0	2	4	5
6.	16ITD02	Design and Analysis of Algorithms	PC	3	0	0	3	3
TotalCredits							22	

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SEMESTER–V

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16ITD06	Object Oriented Analysis and Design	PC	3	0	2	4	5
2.	16ITD01	Advanced Java Programming	PC	3	0	2	4	5
3.	16ITD08	Principles of Compiler Design	PC	3	0	2	4	5
4.	16ITD09	Cryptography and Network Security	PC	3	2	0	4	5
5.	16SHA08	Principles of Management And Engineering Ethics	HS	3	0	0	3	3
6.	PE	Elective I	PE	3	0	0	3	3
7.	PE	Elective II	PE	3	0	0	3	3
TotalCredits							25	

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SEMESTER–VI

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16ITD13	Mobile and Pervasive Computing	PC	3	0	2	4	5
2.	16ITD11	Computer Graphics and Multimedia	PC	3	0	2	4	5
3.	16ITD16	Wireless Communication	PC	3	0	0	3	3
4.	16ITD19	Distributed Systems	PC	3	2	0	4	5
5.	PE	Elective III	PE	4	0	0	4	4
6.	PE	Elective IV	PE	3	0	0	3	3
7.	PE	Elective V	PE	3	0	0	3	3
8.	16ITF04	Design Project	EEC	0	0	4	2	4
TotalCredits							27	

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SEMESTER–VII

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	PE	Elective – VI	PE	4	0	0	4	4
2.	OE	Open Elective – I	OE	3	0	0	3	3
4.	OE	Open Elective – II	OE	3	0	0	3	3
5.	OE	Open Elective – III	OE	3	0	0	3	3
6.	16ITF01	Project work – Phase I	EEC	0	0	6	3	6
TotalCredits							**16**	

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SEMESTER–VIII

Sl. No.	Course Code	CourseName	Category	Hours/Week			Credit	ContactHrs
				L	T	P	C	
1.	16ITF02	Project work – Phase II	EEC	0	0	30	15	30
TotalCredits							**15**	

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COURSECOMPONENTSUMMARY

S.No.	Subject Area	CreditsPerSemester								Credits total	Percentage credits
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	5	4	-	-	3	-	-	-	12	6.74
2.	BS	11	11	4	4	-	-	-	-	30	16.85
3.	ES	9	10	8	4	-	-	-	-	31	17.41
4.	PC	-	-	11	14	16	15	-	-	56	31.46
5.	PE	-	-	-	-	6	10	4	-	20	11.23
6.	OE	-	-	-	-	-	-	9	-	9	5.05
7.	EEC	-	-	-	-	-	2	3	15	20	11.23
TOTAL		**25**	**25**	**23**	**22**	**25**	**27**	**16**	**15**	**178**	

TotalCredits:178

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16ITC01 **FUNDAMENTALS OF COMPUTING AND PROGRAMMING** **L T P C**
2 0 4 4

COURSE OBJECTIVES

1. Applyskillsandconceptsforbasicuseofcomputerhardware,software,networksandtheInternetin the workplace and in futurecoursework
2. Thestudentswillbeabletoenhancetheiranalyzingand problemsolvingskills
3. Understand the basic componentsand structure of a Cprogram
4. The Students will be able to write programs inC
5. Tounderstandtheservicesprovidedandthedesignofanoperatingsystem

COURSE OUTCOMES

1. Understandtheclassificationofcomputers,applicationofcomputersandvariouscomponentsof computers.
2. Developtheskillfor wordprocessing,presentation,spreadsheetcalculationanddatacollectionsoftware.
3. Learn basic C program structure anditscomponents.
4. Write simple C programs using control and loopstatements.
5. Explainthebasiccharacteristicsofoperatingsystemandcomputernetworkcomponents.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITC01.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC01.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC01.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC01.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC01.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNIT ICOMPUTERBASICS 6

Evolution of Computer-Generation of Computer-Computer Organization-Applications of computer- Computer memory and storage-Input Output Media-Number systems-Algorithm-Flowchart-pseudo code-Program control structure-Programming languages-Computer software-definition-categories of software

UNIT IIMS OFFICE 6

Basics of Word Processing: Creating and Editing a documents- Formatting a Document, Mail Merge Excel: Creating a Worksheet (Using Excel)-Formatting Your Worksheet -Finalizing Your Worksheet PowerPoint: Creating a Presentation (Working with PowerPoint) -Finalizing Your Presentation-PowerPoint Quick Reference Access: Creating a Database (Using Access) -Finalizing Your Database

UNIT III INTRODUCTION TOCLANGUAGE 6

Basic concepts in a C program: constants-variables-declaration and initialization of Variables-data types and statements. Operators and Expressions-precedence and association-type conversions-managing input/output functions-with programming examples

UNIT IV DECISION MAKING, LOOPINGANDBRANCHING 6

Decision making statements: if, if-then-else, nested if-else, cascaded if else and switch statements-Looping statements: for, while, do-while-Branching statements: go to-break and continue- application programming examples

UNIT VOPERATINGSYSTEM 6

Operating system: definition-types of operating systems. Networking: Basic components of a network-Network Topology-exploring the types of networks-characteristics of networks

TOTAL HOURS:30

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LIST OF EXPERIMENTS:

1. Study the features of Officepackage
2. Create Presentation and Visualization using graphs, charts, 2D,3D
3. Problem formulation, Problem Solving andFlowcharts
4. Simple statements and expressions usingCProgramming
5. Scientific problem solving using decisionmaking
6. Scientific problem solvingusinglooping
7. SolvingproblemsusingStringfunctions

TOTAL HOURS:60

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	E. Balagurusamy	Fundamentals of Computers	Tata McGraw-Hill	2009
2.	Vikas Gupta	Computer Concepts & C Programming	Dreamtech Press	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Behrouz A. Forouzan, Richard F Gilberg	Computer Science: A Structured programming approach using C	Thomson India Edition.	2007
2.	Byron Gottfried	Programming with C	Schaum's Outlines	2010
3.	Anita Goel	Computer Fundamentals	Pearl Software	2014
4.	S.S. Shrivastava	MS-Office	Laxmi Publications	2015
5.	Pradip Dey, Manas Ghosh	Fundamentals of Computing and Programming in C	Oxford University Press	2009

WEB URLs

1. www.microsoft.com/en-in/learning/office-training.aspx
2. www.courses.cs.vt.edu/csonline/OS/Lessons/Introduction/index.html
3. www.blog.udemy.com/networking-tutorials-for-beginners/
4. www.cprogramming.com/tutorial/c-tutorial.html
5. www.codingunit.com/c

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16ITC02 **ADVANCED CPROGRAMMING** **L T P C**
2 0 4 4

COURSE OBJECTIVES

1. Ability to understand the basic programmingconcepts in C.
2. Developing the programming skills for writing programs inC.
3. Abilitytointroducedifferenttechniquesfor solvingrealtimeproblems.
4. Understand the concept of dynamic memory by usingpointers.
5. TounderstandandapplydifferentFile Operations.

COURSE OUTCOMES

1. Solvetherealtimeproblemsusingarrays inClanguage.
2. Applicationofpointersin Clanguageforrealtimedynamicprograms.
3. Classifyandusethedifferenttypesoffunctions inClanguage.
4. Describe the use of structure and union concepts inCprograms.
5. Abletodevelop therealtimeapplicationusingfilesinClanguage.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITC02.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC02.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC02.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC02.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC02.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNITIARRAYS 6

Declaring and initializing One-Dimensional array and Array operations, Two Dimensional Array and its operation,Insertion,Deletion,Matrixadditionoperation-Multi-DimensionalArrays-DrawbacksofLinearArrays

UNIT II POINTERS &PREPROCESSORDIRECTIVES 6

Pointers-IntroductionandFeaturesofPointers,Declaration ofPointer-VoidPointers-ArrayofPointers-Pointers to Pointers - Introduction - #define and #undef Directives- #include ,#line Directive- Predefined macros in ANSI C-Standard I/O Predefined Streams in stdio.h- Predefinedmacros inctype.h

UNITIIIFUNCTIONS 6

Basics of Functions - Built-in and user defined Functions- Using String, Math and other built-in functions, Advantages of using Functions- Working of a Function- Declaring, Defining and calling user defined Functions-ThereturnStatement-CallbyValueandcallbyReference-FunctionasanArgument-Recursion-Advantagesand Disadvantages ofRecursion

UNIT IV STRUCTUREANDUNION 6

Introduction and Features of Structures, Declaration and Initialization of Structures, Array of Structures, Pointers to Structure, typedef, Enumerated Data Type- Union, Union of Structures

UNITVFILES 6

Introduction- File Operations, Opening a File, Reading a File,Closing a File- Text Modes- Binary Modes- File Functions, fprintf(), fscanf(),getc(),putc(), fgetc(),fputc(),fseek(), feof()-Command Line Arguments

TOTALHOURS 30

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LIST OF EXPERIMENTS:

1. Implementation of LinearArray
2. Implementing matrix operations using Two DimensionalArrays
3. Program usingfunctions
4. ProgramusingPointers(bothdatapointersandfunctionpointers)
5. ProgramtomaintainstudentdetailsusingStructureandUnionconcepts
6. ImplementationofDataFileHandling
7. Implementation of Text FileHandling
8. Program usingRecursion

TOTAL HOURS: 60

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Kamthane A.N	Programming in 'C'	Pearson Education	2012
2.	E Balagurusamy	Programming in ANSI C	Tata McGraw Hill	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Vikas Gupta	Computer Concepts & C Programming	Dreamtech Press	2010
2.	Herbert Schildt	C: The Complete Reference	Osborne/McGraw-Hill Fourth Edition	2000
3.	Byron Gottfried	Programming with C	Schaum's Outlines	2010
4.	Paul Deitel , Harvey M. Deitel.	C: How to Program	Prentice Hall, 6th Edition	2010
5.	Brian W.Kernigham and Pike R	The Practice of Programming	Addison Wesley	2002

WEB URLs

1. www.programiz.com/c-programming/c-arrays
2. www.cprogramming.com/tutorial/c/lesson6.html
3. www.codingunit.com/c-tutorial-structures-unions-typedef
4. www.studytonight.com/c/file-input-output.php
5. www.fresh2refresh.com/c-programming/c-preprocessor-directives/

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16ITC06 **ENGINEERING PRACTICES FORCOMPUTERSCIENCES** **L T PC**
0 0 4 2

COURSE OBJECTIVES

1. Studentswillbeable tounderstandthe functionsofvariousInputandOutputDevices.
2. Understanding the importance of SMPS andUPS.
3. Students will be capable to understand the functionalitiesofMotherboard.
4. Assembling and Disassembling ofcomputersystems.
5. Ability to install the various operatingsystems.

COURSE OUTCOMES

1. Explain the working principlesof various input devices and outputdevices.
2. Describethestructure,functionandimportanceof motherboardinthecomputersystem.
3. Abletoexplainthevariousslotsandportsavailableinthecomputersystemfordatatransferanddata storage.
4. Able to assemble and dissemble the computersystem.
5. Demonstratetheinstallationprocessofvariousoperatingsystemofthecomputer.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITC06.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC06.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC06.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC06.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC06.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

LIST OF EXPERIMENTS:

1. To study about the working of InputDevices
2. To study about the working of OutputDevices
3. To study the detailsofmotherboard.
4. To study about thedifferentports.
5. To study about thedifferentslots.
6. To study various types of Cables&Connectors.
7. To study SMPS andUPS.
8. Assembling aPC
9. Disassembling aPC.
10. Installation of OperatingSystem

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16ITC10 **OBJECTORIENTEDPROGRAMMING** **L T PC**
2 0 4 4

COURSE OBJECTIVES

1. Understand the basic Object OrientedProgramming concepts.
2. Developingsolutionstoproblemsbyusageofdataabstraction,encapsulationandinheritance.
3. Abilitytoimplementone or morepatternsinvolvingrealizationofanabstractinterface.
4. Utilizationofpolymorphisminthesolutionofproblemswhichcantakeadvantageofdynamic dispatching.
5. Tocomprehendtheartofprogramming,thestructureandthemeaningofbasicJavaprograms.

COURSE OUTCOMES

1. Classifybasicconceptsandstructureofobject-orientedprogramming.
2. Implementrealtimeapplicationsbyusingconstructor,operatoroverloadingandfunctionoverloadingin C++ Programminglanguage.
3. DemonstrateofInheritanceandpolymorphismtechniquesin C++Programminglanguage.
4. Abletowritesimpleprogramsin JAVAProgramminglanguage.
5. Implement real time application by using exception handling and multithreaded techniques inJAVA programminglanguage.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PS O4
16ITC10.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC10.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC10.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC10.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC10.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNIT I BASICCONCEPTSOFOOP 6

Introduction OOP: Principles of OOP, Benefits and applications of OOP - Overview of C++: Program Structure-Namespace- Identifiers-Declaration of variables-Constants-Operators- Reference Variables - Functions in C++: Inline Functions-Friend Functions - Objects and classes: Basics of object and class in C++-Private and Public Members-Static Data and Function Members-Class Scope and Accessing Class Members

UNIT II CONSTRUCTORSANDOVERLOADING 6

Constructors: Types of Constructors-Destructors - Overloading: Operator Overloading: Overloading Unary and Binary Operators-Rules for Overloading Operators - Function Overloading

UNIT III INHERITANCEANDPOLYMORPHISM 6

Base Class and Derived Class-Types of Inheritance: Single-Multiple-Multilevel-Hierarchical-Protected Members. DerivedClassConstructors–Overriding,MemberFunctions-VirtualBaseClass-AbstractClass- Polymorphism:this pointer - Virtual Functions.

UNIT IV INTRODUCTIONTOJAVA 6

Basic Java Concepts: Objects – Classes – Methods and Messages –Abstraction and Encapsulation – Inheritance – Abstract Classes – Polymorphism - Access specifiers – Static Members –Constructors – Finalize Method

UNIT VJAVAPROGRAMMING 6

Arrays – Strings - Packages and Interfaces - Exception Handling – Multithreaded Programming- Dynamic Binding – Final Keyword – Abstract classes

TOTAL HOURS: 30

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LIST OF EXPERIMENTS:

1. Illustrationofpassbyvalue,passbyreference, passbyaddress.
2. Illustration of functionoverloading
3. Illustration of Friendfunction.
4. Illustration of Overloading increment, decrement, binary +&<<operator
5. Illustrationofuserdefinedstringprocessingfunctionsusingpointers(stringlength,stringcopy,string concatenation)
6. Illustration of different typesofconstructors.
7. Implementation of inheritance (Multiple, Multilevel,Hybrid)
8. Implementation of array ofobjects.
9. Implementation of inheritance and demonstrate useof methodoverriding.
10. Developing a multithreaded GUIapplication.
11. Demonstrationofuse ofimplementinginterfaces.
12. Implementation of the concept of Exception Handling usingpredefinedexception.

TOTAL HOURS: 60

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	E Balagurusamy	Object Oriented Programming with C++	Tata McGraw Hill	2012
2.	Herbert Schlitz	JAVA -The Compete Reference	Tata McGraw-Hill	2014

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bjarne Stroustrup	The C++ Programming Language	Pearson Education	2012
2.	Deitel and Deitel	C++ : How to Program	PHI	2014
3.	Herbert Schlitz	The Compete Reference C++	Tata McGraw Hill Wesley	2014
4.	Cay S. Horstmann and Gary Cornell	Core Java: Volume I – Fundamentals	Sun Microsystems Press	2008
5.	C. Thomas Wu	An introduction to Object-oriented programming with Java	Tata McGraw-Hill Publishing company Ltd	2006

WEB URLs

1. www.tutorialspoint.com/cplusplus/cpp_object_oriented.html
2. www.codecademy.com/courses/intro-to-object-oriented-programming
3. www.wiziq.com/tutorials/object-oriented-programmingdocs
4. www.java2s.com/Tutorial/Java/CatalogJava.html
5. www.docs.oracle.com/javase/tutorial/java/TOC.html

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16ITC11 **DATASTRUCTURES** **L T PC**
2 0 4 4

COURSE OBJECTIVES

1. To understand the basic structure concept such as Abstract Data Types, Linear and Non LinearDatastructures.
2. Tounderstandthebehaviorofdatastructuressuchas stacks,queues,trees, hashtables,searchtrees,Graphand theirrepresentations.
3. To choose the appropriate data structure for a specifiedapplication
4. To understand and analyze various searching and sortingalgorithms.
5. Tosolveproblemsusingdatastructuressuchasarray,linkedlists,queues,trees, graphs, hash tables,search trees.

COURSE OUTCOMES

1. Ability to identify the appropriate data structure for givenproblem.
2. Able to solve the problems using stack andqueues.
3. Able to implement the application of Tree datastructure.
4. Able to understand the application of Graph and hashingtechniques.
5. Ability to solve the problems using various searching and sortingtechniques.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITC11.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC11.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC11.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC11.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITC11.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNIT I INTRODUCTIONAND LIST 6

Definition, ADT, Types of Data Structures- Linear &Non Linear Data Structures. Array: Representation of arrays, structure and Pointers, Applications of arrays, structure and Pointer, Dynamic Memory Allocation Functions and Recursion function. Linked List: Definition, Types of List, Singly Linked List operations, Doubly Linked list operation, Circular linked list operation, Applications of linked list

UNIT IISTACKANDQUEUE 6

Stack: Stack-Definitions & Concepts, array and Linked implementation of Stack Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi. Queue: Representation Of Queue, array and Linked implementation of Queue Operations on Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue.

UNIT III TREE AND BINARYSEARCHTREE 6

Trees: Basic terminologies of trees – Node, Root, Parent, Child, Link, Sibling, Level, Height, Depth, Leaf, Degree; Binary tree – Full Binary tree, Complete Binary tree; Representation of binary tree – Linear representation, linked representation, Advantages and Disadvantages of both representations; Binary tree traversal – Inorder, Preorder, Postorder traversals; Operations on Binary tree - creation, insertion of left and right child; Tree representation of an arithmetic expression, inorder, Preorder and Postorder expressions from expression tree. Binary Search Tree – Definition, Creation of Binary search tree for a given set of values; Searching for an item – Minimum, Maximum or any given value; Applications of Binary search tree. Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap

UNIT IV GRAPHS 6

Definition – Graph terminologies – Directed and Undirected graph, Weighted graph, Adjacent Vertices, Self loop, Parallel edges, Path, Cycle, in degree, out degree; complete graph, Connected graph; Representation of graph – Set representation – Adjacency matrix representation – Linked representation – Comparison of representations. Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree and Hamiltonian circuit

UNIT V HASHING, SEARCHINGANDSORTING 6

Hashing: Introduction, Hash table, Hash function, Collision, Collision resolution – separate chaining, open addressing; Rehashing – Extendible hashing. Searching: Definition – Algorithm and Example for sequential search and binary search. Sorting: Definition – Algorithm and Example for selection sort, bubble sort, insertion sort, quick sort, merge sort, radix sort and HeapSort.

TOTAL HOURS: 30

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LIST OF EXPERIMENTS:

1. Implementamenudrivenprogramtoimplementoperationsonthesinglylinkedlist.
2. Implement a menu driven program to implement operations on the doubly linkedlist
3. Implement a menu driven program to implement operations on the circular linkedlist
4. Implement a program for stack that performs operationsusingarray
5. Implementaprogramtoconvertinfixnotationtopostfixnotationusingstack.
6. Implement a program to QUEUE using arrays thatperformsoperations
7. Implementaprogramtostackusinglinkedlist.
8. Implement a program to queue usinglinkedlist.
9. Implementrecursiveandnon-recursivetreetraversingmethodsinorder,preorderandpost-ordertraversal
10. Implementaprogramtocreateandoperationonbinarysearchtree.
11. Implement a program toQueueSort.
12. Implement a program toMergeSort.
13. Implement a program to BubbleSort.
14. ImplementaprogramtoBinarySearchandsequentialsearch.
15. ImplementaprogramtoBreadthFirstsearchusinglinkedrepresentationofgraph
16. Implement a program to Depth first search using linked representationofgraph.

TOTAL HOURS: 60

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	E.Horowitz, S.Sahni Susan Anderson-Freed	Fundamentals of Data structures in C,	Universities Press.	2008
2	Mark Allen Weiss	Data structure and Algorithm Analysis in C	Pearson India	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	R. F. Gilberg, B. A. Forouzan	Data Structures	2nd Edition, Thomson India	2005
2	R.Kruse, C.L.Tondo and B.Leung,	Data structures and Program Design in C	2nd Edition ,Prentice-Hall	2006
3	A.M.Tanenbaum, Y. Langsam, M.J.Augenstein	Data Structures using C and C++	2nd Edition , PHI Learning	2015
4	R. Krishnamoorthy	Data Structures Using C	Tata McGraw-Hill Education	2008
5	E Balagurusamy	Data Structures Using C	Tata McGraw-Hill Education	2013

WEB URLs

1. www.tutorialspoint.com/data_structures_algorithms/
2. www.nptel.ac.in/courses/106102064/1
3. www.wiziq.com/tutorials/data-structure
4. www.freevideolectures.com/Subject/Data-Structures
5. www.studytonight.com/data-structures/introduction-to-data-structures

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16ITD01 **ADVANCEDJAVAPROGRAMMING** **L T P C**
3 0 2 4

COURSE OBJECTIVES

1. Understand advanced java programming concepts like files, threads,Swingsetc.
2. To Understand advanced javanetworkingconcepts.
3. To learn the concepts of web applications and multitierarchitecture.
4. To learn the concept of distributed objects includingwebservices.
5. To understand the importanceof advancedframeworks.

COURSE OUTCOMES

1. Work withJavaI/Ostreams,networkingandGUIbasedapplicationdevelopment.
2. Work with Web application development using Java ServerFaces.
3. Write web applications using Servlet andJSP.
4. Develop web services usingREST/SOAP/JSON.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD01.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD01.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD01.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD01.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD01.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNIT IJAVABASICS 9

Review of java basics - Java String Handling – Recursion - Files – streams – Working with treams - File and I/OHandling - Threads – multithreading - object serialization – Swing components – Graphics and Java 2D.

UNIT II NETWORK PROGRAMMINGINJAVA 9

Sockets – secure sockets – custom sockets – UDP datagrams – multicast sockets – URL classes – Reading Datafrom the server – writing data – configuring the connection – Reading the header – telnet application – JavaMessaging services.

UNIT III WEBAPPLICATIONDEVELOPMENT 9

Overview of servlets – Servlet API – Servlet life cycle – Servlet configuration – Running Servlet with database connectivity - Servlet support for cookies – Session tracking – Basics of JSP –Java Server Faces – Multitier application Architecture – MVC architecture of JSF Apps – common JSF components – Session tracking – Cookies – Accessing databases in Web Apps – Java Beans component.

UNIT IVSOFTWARECOMPONENTS 9

Distributed objects – RMI programming model – Parameters and return values in remote methods – Remote object activation - Web services and JAX-WS - Publishing and consuming SOAP based web services – REST-based web services – REST-based JSON webservices.

UNIT VADVANCEDFRAMEWORK 9

Advanced Frameworks – Understanding Struts – MVC framework – Struts control flow – Building model view controller component - Hibernate – Architecture – Understanding O/R mapping – Query language – Spring framework – Architecture - Case studies.

TOTAL HOURS: 45

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LIST OF EXPERIMENTS:

1. WriteaJavaprogramtostore, deleteand updatedatainadatabasewiththesupportofjdbc-odbc connectivity.
2. WriteaJavaprogramwithservletstocreateadynamic html formtoacceptanddisplayusernameand password with the help of 'get ()' and 'post ()'methods.
3. WriteaJavaprogramwithservletsto storeonlyvaliddatainadatabasewiththesupportofjdbc-odbc connectivity.
4. WriteJava servletprogramfor'autorefreshing'thewebpageaftergivenperiod oftime.
5. WriteaJava servletprogramto demonstratetheuseofcookies.
6. WriteJSP programto implementformdatavalidationtoaccept correctdata.
7. Write a JSP script to demonstrate the use of <jsp: include .....> by displaying an external webpage and <jsp: plugin ……> to run anapplet.
8. Write a JSP program for demonstrating creation and accessingjavabeans.
9. Write a Java program to demonstrate the use of javaswingcomponents

TOTAL HOURS: 30

TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Herbert Schildt	Java 2 - Complete Reference	Tata Mc Graw Hill	2011
2.	Bogdan Ciubotaru & Gabriel-Miro Muntean	Advanced Network Programming Principles & Techniques, NetworkApplication Programming with Java	Springer Verlag	2013

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Elliotte Rusty Harold	Java Network Programming	O'Reilly Media	2013
2.	David Turner and Jinseok Chae	Java Web Programming with Eclipse	Create Space	2010
3.	Andrew Lee Rubinger, Bill Burke	Enterprise Java Beans 3.1	O'Reilly Media	2010
4.	Kiet T. Tran	Introduction to web services with Java	BI Publisher	2013
5.	Amuthan G	Spring MVC: Beginner's Guide	Packt Publishing	2014

WEB URLs

1. www.java.sun.com/developer/onlineTraining/Programming/JDCBook
2. www.javatpoint.com/servlet-tutorial
3. www.java.sun.com/docs/books/tutorial/networking/TOC.html
4. www.my.execpc.com/~gopalan/java/java_tutorial.html
5. www.apl.jhu.edu/~hall/java/Servlet-Tutorial/

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16ITD02 **DESIGN AND ANALYSISOFALGORITHMS** **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. Tolearnhowto developefficientalgorithms forsimplecomputationaltasks.
2. Tolearnreasoningandcorrectnessofalgorithms.
3. Tolearnthecomplexitymeasures,differentrangeofbehaviorsofalgorithmsandthenotionoftractableand intractable problems will beunderstood.
4. To design the algorithms for realtimeproblems.
5. Tosolvethe problemsbyusingdifferenttypesofalgorithmstechniques.

COURSE OUTCOMES

1. Design algorithms for various computingproblems.
2. Analyzethetimeandspacecomplexityofalgorithms.
3. Criticallyanalyzethe differentalgorithmdesigntechniquesfora givenproblem.
4. Modifyexistingalgorithmstoimproveefficiency
5. Solvetherealtimeproblemsbyusingbacktrackingandbranchand boundtechniques.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD02.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD02.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD02.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD02.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITD02.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNITIINTRODUCTION 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.

UNITIIBRUTE FORCEANDDIVIDE-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.

UNITIIIDYNAMIC PROGRAMMINGANDGREEDYTECHNIQUE 9

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

UNITIVITERATIVEIMPROVEMENTANDLIMITATIONOFALGORITHM 9

The Simplex Method-The Maximum-Flow Problem – Maximm Matching in Bipartite Graphs- the Stable marriage Problem. Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP Complete Problems.

UNIT VBACKTRACKING, BRANCH AND BOUND AND APPROXIMATION ALGORITHM 9

Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem.

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Anany Levitin	Introduction to the Design and Analysis of Algorithms	Third Edition, Pearson Education,.	2012
2.	Bogdan Ciubotaru & Gabriel-Miro Muntean	Advanced Network Programming Principles & Techniques, NetworkApplication Programming with Java	Springer Verlag	2013

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman	Data Structures and Algorithms	Pearson Education, Reprint	2006
2	Donald E. Knuth,	The Art of Computer Programming	Volumes 1& 3 Pearson Education,	2009
3	A I. Chandra Mohan	Design and Analysis of Algorithms	PHI Learning Pvt. Ltd, 2nd Edition	2012
4	Steven S. Skiena	The Algorithm Design Manual	Second Edition, Springer,	2008
5	Manas Ranjan Kabat	Design And Analysis Of Algorithms	PHI Learning Pvt. Ltd, 2nd Edition	2013

WEB URLs:

1. www.nptel.ac.in/algorithms
2. www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm
3. www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html
4. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-046j-design-and-analysis-of-algorithms-spring-2015/lecture-videos/
5. www.khanacademy.org/computing/computer-science/algorithms

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16ITD03 **DATABASEMANAGEMENTSYSTEM** **L T PC**
3 0 2 4

COURSE OBJECTIVES

1 Analyze database requirements and determine the entities involved in the system and their relationships.
2 Formulate solutions to a broad range of query and data update problems usingSQL.
3 Understand the basic issues of transaction processing and concurrencycontrol.
4 Explain and implement the fundamental concepts of a relational databasesystem.
5 Understand the database security and accesstechniques.

