PAAVAI ENGINEERING COLLEGE, NAMAKKAL - 637 018

(AUTONOMOUS)

B.E. COMPUTER SCIENCE AND ENGINEERING

REGULATIONS 2016

CURRICULUM

(CHOICE BASED CREDIT SYSTEM)

SEMESTER V

S.No.	Category	Course Code	Course Title	L	Т	Р	С
Theory	y						
1	PC	CS16501	Theory of Computation	3	2	0	4
2	PC	CS16502	Graphics and Multimedia	3	0	0	3
3	PC	CS16503	Java and Internet Programming	3	0	0	3
4	PC	CS16504	Operating Systems	3	0	0	3
5	PE	CS16***	Programme Elective I	3	0	0	3
Practi	ical						
6	PC	CS16505	Graphics and Multimedia Laboratory	0	0	4	2
7	PC	CS16506	Java and Internet Programming Laboratory	0	0	4	2
8	PC	CS16507	Operating Systems Laboratory	0	0	4	2
9	EE	EN16501	Career Development Laboratory I	0	0	2	1
			Total	15	2	14	23

SEMESTER VI

S.No.	Category	Course Code	Course Title	L	Т	Р	С
Theor	y Y						
1	PC	CS16601	Object Oriented Analysis and Design	3	0	0	3
2	PC	CS16602	Artificial Intelligence	3	0	0	3
3	PC	CS16603	Cryptography and Network Security	3	0	0	3
4	PC	CS16604	Compiler Design	3	2	0	4
5	OE	******	Open Elective I	3	0	0	3
Practi	cal						
6	PC	CS16605	Object Oriented Analysis and Design Laboratory	0	0	4	2
7	PC	CS16606	Compiler Design Laboratory	0	0	4	2
8	PC	CS16607	Artificial Intelligence Laboratory	0	0	4	2
9	EE	EN16601	Career Development Laboratory II	0	0	2	1
			Total	15	2	14	23

LIST OF PROGRAMME ELECTIVE

PROGRAMME ELECTIVE I

S.No.	Category	Course Code	Course Title	L	Т	Р	С
1	BS	MA16151	Discrete Mathematics	3	0	0	3
2	PE	CS16151	XML and Web Services	3	0	0	3
3	PE	BA16254	Principles of Management	3	0	0	3
4	PE	CS16152	Big Data Analytics	3	0	0	3
5	PE	CS16153	Parallel Computing	3	0	0	3

OPEN ELECTIVE I

S.No.	Category	Course Code	Course Title	L	Т	Р	С
1	OE	CS16901	R and Python Programming	3	0	0	3
2	OE	CS16902	Fundamentals of Database System	3	0	0	3
3	OE	CS16903	E - Commerce	3	0	0	3

SEMESTER V

CS16501

THEORY OF COMPUTATION

COURSE OBJECTIVES

To enable the students to

- Introduce the mathematical foundations of computation using automata theory.
- Prove properties of regular languages and construct FA for regular expressions.
- Understand context free grammar and determine whether a given language is context free language or not.
- Build CFG for pushdown automata.
- Design Turing machine for simple problems.

PRE - REQUISITE: Nil

UNIT I FINITE AUTOMATA

Introduction to automata theory - Formal definition of Finite automata - Deterministic Finite Automata (DFA) - Non - deterministic Finite Automata (NFA) - Finite Automata with Epsilon transitions - NFA to DFA conversions - DFA minimization.

UNIT II REGULAR EXPRESSIONS AND LANGUAGES

Regular Expression -regular sets - construction of Finite automata from regular expressions - pumping lemmafor regular languages- Applications of pumping lemma - Proving languages not to be regular- Closureproperties of regular languages.