COURSE OUTCOMES

1 Design ER diagrams for new databases and apply for databaseapplications.
2 Implement a database schema for a givenproblem-domain.
3 Normalize a database with non-lossdecomposition.
4 Apply concurrency control techniques fordatabasetransactions.
5 Implement different database accesstechniques.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD03.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	X	-
16ITD03.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	X	-
16ITD03.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	X	-
16ITD03.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	X	-
16ITD03.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	X	-

UNIT I INTRODUCTIONTODBMS

9

Database System Applications-Purpose of Database Systems -View of data- Database Languages - Database System Architecture - Data models - Entity-Relationship model - Extended E-R Features - Introduction to relational databases- Keys - Integrity Constraints - Relational Algebra - Fundamental Operations - Additional Operations- Domain Relational Calculus - Tuple RelationalCalculus.

UNIT II SQL &QUERYOPTIMIZATION

9

SQL Standards - Data types - Basic Structure of SQL Queries - DDL-DML-DCL-TCL - Views- Advanced SQL - Embedded SQL - Static Vs Dynamic SQL - Query Processing - Query Optimization Heuristic and Cost based QueryOptimization.

UNIT III RELATIONAL DATABASE DESIGNANDTRANSACTIONS

Functional Dependencies - Codd's Rule - Normalization - Non-loss decomposition- 1NF to 5NF - DomainKeyNormalForm–Denormalization -TransactionConcepts-ACIDProperties–Serializability Concurrency Control - Locking Mechanisms - Two Phase Commit Protocol - Deadlock.

UNIT IV SYSTEMARCHITECTURE

9

Overview of Physical Storage Media - 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 - Distributed Databases - Distributed Data Storage -DistributedTransactions.

UNIT VDATABASESECURITY

9

Database Security - Data Classification - Threats and risks - Database Access Control - Types of Privileges - Security of Statistical Databases Parallel Databases- Spatial and Multimedia Databases - Mobile and Web databases - Object Oriented Databases- XMLDatabases.

TOTAL HOURS: 45

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LIST OF EXPERIMENTS:

1. Data Definition Language commands inRDBMS
2. Data Manipulation Language and Data control Languagecommands
3. Apply Integrity constraints and Domain constraints for aDatabase
4. Creation of Views, Nested Queries and JoinQueries
5. Study of PL/SQLblocks
6. High level programming language extensions (Control structures andProcedures)
7. Implementation ofFunctions
8. Implementation ofTriggers
9. Design and Implementation of BankingSystem
10. Design and Implementation of Student InformationSystem
11. Design and Implementation of Payroll ProcessingSystem

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publicatio
1.	Abraham Silberschatz, Henry F. Korth	Database System Concepts	Tata McGraw-Hill	2013
2.	Ramez Elmasri Shamkant	Fundamentals of Database Systems	Pearson Education	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publicatio
1.	Raghu RamakrishnanJohann es Gehrke	Database Management Systems	Tata McGraw-Hill	2014
2.	Hector Garcia-Molina Jeffrey D. Ullman Jennifer	Database Systems: The Complete book	Pearson Education	2013
3.	Shefali Naik	Concepts of Database Management Systems	Pearson Education	2013
4.	G.K.Gupta	Database Management Systems	Tata McGraw Hill	2011
5.	Rob Cornell	Database Systems Design and	Cengage Learning	2011

WEB URLs

1. www.w3schools.in/dbms/l
2. www.tutorialspoint.com/sql/sql_tutorial.pdf
3. tutorialink.com/dbms/introduction-to-transaction-concepts.dbms
4. https://www.cse.iitb.ac.in/~sudarsha/db-book/slide-dir/ch12.pdf
5. www.edutechlearners.com/advance-database-management-system-notes/

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16ITD04 **OBJECT ORIENTEDSOFTWAREENGINEERING** **L T PC**

3 0 0 3

COURSEOBJECTIVES

1. To understand the basic concepts ofSystemEngineering.
2. To know the Architectural design and Requirementanalysis.
3. To understand and analyze the design interactivesystem
4. To implement the quality assurance usingtesting
5. To analyze and implementation different levels of maintainingproject

COURSE OUTCOMES

1. Analysis and design the software modeling for various real timeproblems.
2. Design interactive system for variousapplications.
3. Design the modal and framework forreal-timeapplications
4. Find the quality of thesoftware.
5. Understand the maintenance of the software project management insecurity.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD04.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD04.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD04.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD04.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD04.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X

UNIT I Introduction andSystemEngineering 9

Introduction: Software Life-Cycle Activities - Object-Oriented Software Engineering -Software Process and Methodology: Software Process - Software Process Models- Software Development Methodology- Agile Methods – System Engineering: -Requirements - ArchitecturalDesign

UNIT II Analysis andArchitecturalDesign 9

Software Requirements Elicitation - Domain Modeling - Object Orientation and Class Diagram- Steps for Domain Modeling- Architectural Design: Process-Style and Package Diagram –Applying software DesignPrinciples

UNIT III Modeling and Design ofInteractiveSystems 9

Deriving Use Cases from Requirements - Actor-System Interaction Modeling - Object Interaction Modeling - Applying Responsibility-Assignment Patterns : Specification –Controller-expert-creator patterns- Deriving a Design Class Diagram - User Interface Design: GUIwidgets-Process.

UNIT IV Implementation andQualityAssurance 9

Implementation Considerations - Software Quality Assurance: Quality Measurements and Metrics- Software Verification and validation Techniques- Functions- Software Testing: Black box and white box testing- OO software testing – Testing Web Applications – Testing for Non Functional Requirements- Testing Life Cycle – RegressionTesting

UNIT-V Maintenance Configuration andProjectManagement 9

Software Maintenance- Software Configuration Management- Software Project Management: Project Organization - Effort Estimation Methods - Project Planning and Scheduling -Risk Management – Process improvement - Software Security : Software Security in the Life Cycle - Applying Agile Principles- Software Tools

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	David Kung	Object-Oriented Software Engineering: An Agile Unified Methodology	McGraw-Hill Education	2013
2	Bernd Bruegge & Allen H. Dutoit	Object-Oriented Software Engineering Using UML, Patterns, and Java	Prentice Hall	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Timothy C. Lethbridge	Object-Oriented Software Engineering	McGraw-Hill Education	2005
2	Ivar Jacobson	Object-oriented software engineering: a use case driven approach	ACM Press	2007
3	Stephen R. Schach	Object-oriented Software Engineering	McGraw-Hill Education	2007
4	Stephen R. Schach	Object-Oriented andClassical Software Engineering – Irwin Computer Science	McGraw-Hill Education	2010
5	Bernd Bruegge & Allen H. Dutoit	Object-Oriented Software Engineering Conquering Complex and Changing Systems	Prentice Hall.	1997

WEB URLs

1. http://pl.cs.jhu.edu/oose/index.shtml
2. http://www.tutorialspoint.com/software_engineering/
3. https://sites.google.com/site/atulkg/courses/cs-504-object-oriented-software-engineering-2012
4. http://www.cse.lehigh.edu/~glennb/oose/oose06.htm
5. https://www.youtube.com/watch?v=jZo1oAy9oMQ

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16ITD05 **OPERATINGSYSTEMS** **L T P C**
3 0 2 4

COURSE OBJECTIVES

1. Tounderstand the basic concepts OperatingSystem.
2. To understand the fundamental Operating System abstractions such as processes, processscheduling
3. To understand the principles of concurrency and synchronization, and apply them to write concurrentprograms/software
4. ToImplementbasicresource managementtechniques(schedulingortimemanagement,space management)andprinciples
5. TodescribethetypesofI/Omanagement,diskscheduling,diskmanagementandswapspacemanagement

COURSE OUTCOMES

1. Explain structures of OperatingSystem.
2. ApplyfundamentalOperatingSystemabstractionssuchasprocesses,processscheduling,Semaphores, IPC abstractions, shared memoryregions, deadlock andthreads.
3. Explain the principles of concurrencyand synchronization, and apply them to write concurrentprograms/software.
4. Implementbasicresourcemanagementtechniques(schedulingortimemanagement,space managementandprinciples.
5. DescribethetypesofI/Omanagement,diskscheduling,disk managementandswapspacemanagement

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD05.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD05.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD05.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD05.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X
16ITD05.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	X

UNIT I INTRODUCTION 9

Introduction – What Operating System Do – Operating System Structure – Operating system Operations – Operating System Components: Process Management – Memory Management – Storage Management – I/O Management – Network Management - Protection andSecurity.**ClassesofOperatingSystems:**MainframeSystems– SingleProcessorSystem-MultiprocessorSystems- Desktop Systems — Distributed Systems – Clustered Systems – Real-Time Systems – Handheld Systems - Open Source OperatingSystems.**Operating System Structures:** Operating System Services – User and Operating System Interface – System Calls– Types of System Calls.

UNIT II PROCESS MANAGEMENTANDTHREADING 9

Processes: Process concept – Process scheduling – Operation on Processes - Inter-process Communication: Shared Memory Systems - Message Passing Systems.**Process Scheduling:** Basic Concepts – Scheduling Criteria – Scheduling Algorithms: First-Come, First-Served – Priority – Round-Robin – Multilevel Queue – Multilevel Feedback Queue.**Threads:** Overview – Multithreading models - Threading issues.

UNIT IIIPROCESSSYNCHRONIZATIONANDDEADLOCKS 9

Process Synchronization: Background - The critical-section problem (Software based solution and hardware based solution) – Semaphores – Classic Problems of Synchronization – Monitors.
Deadlocks: System model - Deadlock Characterization – Methods for Handling Deadlocks -Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlocks

UNIT IV MEMORYMANAGEMENT 9

Management Strategies: Background – Swapping – Memory allocation: Contiguous Memory Allocation –Non-Contiguous Memory Allocation: Segmentation - Paging – Segmentation with Paging - Structure of the Page Table.
Virtual Memory: Background - Demand Paging – Page Replacement – Allocation of Frames – Thrashing.

UNIT V FILE SYSTEM ANDSTORAGEMANGEMENT 9

System Interface: File Concept – Access Methods – Directory and Disk Structure – Protection.**File System Implementation:** File System Structure – File System Implementation – Directory Implementation- Allocation Methods – Free Space Management.**Mass Storage Structure:** Overview of Mass Storage Structure – Disk Structure- Disk Scheduling – Disk Management - Swap Space Management.
Case Study: Windows, Linux and Android operating Systems.

TOTAL HOURS:45

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LIST OF EXPERIMENTS:

1. File exploringbasiccommandsunderLinuxOperatingsystems
2. Program using Shellscripts.
3. Basic process managementalgorithms.
4. Process synchronizationalgorithms.
5. Implementing various memoryallocationmethods.
6. Implementing paging andsegmentation.
7. Implementing various page replacementpolicies.
8. Implementation of file systemcalls.
9. Implementation of Patternmatching.
10. Implementation of diskschedulingalgorithms.

TOTAL HOURS: 30

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne,	Operating System Concepts	John Wiley & Sons (ASIA) Pvt. Ltd, 9th Edition	2015
2	Harvey M. Deitel	Operating Systems	Pearson Education, 3rd Edition.	2007

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Andrew S. Tanenbaum	Modern Operating Systems	Prentice Hall of India, 3rd Edition	2009
2	William Stallings	Operating Systems: Internals and Design Principles	Prentice Hall of India, 6th Edition	2009
3	D M Dhamdhere	Operating Systems: A Concept-Based Approach	Tata Mc-graw Hill Publishing3rd Edition	2012
4	Charles Crowley	Operating System: A Design-Oriented Approach	Tata Mc-graw Hill Publishing, 1st edition	2009
5	Evi Nemeth , Garth Snyder, Trent R. Hein , Ben Whaley , Dan Mackin	UNIX and Linux System Administration Handbook	Prentice Hall of India, 4th Edition	2010

WEB URLs:

1. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2012/
2. www.onlinecourses.nptel.ac.in/noc16_cs10
3. www.udacity.com/course/introduction-to-operating-systems--ud923
4. www.cs140.stanford.edu/
5. www.tutorialspoint.com/operating_system/

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16ITD06 **OBJECT ORIENTED ANALYSISANDDESIGN** **L T PC**
3 0 2 4

COURSE OBJECTIVES

1. To understand the Object Basics, Classes andInheritance
2. To make utilization of software objects to build systems that are morerobust
3. To familiarize the Object-Oriented Analysis and Design (OOAD) concepts for developing Object OrientedProjects
4. To understand the quality and testingissues
5. To use UML for requirements, designs and componentinterfaces

COURSE OUTCOMES

1. Design and implement projects using Object Orientedconcepts.
2. Applyappropriate UMLdesign patterns for the application.
3. Analysis the design by using object orientedtechniques.
4. DrawthevariousOOADdiagramsforrealtimeproblems
5. Compare and contrast various testingtechniques

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD06.CO1	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	X
16ITD06.CO2	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	X
16ITD06.CO3	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	X
16ITD06.CO4	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	X
16ITD06.CO5	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	X

UNIT I–INTRODUCTION 9

Categories of Information systems – Traditional Paradigm Vs. Object Oriented Paradigm – Objects and Classes – Inheritance – Object relationship – Examples of UML class modeling –Unified Process – Iteration and incrementation within the Unified Process.

UNIT II – UML AND THEUNIFIED PROCESS 9

Overview of requirements – Initial understanding of the domain – Business Model – Requirements workflow – Osbert Oglesby case study – MSG Foundation case study – Revising the requirements – MSG Foundation Case Study – Continuing the requirements workflow – MSG Foundation Case Study - Refining the revised requirements – MSG Foundation Case Study.

UNIT III – OBJECTORIENTEDANALYSIS 9

Extracting Entity Classes – Initial dynamic model – Extracting control classes- refining use cases – Incrementing the Class Diagram – Initial dynamic model – MSG Foundation case study – Revising the entity classes – Extracting – USE case realization – MSG Foundation case study – Incrementing the Class Diagram – More on use cases – Risk.

UNIT IV – OBJECT ORIENTEDDESIGN WORKFLOW 9

Design workflow – Format of the Attributes – Allocation of Operations – Osbert Oglesby Case StudyWorkflows of the Unified Process – Phases of the Unified Process – Class Diagrams – Use Case Diagrams – Interaction Diagrams – State Charts – Package Diagrams – DeploymentDiagrams.

UNIT V – TESTING ANDMANAGEMENTISSUES 9

Quality Issues – Non Execution Based Testing – Execution Based Testing – Cost Benefit Analysis – Risk Analysis – Improving the Process – Metrics – CPM/PERT – Choice of Programming Language – Reuse Case Studies – Portability – Planning and Estimating Duration and Cost – Testing the Project Management Plan – Maintenance and the Object Oriented Paradigm – CASE Tools for Maintenance.

TOTAL HOURS: 45

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LIST OF EXPERIMNENTS:

1. Develop a problemstatement.
2. Identify Use Cases and develop the UseCasemodel.
3. Identify the conceptual classes and develop a domain model with UMLClassdiagram.
4. Using the identified scenarios, find the interaction between objects and represent those usingUML Sequencediagrams.
5. Drawrelevantstatechartsandactivitydiagrams.
6. IdentifytheUserInterface,Domainobjects,andTechnicalservices.Drawthepartiallayered,logical architecture diagram with UML packagediagramnotation.
7. Develop and test the Technical serviceslayer.
8. Develop and test the Domain objectslayer.
9. Develop and test the User interfacelayer

TOTAL HOURS: 30

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	John Deacon	Object Oriented Analysis and Design	Pearson Education	2009.
2	Grady Booch, James Rumbaugh, Ivar Jacobson	The unified modeling Language user Guide	Pearson Education	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Grady Booch,	Object Oriented Analysis and Design with application	Pearson Education	2012.
2	Martin Fowler	UML Distilled	PHI/Pearson Education	2007
3	Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides	Design patterns: Elements of Reusable Object- Oriented Software	Tata McGraw Hill	2010
4	Brett McLaughlin, Gary Pollice, David West	Head First Object-Oriented Analysis and Design	O'Reilly Media	2006
5	Brahma Dathan, Sarnath Ramnath	Object-Oriented Analysis, Design and Implementation	Springer	2015

WEB URLs:

1. www.omg.org
2. www.ibm.rational.com
3. www.OOAD.org
4. www.ebookbrowse.com/unit-ii-ooad-notes-doc-d140018629
5. www.utdallas.edu/~chung/OOAD/presentation

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16ITD07 **COMPUTERNETWORKS** **L T P C**
3 0 2 4

COURSE OBJECTIVES

1. Understand the state-of-the-art in network protocols, architectures andapplications.
2. Gain knowledge about the functions of different network layers.
3. To be familiar with the transmission media andtools.
4. To learn about IEEE standards in computernetworking.
5. To get familiarized with different protocols and networkcomponents.

COURSE OUTCOMES

1. Identify the role of each layer in computer networks anditsprotocols.
2. Develop scheme for error detectionandcorrection
3. Select flow control algorithm at link to linklevel.
4. Evaluate the performance of various routingalgorithms.
5. Analyze the flow control and congestion control algorithms for QoS at end toendlevel.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD07.CO1	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	-
16ITD07.CO2	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	-
16ITD07.CO3	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	-
16ITD07.CO4	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	-
16ITD07.CO5	X	X	X	X	X	-	-	-	X	-	X	X	X	-	-	-

UNIT I INTRODUCTION,PHYSICALLAYER 9

Overview: Data Communication - Network Types - Internet History –Topology- Network model: OSI Model, TCP/IP Protocol Suite - - Digital Signals - Data rate limits - Performance - Transmission Media: Guided Media- Unguided Media.

UNIT II DATALINKLAYER 9

Error Detection and Correction - Flow Control- Data Link Control - Data Link Layer Protocols - HDLC - PPP - Media Access Control - Ethernet - Wireless LANs: IEEE 802.11, Bluetooth –Switching - Connecting Devices.

UNIT IIINETWORKLAYER 9

Logical Addressing: IPv4 Addresses – subnetting – CIDR - IPv6 Addresses – Internetworking - IPv4 - IPv6 - Transition from IPv4 to IPv6 –Address Mapping: ARP- RARP- DHCP- Error Reporting: ICMP- Multicasting: IGMP

UNIT IV ROUTINGANDTRANSPORTLAYER 9

Routing Protocols: Distance Vector Routing – Link state Routing- RIP – OSPF – BGP- Multicast Routing. Transport Layer: UDP - Overview of TCP - TCP flow control- TCP Error control - Congestion Control- Quality of Service

UNIT V APPLICATION LAYERANDSECURITY 9

World Wide Web and HTTP - FTP - Electronic Mail - Telnet - Secure Shell - Domain Name System - CryptographicAlgorithms-AuthenticationProtocols-MessageIntegrityProtocols -PublicKeyDistribution(X.509)
- Network Layer Security - Transport Layer Security - Application Layer Security - Firewalls.

TOTALHOURS 45

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LIST OF EXPERIMENTS:

1. Demonstrate various networkcommands.
2. Develop client server based TCP applications using UNIX socket programmingfunctions.
3. Develop client server based UDP applications using UNIX socket programmingfunctions.
4. Implementation of HTTP/DNS/ARP/RARPprotocols.
5. Implementation of sliding window and CRCprotocols.
6. Implementation of Distance Vector and Link state routingprotocols.
7. Study of network simulation tool -NS2.
8. Performance analysis of TCP/UDP protocol using simulationtool
9. Performance analysis of routing protocols using simulationtool.
10. Analyze the network traffic using Wire sharktool.

TOTALHOURS 30

TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Behrouz A. Foruzan	Data communication and Networking	Tata McGraw-Hill	2013
2.	Larry L. Peterson and Bruce S. Davie	Computer Networks: A systems approach	Morgan Kaufmann Publishers	2010

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Mani Subramanium	Network Management Principles and practices	Pearson Education	2010
2.	Andrew S Tanenbaum, David J.Wetherall	Computer Networks	Prentice Hall of India/ Pearson Education	2010
3.	William Stallings	Data and Computer Communications	Pearson Education	2013
4.	James F. Kurose, Keith W. Ross	Computer Networking, A Top–Down Approach Featuring the Internet	Pearson Education	2012
5.	Ying-Dar Lin, Ren-Hung Hwang, Fred Baker	Computer Networks: An Open Source Approach	McGraw Hill Publisher	2011

WEBURLs :

1. http://nptel.ac.in/courses/106105082/
2. http://compnetworking.about.com/od/basicnetworkingconcepts/a/network_types.htm
3. http://www.protocols.com/pbook/tcpip1.htm
4. http://docs.oracle.com/cd/E23824_01/html/821-1453/ipv6-troubleshoot-2.html
5. http://searchsecurity.techtarget.com/tip/Get-ready-for-IPv6-Five-security-issues-to-consider

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16ITD08 **PRINCIPLES OF COMPILER DESIGN**

L	T	P	C
3	0	2	4

COURSE OBJECTIVES

1. Tolearn the basic concepts of Automatatheory.
2. To know the basic concepts ofcompilers.
3. To learn the functions of Lexical Analyzer and SyntaxAnalyzer.
4. TounderstandtheprocessofIntermediateCodeGeneration.
5. Tounderstandthe conceptsofCodeGenerationandCodeOptimization

COURSE OUTCOMES

1. Design a lexical analyzer forcompiler.
2. Implement a parser such as a bottom– up SLR parser without usingYACC.
3. Implement semantic rules into aparser.
4. Implement intermediate code generator for compilerdesign.
5. Implement code generator and codeoptimizer.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD08.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD08.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD08.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD08.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD08.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT I INTRODUCTION TOAUTOMATAANDCOMPILER 9

Basic Machines Finite Automata (FA) - Deterministic Finite Automata (DFA) – Nondeterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions-Finite State Automata and Regular Expressions. Compilers – Phases of a compiler – Cousins of the Compiler– Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Tokens Specification.

UNIT IILEXICALANALYSIS 9

Recognition machine - A typical lexical analyzer generator - Parsing - Top Down parsing – Recursive Descent Parsing – Predictive Parsing. Syntax

UNITIIIANALYSIS 9

Analysis: Role of the parser – Context-Free Grammars — Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

UNIT IVINTERMEDIATECODEGENERATION 9

Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls. Code Optimization and Code generation:

UNIT V CODEOPTIMIZATION 9

Introduction to code optimization - Principal Sources of Optimization – Optimization of basic Blocks – DAG representation of Basic Blocks – Peephole Optimization - code generation- Issues in design of code generator – The target machine - A simple Code generator.

TOTAL HOURS: 45

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LISTOF EXPERIMENTS:

1. Implementation of lexical analyzer inC.
2. Implementation of lexical analyzer using LEXtool.
3. Implementation ofthe recursive descent parser for an expression grammar that generates arithmetic expressions with digits, + and*.
4. Implementation of a parser for the same grammar as given in problem using YACC andLEX.
5. WritesemanticrulestotheYACCprograminproblem5andimplementacalculatorthattakesanexpression with digits, + and * and computes and prints itsvalue.
6. Implementation of the front end of a compiler that generates the three address code for a simplelanguage with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignmentstatement.
7. Implementation of back end of a compiler usingC.
8. Stack implementation of LR parser usingC.

TOTAL HOURS:30

TEXT BOOKS:

Sl. No.	Author(s)	Title of the Book	Publisher	Year of Publicatio
1.	Alfred Aho Ravi Sethi Jeffrey D Ullman	Compilers Principles Techniques and Tools	Pearson Education	2014
2	J.E.Hopcroft, R.Motwani and J.D Ullman	Introduction to Automata Theory, Languages and Computations	Pearson Education	2003

REFERENCE BOOKS:

Sl. No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Fischer C N LeBlanc R J	Crafting a compiler with C	Benjamin Cummings	2003
2.	Bennet J P	Introduction to Compiler Techniques	Tata McGraw Hill	2003
3.	Kenneth C Louden	Compiler Construction Principles and Practice	Thompson Learning	2003
4	Henk Alblas and Albert Nymeyer	Pract ice and Principles of Compiler Building wit h C	PH.	2001
5	Alfred V. Ahoet. al	Compilers Principles, Techniques and Tools	Pearson Education	2007

WEB URLs:

1. www.personal.kent.edu/~rmuhamma/Compilers/compiler.html
2. www.cs.rpi.edu/~moorthy/Courses/compiler98/Lectures/lecturesinppt/
3. www.cse.iitd.ernet.in/~sak/courses/cdp/slides.pdf
4. www.cs.nyu.edu/courses/fall06/G22.2130-001/lectures/lectures.html
5. www.nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/30Oct/sanjeev/power-system/ui/TOC.html

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16ITD09 CRYPTOGRAPHY ANDNETWORKSECURITY LTPC 3204

COURSE OBJECTIVES

1. Tounderstand Mathematical Logics behindCryptography.
2. Toknowtheprinciplesandmethodsofconventionalandadvancedencryptionalgorithms.
3. Tounderstandthestandardalgorithmsusedtoprovideconfidentiality,integrityandauthenticity.
4. Tolearnthetechniquesusedformessageauthenticationandconfidentialitymaintenance
5. To understand security issues in the wirelessnetworks.

COURSE OUTCOMES

1. Explainsecurityissuesandciphertechniquesinnetworks.
2. Demonstrateanabilitytousetechniques,skills,andmoderncomputingtoolstoimplementand organize Computing works under givenconstraints.
3. Explaintheprotocolsforpublickeycryptographyandmake useofittosolveproblems.
4. Demonstrateproblemsolvinganddesignskillsincludingtheabilitytoformulateproblemsandtheir Solutions think creatively andcommunicateeffectively.
5. Outline the authentication functionsand web security

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD09.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD09.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD09.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD09.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD09.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNITIINTRODUCTION 9

ComputerSecurityConcepts-OSISecurityArchitecture-SecurityAttacks–Services–Mechanisms-Model for Network Security - Classical Encryption Techniques - Substitution – Transposition Techniques - LFSR sequences - Basic Concepts in Number Theory and Finite Fields - Euclidean Algorithm- Fermat and Euler's theorem – Legendre and Jacobi symbols – continuedfractions.

UNIT II SYMMETRIC CIPHERS &PUBLICKEYCRYPTOGRAPHY 9

Classical Encryption Techniques - Block Ciphers: Modes of operation - Block Cipher Principles - Data Encryption Standard-DES Example- Strength of DES - Triple DES- the Origins AES - **PUBLIC KEYCRYPTOGRAPHY-** Principles of public key cryptosystems-The RSA algorithm-Key management – DiffieHellmanKeyexchange-Ellipticcurvearithmetic-Ellipticcurvecryptography.

UNIT III DATA INTEGRITY ALGORITHMS &DIGITALSIGNATURES 9

Hash Functions - Applications - Requirements - Secure Hash Algorithm (SHA) - SHA-3 - Message AuthenticationCodes(MAC)-MACsbasedonHashFunctions:HMAC–CMAC–MD5 –DigitalSignatures - Digital Signature Standard (DSS).

UNIT IV AUTHENTICATION, E-MAIL &WEBSECURITY 9

Authentication applications – Kerberos version4, X.509-Electronic Mail security: Pretty Good Privacy(PGP), S/MIME – IP security – Web Security: SSL, TLS, SET: SET for E-CommerceTransactions.

UNIT V SYSTEM LEVEL SECURITY,MALICIOUSSOFTWARE 9

System Security: Intruders – viruses – Firewalls – Security Standards. Malicious Software: Types of Malicious Software - Viruses –Worms.

TOTAL HOURS: 45+30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	William Stallings	Cryptography and Network Security	Prentice Hall	2014
2.	AtulKahate	Cryptography and Network Security	Tata McGraw Hill	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Charles B. Pfleeger, Shari Lawrence Pfleeger	Security in Computing	Pearson Education	2011
2.	William Stallings	Cryptography and Network Security	Pearson Education	2013
3.	William Stallings	Cryptography and Network security Principles and Practices	Pearson Education	2010
4.	Javier López, Gene Tsudik	Applied Cryptography and Network Security	Springer	2011
5.	Niels Ferguson	Cryptography Engineering: Design Principles and Practical Applications	John Wiley	2010

WEB URLs:

1. www.tolearnsecurity.blogspot.in/2012/08/the-osi-security-architecture.html
2. www.searchsecurity.techtarget.com/definition/RSA
3. www.iet.unipi.it/g.dini/Teaching/sanna/lecturenotes/applied-cryptography-digital-signature.pdf
4. www.ssd.eff.org/en/module/introduction-public-key-cryptography-and-pgp
5. www.webopedia.com/TERM/F/firewall.html

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16ITD10 **COMPUTER ORGANIZATION** **L T P C**
3 2 0 4

COURSE OBJECTIVES

1. Tounderstandthebasichardwareandsoftwareissuesofcomputer organization
2. To understand the arithmetic and logic unit and implementation of fixed point and floating-point arithmeticoperations
3. To provide the concept of pipeliningand hazards
4. Tofamiliarizethestudentswithmemorysystemincluding virtualmemoriesandcachememories
5. Toexpose the students with I/O devices and standard I/Ointerfaces

COURSE OUTCOMES

1. Analyze the abstraction of various components ofa computer.
2. Design arithmetic and logicalunit.
3. Analyze pipelined controlunits.
4. Evaluate the performance ofmemory systems.
5. Understanding the I/O devices andinterfaces

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD10.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD10.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD10.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD10.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD10.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNITIINTRODUCTION 9

Introduction-Technologies for building Processors and Memory-Performance-The Power Wall-Operations of the Computer Hardware-Operands Signed and Unsigned numbers, Representing Instructions, Logical Operations, Instructions for Making Decisions

UNIT IIARITHMETICOPERATIONS 9

MIPS Addressing for 32-Bit Immediate and Addresses-Parallelism and Instructions: Synchronization, Translating and Starting a Program, Addition and Subtraction, Multiplication, Division, Floating Point, Parallelism and Computer Arithmetic: Subword Parallelism, Streaming SIMD Extensions

UNIT III PIPELININGANDHAZARDS 9

Building a Datapath-A Simple Implementation Scheme-Overview of Pipelining-Pipelined Datapath-Data Hazards: Control Hazards, Exceptions-Parallelism via Instructions-Instruction Level Parallelism and Matrix Multiply Hardware Designlanguage

UNIT IVMEMORYSYSTEM 9

Memory Technologies-Basics of Caches-Measuring and Improving Cache Performance-Memory hierarchy- Virtual Memory-Secondary storage-Redundant Arrays of Inexpensive Disks-Implementing Cache Controllers

UNIT VINPUT&OUTPUTORGANIZATION 9

Accessing I/O Devices-Interrupts-Interrupt Hardware-Enabling and Disabling Interrupts-Handling Multiple Devices-Controlling Device Requests-Exceptions-Direct Memory Access-Buses -Standard I/O Inter faces – PCI Bus, SCSI Bus, USB

TOTAL HOURS L: 45+30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David A. Patterson and John L. Hennessey	Computer Organization and design	Morgan auffman / lsevier	2014
2.	Smruti Ranjan Sarangi	Computer Organization and Architecture	Tata McGraw Hill	2015

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky	Computer Organisation	McGraw-Hill Inc	2012
2.	William Stallings	Computer Organization and Architecture	Pearson Education	2010
3.	Vincent P. Heuring, Harry F. Jordan	Computer System Architecture	Pearson Education	2011
4.	Carl Hamacher, Zvonko Vranesic, Safwat Zaky, and Naraig Manjikian	Computer Organization and Embedded Systems	McGraw Hill Higher Education	2011
5.	John P. Hayes	Computer Architecture and Organization	Tata McGraw Hill	2014

WEB URLs:

1. www.ics.p.lodz.pl/~dpuchala/CompArch/Lectur6.pdf
2. www.dauniv.ac.in/downloads/CArch_PPTs/
3. www.nptel.ac.in/Computerorganization
4. www.cse.iitk.ac.in/users/karkare/courses/2011/cs220/html/notes.html
5. www.freevideolectures.com/Course/2277/Computer-Organization

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16ITD11 **COMPUTER GRAPHICS AND MULTIMEDIA** **L T P C**
3 02 4

COURSE OBJECTIVES

1. To understand the basic concepts of ComputerGraphics.
2. To Understand the Two Dimensional Transformations in ComputerGraphics
3. ToUnderstandtheClippingandThreeDimensionalGraphics.
4. To Know the projection and Animation ofGraphics
5. To Understand the differentMultimediaapplications

COURSE OUTCOMES

1. Explain graphics input and outputprimitives.
2. Apply 2D geometric transformationsonobjects.
3. Summarize the graphicsmodelingprocess.
4. Model a simple application withanimation.
5. Implement the video storage andcompressiontechniques

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD11.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD11.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD11.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD11.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD11.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-

UNIT I2DPRIMITIVES 9

Elements of pictures created in Computer Graphics – Graphics input primitives and devices – OpenGL basic Graphics primitives – Output Primitives – Line, Circle and Ellipse drawing Algorithms – Attributes of output primitives – Line drawings in OpenGL

UNIT II 2DGEOMETRICTRANSFORMATIONS 9

Two Dimensional Geometric Transformations – 2D Viewing – Window-Viewport Transformations – Line, Polygon, Curve and Text Clipping algorithms – 2D Geometric Transformations using OpenGL

UNIT III3D CONCEPTS 9

Three Dimensional Object Representation – Polygons, Curved Lines, Splines, Quadric Surfaces - 3D affine transformations - Parallel and perspective projections – Visualization of data sets –Viewing – Visible Surface Identification - Color Models

UNIT IVMULTIMEDIABASICS 9

IntroductionandDefinitions–Applications–Elements–Animations–Compression–TypesofCompression: LossyandLossless–VideoCompression–ImageCompression–AudioCompression–Dataand fileformat– Multimedia Data Structures: KD Trees –RTrees

UNIT V MULTIMEDIACOMMUNICATIONANDAUTHORING 9

Protocol – QoS Issues – Conferencing - Creating Interactive Multimedia – Multimedia Authoring Systems – Multimedia On Demand – Virtual Reality – Augmented Reality –Content Based Retrieval

TOTAL HOURS: 45

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LIST OF EXPERIMENTS:

1. Implementation of DDA and Bresenhams Line Algorithms for allslopes
2. Implementation of Midpoint CircleAlgorithm
3. 2D Geometric Transformations – Translation, Rotation, Scaling, Reflection,Shearing
4. Cohen - Sutherland Line Clipping
   Algorithm Implement the exercises
   from 5 to 7 usingOpenGL
5. 3D Transformations - Translation, Rotation,Scaling
6. 3D Projections – Parallel,Perspective
7. Creating 3DScenes
8. Compression Algorithms – To implement text and image compressionalgorithms
9. ImageEditingandManipulation -
   BasicoperationsonimageusinganyimageeditingSoftware,creatinggif animated images,
   Imageoptimization
10. 2D Animation – To create interactive animation using any authoringtool

TOTAL HOURS:30

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Donald Hearn,M. Pauline Bakerand WarrenCaritthers,	Computer Graphics with OpenGL	Prentice Hall	2010
2	Ze-Nian Li and Mark S. Drew	Fundamentals of Multimedia□, First Edition	Pearson Education	2004.

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	PrabhatK.Andleigh, KiranThakrar	Multimedia Systems Design	PHI	2013.
2	Ralf Steinmetz and Klara	Multimedia Computing, Communications and Applications	Pearson Education	2012
3	F.S. Hill	Computer Graphics using OpenGL	Pearson Education	2006
4	A. Rajaraman	Computer Graphics with Multimedia	Alpha Science International	2009
5	D. P. Mukherjee, Debasish Jana	Computer Graphics : Algorithms and Implementations	PHI Learning Pvt. Ltd	2010

WEB URLs

1. www.tutorialspoint.com/computer_graphics/computer_graphics_pdf_version.htm
2. www.nptel.ac.in/courses/106106090/
3. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-837-computer-graphics-fall-2012/
4. www.ignouassignmentguru.com/2016/10/mcs-053-computer-graphics-and-multimedia-study-material-download.html
5. www.cglearn.codelight.eu/pub/computer-graphics

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16ITD12 **ANALOG ANDDIGITALCOMMUNICATION** **L T PC 3 0 0 3**

COURSE OBJECTIVES

1. To Understand basic elements of acommunicationsystem
2. ToConductanalysisofbasebandsignalsintimedomainandin frequencydomain
3. ToDemonstrateunderstandingofvariousanalogganddigitalmodulationanddemodulationtechniques technique
4. ToAnalysestheperformanceofmodulationanddemodulationtechniquesinvarioustransmission environments
5. Toappreciatetheimportanceofsynchronizationincommunicationsystems

COURSE OUTCOMES

1. Explainandapplyvarioustypesofmodulationanddemodulationinanalogganddigital Communication.
2. Describe the concept of digitalcommunicationtechniques.
3. Describe the concept of various digital transmissiontechniques.
4. Comprehend the Cellularcommunicationtechniques.
5. ExplaintheconceptsofSatellitecommunicationandOpticalcommunication

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD12.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	X
16ITD12.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	X
16ITD12.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	X
16ITD12.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	X
16ITD12.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	X

UNIT I FUNDAMENTALS OFANALOGCOMMUNICATION 9

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

UNITIIDIGITALCOMMUNICATION 9

Shannon limit for information capacity - Digital amplitude modulation - Frequency Shift Keying - FSK bit rateand baud - FSK transmitter - BW consideration of FSK - FSK receiver - Phase Shift Keying – BPSK, QPSK8- PSK - Quadrature Amplitude modulation – 8-QAM - bandwidth efficiency - Carrier recovery – squaring loop, Costas loop - DPSK.

UNIT III DIGITALTRANSMISSION 9

Pulse modulation - PCM – PCM sampling - Sampling rate - Signal to Quantization noise rate - Commanding- analog and digital - Delta modulation PCM - Adaptive Delta modulation PCM - Differential PCM – Inter symbol interference - Eye patterns.

UNIT IV CELLULARCOMMUNICATION 9

Fundamental concept of Cellular telephone - Frequency reuse, Interference - Co-channel Interference, Adjacent channel Interference - Cell splitting - Cell sectoring - Segmentation and Dualization - Roaming and Handoff.

UNIT V SATELLITE ANDOPTICALCOMMUNICATION 9

Kepler's Law - Satellite Orbits - Geo synchronous satellites - satellite system link models - Optical Fiber Communication system - Optical Fiber configurations - Optical Fiber classification Losses in Optical fiber cables - Optical sources - LED , Injection laser diode - Light detector - PIN diodes, Avalanche photodiode.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Wayne Tomasi,	Electronic Communication Systems Fundamentals through Advanced	Pearson Education	2008
2	H.Taub,D L Schilling ,G Saha	Principles of Communication	Pearson Education	2008

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	B.P.Lathi	Modern Analog and Digital Communication systems	Oxford University Press	2008
2	Blake	Electronic Communication Systems	Thomson Delmar Publications	2002
3	Martin S.Roden	Analog and Digital Communication System	PHI	2002
4	B.Sklar	Digital Communication Fundamentals and Applications	Pearson Education	2007
5	Simon Haykin	Communication Systems	John Wiley & Sons	2010.

WEB URLs

1. www.complextoreal.com/tutorials/#.WSACKM-0nIU
2. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-450-principles-of-digital-communications-i-fall-2006/video-lectures/
3. www.safaribooksonline.com/library/view/analog-and-digital/9788131731871/xhtml/chapter006.xhtml
4. www.nptel.ac.in/courses/117101051/
5. www.freevideolectures.com/Course/2311/Digital-Communication/16

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16ITD13 **MOBILE ANDPERVASIVECOMPUTING** L T P C
3 0 2 4

COURSE OBJECTIVES

1. ToStudythe contextofpervasivecomputingandmobileapplications
2. Tointroducethecharacteristics,basicconceptsinmobileandpervasivecomputing
3. To introduce the systems issues in mobile and pervasivecomputing
4. To have deep knowledge about wireless communication and mobiletechnologies
5. To know the future trends in mobiletechnologies

COURSE OUTCOMES

1. Discover the characteristics ofpervasive computing applications including the major system components and architectures of thesystems
2. Exploitthe characteristicsofdifferenttypesofmobilenetworks
3. Analyze the working principles of WirelessLANstandards
4. Identify the fundamentals of pervasivecomputing.
5. Discover the characteristics of routingprotocols.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD13.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD13.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD13.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD13.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD13.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-

UNIT IPERVASIVECOMPUTING 9

Basics and vision – Architecture and applications requirements – Smart devices and operating systems - Secure services – Smart mobiles, cards and device networks

UNIT IIMOBILEAPPLICATIONS 9

History – Mobile ecosystem – Designing for context – Mobile strategy – Mobile applications– Information architecture – Design – Mobile web apps Vs native apps – Adapting to devices – Supporting devices – Application development on Android andiPhone.

UNIT III MEDIUM ACCESSANDTELECOMMUNICATIONS 9

Frequencies – Signals – Antennas – Signal propagation – Media access control: Motivation - SDMA, FDMA, TDMA, CDMA – GSM - Mobile services - System architecture – Protocols - Localization and calling - Handover – GPRS

UNIT IVWIRELESSNETWORKS 9

Infrared vs radio transmission – Infrastructure and adhoc networks – WLAN, IEEE 802.11 standards protocols. Piconet – Bluetooth - Architecture and services - Wireless Broadband networks and satellites networks – Wifi – WiMAX

UNIT V MOBILE NETWORKANDTRANSPORTLAYERS 9

Mobile IP – DHCP – Routing in Mobile adhoc networks - Proactive and reactive routing protocols– TCP Improvements – TCP over 2.5/3G.

TOTAL HOURS: 45

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LIST OF EXPERIMENTS

1. Develop an application that uses GUI components, Font andColors
2. Develop an application that uses Layout Managers and eventlisteners.
3. Develop a native calculatorapplication.
4. Writeanapplicationthat drawsbasicgraphicalprimitiveson thescreen.
5. Develop an application that makes useofdatabase.
6. Develop an application that makes use ofRSSFeed.
7. Implement an application that implements Multithreading
8. Develop a native application that uses GPS locationinformation.
9. Implement an application that writes data to theSDcard.
10. Implementanapplicationthatcreatesanalertuponreceivingamessage.
11. Writea mobileapplicationthatcreatesalarmclock

TOTAL HOURS: 30

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Asoke K Talukder, Hasan Ahmed, Roop R Yavagal	Mobile Computing	Tata McGraw Hill	2010
2.	Brian Fling	Mobile Design and Development	O'Reily	2009

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Zigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura	Programming Android	O'Reilly	2011
2.	Wei-Meng Lee	Beginning iPhone SDK Progrmming with Objective-C	Wrox Wiley	2010
3.	Stefan Poslad	Ubiquitous Computing: Smart Devices, Environments and Interactions	Wiley	2009
4.	Pei Zheng, Lionel M. Ni	Smart Phone & Next Generation Mobile Computing	Morgan Kaufmann	2006
5.	Jochen Burkhardt et al	Pervasive Computing: Technology and Architecture of Mobile Internet Applications	Pearson Education	2002

WEB URLs

1. www.wiley.com/college/sc/trp/ch06.pdf
2. www.cse.iitk.ac.in/users/rkg/Talks/mobile_main.pdf
3. www.vicomsoft.com/learning-center/wireless-networking/
4. www.astm.org/Standards/E2213.html
5. www.explainingcomputers.com/mobile.html

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16ITD14 **CLOUDCOMPUTING** **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. To analyze the components of cloud computing and its businessperspective.
2. To evaluate the various cloud developmenttools.
3. To collaborate with real time cloudservices.
4. Toanalyzethecasestudiestoderivethe bestpracticemodeltoapplywhendevelopinganddeployingcloud based applications.
5. To apply the security techniques in cloud baseapplications.

COURSE OUTCOMES

1. Explore the activities, architecture and applicationscloudcomputing.
2. Implement the cloud services and file system in the real timeapplications.
3. Implement the scheduling and management techniques of cloud computing.
4. Create the virtualization for cloudcomputing.
5. Implement security measures in thecloudenvironment.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD14.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITD14.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITD14.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITD14.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITD14.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X

UNIT I -CLOUDINTRODUCTION 9

Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud – Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus – Open Nebula, CloudSim.

UNIT II - CLOUD SERVICES ANDFILESYSTEM 9

Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service – Communication as services. Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force. Introduction to MapReduce, GFS, HDFS, Hadoop Framework.

UNIT III - COLLABORATINGWITHCLOUD 9

Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management – Collaborating on Word Processing ,Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis

UNIT IV - VIRTUALIZATIONFORCLOUD 9

Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT V - SECURITY, STANDARDS,AND APPLICATIONS 9

Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards forMessaging–StandardsforSecurity,Enduseraccesstocloudcomputing,MobileInternetdevicesandthecloud

TOTAL HOURS :45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Bloor R., Kanfman M., Halper F. Judith Hurwitz	Cloud Computing for Dummies	Wiley India Edition	2010
2	John Rittinghouse & James Ransome	Cloud Computing Implementation Management and Strategy	CRC Press	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Antohy T Velte	Cloud Computing : "A Practical Approach	McGraw Hill	2009
2	Michael Miller	Cloud Computing:"Web-Based Applications That Change the Way You Work and CollaborateOnline	Que Publishing	2008
3	James E Smith, Ravi Nair	Virtual Machines	Morgan Kaufmann Publishers	2006
4	Haley Beard	Cloud Computing Best Practices for Managing and	Emereo Pty Limited	2008
5.	Barrie Sosinsky	Cloud Computing Bible	John Wiley & Sons	2010

WEB URLs

1. www.cloud-standards.org/wiki/index.php?title=Main_Page
2. www.nptel.ac.in/courses/106105033/41
3. www.courses.cs.ut.ee/2011/cloud/Main/Lectureswww.cloudbus.org/cloudsim/www.hadoop.apache.org/docs/stable/hdfs_design.html
4. www.eucalyptus.com/

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16ITD15 **WEBTECHNOLOGY** **L T P C**
3 0 2 4

COURSE OBJECTIVES

1. To Explain the basic web concepts and Internetprotocols
2. To Apply style sheet formats forapplications
3. ToUnderstandserversideprogrammingandscriptinglanguages
4. To implement XML, SERVELETS AND JSP forwebservices
5. To Explain the basic concepts and characteristicsinPHP

COURSE OUTCOMES

1. CreatewebpagesusingXHTMLandCascadingstylessheets.
2. Build dynamic web pages usingJavaScript
3. Writeaserversidejavaapplicationcalledservlettocatchformdatasentfromclientandstoreit ondatabase.
4. Create XML Documents andWebservices
5. Build web applications usingPHP.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD15.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD15.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD15.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD15.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITD15.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-

UNITI FUNDAMENTALS 9

Introduction to the Internet - The World Wide Web - Web Browsers - Web Servers - Uniform Resource Locators -MIME - HTTP - HTTP Request Message - Response Message - Web Clients - Web Servers – MarkupLanguages: Origins and Evolution of HTML and XHTML - Basic XHTML Syntax and Semantics - Fundamental HTML Elements - Basic Text Markup - Images - Hypertext Links - Lists - Tables - Frames - Forms - Syntactic Differences Between HTML andXHTML

UNIT II CLIENTSIDEPROGRAMMING 9

Style Sheets: Introduction - Level of Style Sheets - Style Specification Formats - Selector Forms - Property Value Forms - Font and List Properties – Color - Alignment of Text - The Box Model - Client Side Programming: The JavaScript Language - History and Versions - Introduction to JavaScript in Perspective - Syntax - Variables and Data Types – Statements – Operators – Literals – Functions – Objects – Arrays - Built- in Objects - JavaScriptDebuggers

UNIT III HOST OBJECTS ANDSERVERSIDEPROGRAMMING 9

Browsers and the DOM - Introduction to the Document Object Model - Element Access in JavaScript - Events and Event Handling - Handling Events from Body Elements, Button Elements, Text Box and Password Elements - DOM Tree Traversal and Modification - Server-Side Programming: Java Servlets - Architecture – Overview - A Servlet - Generating Dynamic Content - Life Cycle - Parameter Data - Sessions - Cookies - URL Rewriting - Other Capabilities - Data Storage Servlets and Concurrency - Case Study - Related Technologies.

UNIT IV XMLANDJSP 9

RepresentingWebData:XML–DTD–Namespaces-XMLSchemas-XSLTStyleSheets-WebServices -Separating Programming and Presentation: JSP Technology - Introduction-JSP and Servlets - Running JSP Applications - Basic JSP - JavaBeans Classes and JSP - Tag Libraries and Files - Support for the Model – View - Controller Paradigm - CaseStudy

UNIT V INTRODUCTIONTOPHP 9

Overview of PHP- General Syntactic Characteristics- Primitives - Operations - Expressions – Output – Control Statements – Arrays – Functions - Pattern Matching - Form Handling – Files – Cookies - Session Tracking

TOTAL HOURS:45

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LIST OF EXPERIMENTS:

1. Develop a simple webpage using HTML. Apply Text Formatting and HyperLinks.
2. Use frames to include Images andVideos.
3. Creation of a simple application to access data base using JDBC formatting HTML withCSS.
4. Design a dynamic web page with validation usingJavaScript.
5. WriteaprograminJavatocreatethree-tierapplicationusingJSPandDatabasesforconductingon-line Examination.
6. Simple application to demonstrateServlets.
7. Programs using XML - Schema -XSLT/XSL.
8. Write a program to implement web service for calculatorapplication.
9. Use HTML form to accept the two numbers N1 and N2 and using PHP program display onlyprime numbersin between N1 andN2.

TOTAL HOURS: 30

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Jeffery C. Jackson	Web Technologies: A Computer Science perspective	Pearson Education	2011
2	Robert W. Sebesta	Programming The World Wide Web	Pearson Education	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Paul Deitel, Harvey Deitel, Abbey Deitel	Internet & World Wide Web: How to Program	Pearson Education	2011
2	N.P.GopalanJ.Akilandeswari	Web Technology: A Developer's Perspective	PHI	2014
3	Uttam K.Roy	Web Technologies	Oxford University Press	2010
4	Mahesh P. Matha	Core Java A Comprehensive study	PHI	2011
5	Chris Bates	Web Programming: Building Internet Applications	Wiley	2012

WEB URLs

1. www.docs.google.com/file/d/0BxXCzDgp0Y7VbHVla3Z5T1JQd00/
2. www.nptel.ac.in/courses/106105084/
3. www.tutorialspoint.com/web_developers_guide/web_basic_concepts.htm
4. www.w3schools.com/
5. www.tutorialride.com/web-technologies.html

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16ITD16 **WIRELESSCOMMUNICATION**

L	T	P	C
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COURSE OBJECTIVES

1. To learn the basics of wireless communication and how communication takes place in wirelessnetworks.
2. To study about digital modulation and radiopropagation.
3. To learn about cellular communication and multiple accesstechniques.
4. To learn GSM and CDMAtechnologies
5. To understand the emerging wirelesstechnologies.

COURSE OUTCOMES

1. Understand the principles and fundamentals of wirelesscommunications.

   Differentiate the digital modulation and radio propagation
2. Analyze various multiple access schemes used in wirelesscommunication.
3. Understand the operation GSM and CDMA digital cellularstandards.
4. Familiar with some of the existing and emergingwirelessstandards

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD16.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD16.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD16.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD16.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD16.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-

UNIT I - INTRODUCTION TOWIRELESSNETWORKS 9

Elements of a wireless communication system – signal and noise - the radio – frequency spectrum –Analog modulation schemes -Amplitude modulation – frequency and phase modulation – sampling – pulse code modulation – delta modulation – data compression.

UNIT II - DIGITAL MODULATION ANDRADIOPROPAGATION 9

Digital communication- sampling –pulse code modulation – delta modulation -Frequencyshifkeyig– Phase shift keying – Multiplexing and Multiple access – spread spectrum systems - radiopropagation.

UNIT III - PRINCIPLES OF CELLULAR COMMUNICATION AND MULTIPLE ACCESS TECHNIQUES 9

Cellular terminology - Cell structure and Cluster – Frequency reuse concept – Cluster size and system capacity – method of locating co channel cells – frequency reuse distance – frequency division multiple access – time division multiple access – space division multiple access – code division multiple access.

UNIT IV - GSM AND CDMA DIGITALCELLULARSTANDARDS 9

GSM network architecture –GSM signaling protocol architecture – Identifiers in GSM – GSM channels –GSM handoff procedures – Edge technology – wireless local loop – DECT system – GPRS

UNIT V - EMERGINGWIRELESSTECHNOLOGIES 9

IEEE 802.11 system architecture – mobile ad hoc networks – Mobile IP and mobility management – Mobile TCP - wireless sensor networks – RFID technology – Blue tooth – Wi –Fi standards – Wimax standards. – Femtocell network – Push -to –talk technology for SMS.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Roy Blake,	Wireless communication technology	CENGAGE Learning	2010
2	Singal T.L.	Wireless communication	Tata McGraw Hill Education	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Dharma Prakash Agrawal , Qing –An Zeng	Introduction to wireless and mobile systems	CENGAGELearning	2012
2	Upena Dalal,	"Wireless communication	Oxford University press	2009
3	Kaveh Pah Laven and P. Krishna Murthy	Principles of Wireless Networks	Pearson Education	2002
4	Gottapu Sasibhushana Rao	MobileCellular Communication	Pearson Education,	2012
5	Vijay K. Gary	Wireless Communications and Networking	Elsevier	2007

WEB URLs:

1. www.ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-450-principles-of-digital-communications-i-fall-2006/video-lectures/lecture-20-introduction-of-wireless-communication/
2. www.nptel.ac.in/courses/117102062/
3. www.tutorialspoint.com/wireless_communication/index.htm
4. www.freevideolectures.com/Course/2329/Wireless-Communication
5. www.slideshare.net/Darshan246/wireless-communication-30415774

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16ITD17 **EMBEDDEDPROGRAMMING** **LTP C**
3 0 0 3

COURSE OBJECTIVES

1. To understand basics of embeddedsystemprogramming
2. TodescribethememorymanagementinEmbeddedprogramming
3. To describe the basic elements fordesigningpurposes
4. Todesign real time embedded systemprogramming
5. To Analyze various examples of embeddedprogramming

COURSE OUTCOMES

1. Describe the system architecture for embeddedprogramming.
2. Describe the memory managementin Embedded programming
3. Design various real time embeddedsystems.
4. Use the real time software's to handlesemaphores.
5. Design and develop application for specific embeddedsystems

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD17.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD17.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD17.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD17.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITD17.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-

UNITIINTRODUCTION 9

Introduction-Applications of Embedded systems-Embedded System Architecture-Instruction Set- Requirements for Embedded Systems-Embedded Software Development: Challenges and Issues- Operating Systems for Embedded Systems: Introduction and Features

UNIT II GETTING STARTED WITHEMBEDDEDPROGRAMMING 9

Assembly verses High Level language-Integrated Development Environment-Building Process-Types of Memory for Embedded System-Memory Management methods-Bug Handling-Interrupts and ISRs handling in Embedded Systems

UNIT IIIDESIGNINGELEMENTS 9

Basic Input Output Device Interface Programming-Developing Programmable Interrupt Controller-Timers and Counters-LCD hardware and Programming-Analog to Digital Clock

UNIT IV REAL TIMEEMBEDDEDPROGRAMMING 9

Scheduling in Real Time Environment-Real Time Clock Designing-Real Time Operating System Support for Embedded Programming-Task Management in Real Time Environment-Semaphores handling-Message Queuing: States, Content, Storage

UNIT VCASESTUDY 9

Bioinformatics on Embedded System- Cruise Controller in Transportation- Mobile Phones and Handheld Devices- Low Power Systems-Reconfigurable Systems- Applications in Medical Field-Wireless Communication in Embedded Systems

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Julio Sanchez and Maria P. Canton	Embedded Systems Circuits and Programming	Taylor and Francis	2012
2.	Michael Barr and Anthony Massa	Programming Embedded Systems: With C and GNU Development Tools	O'Reilly	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Qing Li and Caroline Yao	Real-Time Concepts for Embedded Systems	Elsevier	2003
2.	Sriram V Iyer and Pankaj Gupta	Embedded Real Time System Programming	Tata McGraw Hill	2004
3.	Raj Kamal	Embedded Systems Architecture, Programming, and Design	Tata McGraw Hill	2008
4.	K.V. Shibu	Introduction To Embedded Systems	Tata McGraw	2009
5.	Dreamtech Software Team	Cracking theCode EmbeddedSystem	Wiley	2002

WEB URLs

1. www.elprocus.com/basics-and-structure-of-embedded-c-program-with-examples-for-beginners/
2. www.dauniv.ac.in/downloads/EmbsysRevEd_PPTs/Chap_5Lesson01EmsysNewCProgrElements.pdf
3. www.codeproject.com/Articles/34675/C-Programming-for-Embedded-System
4. www.inf.ed.ac.uk/teaching/courses/es/PDFs/AMF_ENT_T0001.pdf
5. www.javatpoint.com/embedded-system-c-programming

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16ITD18 **SOFTWARE ARCHITECTURE** **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. To understand software architectural requirements anddrivers
2. To Be exposed to architecturalstyles
3. ToAbilitytounderstandthearchitecturalviews
4. ToStudentswillbeabletoidentifyandenhancethearchitecturaldesign
5. To help software engineers and enterprise architects to create an information-driven, integrated organizationalenvironment.