UNIT III CONTEXT FREE GRAMMARS AND LANGUAGES

Introduction to grammars - Language generated by grammars - Chomsky classification of grammar - Context free grammars and languages - Derivations - leftmost and rightmost derivations - Parse Tree - Ambiguity in grammars and Languages - Simplification of CFG - Elimination of useless symbols - Unit productions - Null productions Normal forms - Chomsky Normal form - Greibach normal form - pumping lemma for context free grammar.

UNIT IV PUSHDOWN AUTOMATA

Introduction - Pushdown automata - Basic structure of PDA - Instantaneous description of pushdown automata - Acceptance by empty stack and final state - Equivalence of CFG and PDA.

UNIT V TURING MACHINE AND LANGUAGE DECIDABILITY

Turing machine introduction - definition - Programming Techniques for TM - Storage in finite Control - (Multiple Tracks, Subroutines, Checking off symbols) Designing a Turing machine for simple problems - Multitape Turing machine and multitrack Turing machine - Language decidability - Undecidable languages - Turing machine halting Problem - Rice theorem - Post correspondence problem.

TOTAL PERIODS: 60

12

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COURSE OUTCOMES

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

- Analyze and design finite automata and minimize finite automata.
- Understand the properties of regular expressions, convert regular expression to finite automata.
- Understand CFG and simplification of grammar, normal forms.
- Understand PDA and equivalence of PDA and CFG.
- Understand the concept of Turing Machine and Language Decidability.

TEXT BOOKS

- 1. John E.Hopcroft, Rajeev Motwani and Jeffrey.D Ullman, Introduction to Automata Theory, Languages and Computations, Pearson Education, Third Edition, 2009.
- 2. John C.Martin, Introduction to Languages and the Theory of Computation, TMH, 2007.

REFERENCES

- 1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.
- 2. S.N.Sivanandam,"Theory of computation", I.K.International Publishing Pvt Limited, 2009.
- Thomas A. Sudkamp," An Introduction to the Theory of Computer Science, Languages and Machines", Third Edition, Pearson Education, 2007.
- 4. Raymond Greenlaw an H.James Hoover, "Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.
- 5. MichealSipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

- 1. www.freetechbooks.com/theory of computation f50.html.
- 2. www.nptel.ac.in/courses/106106049.
- 3. www.freecomputerbooks.com/compscComputationBooks.html.
- 4. www.tutorialspoint.com/automata_theory.
- 5. http://freevideolectures.com/Course/3045/Theory of Computation I.



	Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1-Weak													
						Prog	gramme	e Outco	omes(P	Os)				
COs	PO1	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02												
C01	3	3	2	3	-	-	-	-	-	-	-	2	3	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3	3	3
CO3	3	3	3	2	-	-	-	-	-	-	-	2	3	3
CO4	3	2	3	3	-	-	-	-	-	-	-	3	3	3
CO5	3	3 2 3 3 - - - - - 3 3 3 3 3 2 3 - - - - - 3 3 3												

CS16502

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COURSE OBJECTIVES

To enable the students to

- Understand 2D graphics techniques and algorithms.
- Implement various3D graphics techniques.
- Implement the graphics programming concepts.
- Understand the basic concepts of Multimedia.
- Gain the knowledge of the various file formats in multimedia.

PRE - REQUISITE: Nil

UNIT I 2D PRIMITIVES

Introduction - Output primitives: Line (DDA, Bresenham"s), Circle (Bresenham"s, Midpoint) drawing algorithms -Filled Area primitives - Attributes of output primitives - Two dimensional geometric transformations: Translation rotation - scaling - reflection and shearing - Two dimensional viewing - Clipping algorithm: Line (Cohen Sutherland, Liang Bar - sky - Clipping), Polygon (Sutherland Hodgeman Clipping), Curve - Point and Text clipping algorithms.

UNIT II 3D REPRESENTATION

3D transformations - Translation - rotation - scaling - reflection and shearing - 3D Viewing - Parallel and Perspective projections - Visible surface identification.