COURSE OUTCOMES

1. Explain influence of software architecture on business andtechnicalactivities
2. Use styles to specify softwarearchitecture
3. Use views to specify softwarearchitecture
4. Design document for a givenarchitecture
5. Describe the recent trends insoftwarearchitecture

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD18.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD18.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD18.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD18.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD18.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNITIINTRODUCTION 9

Definition of Software Architecture – Architectural structures and views – Architectural Patterns – Software architectures and documentation - Quality Attribute Workshop – Documenting Quality Attributes – Six part scenarios

UNITIIARCHITECTURESTYLES 9

Architectural statics and patterns - Use of Patterns and styles - Software design - Common architectural styles - Call-return styles – Shared Information styles - Event styles - Pipes and filters - Data abstraction and object orientation - Event based implicit invocation - Layered systems – Repositories – interpreters

UNITIIIARCHITECTURALVIEWS 9

Introduction - Definitions for views – Structures and views - Representing views-available notations – Standard Views – view of RUP – Architectural documentation and Quality Attributes - Siemens 4 views – Case Study.

UNITIVARCHITECTURALDESIGN 9

Guidelines for Architectural design, Design space and rules, Applying design space with an example, study of Quantified design space

UNITVARCHITECTURE IN THELIFECYCLE 9

Architecture in Agile projects – Architecture and requirements – Designing architecture – Documenting software – Architecture, Implementation and Testing.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Len Bass, Paul Clements, & Rick Kazman	Software Architecture in Practice	Addision Welsey,Third Edition	2012
2.	Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Reed Little, Paulo Merson, Robert Nord, andJudith Stafford	Documenting Software Architectures. Views and Beyond	2nd Edition, Addison-Wesley	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Mary Shaw & David Garlan	Software Architecture	Prentice Hall India Private Limited.	2012
2.	Anthony J Lattanze	Architecting Software Intensive System. A Practitioner's Guide	Auerbach Publications	2010
3.	Rajkumar Buyya, James Broberg, and Andrzej Goscinski	Cloud Computing. Principles and Paradigms	John Wiley & Sons	2011
4.	Len Bass, Paul Clements, and Rick Kazman	Software Architectures Principles and Practices	2n Edition, Addison-Wesley	2003
5.	Paul Clements, Rick Kazman, and Mark Klein	Evaluating software and case studies	Addison-Wesley	2001

WEB URLs

1. www.vishvavishva15.wordpress.com/tag/software-architectures/
2. www.drive.google.com/file/d/0B1YwnmsX9iV4Mk15WWMxVXVhUk0/edit
3. www.msdn.microsoft.com/en-in/library/ee658098.aspx
4. www.sei.cmu.edu/architecture/
5. www.tutorialspoint.com/software_architecture_design/

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16ITD19 **DISTRIBUTEDSYSTEMS**

L T PC
3 2 04

COURSE OBJECTIVES

1. To Understand the basic concepts of DistributedSystems
2. To Analyze the inter process communication paradigms in distributedenvironment
3. ToExplainthedifferentfilesystemarchitecturesandnameservices
4. ToCoordinateandsynchronizeprocessstatesfordifferentnetworks
5. To Understand the concept of distributed transaction and its concurrencycontrol techniques

COURSE OUTCOMES

1. Demonstrateknowledgeofthebasicelementsandconceptsrelatedtodistributedsystemtechnologies
2. Apply remote method invocation andobjects
3. Able to analyze file system structureand nameservices
4. Useandapplyimportantmethodsindistributedsystemsto supportscalabilityandsynchronization
5. Implement concurrency control techniques fordistributedtransactions

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD19.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD19.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD19.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD19.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD19.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNITIINTRODUCTION 9

Introduction - Examples of Distributed Systems - Trends in Distributed Systems - Focus on resource sharing - Challenges - Case study: World Wide Web, System models - Introduction, Architectural and Fundamental models

UNIT IIINTERPROCESSCOMMUNICATION 9

Inter process Communication - The API for the Internet protocols - External data representation and Multicast communication - Network virtualization: Overlay networks - Case study : MPI Remote Invocation - Introduction–- Request - Reply protocols - Remote procedure call - Remote method invocation - Case study: Java RMI- Group communication - Publish - subscribe systems - Message queues - Shared memory approaches

UNIT III FILE SYSTEMS ANDNAMESERVICES 9

Distributed File Systems – Introduction - File Service Architecture - Case Study - Sun network File System - Name Services: Introduction -, Name Services and the Domain Name System - Case study of the Global Name Service - Case study of the X.500 Directory Services

UNIT IV SYNCHRONIZATIONANDCOORDINATION 9

Time and Global States: Introduction – Clocks - events and Process states - Synchronizing physical clocks - logical time and logical clocks - global states - distributed debugging. Coordination and Agreement: Introduction- Distributed mutual exclusion - Elections - Multicast communication - consensus and related problems.

UNIT V DISTRIBUTEDTRANSACTIONS 9

Introduction - Flat and Nested Distributed Transactions - Atomic commit protocols - Concurrency controlin distributed transactions - Distributed deadlocks - Transaction recovery – Replication – Introduction - System model and group communication - Fault tolerant services - Transactions with replicateddata

TOTAL HOURS: 45+30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	GCoulouris J Dollimore TKindberg	Distributed Systems Concepts and Design	Pearson Education	2013
2.	S.Ghosh,	Distributed Systems	Taylor &Francis Group	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S.Mahajan S.Shah	Distributed Computing	Oxford University Press	2013
2.	K.P.Birman	Reliable Distributed Systems	Springer	2014
3.	A.S. Tanenbaum M.V. Steen	Distributed Systems: Principles and Paradigms	Pearson Education	2015
4.	Sukumar Ghosh	Distributed Systems: An Algorithmic Approach	CRC Press	2014
5.	S. K. Basu	Parallel and Distributed Computing: Architectures and Algorithms	PHI	2016

WEB URLs

1. www.hpcs.cs.tsukuba.ac.jp/~tatebe/lecture/h23/dsys/dsd-tutorial.html
2. www.cis.upenn.edu/~lee/07cis505/Lec/lec-ch1-DistSys-v4.pdf
3. www.nptel.ac.in/courses/106106107/
4. www.na.icar.cnr.it/~oliva/cluster.tigem.it.pdf
5. www.tutorialspoint.com/distributed_dbms/

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16ITD20 **HIGH SPEED NETWORKS**

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COURSE OBJECTIVES

1. To learn High speed networks and ATMArchitecture
2. To understand resource allocation and s congestionmanagementapproaches
3. To understand ATM Congestioncontrolmanagement
4. To understand the integrated and differentiatedservices
5. To learn protocols forQOSsupport

COURSE OUTCOMES

1. Summarizethemechanismstoprovidehighspeednetworkingthroughcasestudiesof ATMandframe relaynetworks
2. Construct queuing system with different arrival andservicerates
3. Analyze the performance of various congestion control inATM.
4. Design the integrated and differentiatedservices
5. Explain the protocols needed for QoSsupport

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD20.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD20.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD20.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD20.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITD20.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT I HIGHPERFORMANCENETWORKS 9

FrameRelayNetworks–AsynchronousTransferMode(ATM)–ATMProtocolArchitecture-ATMlogical connection - ATM cell – ATM service categories – ATM Adaptation Layer (AAL) - High Speed LANs: Fast ethernet - Gigabit ethernet - Fiberchannel.

UNIT II QUEUINGMODELS ANDCONGESTIONMANAGEMENT 9

Queuing analysis- Queuing models – Single server queues – Effects of congestion – Congestion control – Traffic management – Congestion control in packet switching networks

UNIT III ATMCONGESTIONCONTROL 9

Performance of TCP over ATM - Traffic and congestion control in ATM – Requirements – Attributes – Traffic management frame work - Traffic control – Available Bit Rate (ABR) Traffic management – ABR rate control - Resource Management (RM) Cell formats – ABR capacity allocations.

UNIT IV INTEGRATED ANDDIFFERENTIATEDSERVICES 9

Integrated services architecture – Approach - Components - Services - Queuing discipline – Fair admission control - Traffic shaping - Resource reservation queuing (FQ) - Processor Sharing (PS) - Bit-Round Fair Queuing (BRFQ) - Generalized Processor Sharing (GPS) - Weighted Fair Queuing (WFQ) – Random early detection - Differentiated services DS code points – Per Hop Behavior

UNIT V PROTOCOLS FORQOSSUPPORT 9

Resource Reservation (RSVP) – Goals & characteristics - Data flow - RSVP operations - Protocol mechanisms – Multiprotocol label switching – Operations - Label stacking – Protocol details – Real Time Protocol (RTP) – Protocol architecture - Data transfer protocol - Real Time Control Protocol (RTCP)

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	William Stallings	High Speed Networks and	Pearson Education	2002
2.	Warland &PravinVaraiya	High Performance Communication Networks	Jean Harcourt Asia Pvt. Ltd	2001

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	IrvanPepelnjk, et al	MPLS and VPN architecture□	Cisco Press	2003
2.	Behrouz A. Forouzan, Sophia Chung Fegan	Data Communications and Networking	McGraw-Hill Higher Education	2003
3.	Larry L. Peterson and Bruce S.Davie	Computer Networks	Elsevier Publications	2003
4.	Mahbub Hassan, Raj Jain	High Performance TCP/IP Networking	Prentice Hall	2004
5.	William Stallings	Data and Computer Communications	Pearson Education	2007

WEB URLs

1. www.utdallas.edu/~metin/SUNet
2. www.rivier.edu/faculty/vricbov
3. www.williamstalling.com/NSNe2e.html.
4. www.sterbenz.org/jpgs/tutorials/hsn/
5. www.ittc.ku.edu/~jpgs/courses/hsnets

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16ITD21 **IOT AND APPLICATIONS** **L T P C**

3 0 0 3

COURSE OBJECTIVES

1. To understand the basic concepts of Internet ofthings.
2. To draw the architecture and operation ofIOT
3. To design web page s usingIOT
4. To learn about privacy, security and governance ofIOT
5. To create a application usingIOT.

COURSE OUTCOMES

1. Understand the fundamental concepts ofIOT
2. Draw the architectureIOT
3. Design a web page usingIOT
4. Develop the secure real time application usingIOT
5. Create a applications usingIOT

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITD21.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD21.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD21.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD21.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-
16ITD21.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	X	-	-

UNIT IOVERVIEW 9

IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics, KnowledgeManagement

UNIT IIARCHITECTURE 9

IoT Architecture-State of the Art – Introduction, State of the art, Reference Model and architecture, IoT reference Model - IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remotecontrol.

UNIT IIIWEBTECHNOLOGY 9

The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Case Study

UNIT IV PRIVACY, SECURITYANDGOVERNANCE 9

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security

UNIT V APPLICATIONS FORVALUECREATIONS 9

Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth.

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Vijay Madisetti and Arshdeep Bahga	Internet of Things (A Hands-on-Approach	VPT	2014
2.	Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle	From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence	Academic Press	2014

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Francis daCosta	Rethinking the Internet of Things: A Scalable Approach to	Apress Publications	2013
2.	Cuno Pfister	Getting Started with the Internet of Things	O□Reilly Media	2011
3.	Daniel Kellmereit, Daniel Obodovski,	The Silent Intelligence: The Internet of Things	Lightning Source	2014
4.	Hakima Chaouchi,	The Internet of Things Connecting Objects to the Web"	Willy Publications	2014
5.	Olivier Hersent, David Boswarthick,	The Internet of Things: Key Applications and Protocols	Willy Publications	2014

WEB URLs

1. www.cse.wustl.edu/~jain/cse570-15/ftp/iot_prot/index.html
2. www.github.com/connectIOT/iottoolkit
3. www.arduino.cc/
4. www.zettajs.org/
5. www.tutorialspoint.com/internet_of_things/

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16ITE01 **C# AND.NETFRAMEWORK** **L T PC**
3 2 04

COURSE OBJECTIVES

1. To discuss the concepts of NET Framework and C#language
2. ToDesignand developreal-timeapplicationsusingobjectorientedconceptsinC#
3. ToDesignanddevelopreal-timeapplicationsusing.NET
4. To Design and develop windows and web based applications usingC#
5. To Develop C# programs for Multithreading anddatabaseapplications

COURSE OUTCOMES

1. Discuss the concepts of NET Framework and C#language
2. Design and develop real-time applications using object oriented concepts inC#
3. Design and develop real-time applications using.NET
4. Develop the web based applications using ADO.NET inC#
5. Implementthenetworkapplicationbyusing.Netframework.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE01.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE01.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE01.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE01.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE01.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT-IINTRODUCTIONTOC# 9

Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT-IIOBJECT ORIENTED ASPECTSOFC# 9

Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

UNIT-IIIAPPLICATION DEVELOPMENTON.NET 9

Windows Applications: Basic windows controls. Advanced controls, multi window applications, Accessing Data with ADO.NET: Connections, Data Adapters, Datasets, Data Application, Working with relational databases, multiple tables in a single dataset, Data views, Data Binding, Complex Binding, Navigating through datasets using bound controls.

UNIT -IV WEB BASED APPLICATION DEVELOPMENTON.NET 9

Programming Web Applications with Web Forms, web server controls, Programming Web Services.

UNIT-VTHE CLR AND THE.NETFRAMEWORK 9

Assemblies, Versioning, Attributes, Reflection, Viewing Metadata, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using Single Call, Threads.

TOTAL HOURS: 45+30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	E. Balagurusamy	Programming in C#	Tata McGraw-Hill	2004
2.	J. Liberty	Programming C#	O'Reilly	2002

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Herbert Schildt	The Complete Reference: C#	Tata McGraw-Hill	2004
2.	Robinson et al	Professional C#	Wrox Press	2002
3.	Andrew Troelsen	C# and the .NET Platform	A1 Press	2003
4.	Thamarai Selvi, R. Murugesan	A Textbook on C#	Pearson Education	2003
5.	Karli Watson, Christian Nagel,Jacob Hammer Pedersen,Jon Reid, Morgan Skinner	Beginning Viual C# 2010	Wiley India Pvt.Ltd	2010

WEB URLs

1. www.tutorialspoint.com/net_framework_online_training/index.asp
2. www.csharp.net-tutorials.com/basics/visual-csharp-express/
3. www.lynda.com/C-sharp-training-tutorials/1022-0.html.
4. www.learncs.org\
5. www.msdn.microsoft.com/en-us/library/aa288436(v=vs.71).aspx

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16ITE02 **SOFTWAREPROJECTMANAGEMENT** **L TPC**
3 0 03

COURSE OBJECTIVES

1. To highlight different techniques for softwarecostestimation
2. To plan and monitor projects for the riskmanagement
3. To explore the process of monitoringand controlling
4. To manage people and organizationofteams
5. To estimate the cost associated withaproject

COURSE OUTCOMES

1. Able to practice the process of project management and its application in delivering successfulprojects
2. Evaluatetherisksandhazardsintheprojectmanagement
3. Apply cost monitoring and control strategies for softwareprojects
4. Identifydesirablecharacteristicsofeffectiveprojectmanagersand managetheorganizational behavior of people working inteams
5. Evaluateaprojectto developthescopeofwork,provideaccuratecostestimatesandtoplanthe variousactivities

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE02.CO1	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITE02.CO2	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITE02.CO3	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITE02.CO4	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-
16ITE02.CO5	X	X	X	X	-	-	-	-	X	-	X	X	X	-	-	-

UNITIINTRODUCTION ANDPROJECTEVALUATION 9

Project Definition – Importance of Software Project Management – Contract Management – Activities covered by Software Project Management – Setting objectives – Stakeholders - Management Control – Overview of Project Planning – Stepwise Project Planning – Project evaluation - Strategic Assessment – Technical Assessment–Cost BenefitAnalysis– CashFlowForecasting–CostBenefitEvaluationTechniques

UNIT II ACTIVITY PLANNING ANDRISKMANAGEMENT 9

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – ForwardPass–BackwardPass–Criticalpath(CRM)method–ActivityFloat–ShorteningtheProjectDuration– Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – HazardAnalysis

UNITIIIPROJECT MANAGEMENTANDCONTROL 9

Introduction – Creating the Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages in Contract Placement – Typical Terms of a Contract – Contract Management –Acceptance

UNITIVMANAGING PEOPLE ANDORGANIZINGTEAMS 9

Introduction – Understanding Behavior – Organizational Behavior – Selecting the Right Person for the Job –Instruction in the Best Methods – Motivation – The Oldham Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health AndSafety

UNIT VSOFTWAREEFFORTESTIMATION 9

Introduction–Thebasicsforsoftwareestimation–Softwareeffortestimationtechniques–Expertjudgment –Estimating by analogy – Albrecht function point analysis –Function points Mark II – COSMIC Full function points - COCOMO: A Parametric Productivity Model.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bob Hughes, Mike Cotterell	Software Project Management	Tata McGraw Hill, Fifth Edition	2011
2.	Robert K. Wysocki	Effective Software Project Management	Wiley Publication	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Adolfo Villafiorita	Introduction to Software Project Management	CRC Press	2014
2.	Jalote	Software Project Management in Practice	Pearson Education	2010
3.	Murali k. chemuturi, Thomas m cagly	Mastering software project management- best practices tools and Techniques	j ross Publication	2010
4.	Richard E. Fairly	Managing and Leading Software projects	Weilly and sons	2009
5.	Ramesh, Gopalaswamy	Managing Global Projects	Tata McGraw Hill	2001

WEB URLs

1. www.cs.ox.ac.uk/people/michael.wooldridge/teaching/soft-eng/lect05.pdf
2. www.at-web1.comp.glam.ac.uk/staff/dwfarthi/projman.html
3. www.tutorialspoint.com/management_concepts/project_management_softwares.htm
4. www.projectmanagement.com/wikis/233034/Cost-Benefit-Analysis
5. www.abebooks.com/book-search/kw/software-project-management-5th-edition-bob-hughes-mike- cotterell/

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16ITE03 SOFTWARETESTING **L T P C**
3 2 0 4

COURSE OBJECTIVES

1. To understand the basic software testingprinciples.
2. To understand the working principles of various testingmethodologies.
3. ToUnderstandknowledgeoftechniquesforsystemtestingandfunctionaltesting
4. Tounderstandthewaysandmeansofcontrollingand monitoringtestingactivity.
5. Tounderstand the concept of modern software testingtools.

COURSE OUTCOMES

1. Explain the basic software testingprinciples.
2. Classify the types oftesting
3. Differentiate operation of system testing & functionaltesting
4. Analyze the techniques in testing in planning, automation & executionmanagement.
5. Implement the testing using modern software testingtools.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE03.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE03.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE03.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE03.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE03.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-

UNITIINTRODUCTION 9

Basic Concepts and preliminaries –Objectives of Testing-Testing Activities-Testing Levels-Role of Testing- Verification and Validation-Test Case-Theory of Program Testing- Theory of Good enough and Gerhart-WeyukerandOstrand-Gourlay-AdequacyofTesting-LimitationsofTesting.

UNIT II TYPESOFTESTING 9

Unit Testing-Static and Dynamic Unit Testing-Defect Prevention-Mutation Testing and Debugging-Control Flow Testing- Control Flow Graph- Paths in a Control Flow Graph- Path Selection Criteria- Generating Test Input- Data Flow Testing- Data Flow Graph- Data Flow Terms- Data Flow Testing Criteria- Comparison of Data Flow Test Selection Criteria- Feasible Paths and Test Selection Criteria- Comparison of Testing Techniques-DomainTesting.

UNIT-III SYSTEM TESTING &FUNCTIONALTESTING 9

System Testing- Different Types of Interfaces and Interface Errors- System Integration Techniques- Software and Hardware Integration- Test Plan for System Integration- Test Categories- Basic Tests- Functionality Tests- Robustness Tests- Functional Testing- Functional Testing Concepts of Howden- Pairwise Testing- Equivalence Class Partitioning- Boundary Value Analysis- Decision Tables- Random Testing- Error Guessing- CategoryPartition.

UNIT-IV PLANNING, AUTOMATION&EXECUTION 9

Planning And Automation- Approach- Suite Structure- Environment- Execution Strategy- Effort Estimation- System Test Automation- Evaluation and Selection of Test Automation Tools- Characteristics of Automated Test Cases- Structure of an Automated Test Case- Test Execution- Modeling Defects- Metrics for Tracking System Test- Orthogonal Defect Classification- Defect Causal Analysis- Beta Testing- First Customer Shipment- System Test Report- Product Sustaining-Measuring TestEffectiveness

UNIT-V M O D E R N SOFTWARETESTINGTOOLS 9

Evolution of Automated Testing Tools-Variable Capture/Replay Tools-Extreme Programming-Software Testing Trends-Taxonomyof Testing Tools-Methodologyto Evaluate Automated Testing Tools-CaseStudy

TOTAL HOURS:45+30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Kshirsagar Naik, Priyadarshi Tripathy	Software Testing & Quality Assurance	A JOHN WILEY & SONS	2011
2.	William E.Lewis, Gunasekaran Veerapillai	Software Testing & Continuous Quality Improvement	AUERBACH PUBLICATIONS	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Alan C Gillies	Software Quality Theory and Management	Cengage Learning	2011
2.	Srinivasan Desikan, Gopalaswamy Ramesh	Software Testing – Principles and Practices	Pearson Education	2009.
3.	Ron Patton	Software testing	Pearson Education	2007
4.	William E. Perry	Effective Methods for Software Testing	Wiley India	2006.
5.	Renu Rajani and Pradeep Oak	Software Testing – Effective Methods, Tools and Techniques	TataMcGraw Hill PublishingCompany Limited	2005

WEB URLs

1. www.tutorialspoint.com/software_testing/software_testing_qa_qc_testing.htm
2. www.etestinghub.com/introduction_to_testing.php
3. www.guru99.com/automation-testing.html
4. www.softwaretestinghelp.com/automation-testing-tutorial-1/
5. www.softwaretestingtimes.com/2010/04/software-testing-tutorials-for.html

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16ITE04 **ARTIFICIALINTELLIGENCE** **L T P C**
3 0 0 3

COURSE OBJECTIVE

1. Tolearntheconceptsofcomputationalintelligenceforsolvingproblems
2. To Understand about knowledge representation and decisionsmaking
3. Tointroducethe conceptsofmachinelearningand NeuralNetworks
4. To Initiate the Perception of GeneticAlgorithms.
5. To understand the knowledge about ExpertSystems

COURSE OUTCOMES

1. Apply different searching strategies forproblemsolving
2. Representplanningproblemsandfindthesequenceofactionstoachievegoalsbyusingknowledge representation.
3. Comprehends the various machine learningtechniques.
4. Demonstrate different techniquesto represent Genetic Algorithms
5. Develop the expert system for the real timeproblems.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE04.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	X
16ITE04.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	X
16ITE04.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	X
16ITE04.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	X
16ITE04.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	X

UNIT I INTRODUCTION TO AI ANDPRODUCTIONSYSTEMS 9

Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system-Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of searchalgorithms

UNIT II REPRESENTATIONOFKNOWLEDGE 9

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

UNIT IIIMACHINELEARNING 9

Machine Learning-Supervised learning-un Supervised learning-Reinforcement Learning-Learning by Inductive Logic Programming-Computational Learning Theory-Neural Nets-Artificial Neural Nets-Topology of AI- Learning using Neural Nets-Back Propagation Training Algorithm- Multi-Layered ADALINE Models-Hopfield Neural Net-Associative Memory-Fuzzy Neural Nets- Self Organizing Neural Net-Adaptive Resonance Theory.

UNIT IVGENETICALGORITHMS 9

Genetic Algorithms-Hollands Observation-Fundamental Theorem of Genetic Algorithms-Markov Model for Convergence Analysis-Applications of Optimization problem,Intelligent Systems-Genetic Programming-Fuzzy Neural Nets-Cognitive Maps-Stability Analysis-Control Command by Cognitive Map-Visual perception-CaseStudy

UNIT VEXPERTSYSTEMS 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

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Elaine Rich, Kevin Knight, Shivashankar.B.Nair	Artificial Intelligence	Tata Mc Graw Hill	2011
2.	Amit Konar	Artificial Intelligence	CRC,Press	2009

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Russell, Peter Norvig	ArtificialIntelligence– A ModernApproach	Prentice Hall of India	2009
2.	Dan W. Patterson	Introduction to AI and ES	Pearson Education	2007
3.	AndriesP.Engelbrecht,	Computational Intelligence: An Introduction	John Wiley & Sons	2007
4.	Eugene Charniak, Drew McDermott	Introduction to Artificial Intelligence	Pearson Education	2006.
5.	Nils.J.Nilsson	Artificial Intelligence: A new synthesis	Elsevier	2003

WEB URLs

1. www.artint.info/html/ArtInt.html
2. www.aima.cs.berkeley.edu
3. www-formal.stanford.edu/jmc/whatisai/
4. www.nptel.ac.in/courses/106106126
5. www.sciencedaily.com/news/computers_math/artificial_intelligence/

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16 ITE05 **ETHICAL HACKING ANDCYBERSECURITY** **L T PC**
3 0 0 3

COURSE OBJECTIVES

1. To understand the concept ofHacking.
2. To understand the Hacking methods andtypes.
3. To understand theHacking tools.
4. To understand the Concept of CyberSecurity
5. To understand the Cyber Security tools

COURSEOUTCOMES

1. Explain the basic concept of Ethicalhacking.
2. Implementthetechniquesforsystemhackingwirelesshackingandwebserverhacking.
3. Explain the basic concept of Cyber Security andPenetrationtesting.
4. Implement the Cyber Security by usingitstools.
5. Implement the cyber Forensicanalysis

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE05.CO1	X	X	X	X	-	-	-	X	-	-	X	X	X	-	X	X
16ITE05.CO2	X	X	X	X	-	-	-	X	-	-	X	X	X	-	X	X
16ITE05.CO3	X	X	X	X	-	-	-	X	-	-	X	X	X	-	X	X
16ITE05.CO4	X	X	X	X	-	-	-	X	-	-	X	X	X	-	X	X
16ITE05.CO5	X	X	X	X	-	-	-	X	-	-	X	X	X	-	X	X

UNIT I INTRODUCTION TOETHICALHACKING 9

Introduction-Ethical hacking Terminology-types of hacking technologies-phases of ethical hacking-Footprinting- Social Engineering-Scanning and enumeration. Understanding the password hacking techniques-Rootkits- Trojans-Backdoors-Viruses and worms-sniffers-denial of service-Session hijacking.

UNIT II WEBSERVERHACKING 9

Hacking web servers-web application vulnerabilities –Buffer overflow-Wireless hackingPhysical Security. WEP, WPA Authentication mechanism-wireless sniffers-Physical Security-factors affecting physical security-honeypots-Firewall types

UNIT III PENETRATION TESTINGANDCYBERSECURITY 9

Cryptography-overviewofMD5,SHA,RC4-penetrationtestingmethodologies-stepspenTestlegalframework-penetration testing tools. Cyber crime: Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations-Organizational measurement for Handling mobile-Security policies and measures in mobile computingera.

UNIT IV CYBERSECURITYTOOLS 9

Tools and methods used in cyber crime-Proxy servers and Anonymizers- Phishing- Password cracking-Key loggers and Spy wares-Virus and worms-Trojan Horse and Backdoors-Steganography-SQL Injection-Buffer overflow-Attacks on wireless network. Understanding computer forensic-Historical background of cyber forensic Analysis of e-mail-Digital forensic life cycle-Network forensic-Setting up a computer forensic Laboratory- Relevance of the OSI 7 Layer model to computer Forensic-Computer forensic from compliance perspectives

UNIT V FORENSIC OF HANDHELDDEVICES 9

Forensic of Hand –Held Devices-Understanding cell phone working characteristics-Hand-Held devices and digital forensic- Toolkits for Hand-Held device-Forensic of i-pod and digital music devices-Techno legal Challenges with evidence from hand-held Devices. Cyber Security –Organizational implications-cost of cybercrimes and IPR issues Web threats for organizations: the evils and Perils-Social media marketing-Security and privacy Implications-Protecting people privacy in the organizations Forensic best practices for organizations.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Michael T. Simpson	Hands-On Ethical Hacking and Network Defense	James Corley	2012
2.	Nina Godbole & Sunit Belapure	Cyber Security	Wiley India	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Patrick Engebretson	The Basics of Hacking and Penetration Testing	Elsevier	2011
2	Harish Chander	Cyber laws & IT protection	PHI	2012
3	Dhiren R Patel	Information security y theory & practice	PHI	2010
4	MS.M.K.Geetha& Ms.Swapne Raman	Cyber Crimes and Fraud Management	MACMILLAN	2012
5	Vivek Sood	Cyber Law Simplified	TMH	2012

WEB URLs

1. www.tutorialspoint.com/ethical_hacking/
2. www.tutorialspoint.com/ethical_hacking/
3. www.breakthesecurity.cysecurity.org/category/ethical-hacking/
4. www.cybrary.it

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16 ITE06 **SOFTCOMPUTING** **L T P C**

3 0 0 3

COURSE OBJECTIVES

1. To understand thebasic concepts of softcomputing,
2. Tounderstandthefundamentalsofartificialandneuralnetworks
3. To understand the fundamentals Unsupervised LearningNetwork
4. Tounderstandthefuzzysetsandfuzzylogicandgeneticalgorithms.
5. To understand the fuzzy Fuzzy Arithmetic and FuzzyMeasures

COURSE OUTCOMES

1. Build intelligent machines using softcomputingtechniques.
2. Design a Neural Networks for the real timeproblems.
3. Implement various learningtechniques
4. ApplyfuzzylogicandDevelopfuzzysetsforrealtimeproblems.
5. Develop genetic algorithms for various realtimeapplications

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE06.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE06.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE06.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE06.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE06.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT-IAI PROBLEMSANDSEARCH 9

AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation- Using Predicate Logic 2nd Rules.

UNIT-IIARTIFICIALNEURALNETWORKS 9

Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perception Networks, Adaptive Linear Neuron, Back propagation Network. Associative Memory Networks, Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-IIIUNSUPERVISEDLEARNINGNETWORK 9

Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks-Introduction to various i networks.

UNIT-IVFUZZYLOGIC 9

Introduction to Classical Sets (crisp Sets)and Fuzzy Sets- operations and Fuzzy sets. Classical Relations - and Fuzzy Relations- Cardinality, Operations, Properties and composition. Tolerance and equivalence relations. Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT-VAPPLICATIONS 9

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search technique.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S N Sivanandam, S N Deepa	Principles of Soft Computing	Wiley India	2007
2.	Fakhreddine 0 Karray, Clarence D Silva	Soft Computing and Intelligent System Design	Pearson Edition	2004

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Amit Konar	Artificial Intelligence and Soft Computing- Behavioral and Cognitive Modeling of the Human Brain	CRC press	2000
2.	Elaine Rich and Kevin Knight	Artificial Intelligence	TMH	2008
3.	Stuart J. Russell and Peter Norvig	Artificial Intelligence A Modern Approach	Prentice Hall	2010
4.	Hung T. Nguyen, Elbert A. Walker	A first course in Fuzzy Logic	CRC. Press	2005
5.	N. P. Padhy	Artificial Intelligence and Intelligent Systems	Oxford University Press	2005

WEB URLs

1. www.slideshare.net/ganeshpaul6/soft-computing-14879490
2. www.myreaders.info/html/soft_computing.html
3. www.nptel.ac.in/courses/106106046/41
4. www2.cs.uh.edu/~ceick/6367/Soft-Computing.pdf
5. www.soft-computing.de/def.html

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16 ITE07 **REALTIMESYSTEMS** **LT P C**
3003

COURSE OBJECTIVES

1. Tounderstandthebasicconceptsofreal-timecomputing
2. Tounderstandthemajorissuesreal-timeschedulingandreal-timekernels.To writeReal-timescheduling algorithms
3. To understand timing analysis and resource control inrealtimesystem
4. To design the real time database and faulttoleranttechniques
5. To implementation the real-timeoperating systems.

COURSE OUTCOMES

1. Applytheknowledgeofoperatingsystemconceptstounderstandrealtimesystem.
2. Implement the tasks scheduling of Realtimesystem.
3. Define various protocols for effective resourcesharing.
4. Findoutthefault inrealtimesystembyusingvarioustechniques.
5. Design real time system for various realtimeapplications.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE07.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE07.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE07.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE07.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE07.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT-I INTRODUCTION TO REALTIMESYSTEM 9

Typical RT applications - Hard and soft Real Time constraints - Hard and soft RTS - Reference Modeling RTS - Issues in RTS - Structure of RTS

UNIT II REALTIMESCHEDULING 9

Task, processes, processors - Task allocation algorithm - Single processor and multi processor Scheduling - Clock driven and priority based scheduling algorithm

UNIT III TIMING ANALYSIS ANDRESOURCECONTROL 9

Prediction of Execution Time - Worst Case Execution Time (WCET) analysis – Assumptions on Resources and Their Usage – Resource Contention and Resource Access Control – Priority Ceiling Protocol – Priority Inheritance Protocol – Stack Based Priority Ceiling Protocol – Preemption Ceiling Protocol.

UNITIVREALTIMEDATABASEANDFAULTTOLERANTTECHNIQUES 9

Transaction priority and concurrency control issues - Disk scheduling - Fault type and Detection Techniques - Redundancy management – Integration issues.

UNIT V REAL TIME SYSTEMCASESTUDIES 9

Examples of Hard, Soft and Firm real time systems like automatic chocolate vending machine, Smart Card and Adaptive Cruise Control System in a car or flight.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jane .W. S. Liu	Real Time Systems	Pearson Education	2012
2.	Krishna .C.M	Real Time Systems	Mc-Graw Hill	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Prasad K.V.K.K	Embedded/Real-Time Systems: Concepts, Design and Programming Cognitive Modeling of the Human Brain	Dream Tech Press	2014
2	Sriram V Iyer , Pankaj Gupta	Embedded Real Time Systems Programming	McGraw Hill	2010
3	Phillip A. Laplante	Real-Time Systems Design & Analysis	John Wiley & Sons	2006
4	Maryline Chetto	Real-time Systems Scheduling	John Wiley & Sons	2014
5	Rajib Mall	Real-Time Systems: Theory and Practice	Pearson	2006

WEB URLs

1. www.freevideolectures.com/Course/3049/Real-Time-Systems
2. www.nptel.ac.in/courses/106105036/
3. www.bogotobogo.com/cplusplus/embeddedSystemsProgramming.php
4. www.cse.unsw.edu.au/~cs9242/08/lectures/09-realtimex2.pdf
5. www.youtube.com/watch?v=BxYwjdrdnQg

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16 ITE08 **WIRELESSSENSORNETWORKS** **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. To understand basic sensornetworkconcepts
2. To know physical layer issues, medium Access controlProtocols
3. Tocomprehendnetworklayercharacteristicsand protocolsand transportlayerissuesand protocols
4. To understand the network management in Wirelesssensornetwork.
5. To understand theMiddlewareservices

COURSE OUTCOMES

1. Explain the basic concepts of wirelesssensornetworks.
2. Describethe structurephysicalandmediumaccesslayer ofwirelesssensornetworks.
3. Applystructureofnetworkandtransportlayerinwirelesssensornetworks(WSN)tovariousapplication areas.
4. Implement and manage the Wireless SensorNetwork.
5. Implement the middleware for Wireless SensorNetwork.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE08.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITE08.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITE08.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITE08.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-
16ITE08.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	X	-	-

UNIT I-INTRODUCTION 9

Introduction to wireless sensor networks - Challenges and Constraints - Application of sensor networks - Node architecture - Operating System - Fundamental aspects.

UNIT II - PHYSICAL LAYER ANDMEDIUM ACCESSLAYER 9

Basic architectural framework – Physical layer – source encoding –channel encoding – modulation – medium access control- Wireless MAC protocols – Characteristics of MAC protocols in sensor networks – Contention free MAC protocols - traffic adaptive medium access - Low-Energy Adaptive Clustering Hierarchy – Contention based protocols - Power Aware Multi-Access with Signaling - Data-Gathering MAC - Receiver-Initiated MAC.

UNIT III - NETWORK LAYER ANDTRANSPORTLAYER 9

Routing metrics – Data centric Routing - Proactive routing – OLSR – Reactive Routing – AODV – Location Based Routing - Traditional Transport Control Protocols - TCP (RFC 793) - UDP (RFC 768) - Mobile IP - Feasibility of Using TCP or UDP for WSNs - Transport Protocol Design Issues – Examples of Existing Transport Control Protocols- CODA (Congestion Detection and Avoidance).

UNIT IV –NETWORKMANAGEMENT 9

Power Management - Local Power Management Aspects - Processor Subsystem - Communication Subsystem - Active Memory - Power Subsystem- Dynamic Power Management - Dynamic Operation Modes - Time Synchronization – Clocks and the Synchronization Problem - Time Synchronization in Wireless Sensor Networks- Reasons for Time Synchronization - Challenges for Time Synchronization - Basics of Time Synchronization - Synchronization Messages Non determinism of Communication Latency -Time Synchronization Protocols Lightweight Tree-Based Synchronization - Timing-sync Protocol for Sensor Networks Localization -Ranging Techniques -Time of Arrival - Time Difference of Arrival - Angle of Arrival - Received Signal Strength - Range- Based Localization - Triangulation -Range-Free Localization - Ad Hoc Positioning System (APS) .

UNIT V-MIDDLEWARE FORWIRELESSSENSORNETWORKS 9

Introduction -WSN Middleware Principles - Middleware Architecture – Data Related Functions, Architectures – Case study - MiLAN (Middleware Linking Applications and Networks) - IrisNet (Internet-ScaleResource-Intensive Sensor Networks Services).

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.Xerenium, Shen, Dr. Yi Pan	Fundamentals of Wireless Sensor Networks, Theory and Practice	Wiley Series	2010
2.	H. Karl and A. Willig	Protocols and Architectures for Wireless Sensor Networks	John Wiley & Sons	2005

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Kazem Sohraby, Daniel Manoli	Wireless Sensor networks-Technology, Protocols and Applications	Wiley Inter Science Publications	2007
2	Bhaskar Krishnamachari	Networking Wireless Sensors	Cambridge university press	2005.
3	C. S. Raghavendra,K. M. Sivalingam, andT.	Wireless Sensor Networks	John Wiley & Sons	2007
4	N.P. Mahalik	Sensor Networks and Configuration: Fundamentals, Standards, Platforms, and	Springer	2006
5	N. Bulusu and S. Jha	Wireless Sensor Networks: A Systems Perspective	Artech House	2005

WEB URLs

1. www.libelium.com/video-wsn-introduction/
2. www.onlinecourses.nptel.ac.in/noc17_cs07/preview
3. www.slideshare.net/rajatmal4/wireless-sensor-networks-341603
4. www.classes.soe.ucsc.edu/cmpe080u/Winter08/sensonetwork.pdf
5. www.di.unipi.it/~bonucce/sensori.pdf

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16ITE09 **NETWORK PROGRAMMINGANDMANAGEMENT** **L T PC**
3 0 03

COURSE BJECTIVES

1. To Explain socket programming to design client serverenvironment
2. Tounderstandthebasicsofsocket programmingusingTCPandUDPSockets
3. To analyze the socket options and Internet protocolinteroperability
4. To develop macros for including objects in MIBstructure.
5. . T o Understand SNMPv1, v2 and v3 protocols & practicalissues

COURSE UTOMES

1. Apply socket structure and functionsto client serverapplications
2. Design applications using TCP andUDP sockets
3. Implement socket optionsand advanced sockets toapplications
4. Comparenumberofvariationsofthenetworkmanagementarchitecture
5. Configure and manage network services and networkarchitecture

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE09.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE09.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE09.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE09.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE09.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-

UNIT I SOCKET STRUCTUREANDFUNCTIONS 9

Introduction to Socket Programming - OSI Layer and Services - Overview of TCP/IP Protocols - Socket Introduction - Socket address Structures - Value - Result Arguments - Byte Ordering Functions Byte Manipulation Functions - Elementary TCP sockets - Socket, connect, bind, listen, accept, fork and exec functions, concurrent servers - Closefunction

UNIT II TCP ANDUDPSOCKETS 9

TCP Echo Server - TCP Echo Client - Posix Signal handling - TCP Echo server functions - Normal startup -terminate and signal handling server process termination - Crashing and Rebooting of server host - shutdown of server host - I/O multiplexing - I/O Models - select function - shutdown function - pselect function - poll function- Multiplexing TCP Sockets - TCP socket options - Elementary UDP sockets - UDP echo Server - UDP echo Client - Multiplexing UDPsockets

UNIT III SOCKET OPTIONS ANDADVANCEDSOCKETS 9

Socket options - getsocket and setsocket functions - generic socketoptions - IP socket options - ICMP socket options - Domain name system - gethostbyname function - gethostbyadr function -getservbyname and getservbyport functions Ipv4 and Ipv6 interoperability - threaded servers - thread creation andtermination - Mutex - condition variables - raw sockets - raw socket creation - raw socket output - raw socket input - ping program - trace route program

UNIT IV SIMPLENETWORKMANAGEMENT 9

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

UNIT V SNMP ENHANCEDFEATURESANDRMON 9

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

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	W. Richard Stevens, Bill Fenner Andrew M. Rudoff	Unix Network Programming Vol-I	Pearson Education	2015
2.	Mani Subramaniam	Network Management: Principles and Practice	PHI	2012

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	D.E. Comer, David L. Stevens	Internetworking with TCP/IP Vol- III	Pearson Education	2015
2.	Brijendra Singh	Network Security and Management	PHI	2012
3.	William Stallings	SNMP, SNMPv2, SNMPv3 and RMON 1 and 2	Pearson Education	2011
4.	W. Richard Stevens	Unix Network Programming Vol-II	Pearson Education	2015
5.	Andrew S. Tanenbaum, David J. Wetherall	Computer Networks	Pearson Education	2013

WEB URLs

1. www.tutorialspoint.com/unix_sockets/
2. www.csd.uoc.gr/~hy556/material/tutorials/cs556-3rd-tutorial.pdf
3. www.codeproject.com › General Programming › Internet /Network
4. www.cs.rpi.edu/~moorthy/Courses/os98/Pgms/socket.html
5. www.cisco.com/networkers/nw04/presos/docs/NMS-1N01.pdf

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16ITE10 **INFORMATION SECURITY** **L T P C**
3 00 3

COURSE OBJECTIVES

1. Tounderstand the basics of informationsecurity.
2. To describe the legal, ethical and professional issues in informationsecurity.
3. Toestimatethelevelofsecurityriskfaced byanorganizationandthecountermeasurestohandlethe risk.
4. Tounderstandthelogicaldesignandsecuritymodels.
5. Toimplementthephysicaldesignandimplementationofinformationsecurity.

COURSE OUTCOMES

1. Explorethebasicconcept ofinformationsecuritymodels.
2. Analyze the need for securityissues.
3. Use the security policies for informationsecurity.
4. Design logical structure of the informationsystems.
5. Implementphysicalstructureofinformationsecuritysystembyusingsecuritytools.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE10.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE10.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE10.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE10.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE10.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-

UNITIINTRODUCTION 9

Introduction to Information Security: History- Aspects of Security- NSTISSC Security Model, Components of Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.

UNIT IISECURITYINVESTIGATION 9

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT IIISECURITY PRACTICE 9

Vulnerability Analysis-Auditing-Anatomy of an Auditing System-Design of Auditing Systems-Auditing Mechanisms-Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk.

UNIT IVLOGICALDESIGN 9

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity

UNIT V PHYSICAL DESIGNANDIMPLEMENTATION 9

Security Technology, IDS, Honey Pots, Honey Nets, and Padded Cell Systems, Scanning and Analysis Tools, Access Control Devices, Implementing Information Security, Project Management for Information Security, Technical Topics of Implementation, Nontechnical Aspects of Implementation

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Michael E Whitman and Herbert J Mattord	Principles of Information Security	Thomson (Cengage) Indian	2016
2.	Mark Rhodes-Ousley	Information Security: The Complete Reference	Pearson/PHI	2013

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Stuart Mc Clure, Joel Scrambray, George Kurtz	Hacking Exposed	Tata McGraw-Hill	2003
2.	Micki Krause, Harold F. Tipton	Handbook of Information Security Management	CRC Press LLC	2004
3.	Charles Pfleeger,Shari Lawrence Pfleeger,Devin N Paul	Security in Coding	Pearson Education	2007
4.	Wenbo Mao	Modern Cryptography Theory and Practice	Pearson Education	2004
5.	Matt Bishop	Computer Security: Art and Science	Pearson Education	2003

WEB URLs

1. www.nptel.ac.in/courses/106106129/
2. www.vssut.ac.in/lecture_notes/lecture1423183198.pdf
3. www.course.cs.tau.ac.il/infosec15/lectures
4. www.caislab.kaist.ac.kr/lecture/2009/summer/ice1212/Data/Lect1-introduction.ppt
5. www.iiscs.wssu.edu/drupal/node/2991

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16ITE11 **PYTHONPROGRAMMING** **L T PC**
3 2 0 4

COURSE OBJECTIVES

1. Todemonstratethe basicandfundamentalconceptsinPythonprogramming.
2. Tolearnhowtowriteloopsanddecisionstatementsin Python.
3. Tolearnhowtowritestrings,listsanddictionariesin Python.
4. Tolearnhowtouse,tuples,andfilesinPythonprograms.
5. Togainknowledgeofdevelopingpythonprogramsusingtheobjectorientedtechniques

COURSE OUTCOMES

1. Developsimplepythonprogramsusingappropriatesyntax,controlstructureand expression
2. Develop python programs using function and recursionfunction
3. Adequately use standard programming concept of strings lists anddictionaries
4. Explain the concept of tuples and files in python programminglanguage
5. Make use of object oriented concepts to build real timeapplications

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE11.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE11.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE11.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE11.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE11.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT I INTRODUCTION TOFUNCTIONALPROGRAMMING:PYTHON 9

Introduction to Python Programming Language - Debugging– Errors: Syntax Errors, Runtime Errors and Semantic Errors - The first program- Essentials for programming: Values and Types, Variables, Variable Names, Keywords, Operators, Operands, Expressions, Statements- Mode of programming: Interactive Mode and Script Mode- Operations: Order of Operations and String Operations–Comments

UNIT II FUNCTIONS, CONDITIONALSANDRECURSION 9

FunctionCalls -TypeConversionFunctions-MathFunctions–Composition -AddingNewFunctions - Definitions and Uses - Flow of Execution - Parameters and Arguments - Variables and Parameters Are Local- Stack Diagrams - Fruitful Functions and Void Functions - Why Functions?- Importing with from. Modulus Operator - Boolean Expressions - Logical Operators - Conditional Execution - Alternative Execution - Chained Conditionals - Nested Conditionals - Stack Diagrams for Recursive Functions - Infinite Recursion - Keyboard Input.

UNIT III STRINGS, LISTSANDDICTIONARIES 9

Strings: A String Is a Sequence , len, Traversal with a for Loop, String Slices, Strings Are Immutable, Searching,Looping and Counting- String Methods, The in Operator and String Comparison – Lists: A List Is a Sequence, Lists Are Mutable, Traversing a List- List Operations - List Slices - List Methods - Map, Filter, and Reduce - Deleting Elements - Lists and Strings - Objects and Values – Aliasing - List Arguments- Dictionaries: Dictionary as a Set of Counters, Looping and Dictionaries, Reverse Lookup, Dictionaries and Lists, Memos, Global Variables, LongIntegers.

UNIT IV TUPLESANDFILES 9

Tuples: Tuples Are Immutable, Tuple Assignment, Tuples as Return Values, Variable-Length Argument Tuples, Lists and Tuples- Dictionaries and Tuples -Comparing Tuples- Sequences of Sequences- Files: Persistence, Reading and Writing, Format Operator, Filenames and Paths, Catching Exceptions, Databases, Pickling and Pipes.

UNIT V INTRODUCTION TOCLASSESANDOBJECTS 9

Classes and Objects: User defined types, Attributes, rectangles and copying- Classes and Functions: Time, Pure functions and modifiers- Classes and Methods: object oriented features, polymorphism and type based dispatch- Inheritance: Card Objects, Class Attributes, Comparing Cards, Inheritance Class Diagrams and Data Encapsulation.

TOTAL HOURS: 45+30

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Allen B.Downey	Think Python – An Introduction to software design	Green Tea Press	2012
2.	Mark Lutz	Learning Python	O'Reilly Media,Inc	2013

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Chun, Wesley J	Core Python Programming	Pearson Education	2012
2.	Bill Lubanovic	Introducing Python – Modern Computing in Simple Packages	O'Reilly Media,Inc	2015
3.	Adam Stark	Python: Python Programming For Beginners - The Comprehensive Guide To Python Programming	Kindle Edition	2016
4.	Guttag, John V	Introduction to Computation and Programming Using Python	PHI Learning Private Limited	2014
5.	Lutz Mark	Programming Python	O'Reilly Media,Inc	2011

WEB URLs

1. www.thinkpython.com/
2. www.cs.toronto.edu/~frank/csc401/tutorials/401_python_web/
3. www.tutorialspoint.com/python/
4. www.learnpython.org/
5. www.youtube.com/watch?v=cpPG0bKHYKc&noredirect=1

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16 ITE12 **SOCIAL NETWORKS** **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. To Gain knowledge about the current web development and emergence of SocialWeb.
2. To understand the social media mining andsearch.
3. To model the social network infrastructures andcommunities.
4. To understand the privacy in online socialnetworks.
5. To understand visualization and applications of socialnetworks

COURSE OUTCOMES

1. Apply knowledge for current web development in the era of SocialWeb.
2. Implement the social media mining andsearch
3. Model, aggregate and represent knowledge social network infrastructures andcommunities
4. Analyze human behavior and privacyissues.
5. Develop personalized web sites and visualization for Socialnetworks

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE12.CO1	X	X	X	X	-	X	-	-	-	-	X	X	X	-	-	-
16ITE12.CO2	X	X	X	X	-	X	-	-	-	-	X	X	X	-	-	-
16ITE12.CO3	X	X	X	X	-	X	-	-	-	-	X	X	X	-	-	-
16ITE12.CO4	X	X	X	X	-	X	-	-	-	-	X	X	X	-	-	-
16ITE12.CO5	X	X	X	X	-	X	-	-	-	-	X	X	X	-	-	-

UNIT ISOCIALNETWORKANALYSIS 9

Social Network Analysis: History, Concepts and Research - Structure and Dynamics of Social Networks - Analysis of Social Networks - Analyzing the Dynamics of Communication in Online Social Networks - Qualitative Analysis of Commercial Social Network Profiles - Analysis of Social Networks Extracted from Log Files - Perspectives on Social Network Analysis for Observational Scientific Data - Modeling Temporal Variation in Social Network: An Evolutionary web graph approach - Churn in Social Networks.

UNITIISOCIAL MEDIA MININGANDSEARCH 9

Discovering Mobile Social Networks - Online Identities and Social Networking - Detecting Communities - Concept Discovery in Youtube.com - Mining Regional Representative Photos from Consumer- Generated Geo tagged Photos - Collaborative Filtering Based on Choosing a Different Number of Neighbors - Discovering Communities from SocialNetworks

UNIT IIISOCIAL NETWORK INFRASTRUCTURESANDCOMMUNITIES 9

Decentralized Online Social Networks - Multi-Relational Characterization of Dynamic Social Network Communities- Accessibility Testing of Social Websites - Understanding and Predicting Human Behavior for Social Communities- Associating Human-Centered Concepts with Social Networks Using Fuzzy Sets

UNITIVPRIVACY IN ONLINESOCIALNETWORKS 9

Managing Trust in Online Social Networks - Security and Privacy in Online Social Networks - Investigation of Key-Player Problem in Terrorist Networks Using Bayes Conditional Probability - Optimizing Targeting of Intrusion Detection Systems in Social Networks - Security Requirements for Social Networks in Web2.0

UNITVVISUALISATION AND APPLICATIONS OFSOCIALNETWORKS 9

Visualization of Social Networks - Novel Visualizations and Interactions for Social Networks Exploration- Applications of Social Network Analysis - Online Advertising in Social Networks - Social Bookmarking on a Company's Intranet: A Study of Technology Adoption and Diffusion

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Furht, Borko	Handbook of Social Network Technologies andApplications	Springer	2010
2.	Giles, Mark Smith, John Yen	Advances in Social Network Mining and Analysis	Springer	2010

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Max Chevalier, Christine Julien and Chantal Soul-Dupuy	Collaborative and Social Information Retrieval and Access: Techniques for Improved User Modelling	IGI Global snippet	2010
2.	Charu C. Aggarwal	Social Network Data Analytics	Springer	2011
3.	Guandong Xu, Yanchun Zhang and Lin Li	Web Mining and Social Networking Techniques and applications	Springer	2011
4.	John Scott	Social Network Analysis	SAGE Publications Ltd	2013
5.	Toby Segaran	Programming Collective Intelligence	O□Reilly	2012

WEB URLs

1. www.library.tukenya.ac.ke/cgi-bin/koha/opac-detail.pl?biblionumber=110723
2. www.books.google.co.in/books/about/Social_Network_Analysis.html?id=LkM7MAEACAAJ&redir_esc =y
3. www.onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2007.00393.x/full
4. www.youtube.com/watch?v=xQdDdf5RzCg
5. www.youtube.com/watch?v=Ko2wD_yAjmI

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16ITE13 **BUSINESSINTELLIGENCE** **L TP C**
3 003

COURSE OBJECTIVES

1. To understand the businessintelligencearchitectures.
2. T o develop a foundation in Business Intelligence (BI) for Business Analysis through knowledge delivery.
3. T o understand the different aspects of the BI environment, and dataenvelopmentanalysis.
4. To implementation methodology and project life cyclebusinessintelligence
5. To understand the management and future of businessintelligence

COURSE OUTCOMES

1. Explain about businessintelligencearchitectures.
2. Summarizevariousknowledgedeliverymethods
3. Summarize data envelopmentanalysis
4. Implement the business intelligent system for realtimeapplication.
5. Explainthemanagementandfutureofbusinessintelligentsystem.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE13.CO1	X	X	X	X	-	-	X	-	X	X	X	X	X	-	-	-
16ITE13.CO2	X	X	X	X	-	-	X	-	X	X	X	X	X	-	-	-
16ITE13.CO3	X	X	X	X	-	-	X	-	X	X	X	X	X	-	-	-
16ITE13.CO4	X	X	X	X	-	-	X	-	X	X	X	X	X	-	-	-
16ITE13.CO5	X	X	X	X	-	-	X	-	X	X	X	X	X	-	-	-

UNIT IBUSINESSINTELLIGENCE 9

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

UNIT IIKNOWLEDGEDELIVERY 9

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

UNIT III DATAENVELOPMENTANALYSIS 9

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

UNIT IV BUSINESS INTELLIGENCE IMPLEMENTATION: INTEGRATION AND EMERGING TRENDS 9

Implementing BI – Overview – BI and Integration Implementation – Connecting BI System to Database and other Enterprise Systems – On-Demand BI – Issues of Legality, Privacy, and Ethics –Emerging Topics in BI – The Rise of Collaborative Decision Making

UNITVMANAGEMENTANDFUTUREOFBUSINESSINTELLIGENCE 9

Development of BI - Business Intelligence System - Reporting system - Data Warehouse - Data Mart - Knowledge Management Systems - Discussion and Case Study – The Future of Business Intelligence.