UNIT III GRAPHICS PROGRAMMING

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

UNIT IV MULTIMEDIA

Introduction - Applications - Multimedia system Architecture - Multimedia data interface standards - Multimedia Databases - Compression and decompression: Types of Compression - Video image compression (JPEG, MPEG) -Audio compression.

UNIT V MULTIMEDIA FILE FORMAT AND INPUT/OUTPUT TECHNOLOGIES

Data File Format standards: TIFF file format - RIFF file format - MIDI file format - JPEG DIB File format - Multimedia input and output technologies(Video and Image display systems, Video image and Animation).

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Understand the basic concepts of computer graphics 2D modeling.
- Understand the 3D modeling techniques.
- Develop a program using computer graphics.

- Understand multimedia concepts.
- Understand multimedia file format.

- 1. Donald Hearn and Pauline Baker, Computer Graphics C version, Pearson Education, 2008.
- 2. Andleigh, Prabat K, and ThakrarKiran., "Multimedia Systems and Design", Prentice Hall of India, New Delhi, 2004.

REFERENCES

- 1. Ashok Banerji, AnandaGhosh, "Multimedia Technologies", Tata McGraw Hill, New Delhi, 2009.
- 2. Halshall, Fred., "Multimedia Communications", Pearson Education (India), New Delhi, 2008.
- 3. Foley, Vandam, Feiner and Huges, "Computer Graphics: Principles and Practice", 2nd Edition, Pearson Education, 2003.
- 4. Steinmetz, Ralf and Nahrstedt, Klara., "Multimedia: Computing, Communications and Applications" Pearson Education, New Delhi, 2001.
- 5. Tay Vaughan, Multimedia: Making It Work, Tata McGraw Hill, 2008.

	Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
COs		Programme Outcomes(POs)												mme c nes
	PO1	PO2	PO3	PO12	PSO1	PSO2								
CO1	2	3	3	3	3	3								
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	3	3 3 3												3
CO5	3	3	3	-	-	2	-	-	-	-	-	3	3	2



CS16503

COURSE OBJECTIVES

To enable the students to

- Understand the concepts of Java fundamentals.
- Understand the importance of Multi thread Programming and IO.
- Develop an application using Applet and JDBC.
- Gain the knowledge about the client side scripting.
- Gain the knowledge about the server side scripting and web development application.

PRE - REQUISITE: Object Oriented Programming

UNIT I JAVA FUNDAMENTALS

Review of OOP - Objects and classes in Java - Defining classes - Methods - Access Specifiers - Static members - Constructors - Finalize method - Arrays - Strings - Packages - Inheritance.

UNIT II CONCURRENT PROGRAMMING

MULTI-THREADED PROGRAMMING: interrupting threads - thread states - thread properties - thread Synchronization. I/O AND EXPLORING JAVA.IO: Basics - Reading Console Input - Writing Console output - Native Methods - I/O Classes and Interfaces - File - The Byte Streams - The Character Streams - Serialization.

UNIT III APPLETS, EVENT HANDLING AND AWT

Applet Basics - Applet Architecture - Applet Display Methods - Parameter Passing - Event Handling Mechanisms - Event Classes - Event Listener - Working with Windows - Graphics - Colors and Fonts - AWT Controls -Layout Managers and Menus.

UNIT IV CLIENT - SIDE PROGRAMMING

Scripting for content structuring - design - client side validation - dynamic page generation - adding interactivity - styles using HTML - DHTML - XHTML - CSS - Java Script.

UNIT V SERVER - SIDE PROGRAMMING

Types of servers - Handling form data - validation - querying databases - information retrieval - Response generation - Session management - using Servlets and JSP.

TOTAL PERIODS45

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

COURSE OUTCOMES

- Construct java program using concept of OOPs and packages in java.
- Construct java program using concept of I/O exploring java.io and multithreading.
- Develop the application of Applets, Event Handling and AWT.
- Create the UI in client side programming.
- Acquire knowledge to configure the Servers.