TOTAL HOURS: 45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	David Loshin Morgan, Kaufman	Business Intelligence: The Savvy Manager□s Guide	Wiley Publications	2012
2.	Efraim Turban, Ramesh Sharda, Jay E.Aronson, David King	Business Intelligence: A Managerial Approach	Pearson Education	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Efraim Turban, Ramesh Sharda, Dursun Delen,	Decision Support and Business Intelligence Systems	Pearson	2013
2.	Rajiv Sabherwal, Irma Becerra-Fernandez	Business Intelligence Practices, Technologies, and Management	Wiley	2011
3.	Carlo Vercellis	Business Intelligence: Data Mining and Optimization for Decision Making	Wiley Publications	2009
4.	Cindi Howson	Successful Business Intelligence: Secrets to Making BI a Killer App	McGraw-Hill	2007
5.	Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob	The Data Warehouse Lifecycle Toolkit	Wiley Publication Inc	2007

WEB URLs

1. www.nptel.ac.in/courses/110106050/
2. www.dea-analysis.com/
3. www.youtube.com/watch?v=SE7IpYJ77Dg
4. www.nptel.ac.in/courses/106106093/31
5. www.youtube.com/watch?v=-GKpYTLRFbQ

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16ITE14 **DATAWAREHOUSING AND DATA MINING**

L	T	P	C
3	2	0	4

COURSE OBJECTIVES

1. Tostudythe conceptsofdatawarehousingarchitecture
2. Tounderstand data mining principles andtechniques
3. To learn to use association rule mining for handlinglarge data
4. Tostudyclassificationandclusteringforbetterorganizationandretrievalofdata
5. Toexposebusinessapplicationsandrecenttrendsof Datamining

COURSE OUTCOMES

1. Identify the componentsof data warehousingarchitecture
2. Implement data preprocessing for miningapplications
3. Apply the association rules for miningthedata
4. Deployappropriateclassificationandclusteringtechniques
5. UserecenttrendsofDatamininginbusinessapplications

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE14.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE14.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE14.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE14.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE14.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-

UNIT IDATAWAREHOUSING 9

Introduction to Data warehousing - Data warehousing Components - Building a Data Warehouse - Mapping the Data Warehouse to Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools - Multidimensional Data Model-On Line Analytical Processing and tools - Need for OLAP- OLAP Operations – Types ofOLAPservers.

UNIT IIDATAMINING 9

Data Mining-Motivation and Importance of Data mining – Evolution of Database systems – Data mining functionalities – Steps in KDD process- Architecture of a typical data mining system - Classification of data mining systems – Data mining task primitives - Major issues in data mining.

UNIT III ASSOCIATIONRULEMINING 9

Introduction - Association rule mining - Mining frequent itemsets with and without candidate generation – Pattern evaluation methods - Mining various kinds of association rules: Pattern mining - Mining multilevel association - Mining multidimensional association - Constraint based mining.

UNIT IV CLASSIFICATIONAND CLUSTERING 9

Basic concepts - Decision tree induction - Bayesian classification - Rule based classification - Classification by back propagation - Model Evaluation and Selection - Techniques to improve classification - Cluster analysis - Clustering techniques: Partitioning methods - Hierarchical methods - Evaluation of clustering Outlier detection: Outliers and Outlier analysis - Outlier detection methods.

UNIT VCASESTUDY 9

Sequential pattern mining in symbolic sequences - Mining graphs and networks - Visual and audio data mining - Data mining for intrusion detection and prevention - Data mining and Recommender systems - Working with WEKA, GEPHI tools, Massive Online Analysis

TOTAL HOURS: 45+30

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jiawei Han and Micheline Kamber,	Data Mining: Concepts and Techniques	Morgan Kaufmann Publishers	2011.
2.	Alex Berson and Stephen J. Smith	Data Warehousing, Data Mining & OLAP	Tata McGraw Hill Edition	2011

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	G. K. Gupta	Introduction to Data Mining with Case Studies	Prentice Hall of India	2014
2.	Ian Witten, Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	Morgan Kaufmann	2011
3.	Alex Berson and Stephen J. Smith	Data Warehousing, Data Mining & OLAP	Tata McGraw – Hill Edition	2007
4.	K.P. Soman, ShyamDiwakar and V. Ajay	Insight into Data mining Theory and Practice	Prentice Hall of India	2006
5.	George M Marakas	Modern Data Warehousing, Mining and Visualization	Prentice Hall	2003

WEB URLs

1. www.nptel.ac.in
2. www.gtbit.org/downloads/dwdmsem6/dwdmsem6lman.pdf
3. www.abbottanalytics.com/data-mining-resources-websites.php
4. www.gephi.org
5. www.ocw.mit.edu/courses/sloan-school-of-management/15-062-data-mining-spring-2003

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16ITE15 INFORMATIONRETRIEVALTECHNIQUES L TP C
300 3

COURSE OBJECTIVES

1. ToknowaboutInformationretrievalsystemstrategies.
2. TolearnWebSearchEngineandComparevarioustypesofretrievalutilities.
3. ToknowaboutInformationRetrievalmodelingtechniques
4. ToIdentifyvariouswebbasedinformationretrievaltechniquesusingmoderntools.
5. To understand informationretrieval techniques in XML retrieval andmultimedia

COURSE OUTCOMES

1. Explain the factors which optimize the information retrievalprocess
2. Understand web based information retrievaltechniques
3. Identify the techniques of Information Retrievalmodeling
4. Applyparallelinformationretrievalmodelsanddistributedinformationretrievalmodelsinrealtime problem.
5. SummarizevariousstepsinvolvedinXMLandmultimediainformationretrievaltechniques

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE15.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE15.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE15.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE15.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-
16ITE15.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X	-

UNITI INTRODUCTION 9

Introduction - History of IR- The IR problem – Software Architectures of the IR system – The retrieval and ranking processes – Open source Search engine Frameworks - The impact of the web on IR - The role of artificial intelligence (AI) in IR – IR Versus Web Search - Components of a Search engine- Characterizing the web.

UNIT II WEB RETRIEVAL ANDWEBCRAWLING 9

Web retrieval – Introduction – The web – search engine architectures – search engine ranking – managing web data – search engine user interaction – browsing – Web crawling – Introduction – Applications of web crawler – Architecture and implementation

UNIT III INFORMATIONRETRIEVALMODELING 9

IR Models-Modeling and Ranking - A Taxonomy of IR Models - Classic Information Retrieval -The Boolean Model – TF - IDF Weights - Document Length Normalization - The Vector Model- The Probabilistic Model - Alternative Set Theoretic Models - Set-Based Model - Extended Boolean Model-Fuzzy Set Model - Alternative Algebraic Models - Generalized Vector Space Model - Latent Semantic Indexing Model - Neural Network Model - Alternative Probabilistic Models - BM25 - Language Models - Divergence from Randomness – Bayesian NetworkModels

UNIT IV PARALLEL AND DISTRIBUTEDINFORMATIONRETRIEVAL 9

Distributed Information Retrieval – Introduction – A taxonomy of Distributed IR systems – Theoretical Model – Data partitioning – Parallel IR – Introduction – Parallel Indexing – Clustering and Classification – Parallel Systems – Parallel IR on MIMD architectures – parallel IR on SIMD architectures – Cluster based IR – Retrieval in peer to peernetworks.

UNITV XMLRETRIEVALANDMULTIMEDIAINFORMATIONRETRIEVAL 9

XML Retrieval – Introduction – XML retrieval evaluation – Query Languages – Multimedia Information Retrieval –The challenges – Content based image retrieval – Audio and Music retrieval – Retrieving and browsingvideo.

TOTAL HOURS:45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Ricardo Baeza -Yates and Berthier Ribeiro - Neto	Modern Information Retrieval: The Concepts and Technology behind search	2nd Edition, ACM Press Books	2011
2.	Stefan Buettcher, Charles L. A. Clarke, Gordon V. Cormack	Information Retrieval: Implementing and Evaluating Search Engines	The MIT Press	2010

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	G.G. Chowdhury	Introduction to Modern Information Retrieval	Neal- Schuman Publishers, Third Edition	2010
2.	Mark Levene	An Introduction to Search Engines and Web Navigation	2nd Edition Wiley	2010
3.	Bruce Croft, Donald Metzler and Trevor Strohman	Search Engines: Information Retrieval in Practice	1st Edition Addison Wesley	2009
4.	Christopher D. Manning, PrabhakarRaghavan, Hinrich Schütze	An Introduction to Information Retrieval	Cambridge University Press, Cambridge, England	2008
5.	David A. Grossman, Ophir Frieder	Information Retrieval: Algorithms, and Heuristics	Academic Press, Second Edition	2008

WEB URLs:

1. www.viveksingh.in/ir/ir.htm
2. www.gib.fi.upm.es/sites/default/files/irmodeling.pdf
3. www.mir2ed.org/
4. www.itracs.com.
5. www.gib.fi.upm.es/sites/default/files/irmodeling.pdf

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16ITE16 **AGILETECHNOLOGY** **L TP C**
300 3

COURSE OBJECTIVE

1. T o Identify core agileprinciples
2. T o Describe agile requirement over traditional methods of softwaredevelopment
3. T o Understand Extreme ProgrammingConcepts.
4. To develop theagileproducts.
5. T o Demonstrate the advanced techniques of AgileMethods

COURSE OUTCOMES

1. Applyagileprinciplesandpracticesinanactualproject.
2. PreparetheDocumentandassessanagileproject.
3. ApplyExtremeProgramminginagiletechnology.
4. Explain the steps of releasingagileproduct.
5. Demonstrate the advanced techniques of AgileMethods

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE16.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE16.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE16.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE16.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE16.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X

UNIT I INTRODUCTION TO AGILESOFTWAREDEVELOPMENT 9

Agile Software Development-Cayman design- Organizational Culture Considerations with Agile - eam Members'Viewpoint- Manager's Viewpoint- Executive's Viewpoint- Different Types of Agile- Extreme Programming (XP)- Scrum- Feature-Driven Development- Dynamic Systems Development Method- Kanban Method- Crystal Family- Certification - Different Roles- Deep Dive into Scrum Roles- Roles in Other Methodologies

UNIT IIAGILEREQUIREMENTS 9

Document Requirements- Scrum- Enhancing Requirements- From User Stories to Deliverables- Grooming and Planning- Product Backlog- Prioritization of Stories – Estimating- Product Backlog Grooming- Sprint Planning- XP Planning Game- Maintenance of Legacy Code - Triple Constraints- Refactored Code- Tracking - Meetings or Ceremonies - Products beyond SoftwareDevelopment

UNIT III EXTREMEPROGRAMMING 9

XP Life Cycle-XP Team-XP Concepts-Prerequisite of XP-Recommendation of XP-Pair Programming- Energized Work-Informative Workspace-Root-Cause Analysis-Retrospectives-Collaborating-Team Strategy- Organizational Strategy-Sit Together-Real Customer Involvement-Ubiquitous Language-Coding Standards- Iteration Demo-Reporting

UNIT-IV RELEASINGAGILEPRODUCTS 9

Done Done-No Bugs-Version Control-Continuous Integration-Collective Code Ownership-documentation- Planning-Vision-Release Planning-Planning Game-Risk Management-Iteration Planning-Slack-Stories- Estimating-

UNIT-VMASTERINGAGILITY 9

Developing-Incremental Requirements-Customer Tests-Test Driven Development-Refactoring-Simple Design-Incremental Design and Architecture-Spike Solutions-Performance Optimization-Exploratory Testing Values and Principles-Improve the Process-Rely on People-Eliminate Waste-Deliver Value-Seek Technical Excellence-CaseStudy

TOTAL HOURS:45

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Sondra Ashmore, Kristin Runyan	**Introduction to Agile Methods**	Addison-Wesley Professional	2014
2.	James Shore, Shane Warden	The Art of Agile Development	O'REILLY	2008

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Woodward,E.Surdeck	A Practical guide to Distributed Scrum	Addison-wesley	2010
2.	Dean Leffingwell	Agile Software Requirements	Agile software Development Series	2010
3.	Kent ,Beck	Extreme Programming Explained	Pearson Education	2008
4.	Larman	Agile and iterative development: A Managers Guide	Addison-wesley	2004
5.	Anderson, David	Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results	Prentice Hall	2003

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1. www.agilemainfesto.org
2. www.satisfice.com/articles/sbtm.pdf 3.
3. www.dx.doi.org/10.1109/ADC.2005
4. www.informit.com/articles/article.aspx?p=405514
5. www.cio.com/archive/090103/money.html

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16ITE17 **PARALLELALGORITHM** **L T P C**
3 2 0 4

COURSE BJECTIVES

1. Toacquireknowledgeonmodelsofparallelcomputingand issuesofparallel computing
2. To acquire knowledge on issues of parallel computingalgorithms.
3. To introduce message passing paradigm usingMPI
4. TodemonstratethesharedmemoryparadigmwithPthreadsandOpenMP
5. TostudyGPUbasedparallelprogrammingusingOpenCLandCUDA

COURSE OUTCOMES

1. Identify issues in parallelprogramming
2. Parallelize the algorithm for differentapplications
3. Write parallel programs using MPIframework
4. WritesharedmemoryparallelprogramsusingPthreadsandOpenMP
5. Design and develop CUDA and OpenCLparallelprograms

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE17.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE17.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE17.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE17.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE17.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNIT I FOUNDATIONSOFPARALLELPROGRAMMING 9

Motivation for parallel programming - Concurrency in computing - basics of processes, multiprocessing and threads - cache - cache mappings - caches and programs - virtual memory - instruction level parallelism - hardware multi threading - SIMD - MIMD - interconnection networks - cache coherence - shared memory model - issues in shared memory model - distributed memory model - issues in distributed memory model - hybrid model - I/O - performance of parallel programs - parallel programdesign

UNIT IIPARALLELALGORITHMS 9

Elementary parallel algorithms- Reduction-Broadcast-Prefix sum. Matrix multiplication- Algorithm forprocessor array-Algorithm for multiprocessors and multicomputer. Sorting: Odd even transposition sort - Bitonic merge-Quick sort basedalgorithms.

UNIT III MESSAGEPASSINGPARADIGM 9

Basic MPI programming - MPI_Init and MPI_Finalize - MPI communicators - SPMD programs – Message passing - MPI_Send and MPI_Recv - Message matching - MPI I/O - Parallel I/O - Collective communication - MPI_Reduce - MPI_Allreduce broadcast scatter gather allgather - derived types - Remote Memory Access - Dynamic Process Management - MPI for Grids - Performance evaluation ofMPIprograms

UNITIV SHAREDMEMORYPARADIGM:PTHREADANDOPENMP 9

Basics of Pthreads - Thread Synchronization - Critical sections - Busy waiting - Mutexes - Semaphores - Barriers and Condition variables- Basic OpenMP constructs - Scope of variables - Reduction clause - Parallel For directive- Loops in OpenMP - Scheduling loops - SynchronizationinOpenMP.

UNITV GRAPHICALPROCESSINGPARADIGMS:CUDAANDOPENCL 9

Introduction to GPU architecture. CUDA - Introduction- CUDA programming examples - CUDA Execution model - CUDA Memory hierarchy - Introduction to OpenCL - OpenCL programming examples - ProgramsandKernels-Buffersand Images-Eventmodel-OpenCLlanguage-OpenCLcasestudy

TOTAL HOURS: 45+30

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Peter S. Pacheco	An introduction to parallel programming	Morgan Kaufmann	2011
2.	Rob Farber	CUDA application design and development	Morgan Haufmann,	2011

REFERENCE BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Munshi, B. Gaster, T. G. Mattson, J. Fung, and D. Ginsburg	OpenCL programming guide	Addison Wesley	2011
2.	B. Chapman, G. Jost, and Ruud van der Pas	Using OpenMP	MIT Press	2008
3.	Michael J. Quinn	Parallel Computing: Theory & Practice	Tata McGraw Hill Edition	2003
4.	M. J. Quinn	Parallel programming in C with MPI and OpenMP	Tata McGraw Hill,	2003
5.	W. Gropp, E. Lusk, and A. Skjellum	Using MPI: Portable parallel programming with the message passing interface	MIT Press	1999

WEB URLs

1. www.nptel.ac.in/courses/106106112/1
2. www.mc.stanford.edu/cgi-bin/images/b/ba/M02_2.pdf
3. www.dmi.unict.it/~bilotta/gpgpu/notes/12-opencl-images.html
4. www.youtube.com/results?search_query=MPI+for+Grids+
5. www.youtube.com/watch?v=bm8OrvXW8rk&list=PL8F178AF5EE207CCC

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16ITE18 **SERVICE ORIENTED ARCHITECTURE** **L TP C**
30 03

COURSEOBJECTIVES

1. TostudytheimportanceofServiceOrientedArchitecture.
2. ToprovideanoverviewofXMLTechnologyandmodelingdatabasesinXML
3. TointroduceSecuritysolutionsinXMLandWebServicesandtointroduceSecuritystandardsfor Web Services
4. TolearntoimplementSOAin theJ2EEand.Netenvironment
5. T oImplementthevariousadvancedwebservicesusingJ2EE

COURSE OUTCOMES

1. Explain the fundamental principles ofSOA
2. Develop a simple XML services using SOAprinciples
3. Develop a simple web services using SOAprinciples
4. Model and analyze the JAVA web services andarchitecture.
5. Implement the various advanced web services usingJ2EE

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE18.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE18.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE18.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE18.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X
16ITE18.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	X

UNITIINTRODUCTION 9

The Evolution of SOA –Characteristics of SOA – Introducing SOA- Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design- SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task centric business service design

UNIT IIXMLSERVICES 9

XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X-Files- Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML

UNIT III WEB SERVICESAND SOA 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 IV JAVA WEBSERVICESARCHITECTURE 9

Java Web Service Developer pack– JAXP- Architecture-SAX-DOM-XSLT-JDOM-JAX RI – JAX- RPC-Service Model - JAX RPC and J2EE - JAXM – JAXM Architecture –JAXR - Registries and Repositories – JAXR Architecture – JAXR Information Model - JAXB – Architecture – Developing with JAXB - XML to Java mapping – JAXB API - Validation with JAXB – Customizing JAXB.

UNIT V EXTENDED WEBSERVICESSPECIFICATION 9

Metadata Management - Metadata Specification - Policy – Metadata exchange – Web Services Security –Core concepts – Challenges - Threads and Remedies – Message Level Security – Data Level Security – Advanced Messaging – Reliable Messaging - Notification – Transaction Management - Protocols and Specification – TransactionSpecification

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Eric Newcomer, Greg Lomow	Understanding SOA with Web Services	Pearson Education	2005
2.	James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew	Java Web Services Architecture	Elsevier	2003

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Thomas Erl	Service Oriented Architecture	Pearson Education	2005.
2.	Frank Cohen	Fast SOA	Elsevier	2007
3.	Scott Campbell, Vamsi Mohun,	Mastering Enterprise SOA	Wiley	2007
4.	Eric Pulier, Hugh Taylor	Understanding Enterprise SOA	Dreamtech Press	2007
5.	Sandeep Chatterjee, James Webber	"Developing Enterprise Web Services	Pearson Education	2004.

WEB URLs

1. http://www.W3.orh/TR/soap12-part1/
2. http://www.w3.org/TR/ws-arch/
3. http://xml.coverpages.org/Burdett-WSChoreographyJune032003.pdf
4. http://java.sun.com/developer/technicalArticles/xml/jaxb/
5. http://java.ociweb.com/mark/JavaUserGroup/JAXB.pdf

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16ITE19 **SALESFORCE CRMANDPLATFORM** **L T PC**
3 0 2 4

COURSE OBJECTIVES

1. To learn the basics of Salesforce as a CRM and aPlatform
2. To learn the administrative and configurable capabilities ofSalesforce
3. To write business logic customizations using Apex triggers and classes customized using SOQL andDML
4. To describe how trigger code works within the basics of the Save Order of Execution andtransactions
5. To write Visualforce markup code to customize the userinterface

COURSE OUTCOMES

1. Understand the basics of Salesforceplatform
2. Leverage configurable aspects of Salesforce for business processautomation
3. Understand Apex Programming and Visualforce
4. Develop Apex program with SOQL &DML
5. Testing and Execution of triggers inApex
6. Develop Visualforce pages with variouscontrollers

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE19.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE19.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE19.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE19.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-
16ITE19.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	-	-

UNIT IINTRODUCTION TO SALESFORCE 9

Salesforce Overview - Architecture – Environment - Sales Cloud - Service Cloud - Navigating Setup Salesforce Objects - Standard Objects - Custom Objects & Fields - Field Types - Master Detail - Lookup Relationship - Schema Builder - Global Search.Standard UI Configuration - Page Layouts - Record Types - Record Type Based Picklist Values. Process Automation - Validation Rules, Workflow Rules and Actions - Process Builder - Approval Process. Salesforce Security Model - Role Hierarchy - Profiles and Permission Sets - Access Controls - Object and Field Level Security - Record Level Security - Org Wide Defaults - Record Ownership - Sharing Rules.

UNITIISALESFORCECRMFUNCTIONALITY 9

CRM Basics : Introduction to CRM - Sales Objects - Service Objects. Sales Process: Lead - Web-to-Lead - Lead Conversion - Opportunities - Accounts & Contacts – Products. Service Process: Case, Email-to-Case, Web-to-Case. Automation Rules: Lead/Case Assignment Rules - Escalation Rules - Merge Records - DuplicationRules.

UNIT IIIAPEXPROGRAMMING BASICS 9

Programming with Apex: Introduction to Apex - Statements & Collections - Introduction to Apex Classes. SOQL: Syntax, SOQL in Apex, Dynamic SOQL. Query using relationships: Relationship name, child-to-parent relationship – parent-to- child relationship.DML essentials: DML operations with Apex - Transaction Controls - DML errors.

UNITIVAPEX PROGRAMMINGDEVELOPMENT 9

Apex Trigger Essentials: Introduction - Trigger Events - Syntax - Trigger context variables. Apex Class Implementation: Implement Business Logic in Apex class - Trigger Handlers and Controllers - Best Practices (Bulkification, No DML & queries inside loops) - Apex Test Classes. Advanced Apex: Asynchronous Apex - Apex Scheduler - Batch Apex - Future methods - Queueable Apex API Callouts - Apex Web Services - Standard APIs. Transactions: Lifecycle of a transaction – Memory life cycle for static variable - Salesforce order of Execution - Execution Governor Limits. Development Tools: Developer Console - Debug Logs - Eclipse & Force.com IDE - Visual Studio – Workbench

UNITVVISUALFORCEDEVELOPMENT 9

Visualforce: Introduction – Creating Visualforce pages – Important Visualforce Tags - Exploring the View and Controller layers of Visualforce – Standard Controller – Display data from a record in a Visualforce page – Display related data – Invoke standard controller actions– Using standard list controller in a Visualforce page – Using custom controllers and extensions – Security concerns.

TOTAL HOURS: 45

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LIST OF EXPERIMENTS

1. SalesforceBasics
2. Salesforce PlatformBasics
3. Platform DevelopmentBasics
4. Developer Console Basics
5. Apex Basics for Admin
6. Object Oriented Programming forAdmin
7. ApexTriggers
8. SOQL Database .NetBasics
9. Visual forceBasics
10. Build a Conference ManagementApplication
11. Development an Account GeolocationApplication
12. Transform SQL Queries to SOQLQueries

TOTAL: 60

REFERENCES:

1 Paul Goodey, Salesforce CRM - The Definitive Admin Handbook - Fourth Edition 4th Revised edition Edition, PACKT enterprises, Kindle edition, 2016.

2 Matt Kaufmann and Michael Wicherski, "Learning Apex Programming", PACKT enterprises, Kindle edition, 2015.

3 Keir Bowden, "Visualforce Development Cookbook" PACKT enterprises, Kindle edition, 2016.

4 David Taber, Salesforce.com Secrets of Success: Best Practices for Growth and Profitability (2nd Edition) 2nd Edition, Prentice Hall; 2 edition, 2013).

5 https://trailhead.salesforce.com/en/content/learn/modules/starting_force_com

6 Apex-https://developer.salesforce.com/docs/atlas.enus.apexcode.meta/apexcode/apex_dev_guide.htm

7 Visualforce-https://developer.salesforce.com/docs/atlas.enus.pages.meta/pages/pages_intro.htm

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16ITE20 **NATURALLANGUAGEPROCESSING** **L T PC**
3 0 0 3

COURSE OBJECTIVES

1. To tag a given text with basic language processingfeatures,
2. To Design An innovative application using NLPcomponents,
3. To implement a rule based system to tackle morphology/syntax of alanguage,
4. To Design a tag set to be used for statistical processing keeping an application inmind,
5. To Compare and contrast use of different statistical approaches for different types ofapplications.

COURSE OUTCOMES

1. Understand the basic concepts of Natural LanguageProcessing.
2. Describe the tag a given text with basic language processingfeatures,
3. Implement a rule based system to tackle morphology/syntax of alanguage
4. Design a tag set to be used for statistical processing keeping an application inmind
5. To Compare and contrast use of different statistical approaches for different types ofapplications.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE20.CO1	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE20.CO2	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE20.CO3	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE20.CO4	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-
16ITE20.CO5	X	X	X	X	-	-	-	-	-	-	X	X	X	-	-	-

UNITIINTRODUCTION 9

Natural Language Processing tasks in syntax, semantics, and pragmatics – Issues - Applications - The role of machine learning - Probability Basics –Information theory – Collocations -N-gram Language Models - Estimating parameters and smoothing - Evaluating language models.

UNIT II MORPHOLOGY AND PART OFSPEECHTAGGING 9

Linguistic essentials - Lexical syntax- Morphology and Finite State Transducers - Part of speech Tagging - Rule-Based Part of Speech Tagging - Markov Models - Hidden Markov Models – Transformation based Models - Maximum Entropy Models. Conditional Random Fields

UNIT IIISYNTAXPARSING 9

Syntax Parsing - Grammar formalisms and treebanks - Parsing with Context Free Grammars - Features and Unification -Statistical parsing and probabilistic CFGs (PCFGs)-Lexicalized PCFGs.

UNIT IVSEMANTIC ANALYSIS 9

Representing Meaning – Semantic Analysis - Lexical semantics –Word-sense disambiguation - Supervised – Dictionary based and Unsupervised Approaches - Compositional semanticsSemantic Role Labeling and Semantic Parsing – Discourse Analysis.

UNITVAPPLICATIONS 9

Named entity recognition and relation extraction- IE using sequence labeling-Machine Translation (MT) - Basic issues in MT-Statistical translation-word alignment- phrase-based translation – Question Answering

TOTAL HOURS:45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Roland R. Hausser	Foundations of Computational Linguistics:	MIT Press	2011
2.	Daniel Jurafsky and James H. Martin	Martin Speech and Language Processing	McGraw Hill	2008

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Christopher D. Manning and Hinrich Schuetze	Foundations of Statistical Natural Language Processing	MIT Press	1999
2.	Steven Bird, Ewan Klein and Edward Loper	Natural Language Processing with Python	O'Reilly Media	2009
3.	Pierre M. Nugues	An Introduction to Language Processing with Perl and Prolog: An Outline of Theories, Implementation, and Application with Special	Soft cover reprint	2010
4.	James Allen,	Natural Language Understanding	Addison Wesley	1994
5.	Nitin Indurkhya, Fred J. Damerau	Handbook of Natural Language Processing	CRC Press	2010

WEB URLs

1. www.nltk.org/
2. www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_natural_language_processing.htm
3. www.analyticsvidhya.com/blog/2017/01/ultimate-guide-to-understand-implement-natural-language-processing-codes-in-python/
4. www.kdnuggets.com/2015/12/natural-language-processing-101.html
5. www.youtube.com/watch?v=w9OUpjiu_zg

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16ITE21 **DATAANALYTICS** **L T PC**
30 03

COURSE OBJECTIVES

1. To Be exposed to bigdata
2. To Learn the different ways of DataAnalysis
3. To Be familiar with datastreams
4. To Learn the mining andclustering
5. To Be familiar with the frame work andvisualization

COURSE OUTCOMES

1. Explain the basic concepts of BigData.
2. Analysis the data by using various analysistools.
3. Understand the miming the datastream.
4. Classify the frequent item sets andclustering.
5. Design frame work for the real timeapplications.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE21.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE21.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE21.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE21.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE21.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-

UNIT I INTRODUCTION TOBIGDATA 9

Introduction to Big Data Platform – Challenges of conventional systems - Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting - Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT IIDATA ANALYSIS 9

Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

UNIT III MININGDATASTREAMS 9

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications - case studies - real time sentiment analysis, stock market predictions.

UNIT IV FREQUENT ITEMSETS ANDCLUSTERING 9

Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K-Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods– Clustering in non-euclidean space – Clustering for streams and Parallelism.

UNIT V FRAMEWORKS AND VISUALIZATION

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Anand Rajaraman and Jeffrey David Ullman	Mining of Massive Datasets:	Cambridge University Press	2012
2.	Michael Berthold, David J. Hand	Intelligent Data Analysis	Springer	2007

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Bill Franks Schuetze	Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analystics	John Wiley & sons	2012
2.	Glenn J. Myatt	Making Sense of Data	John Wiley & Sons	2007
3.	Pete Warden	Big Data Glossary,	O□Reilly	2011
4.	Jiawei Han, Micheline Kamber	Data Mining Concepts and Techniques	Elsevier	2008
5.	Thomas A. Runkler	Data Analytics: Models and Algorithms for Intelligent Data	Springer	2016

WEB URLs

1. www.tutorialspoint.com/big_data_analytics/
2. www.youtube.com/watch?v=THODdNXOjRw
3. www.lynda.com/Data-Analysis-training-tutorials/1303-0.html
4. www.analyticsvidhya.com/blog/2016/02/complete-tutorial-learn-data-science-scratch/
5. www.pythonprogramming.net/data-analysis-python-pandas-tutorial-introduction/

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16ITE22 **BIGDATATECHNOLOGY** **L T PC**
3 0 03

COURSE OBJECTIVES

1. To Learn tips and tricks for BigData.
2. To Learn to build and maintain reliable, scalable, distributed systems with Apache Hadoop
3. To Learn the HadoopArchitecture
4. To apply Hadoop ecosystemcomponents
5. To Learn to build Hadoop Advanced Data baseSystems

COURSE OUTCOMES

1. Understand the basic concepts of BigData.
2. Explain the basics ofHadoop.
3. Describe the architecture ofHadoop.
4. Design Hadoop Ecosystem andyarn.
5. Explain the techniques of HIVE AND HIVEQL,HBASE.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE22.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE22.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE22.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE22.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE22.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-

UNIT I – INTRODUCTION TOBIGDATA 9

Introduction – distributed file system – Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce.

UNIT II –INTRODUCTIONHADOOP 9

Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - DataSerialization.

UNIT- IIIHADOOPARCHITECTURE 9

Hadoop Architecture, Hadoop Storage: HDFS, Common Hadoop Shell commands , Anatomy of File Write and Read., NameNode, Secondary NameNode, and DataNode, Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers - Cluster Setup – SSH & Hadoop Configuration – HDFS Administering –Monitoring & Maintenance.

UNIT-IV HADOOP ECOSYSTEMANDYARN 9

Hadoop ecosystem components - Schedulers - Fair and Capacity, Hadoop 2.0 New Features- NameNode High Availability, HDFS Federation, MRv2, YARN, Running MRv1 in YARN.

UNIT-V HIVE ANDHIVEQL, HBASE 9

Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting And Aggregating, Map Reduce Scripts, Joins & Subqueries, HBase concepts- Advanced Usage, Schema Design, Advance Indexing - PIG, Zookeeper - how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications withZookeeper.

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich	Professional Hadoop Solutions	Wiley	2015
2.	Chris Eaton, Dirk deroos	Understanding Big data	McGraw Hill	2012

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Tom White	HADOOP: The definitive Guide Everything	O Reilly	2012
2.	Vignesh Prajapati	Big Data Analytics with R and Haoop	Packet Publishing	2013
3.	Tom Plunkett, Brian Macdonald	Oracle Big Data Handbook	Oracle Press	2014
4.	Jy Liebowitz,	Big Data and Business analytics	CRC press	2013
5.	Seema Acharya and Subhashini C	Big Data and Analytics	Wiley India	2015

WEB URLs

1. www.bigdatauniversity.com/
2. www.tutorialspoint.com/big_data_tutorials.htm
3. www.intellipaat.com › BigData
4. www.lynda.com/Big-Data-training-tutorials/2061-0.html
5. www.edureka.co/blog/big-data-tutorial

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16ITE23 ADVANCED DATAMINING AND VISUALIZATION **L T P C**
3 0 0 3

COURSE OBJECTIVES

1. To study the concepts of data warehousing architecture.
2. To understand data mining principles and techniques.
3. To learn to use miningfrequent pattern, association and correlations for handling large data.
4. To understand and apply various classification and clustering techniques.
5. To expose business applications and recent trends of Data mining.

COURSE OUTCOMES

1. Identify the components of data warehousing architecture.
2. Implement data preprocessing for mining applications.
3. Apply the association rules for mining the data.
4. Deploy appropriate classification, prediction and clustering techniques
5. Use recent trends of Data mining in business applications.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITE23.CO1	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE23.CO2	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE23.CO3	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE23.CO4	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-
16ITE23.CO5	X	X	X	X	X	-	-	-	-	-	X	X	X	-	X	-

UNIT I INTRODUCTION **9**

Data warehousing Components - Building a Data Warehouse –Database Architectures for Parallel Processing-Data Extraction, Cleanup, and Transformation Tools –Metadata - Multidimensional Data Model - On Line Analytical Processing-OLAP Operations-Types of OLAP Server and Tools.

UNIT II DATA MINING **9**

Introduction- Data-Types of Data-Data mining Functionalities–Knowledge Discovery process–Issues in data mining- Data Preprocessing: Discriptive Data Summarization – Data Cleaning – Data integration and transformation – Data Reduction – Data discretization and concept hierarchy Generation.

UNIT III MINING FREQUENT PATTERN, ASSOCIATION AND CORRELATIONS **9**

Basic concepts – Efficient and scalable frequent itemset Mining Methods: Mining frequent itemset with and without candidate generation – Mining various kinds of Association rules: Multilevel and Multidimensional association rules – Association mining to correlation analysis.

UNIT IV CLASSIFICATION, PREDICTION AND CLUSTER ANALYSIS **9**

Classification - Classification by Decision tree induction - Bayesian classification - Rule based classification – Prediction – Accuracy and Error Measures - Model Evaluation and Selection - Cluster analysis: -Clustering techniques: Partitioning methods - Hierarchical methods - Evaluation of clustering.

UNIT V VISUALIZATION **9**

Introduction to Visualization - Multimedia data mining: Multidimentional Analysis of multimedia data- Mining Associations in multimedia data – Audio and video data mining – Data mining security: Data mining for intrusion detection and prevention - Data mining and Recommender systems – Applications and Trends in Data Mining.

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Jiawei Han and Micheline Kamber,	Data Mining: Concepts and Techniques	Morgan Kaufmann Publishers	2011
2	Alex Berson and Stephen J. Smith	Data Warehousing, Data Mining & OLAP	Tata McGraw Hill Edition	2011

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	G. K. Gupta	Introduction to Data Mining with Case Studies	Prentice Hall of India	2014
2	Ian Witten, Eibe Frank	Data Mining: Practical Machine Learning Tools and Techniques	Morgan Kaufmann	2011
3	Alex Berson and Stephen J. Smith	Data Warehousing, Data Mining & OLAP	Tata McGraw – Hill Edition	2007
4	K.P. Soman, ShyamDiwakar and V. Ajay	Insight into Data mining Theory and Practice	Prentice Hall of India	2006
5	George M Marakas	Modern Data Warehousing, Mining and Visualization	Prentice Hall	2003

WEB URLs

1. www.nptel.ac.in
2. www.gtbit.org/downloads/dwdmsem6/dwdmsem6lman.pdf
3. www.abbottanalytics.com/data-mining-resources-websites.php
4. www.gephi.org
5. www.ocw.mit.edu/courses/sloan-school-of-management/15-062-data-mining-spring-2003

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16ITF01 **PROJECT WORKPHASEI** **L T PC**
0 0 63

COURSE OBJECTIVES

1. Topracticalimplementationoftheoreticalknowledgegainedduringthestudyfrom Firstyear to Third year
2. Toimplementtheirideas/realtimeindustrialproblem/currentapplicationoftheirengineeringbranch which they have studied incurriculum
3. To build confidence in the student what he has learnttheoretically.
4. T o identify the appropriate problem solvingmethodology
5. T o Analyze and process the experimentalinformation

COURSE OUTCOMES

1. Preparealiteraturesurveyinaspecificdomainasateam/individualtomotivatelifelonglearning.
2. Identifytheproblemwhichneedstobeprovidedasustainablesolutionusingmoderntools
3. Analyzetheproblemdefinitionanddesignitsimpactonthesocietyandenvironment.
4. Document the literature andbindings.
5. ChosethedomainofInformationTechnologyandprogramminglanguagesandapplytovarietyofreal time problemscenarios.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF01.CO1	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16ITF01.CO2	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16ITF01.CO3	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16ITF01.CO4	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16ITF01.CO5	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-

Content:

- Projecthelpedstudentstogather,organize,summarizeandinterprettechnicalliterature withthe purpose of formulating a projectproposal.

- B.E. Projects can be two types: Projects based on implementation of anyapplicationoriented
- problem,whichwillbemoreorlessexperimentalinnature,andtheotherswillbebas edon some innovative/ theoreticalwork.

- InProjectPhase-
  Ithestudentwillundertakeprojectovertheacademicyear,whichwillinvolve the analysis, design of a system or sub system in the area identified earlier in the field of InformationTechnology.
- The topic must be formulated in consultation with the guide and projectcoordinator.

- Theprojectwillbeundertaken preferablybyagroupof1-3students who willjointlywork and implement theproject.
- Thegroupwill selectaproject withapprovalfromacommitteeformedbythedepartmentof seniorfacultytocheckthefeasibilityandapprovethetopic.

Review Committee:

- The Head of the department/Project coordinator shall constitute a reviewcommittee for project work for projectgroup.
- Project guide would be one member of that committee bydefault.
- Thestudentsorprojectgroup shallmakepresentationontheprogressmadebythembefore thecommittee.
- Therecordoftheremarks/suggestionsofthereviewcommitteeshouldbeproperlymain tained and should be made available at the timeofexamination.

- Eachstudent/groupisrequiredtogivepresentationaspartofreviewfor 10to15 minutesfollowedby
- a detaileddiscussion.

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PROJECT WORK REVIEWS

- Projectworkphaseswillhaveaminimumofthreeinternalreviewsbyanappointedcommitteeoffaculty.
- The final review will be done byan external faculty

Review 1: Finalization of scope – the objectives and scope of the project should be finalized in second week of their academic semester. Should finalize list of required hardware, software or other equipment for executing the project, test environment/tools.
Review 2: Finalization – High level design, planning.**Guidelines for Students and Faculty: Project Review Committee:**

1. Thiscommitteewillberesponsibleforevaluatingthetimelyprogressoftheprojectsandcommuni cating the progress report to thestudents.
2. As far as possible Students should finalize the same project titletaken forProject.
3. Reviewcommitteeshouldconduct"FeasibilityReview"infirstweekaftercommencementoftheterm.Re view committee should finalize the scope of theproject.
4. Ifchangeinprojecttopicisunavoidablethenthestudentsshouldcompletetheprocessofprojectappr oval bysubmittingsynopsisalongwiththereviewofimportantpapers.Thisnewprojecttopicshouldbe approved by reviewcommittee.

Term Work:

1. Thetermworkwillconsistofareportpreparedbythe studentontheprojectallotted tothem.
2. Theyshouldusеappropriatetoolsforthepreparationofthereportlike projectplanning,UMLdiagram, testing tools, referencing toolsetc.

Report Structure

- Contents
- List ofAbbreviations
- List ofFigures
- List ofGraphs
- List ofTables

1. Introduction and aims/motivation andobjectives
2. LiteratureSurvey
3. ProblemStatement
4. ProjectRequirements
5. SystemAnalysisProposedArchitecture/highleveldesignoftheproject
6. VerificationValidation
7. Projectplan
8. Conclusion
9. References
10. Appendices

Evaluation Guidelines:

- Apanel ofexaminerwillevaluatethe viabilityofproject/projectscope.
- The panel will also verify that all the suggestions/comments in the review document are taken care and accordingly allot the termworkmarks.
- Oral examination in the form of presentation will be based on the project work completedby thecandidates.Preliminaryreport mustalsobepresentedduringtheoralexamination.

TOTAL HOURS: 90

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16ITF02 **PROJECT WORK -PHASEII** **L T PC**
0 0 12 6

COURSE OBJECTIVES

1. To Plan an experimental design to solve Engineeringproblems
2. Todevelopanattitudeofteamworkandindependent workingonrealtimeproblems
3. To Analyze and process theexperimentalinformation
4. To evaluate, interpret and justifythe experimental results
5. To develop a dissertationreport

COURSE OUTCOMES

1. Plananexperimentaldesigntosolveengineering/societalproblems usingmoderntools
2. Developlifelonglearningtokeepabreastoflatesttechnologies.
3. Analyzeandimplementthedesigntoprovidesustainablesolutions.
4. Evaluateandinterprettheexperimentalresultsandanalyzetheimpactonsocietyand environment.
5. Implementandtesttheapplicationfor therealtimeproblems.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF02.CO1	X	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X
16ITF02.CO2	X	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X
16ITF02.CO3	X	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X
16ITF02.CO4	X	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X
16ITF02.CO5	X	X	X	X	X	-	-	-	-	-	-	X	X	X	-	X

PROJECT WORK REVIEWS

- Projectworkphaseswillhaveaminimumofthreeinternalreviewsbyanappointedcommit teeof faculty.
- The final review will be done byan external faculty

Review 3: Implementation Status and testing document.
Review 4: Final Project Demonstration, Project Report and proper Result analysis

The group will submit at the end of semester II.

a. The Workableproject.

b. Projectreport(WordDocument)intheformofboundjournalcompleteinallres pect– 1 copyfortheInstitute,1 copyforguideand1copyofeach studentinthegroupfor certification. The project report contains the details.

1.Problemdefinition
2.Requirementspecification
3.System design details (UMLdiagrams)
4.System implementation – code documentation – dataflow diagrams/ algorithm, protocolsused.
5.Test result andprocedure
6.Conclusions.
7.Appendix a. Tools used b. References c. Basepapers.

TOTAL HOURS: 180

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16ITF03 **COMPREHENSION** **L TPC**
0 0 4 2

COURSE OBJECTIVES

1. To write effective and coherentparagraphs
2. Tocomprehendtheoveralland internal organizationofanacademicessay
3. To write an effective thesisstatement
4. To use pre-writing strategies to planwriting
5. ToProducecoherentandunifiedparagraphswithadequatesupportand detail ofthetopic

COURSE OUTCOMES

1. Write a paragraph with a topic sentence, support, andconcludingsentence
2. Writeaneffectiveintroductionthesisstatementthataddressesthewritingpromptandconclusion
3. Produceawell-organizedacademicessayanduseavarietyofaccuratesentencestructures
4. Produce appropriate vocabulary and correctwordforms
5. Produce accurate grammatical structures for the paragraphwriting

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF03.CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF03.CO2	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF03.CO3	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF03.CO4	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF03.CO5	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-

COMPREHENSION TOPICS:

1. Cloud Computing for SmallBusinesses
2. Role of Information Technology in CorporateFunctions
3. KnowledgeManagement
4. The Impact of CloudComputing
5. Clustercomputing
6. Computer Forensics
7. The Internet ofThings
8. DataSecurity
9. GreenComputing
10. Issue on eGovernment Development and Applications
11. BigData
12. Design of Reversible ComputingSystems
13. Social Platforms

TOTAL HOURS: 60

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16ITF04 **DESIGNPROJECT** **L T PC**
0 0 4 2

COURSE OBJECTIVES

1. Toprovidebackgroundinformationandtoolstoguideprojectidentificationandformulation
2. Toemphasizetheimportanceofsoundselectionofalternative meansattheearlystagesofthe cycle.
3. Toexplainhowsound choicecanbeguidedbyusingtoolssuchasLogframeanalysis.
4. Todemonstratehowprojectelementscanbeclearlyspecifiedandrisksassessed and reduced
5. Tosetouthowtolinklogicalprojectdesigntoworkplanningandbudgeting.

COURSE OUTCOMES

1. Understand the processes to follow in formulating projects to identify problems forprimary stakeholders and set appropriate projectobjectives
2. Ensurethatbothalternativeapproachesandalternativemeansofimplementationarefullyconsidered andappropriatechoicesmadeinselectingthebestmeansofachievinggivenobjectives
3. Know how to formulate logically consistent projects and to specify the key project elements ina clear and preciseway
4. Identify, assess, and reduce projectrisks
5. Translateaprojectdesignintoimplementationtools,particularlyworkplans

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF04.CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF04.CO2	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF04.CO3	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF04.CO4	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF04.CO5	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-

TOTAL HOURS: 60

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16ITF05 **TECHNICALSEMINAR** **L T P C**
0 4 0 2

COURSE OBJECTIVES

1. Toexposestudentstothe'real'workingenvironmentandgetacquaintedwiththeorganizationstructure, Business operations and administrativefunctions
2. To promote and develop presentation skills and import a knowledgeablesociety
3. Toset thestageforfuturerecruitmentbypotentialemployers
4. To develop the presentation skill foremployability
5. To Utilize available technical resources inefficientmanner

COURSE OUTCOMES

1. Develop a skill for work in actualworkingenvironment.
2. Utilizeavailabletechnicalresourcesinefficientmanner.
3. Writetechnicaldocumentsandgiveoral presentationsrelatedtotheworkcompleted.
4. PrepareapresentationinlatesttrendsinInformationTechnology.
5. ImplementthepresentationinlatesttrendsinInformationTechnology

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF05.CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF05.CO2	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF05.CO3	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF05.CO4	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF05.CO5	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-

Seminar Topic:

Seminar topic should relate to the Information Technology, Some of the seminar topics are listed below:

1. FreeNet
2. Linear Programming inCloud
3. BlackberryTechnology
4. Biometric SecuritySystems
5. Credit Card FraudDetection
6. Vehicle ManagementSystem
7. SmartshaderTechnology
8. DigitalPiracy
9. GoogleGlass
10. DataRecovery
11. Cyber and SocialTerrorism
12. SpaceMouse
13. PillCamera
14. AmbientIntelligence
15. Mind ReadingComputer
16. Honeypots
17. Security throughObscurity
18. ElectronicBanking
19. Gi-Fi

Scheme of Evaluation:

The Course is evaluated based on:

- Presentation
- Student'sreports
- PPTpresentation
- Presentationwilltakeplacein theweeklyclass.Thepresentationisevaluationbyyourclassincharge.
- Reportmustbesubmittedduringpresentation.Thereportevaluationisdonebyyourclassincharge.
- A Viva voce comprising comprehensive questions basedon thepresentation.

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16ITF06 ENTREPRENEURSHIPDEVELOPMENT L T PC 30 03

COURSE OBJECTIVES

1. Topromotestrongentrepreneurshipamong Engineers,Managersand Sciencestudents.
2. Topromoteentrepreneurshipamongrelevantsectorsinthestate.
3. To collaborate with other organizationsandinstitutions.
4. To organize entrepreneurship development and awarenessprograms.
5. Toundertakeresearchstudiestoidentifyhightechnologyareashavingentrepreneurshipopportunities.

COURSE OUTCOMES

1. Identifyingrealproblemsand asolutionspeoplewantpitchingsolutions,suchasproductsandservices.
2. Achievehighdegreeofproductivityinasmallteamviaagile,highqualitypracticesand team organizationapproaches
3. Create a production softwaredevelopmentenvironment.
4. Preparelandscapeandapproachesforattractinginvestorsandsecuringfunding Communicating withcustomer
5. Achievecustomersatisfactioninthedevelopmentof ITproductsandservices

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF06.CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF06.CO2	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF06.CO3	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF06.CO4	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF06.CO5	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-

UNITI CONCEPT OF ENTREPRENEURSHIP 9

Meaning and characteristics of entrepreneurship, entrepreneurial culture, socio-economic origin of entrepreneurship, factors affecting entrepreneurship, conceptual model of entrepreneurship, traits of a good entrepreneur, entrepreneur, intra-preneur and manager ENTREPRENEURIAL MOTIVATION: motivating, compelling and facilitating factors, entrepreneurial ambition, achievement motivation theory and Kakinada experiment

UNITIIESTABLISHMENTOFENTREPRENEURIALSYSTEMS 9

search,processingandselectionofidea,Input requirements SMALL SCALE INDUSTRY: meaning, importance, characteristics, advantagesand problems of SSIs. Steps for starting a small industry, guidelines for project report, registration asSSI.

UNITIII ASSISTANCE TO SSI 9

need for incentives & subsidies, need for institutional support, role of government and other institutions.

UNITIVFUNCTIONAL PLANS 9

Marketingplan-marketingresearchforthenewventure, stepsinpreparingmarketing plan, contingency planning; Organizational plan- Forms of ownership, designing organizational structure, job design, manpower planning; Financial plan- cash budget, working capital, proforma income statement, Proforma cash flow, proforma balance sheet, break evenanalysis.

UNITVSOURCES OF FINANCE 9

Debt or Equity financing, commercial banks, venture capital; financial institutions supporting entrepreneurs; legal issues- intellectual property rights, patents, trademarks, copy rights, trade secrets, licensing, franchising.

TOTAL HOURS: 45

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Gupta C. B. and Srinivasan N. P	Entrepreneurial Development	Sultan Chand & Sons	2014
2.	Vasant Desai	Management of a Small Scale Industry	Himalaya Publishing House	2011

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Sangeetha Sharma	Entrepreneurship Development	PHI Learning Pvt. Ltd	2016
2	K Ramachandran	Entrepreneurship Development	Tata McGraw-Hill	2009
3	Abhishek Nirjar	Entrepreneurship Development	CBS Publishers	2014
4	S. Anil Kumar	Entrepreneurship Development	New Age International	2008
5	Fang Zhao	Information Technology Entrepreneurship and Innovation	O'Reilly	2008

WEB URLs

1. https://www.tutorialspoint.com/entrepreneurship_development/index.htm
2. https://www.entrepreneur.com/article/244279
3. https://ocw.mit.edu/courses/entrepreneurship/
4. http://freevideolectures.com/Course/3645/Technology-Entrepreneurship
5. http://articles.bplans.com/11-excellent-free-online-courses-for-entrepreneurs

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16ITF07 **SOFTSKILLS** **L T P C**
2 2 0 3

COURSE OBJECTIVES

1. Toenhanceholisticdevelopmentofstudentsandimprovetheiremployabilityskills.
2. Todevelop inter personal skills and be an effective goal oriented teamplayer.
3. Todevelop professionals with idealistic, practical and moralvalues.
4. To develop communicationand problem solvingskills.
5. To re-engineer attitude and understand its influence onbehavior.

COURSE OUTCOMES

1. Analysis self attitude and leadershipquality.
2. Exploresvariousindividualand groupproblem-solvingapproachesandthinkingpatterns
3. Analyzehowstressimpactsallofusinourprofessionallives
4. Manage their time in an efficient and effectivemanner
5. Equip participants with critical skill and decisionmaking

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF07.CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF07.CO2	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF07.CO3	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF07.CO4	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF07.CO5	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-

UNIT I -INTERPERSONALSKILLS 6

Self Analysis: SWOT Analysis-Who am I- Attributes- Importance of Self Confidence- Self Esteem.
Team Work: Necessity of Team- Work Personally- Socially and Educationally
Gratitude: Understanding the relationship between Leadership Networking & Team work- Assessing Interpersonal Skills -Situation description of Interpersonal Skill.

UNITII 6

Attitude: Factors influencing Attitude- Challenges and lessons from Attitude- Etiquette.
Leadership: Skills for a good Leader- Assessment of Leadership Skills
Creativity: Out of box thinking-Lateral Thinking.

UNITIII 6

Stress Management: Causes of Stress and its impact- how to manage & distress- Circle of control- StressBusters.
Emotional Intelligence: What is Emotional Intelligence- emotional quotient why Emotional Intelligence matters- Emotion Scales- Managing Emotions

UNITIV 6

Motivation: Factors of motivation- Self talk, Intrinsic & Extrinsic motivators.
Conflict Resolution: Conflicts in Human Relations – Reasons Case Studies- Approaches to conflict resolution.

UNITV 6

Goal Setting: Wish List- SMART Goals- Blue print for success- Short Term- Long Term- Life Time Goals.
Time Management: Value of time- Diagnosing Time Management- Weekly Planner To do list- Prioritizing work **Decision Making:** Importance and necessity of Decision Making- Process and practical way of Decision Making- Weighing Positives & Negatives.