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- 1. Herbert Schildt, "Java The Complete Reference", 8th Edition, McGraw Hill Osborne Media, 2011.
- 2. Paul Deitel, "Internet & World Wide Web: How to Program", Prentice Hall, 4th Edition, 2007.

REFERENCES

- Cay S. Horstmann and Gary Cornell, "Core Java[™], Vol I Fundamentals" 8Th Edition, Prentice Hall, 2007.
- 2. Robert W. Sebesta, "Programming the World Wide Web", Addison Wesley, Sixth Edition, 2010.
- 3. UttamK.Roy, "Web Technologies", Oxford University Press, 1st Edition, 2010.
- 4. B. Chapman, G. Jost, and Ruud van der Pas, "Using OpenMP", MIT Press, 2008.

- 1. www.javatpoint.com/java oops concepts.
- 2. www.w3resource.com.

	Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
COs					Progra	amme (Outcom	nes(POs	5)				Progr Specif Outco (PSOs	amme fic omes 5)
	PO1	PO2	PO12	PSO1	PSO2									
CO1	2	3	3	3	3									
CO2	3	2	3	3	-	1	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	1	1 3 3 3												3
CO5	3	3	3	-	-	2	-	-	-	-	-	3	3	2



CS16504

OPERATING SYSTEMS

COURSE OBJECTIVES

To enable the students to

- Study the basic concepts and functions of operating systems.
- Learn the Process Management with scheduling algorithms and deadlock handling methods.
- Understand Memory management techniques.
- Learn file system interfaces and implementation process.
- Study I/O Streams and Mass storage management techniques.

PRE - REQUISITE: Nil

UNIT I INTRODUCTION

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

UNIT II PROCESS MANAGEMENT AND DEADLOCK

CPU Scheduling: Scheduling criteria - Scheduling algorithms - Multiple - processor scheduling - Real time Scheduling - Algorithm Evaluation. Process Synchronization: The critical - section problem – Synchronization Hardware - Semaphores - Classic problems of synchronization - Monitors. Deadlock: System model - Deadlock characterization - Methods for handling deadlocks - Deadlock prevention - Deadlock avoidance - Deadlock Detection - Recovery from deadlock.

UNIT III MEMORY MANAGEMENT

Main Memory: Background - Swapping - Contiguous memory allocation - Paging – Segmentation – Segmentation with paging. Virtual Memory: Background - Demand paging - Page replacement - Allocation of frames - Thrashing.

UNIT IV FILE SYSTEMS

File - System Interface: File concept - Access methods - Directory structure - File system mounting - File sharing -Protection. File - System Implementation: Directory implementation -Allocation methods- Free- spacemanagement Efficiency and performance - recovery - Network file systems.

UNIT V I/O SYSTEMS AND MASS STORAGE MANAGEMENT

I/O Systems - I/O Hardware - Application I/O interface - kernel I/O subsystem - streams - performance. Mass
 Storage Structure: Disk attachment - Disk scheduling - Disk management - Swap - space management - RAID - Stable storage.

TOTAL PERIODS 45

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COURSE OUTCOMES

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

- Study the basic concepts and functions of operating systems.
- Learn the Process Management with scheduling algorithms and deadlock handling methods.
- Understand Memory management techniques.
- Learn file system interfaces and implementation process.
- Study I/O Streams and Mass storage management techniques.

TEXT BOOKS

- 1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", Ninth Edition, Wiley India Pvt Ltd, 2013.
- 2. Andrew S. Tanenbaum, "Modern Operating Systems", Fourth Edition, Pearson Education, 2014.

REFERENCES

- 1. William Stallings, "Operating Systems internals and design principles", Prentice Hall, 7thEdition, 2011.
- 2. Harvey M. Deital, "Operating Systems", Third Edition, Pearson Education, 2007.
- 3. Andrew S. Tannenbaum& Albert S. Woodhull, "Operating System Design and Implementation", Prentice Hall, 3rd Edition, 2006.