TOTAL HOURS: 30+30

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Career Development Centre	Soft Skills	Green Pearl Publications	2015
2.	Daniel Coleman	Emotional Intelligence	Bantam Book	2006

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Gopalaswamy Ramesh	The Ace Of Soft Skills: Attitude, Communication And Etiquette For Success	Pearson Education India	2010
2	M. S. Rao	Soft Skills - Enhancing Employability	I. K. International Pvt Ltd	2010
3	Barun Mitra	Personality Development and Soft Skills	Oxford University Press	2012
4	Frederick H. Wentz	Soft Skills Training: A Workbook to Develop Skills for Employmen	Create space Independent Pub	2012
5	John Z. Sonmez	Soft Skills: The Software Developer's Life Manual	Manning Publications Company	2014

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1. https://onlinecourses.nptel.ac.in/noc16_hs15
2. http://www.skillkey.com/courses/explore
3. https://www.wiziq.com/tutorials/soft-skills
4. http://www.skillsoft.com
5. https://elearningindustry.com/soft-skills-training-make-elearning-work-enhancing-soft-skills

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16ITF08 **PROFESSIONALPRACTICES** **L T P C**
0 0 6 3

COURSE OBJECTIVES

1. Toexamineimportantprofessionalissuesincontemporarypracticeandtohelpstudentsbecom ean effective participant in a team of ITprofessionals.
2. Tohavegainedathoroughunderstandingofthevariousissues/factorsanIT professionalfacesandhow one shouldrespond.
3. To have learned what are considered professional behavior in the ITfield
4. To have learned about the currentITpractices.
5. To Develop professional attitude from the perspectives of experienced ITpractitioners

COURSE OUTCOMES

1. Describethevariousissues/factorsaninformationtechnologyprofessional
2. Describe professional behavior in the informationtechnology.
3. Recognizewhatarethecurrentissuesin ITandtheemergingtechnology
4. Write properly formatted and organized technicalreports
5. Acquireandintegrateknowledgetoappreciateindustrypractices

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ITF08.CO1	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF08.CO2	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF08.CO3	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF08.CO4	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-
16ITF08.CO5	-	-	-	-	-	-	-	X	-	X	X	X	-	-	-	-

CONTENT:

1. **Discipline-specificknowledgeandcapabilities**:appropriatetothelevelofstudyrelatedtoanInformation
2. **Communication**:usingoral,writtenandinterpersonalcommunicationtoinform,motivatea ndeffect change
3. **Digitalliteracy:**usingtechnologiestofind,useanddisseminateinformation
4. **Criticalthinking**:evaluatinginformationusingcriticalandanalyticalthinkingandjudgment
5. **Problemsolving:**creatingsolutionstoauthentic(realworldandill-defined)problems
6. **Self-management:** working and learning independently, and taking responsibility for personalactions.
7. **Teamwork**:workingandlearningwithothersfromdifferentdisciplinesandbackgrounds
8. **Globalcitizenship:**engagingethicallyandproductivelyintheprofessionalcontextandwith diverse communities and cultures in a globalcontext

Information TechnologyProfessionalism

A. Privacy andconfidentiality
B. Computerethics
C. Intellectual propertyissues
D. Computer crime andfraud
E. Professionalbodies
F. Impact of information technology onsociety

Information TechnologyPractices

A. Effects ofstandardization
B. Effectiveness vsefficiency
C. Distributed systemsissues
D. Emergingtechnologies
E. Qualityissues
F. Currentissues

TOTAL HOURS: 90

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TEXT BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Schultz, Robert A	Contemporary Issues in Ethics and Information Technology	IRM Press	2006
2.	Baase S	A Gift of Fire, Social, Legal and Ethical Issues for Computers and the Internet	Prentice Hall	2003

REFERENCE BOOKS:

S.No.	Author(s)	Title of the Book	Publisher	Year of Publication
1	Johnson DG	Computer Ethics	Prentice Hall	2001
2	Spinello RA	CyberEthics: Morality and Law in Cyberspace	Jones and Bartlett	2000

WEB URLs

1. www.infosec.gov.hk
2. www.pcpd.org.hk
3. www.ipd.gov.hk
4. www.ogcio.gov.hk
5. www.hkcs.org.h

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16MEE14 **INDUSTRIALROBOTICS** **L T PC**
3 0 03

COURSE OBJECTIVES

- To understand the functions of the basic components of aRobot.
- To study the use of various types of End of Effectors and sensors inrobot
- To impart knowledge in RobotKinematics
- To impart knowledge in Robotprogramming
- To learn Robot safety issues andeconomics.

COURSE OUTCOMES:

- Explain the fundamentals ofrobot
- Know the working of various robot drive systems and endeffectors
- Discuss the working principle of varioussensors
- Know about Robotprogramming
- Understand the implementation of robotics inindustries.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16MEE14.CO1	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE14.CO2	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE14.CO3	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE14.CO4	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE14.CO5	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-

UNIT I: FUNDAMENTALSOF ROBOT 9

Robot - Definition - Robot Anatomy - Co ordinate Systems, Work Envelope Types and Classification-Specifications- Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load- Robot Parts and their Functions-Need for Robots- Different Applications.

UNIT II: ROBOT DRIVE SYSTEMS ANDEND EFFECTORS 9

Pneumatic Drives-Hydraulic Drives-Mechanical Drives-Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors-Salient Features, Applications and Comparison of all these Drives, End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

UNIT III: SENSORS ANDMACHINEVISION 9

Requirements of a sensor, Principles and Applications of the following types of sensors- Position sensors - Piezo Electric Sensor, LVDT, Resolvers, Optical Encoders, pneumatic Position Sensors, Range Sensors Triangulations Principles, Structured, Lighting Approach, Time of Flight, Range Finders, Laser Range Meters, Touch Sensors ,binary Sensors., Analog Sensors, Wrist Sensors, Compliance Sensors, Slip Sensors, Camera, Frame Grabber, Sensing and Digitizing Image Data- Signal Conversion, Image Storage, Lighting Techniques, Image Processing and Analysis-Data Reduction, Segmentation, Feature Extraction, Object Recognition, Other Algorithms, Applications- Inspection, Identification, Visual Serving andNavigation.

UNIT IV: ROBOT KINEMATICS ANDROBOT PROGRAMMING 9

Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Four Degrees of freedom (in 3 Dimension) Jacobians, Velocity and Forces-Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design-Derivations and problems. Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

UNIT V: IMPLEMENTATION ANDROBOTECONOMICS 9

RGV, AGV; Implementation of Robots in Industries-Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

TOTAL: L: 45 = 45

TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Klafter R.D, Chmielewski T.A and Negin M	Robotic Engineering - An IntegratedApproach	Prentice Hall	2003
2.	Groover M.P	Industrial Robotics - Technology Programming and Applications	McGraw Hill	2001

REFERENCES BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Craig J.J.	Introduction to Robotics Mechanics and Control	Pearson Education	2008
2.	Deb S.R.	Robotics Technology and Flexible Automation	Tata McGraw Hill Book Co	1994
3.	Rajput R.K.	Robotics and Industrial Automation	S.Chand and Company	2008
4.	Koren Y	Robotics for Engineers	Mc Graw Hill Book Co	1992
5.	Janakiraman P.A.	Robotics and Image Processing	Tata McGraw Hill	1995

WEB URLs

1. www.eia.udg.edu/~fgarciab/docs/VIBOT/UdG_FR_C1.pdf
2. www.robotbasics.com/robot-drive-system
3. www.en.wikipedia.org/wiki/Machine_vision
4. www.et.byu.edu/~ered/ME537/Notes/Ch3-537.pdf
5. www.readorrefer.in/article/Economic-Analysis-of-Robot_5181/

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16MEE20 **POWERPLANTENGINEERING** **L T PC**

3 0 0 3

OBJECTIVES:

- ToProvideanoverviewofPowerPlantsand detailingtheroleofMechanicalEngineersintheir operation and maintenance.
- To understand about Thermal power plants andworking
- To know about Diesel engine power plants andworking
- To know the working of Nuclear power plants and other powerplants
- To understand Environmental problems related to powerplants

OUTCOMES :

- Comprehend the working principles of coal based thermal powerplants
- Illustrate the working principles of diesel, gas turbine and combined cycle powerplants
- Illustrate and explain the working principle and components of nuclear powerplants
- Explain the techniques to extract power from renewable energysources
- Understand the economic and environmental issues of powerplants.

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16MEE20.CO1	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE20.CO2	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE20.CO3	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE20.CO4	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-
16MEE20.CO5	X	X	X	-	-	-	-	-	-	-	X	X	X	X	-	-

UNIT I: COAL BASED THERMALPOWER PLANTS **9**

Rankine cycle - improvisations, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles and Cogenerationsystems.

UNIT II: DIESEL, GAS TURBINE AND COMBINED CYCLEPOWER PLANTS **9**

Otto, Diesel, Dual & Brayton Cycle - Analysis & Optimisation. Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems.

UNIT III: NUCLEARPOWER PLANTS **9**

Basics of Nuclear Engineering, Layout and subsystems of Nuclear Power Plants, Working of Nuclear Reactors : Boiling Water Reactor (BWR), Pressurized Water Reactor (PWR), CANada Deuterium-Uranium reactor (CANDU), Breeder, Gas Cooled and Liquid Metal Cooled Reactors. Safety measuresfor Nuclear Power plants.

UNIT IV: POWER FROMRENEWABLEENERGY **9**

Hydro Electric Power Plants – Classification, Typical Layout and associated components including Turbines. Principle, Construction and working of Wind, Tidal, *Solar* Photo Voltaic (SPV), SolarThermal, Geo Thermal, Biogas and Fuel Cell power systems.

UNIT V: ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OFPOWER PLANTS **9**

Power tariff types, Load distribution parameters, load curve, Comparison of site selection criteria,relative merits & demerits, Capital & Operating Cost of different power plants. Pollution control technologies including Waste Disposal Options for Coal and Nuclear Power Plants.

TOTAL: 45 Hours

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TEXT BOOKS:

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Nag. P.K.,	Power Plant Engineering	Tata McGraw – Hill	2010
2	C. Elanchezhian, L. Saravanakumar,B. Vijaya Ramnath	Power Plant Engineering	I.K.International Publishing house pvt ltd	2007

REFERENCE BOOKS:

1.	El-Wakil. M.M	Power Plant Technology	Tata McGraw – Hill Publishing Company Ltd.,	2010
2.	Thomas C. Elliott	Power Plant Engineering	Standard Handbook of McGraw – Hill	2003
3.	Godfrey Boyle	Renewable energy	Oxford University Press	2004
4	R.K.Rajput	Power Plant Engineering	Laxmi Publications	2016
5	S. C. Arora and S. Domkundwar	A COURSE in Power Plant Engineering	Dhanpatrai & Sons,	2008

WEB URLs

1. www.youtube.com/watch?v=IdPTuwKEfmA
2. www.youtube.com/watch?v=Uhjhufhg3Xk
3. www.youtube.com/watch?v=9q7_n2E32_g
4. www.youtube.com/watch?v=riRzpm0u81I
5. www.youtube.com/watch?v=hrFeyue--gE

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16MED23 **TOTALQUALITYMANAGEMENT** **L T PC**
3 0 03

COURSE OBJECTIVES

- TounderstandtheTotalQualityManagementconceptandprinciplesandthevarioustoolsavailabletoachieve Total QualityManagement
- To understand the application of statistical approach for qualitycontrol
- To create an awareness about the ISO and QS certification process and its need for theindustries
- To apply the quality concepts in product design, manufacturing etc in order to maximize customerSatisfaction
- Human involvement to improve quality and the development andtransformation

COURSE OUTCOMES

- Understand the concept of total qualitymanagement
- Comprehend and illustrate the TQMprinciples
- Solve quality related problems using statistical processcontrol
- Understand proven methodologies to enhance managementprocesses
- Illustrate the salient freatures of qualitysystems

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16MED23.CO1	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16MED23.CO2	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16MED23.CO3	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16MED23.CO4	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16MED23.CO5	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-

UNIT I:INTRODUCTION 9

Definition of Quality – Dimensions of Quality – Quality Planning – Quality costs – Analysis Techniques for Quality Costs – Basic concepts of Total Quality Management – Historical Review – Quality Statements – Strategic Planning, Deming Philosophy – Crosby philosophy – Continuous Process Improvement – Juran Trilogy, PDSA Cycle, 5S, Kaizen-Obstacles to TQMImplementation

UNIT II:TQMPRINCIPLES 9

Principles of TQM, Leadership – Concepts – Role of Senior Management – Quality Council, Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits– Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure

UNIT III: STATISTICAL PROCESSCONTROL(SPC) 9

The seven tools of quality – Statistical Fundamentals – Measures of central Tendency and Dispersion,Population and Sample, Normal Curve, Control Charts for variables X bar and R chart and attributes P, nP, C, and u charts, Industrial Examples, Process capability, Concept of six sigma – New seven Management tools

UNIT IV:TQMTOOLS 9

Benchmarking – Reasons to Benchmark – Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, and Benefits – Taguchi Quality Loss Function – Total Productive Maintenance (TPM) – Concept, Improvement Needs, and FMEA – Stages of FMEA- Casestudies

UNIT V:QUALITYSYSTEMS 9

Need for ISO 9000 and Other Quality Systems – ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 9000:2005 (definitions), ISO 9001:2008 (requirements) and ISO 9004:2009 (continuous improvement), TS 16949, ISO 14000, AS9100 – Concept, Requirements and Benefits- Case studies

Total mark: 45

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TEXT BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dale H. Besterfiled	Total Quality Management	Pearson Education Inc, New Delhi	2003
2.	James R. Evans and William M. Lidsay,	The Management and Control of Quality	South-Western	2002

REFERENCE BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	N. Gupta and B. Valarmathi,	Total Quality Management	Tata McGraw-Hill Publishing Company Pvt Ltd., New Delhi	2009
2	Dr S. Kumar	Total Quality Management,	Laxmi Publications Ltd., New Delhi	2006
3	P. N. Muherjee	Total Quality Management	Prentice Hall of India, New Delhi	2006
4	James R. Evans and William M. Lindsay	The Management and Control of Quality	8th Edition, First Indian Edition, Cengage Learning	2012
5	Suganthi.L and Anand Samuel	Total Quality Management	Prentice Hall (India) Pvt. Ltd	2006

WEB URLs

1. www.nptel.iitm.ac.in/COURSEs/WebCOURSE-contents/IIT-roorkee/industrialengineering/index.htm
2. www.statit.com/services/SPCOverview_mfg.pdf
3. www.3.ha.org.hk/qeh/wiser/doc/7bqt.pdf
4. www.directory.umm.ac.id/Data%20Elmu/pdf/TQMTools.pdf
5. www.pqm-online.com/assets/files/lib/books/holye2.pdf

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16ECE06 TELECOMMUNICATIONSWITCHINGNETWORKS **L P TC**
3 0 03

OBJECTIVES

- To introduce fundamentals functions of a telecom switchingSystems
- To provide statistical modeling of telephone traffic and characteristics of blocking and queuingsystem
- To learn the various switchingnetworks
- To introduce the concepts of Digital SwitchingSystems
- To study signaling, packet switching andnetworks.

COURSE OUTCOMES

- Describe the Basic Switching concepts oftelecommunication.
- Analyze and evaluate fundamental telecommunication trafficmodels
- Solve problems in switching networks
- Understand the concepts of Digitalswitching
- Understand the signaling and packet switchingtechniques

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ECE06.CO1	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE06.CO2	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE06.CO3	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE06.CO4	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE06.CO5	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-

UNIT ISWITCHINGSYSTEMS **9**

Evolution of Telecommunications; Basics of a Switching System; Functions of a Switching System; Crossbar Switching-Principle of Crossbar Switching; Crossbar Switch Configurations; Cross-Point Technology; Crossbar Exchange Organization; A General Trunking; Electronic Switching; Digital Switching Systems.

UNIT IITRAFFICENGINEERING **9**

Congestion – Network traffic load and Parameters – Traffic measurement – Lost-call system – Grade of Service and Blocking probability – Modeling switching systems – Incoming traffic and service time characterization – Blocking models and loss estimates – Queuing systems – Simulationmodels.

UNIT III SWITCHINGNETWORKS **9**

Single Stage Networks; Gradings-Principle; Two Stage Networks; Three Stage Networks; Four Stage Networks – Gradings – Link systems – Grades of service of link systems – Application of graph theory to link systems – Use of expansion – Call packing – Rearrangeable networks – Strict-sense non-blocking networks –Sectionalized switching networks.

UNIT IV DIGITAL SWITCHING SYSTEMS **9**

Space and time switching – Time-division switching networks – Grades of service of time-division switching networks-– hybrid time and space division multiplexes – Non-blocking networks – Synchronization – Call-processing functions – Common control – Reliability, availability and security – Stored program control.

UNIT V SIGNALING AND PACKET SWITCHING **9**

Customer line signaling – FDM carrier systems – PCM signaling – Inter-register signaling – Common-channel signaling principles – CCITT signaling – Digital customer line signaling – Statistical multiplexing – Local area and wide area networks – Large scale and Broadbandnetworks.

Total:45 Hrs

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TEXT BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Thiagarajan Viswanathan	elecommunication Switching Systems and Networks	Prentice Hall of India Pvt.Ltd	2006
2.	William Stallings	ireless Communication and Networks	Pearson Education, New Delhi	Second edition 2004

REFERENCE BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	J.E. . Flood	Telecommunications Switching, Traffic and Networks	Pearson Education Ltd	2006
2.	John C Bellamy	Digital Telephony	John Wiley	3rd Edition, 2000
3.	Behrouz Forouzan	Introduction to Data Communication and Networking	Tata Mc-Graw Hill New York	1996
4.	Tomasi	Introduction to Data Communication and Networking	Pearson Education	1st Edition, 2007
5.	R.A.Thomson	Telephone switching Systems	Artech House Publishers	2000

WEB URLs

1. www.nptel.ac.in/courses/117104128/12
2. wwwnptel.ac.in/courses/106105082/20
3. wwwnptel.ac.in/courses/117104104/
4. wwwnptel.ac.in/courses/117101050/25
5. wwwnptel.ac.in/courses/106105080/pdf/M4L1.pdf

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16ECE15 **MOBILEAD-HOCNETWORKS** **L T PC**
3 0 03

OBJECTIVES

- To gain knowledge in wireless network protocol and standards.
- To study the MAC, Routing protocols for ad hocnetworks.
- To gain knowledge about NetworkSimulator.
- To learn the concept of security mechanism for wirelessnetworks.
- To study about Characteristics of securityprotocols.

COURSE OUTCOMES

- Demonstratethecurrentad-hoc/sensortechnologiesbyresearchingkeyareassuchas algorithms, protocols andapplications
- Identify the major issues associated with ad-hoc/sensor networks and supporting software inadhoc/sensor networks.
- Create a wireless network scenario and analyze its performance using networksimulator
- Choose security component for five layers ofnetworks
- Analyze the characteristics of different securityprotocols

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16ECE15.CO1	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE15.CO2	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE15.CO3	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE15.CO4	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-
16ECE15.CO5	X	X	X	-	-	-	-	-	-	-	X	X	-	X	-	-

UNIT I INTRODUCTION 9

Introduction to Ad-Hoc wireless networks- Packet radio networks-Key definitions of ad-hoc and sensor networks- Advantages of ad-hoc and sensor networks -Unique constraints and challenges and Vulnerabilities- Wireless Communications/Radio Characteristics. Applications of Ad-Hoc/Sensor Network and Future Directions: Driving Applications- Ultra wide band radio communication- Wireless fidelity systems-optical wireless networks - Simulation of Wi-Fi using QUALNET simulator.

UNIT II MEDIA ACCESS CONTROL(MAC)PROTOCOLS 9

Issues in designing MAC protocols-Bandwidth efficiency-Quality of service support-Synchronization hidden node-exposed node problems. Classifications of MAC protocols: Contention based protocols- MACAW- Media access protocol for wireless LAN-media access with reduced handshake-contention based with reservation mechanisms- Distributed priority-scheduling. Mac protocols using directional antenna. Simulation of 802.11using QUALNET

UNIT III ROUTINGPROTOCOLS 9

Issues in designing routing protocols-Mobility-bandwidth constraint-Table driven routing protocols :DSDV, ,WRP, CHGSRP, - On demand routing protocol : AODV,DSR, TORA,LAR,ANODR- zone routing protocol-Fish eye state routing protocol-power aware routing protocol. Simulation of routing protocols using QUALNET simulator.

UNIT IV WIRELESS SENSOR NETWORKS 9

Introduction-sensor network architecture-Data dissemination-data gathering-self organizing, MAC Protocols for Sensor Networks - Location discovery- Quality of a Sensor Network - Evolving Standards - Energy efficient issues- Transport layer. Synchronizationissues.

UNIT V SECURITY ISSUES IN AD HOC /SENSOR NETWORK 9

Introduction -Need for Security- classification of attack-MAC layer attacks-Network layer attacks-Wired Equivalent Privacy(WEP)-Intrusion prevention scheme- Confidentiality : Symmetric Encryption- DES and Triple DES detection systems- Authentication :Digital Signatures, Certificates, User Authentication, Elliptic Curve Cryptosystems. Intrusion detection systems : behavior based detection knowledge based detection-watch dog-path rater. Reputation based system: CORE,CONFIDENT

Total:45 Hrs

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TEXT BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Siva Ram Murthy C. and Manoj B S,	Ad Hoc Wireless Networks: Architectures and Protocols	Prentice Hall,	2014.
2.	Toh C K,	Ad Hoc Mobile Wireless Networks: Protocols and Systems	Prentice Hall	2008

REFERENCE BOOKS

Sl.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Charles Perkins, Addision Wesley,	Ad hoc Networking	Pearson	2008
2.	Toh C.K,	Ad Hoc Mobile wireless Networks : protocol and Systems	Prentice Hall PTR,	2008
3.	Feng zhao, Leonidas Guibas	Wireless sensor network,	Morgan Kaufmann publishers,	2015
4.	Kazem sohraby, Daniel minoli and Taieb Znati,	Wireless sensor networks- Technology, Protocols and Applications	Wiley	2007
5.	T.L.Singhal	Wireless Communication	TMH,	2012

WEB URLs

1. www.onlinecourses.nptel.ac.in/noc17_cs07
2. www.nptel.ac.in/courses/106105160/3
3. www.nptel.ac.in/courses/106105080/pdf/M5L7.pdf
4. www.ece.rochester.edu/courses/ECE586/lectures/MANETS_MAC.pdf
5. www.onlinecourses.nptel.ac.in/noc17_cs07/announcements

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16CED14 **WATERSUPPLYENGINEERING** **L T PC**
3 0 03

COURSE OBJECTIVES:

- To make the students conversant with sources, demand and characteristics ofwater
- To expose the students to understand the concept of various water supplylines.
- To provide adequate knowledge about the water treatmentprocesses.
- To prefer the suitable advanced treatmenttechniques.
- To provide knowledge on water distribution and plumbing system

COURSE OUTCOMES:

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

- Identify the quantity and quality of water from varioussources.
- Explain the processes involved in the water conveyancesystems
- Infer the design principles of unit operations and unit processes for watertreatment
- Justify the suitable advanced treatment techniques for watertreatment
- Choose the appropriate water distribution network for a city and plumbing systems for abuilding

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16CED14.CO1	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CED14.CO2	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CED14.CO3	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CED14.CO4	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CED14.CO5	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-

UNIT I PLANNING FOR WATERSUPPLY SYSTEM 9

Public water supply system - Planning - Objectives -Design period - Population forecasting -Water demand -Sources of water and their characteristics - Surface and Groundwater- Impounding Reservoir - Development and selection of source
- Water quality - Characterization andstandards.

UNIT IICONVEYANCE SYSTEM 9

Water supply -intake structures -Functions and drawings -Pipes and conduits for water- Pipe materials - Hydraulics of flow in pipes -Transmission main design -Laying, jointing and testing of pipes - Drawings appurtenances - Types and capacity of pumps -Selection of pumps and pipe materials.

UNIT IIIWATERTREATMENT 9

Objectives - Unit operations and processes - Principles, functions design and drawing of chemical feeding, Flash mixers, flocculators, sedimentation tanks and sand filters - Disinfection- Residue Management - Construction and Operation & Maintenance aspects of Water Treatment Plants.

UNIT IV ADVANCEDWATER TREATMENT 9

Principles and functions of Aeration - Iron and manganese removal, Defluoridation and demineralization - Water softening - Desalination - Membrane Systems - Recent advances.

UNITV WATER DISTRIBUTION AND SUPPLYTOBUILDINGS 9

Requirements of water distribution -Components -Service reservoirs - Functions and drawings - Network design - Analysis of distribution networks - Appurtenances -operation and maintenance -Leak detection, Methods. Principles of design of water supply in buildings -House service connection -Fixtures and fittings -Systems of plumbing and drawings of types of plumbing.

TOTAL: 45PERIODS

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Coimbatore

TEXT BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	S.K. Garg	Water Supply Engineering	Khanna Publications Pvt.Ltd. New Delhi.	2010
2	Modi, P.N	Environmental Engineering I	Standard Book House, Delhi	2015

REFERENCE BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1	Cpheeco Manual	Manual on Water supply and Treatment	Government of India, New Delhi	2016
2	Birdie.G	Water Supply and Sanitary Engineering	Dhanpat Rai and sons	2011
3	-	Hand book on Water Supply and Drainage	SP35, B.I.S., New Delhi	2013
4	Syed R Qasim, Motley E M	Water Works Engineering – Planning, Design and Operation	Prentice- hall of India, New Delhi,	2013
5	Babbit. H. E., and Donald. J. J	Water Supply Engineering	McGraw Hill book Co	2012

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1. www.ircwash.org/sites/default/files/202.6-89ES-3959.pdf
2. www.sswm.info/content/water-distribution-pipes
3. www.who.int/water_sanitation_health/dwq/S12.pdf
4. www.sswm.info/print/2820?tid=1257
5. www.sswm.info/content/water-distribution-pipes

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16CEE12 **HEALTH MONITORINGOFSTRUCTURES** **L T P C**
3 0 0 3

COURSE OBJECTIVES:

- To Study about maintenance and repair ofstructure
- To impart the quality and durability ofconcrete
- To Study about special materials for repair ofstructures.
- To learn about repair and demolitiontechnique.
- To gain the knowledge about rehabilitation and strengthening ofstructures.

COURSE OUTCOMES:

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

- Obtain the knowledge of maintenance and repair ofstructures.
- Obtain the knowledge serviceability and durability ofconcrete
- Select suitable material for repair.
- Select appropriate techniques for repair anddemolition
- Know about repair, rehabilitation and strengthening ofstructures..

Course Outcomes	Program Outcomes												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
16CEE12.CO1	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CEE12.CO2	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CEE12.CO3	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CEE12.CO4	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-
16CEE12.CO1	X	X	X	-	-	-	-	-	-	-	X	X	-	-	-	-

UNIT I MAINTENANCE ANDREPAIRSTRATEGIES 9

Maintenance, repair and rehabilitation - Facts of Maintenance - importance of Maintenance various aspects of Inspection
- Assessment procedure for evaluating a damaged structure - causes of deterioration - Diagnosis of causesand preventivemeasures.

UNITII SERVICEABILITY AND DURABILITYOFCONCRETE 9

Quality assurance for concrete construction concrete properties - strength, permeability, thermal properties and cracking-Effects due to climate, temperature, chemicals, corrosion - design and construction errors - Effects of cover thickness and cracking.

UNIT III SPECIAL MATERIALSFOR REPAIR 9

Special concretes and mortar - concrete chemicals - special elements for accelerated strength gain - Expansive cement - polymer concrete - sulphur infiltrated concrete - ferro cement - Fibre reinforced concrete.

UNITIV TECHNIQUES FOR REPAIRANDDEMOLITION 9

Rust eliminators and polymers coating for rebars during repair - foamed concrete - mortar and dry pack - vacuum concrete - Gunite and Shotcrete - Epoxy injection - Mortar repair for cracks - shoring and underpinning - Methods of corrosion protection - corrosion inhibitors - coating and cathodic protection - Engineered demolition techniques for Dilapildated structures - case studies.

UNIT V REPAIRS, REHABILITATION & STRENGTHENINGOFSTRUCTURES 9

Repairs to overcome low member strength - Deflection, Cracking, Chemical disruption, weathering corrosion, wear, fire, leakage and marine exposure - Strengthening of Super Structures - plating - Conversion tocomposite construction
- post stressing - Jacketing - Reinforcement addition, strengthening the substructures - Increasing the load capacity of footing.

TOTAL : 45 PERIODS

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TEXT BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Denison Campbell, Allen and Harold Roper	Concrete Structures, Materials, Maintenance and Repair	Longman Scientific and Technical UK	2006
2.	R.T.Allen and S.C.Edwards	Repair of Concrete structures	Blakie and Sons, UK	2007

REFERENCE BOOKS:

S.No	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Dr.B Vidivelli	Rehabilitation of Concrete Structures	Standard Publishers Distributors	2013
2.	M.S.Shetty	Concrete Technology -Theory and Practice	S.Chand and Company, New Delhi	2006
3.	M.L. Gambhir	Concrete Technology	Tata McGraw Hill Company, Noida	2011
4.	Santhakumar, A.R	Training Course notes on Damage Assessment and repairs in Low Cost Housing,"RHDC–NBO"	Anna University	1995
5.	Lakshmipathy, M	Lecture notes of Workshop on "Repairs and Rehabilitation of Structures"	-	1999

WEB URLs

1. www.youtube.com/watch?v=fikRPFpbgVo
2. www.brainkart.com/.../Important-Questions-and-Answers--Serviceability-and-Durabil...
3. www.iitk.ac.in/nicee/wcee/article/11_2089.PDF
4. www.brainkart.com/.../Important-Questions-and-Answers--Techniques-for-Repair-an...
5. www.ijiert.org/download-file?file=1490447458_Volume%204%20Issue%203...

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