- 1. http://www.youtube.com/watch?v=MzVGL44eq9w.
- 2. https://www.youtube.com/watch?v=5p3bAC AX84.
- 3. http://www.youtube.com/watch?v=AjC2KZuRObQ.

	Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs				Programme Specific Outcomes (PSOs)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO 11	PO12	PSO 1	PSO 2		
CO1	2	102 103 104 105 106 107 108 109 1010 1011 1012 1801 1802 3 3 3 - - - - - 3 3 3 3														
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3		
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3		
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3		
CO5	3	3	3	-	-	2	-	-	-	-	-	3	3	2		



CS16505

GRAPHICS AND MULTIMEDIA LABOROTARY

COURSE OBJECTIVES

To enable the students to

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

LIST OF EXPERIMENTS

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

COURSE OUTCOMES

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

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

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Adobe Flash Player, Dreamweaver, Photoshop 7.0.

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

	Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
COs					Progra	amme (Outcon	nes(PO	s)				Progra Specif Outco (PSOs	amme ic mes
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3 1 1 2												3
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3



TOTAL PERIODS 60

CS16506 JAVA AND INTERNET PROGRAMMING LABORATORY

COURSE OBJECTIVES

To enable the students to

- Implement various of OOP using Java.
- Implement multithreading, Applet and event handling in solving real time problem.
- Develop the skill in usability of web page.
- Develop the skill in handling the web page using servlet or JSP.

LIST OF EXPERIMENTS:

- 1. Write a simple program in java using class, object, array of object and methods.
- 2. Write a program to implement method overloading and method overriding.
- 3. Program to implement inheritance, interface and abstract class in Java.
- 4. Program to implement Multithreading concept in Java.
- 5. Program to implement the concept of Synchronization and Serialization.
- 6. Design a simple Login Window Using AWT Controls (Button, Label, Text field) of Java.
- 7. Develop an Applet program in Java.
- 8. Create a web site using web development tool.
- 9. Create a web page with all types of Cascading style sheets.
- 10. Client Side Scripts for Validating Web Form Controls using JavaScript.
- 11. Client side scripting for roll over image and random image display using JavaScript.
- 12. By using servlet or JSP programming language handle the data, Validate the data and retrieve the information.

TOTAL PERIODS 60

COURSE OUTCOMES

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

- Demonstrate object, class, inheritance, interface concept in java.
- Develop java program using the concept of multithreading, Applet and AWT.
- Develop an attitude to learn and implement the web technology concepts.
- Acquire knowledge in java web services.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

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

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

	CO/PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
COs				Pr	ogram	me Out	comes((POs)					Prog e Spo Outo (PSC	ramm ecific comes)s)
	РО	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	1	1	-	1	-	-	-	-	-	-	-	3	3
CO2	2	1	2	-	2	-	1	-	-	-	-	-	1	3
CO3	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO4	3	1	-	-	-	2	-	-	-	-	-	-	1	3



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COURSE OBJECTIVES

To enable the students to

- Work with file related System calls.
- Implement various CPU scheduling algorithms.
- Implement file allocation algorithms.
- Work with page replacement algorithms.

LIST OF EXPERIMENTS

- 1. Implementation of basic UNIX system commands.
- 2. Shell Programming.
- 3. Implementation of the following CPU scheduling algorithms
 - a) Round Robin b) SJF c) FCFS d) Priority.
- 4. Implementation of file allocation strategies

a) Sequential b) Indexed c) Linked.

- 5. Solving Producer Consumer Problem using Semaphores.
- 6. Implementation of Bankers Algorithm for Dead Lock Avoidance.
- 7. Implementation of an Algorithm for Dead Lock Detection.
- 8. Implementation of page replacement algorithms

a) FIFO b) LRU c) LFU.

- 9. Implementation of Paging Technique for memory management.
- 10. Performing Shared memory and Inter Process Communication.

COURSE OUTCOMES

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

- work with various file related System calls.
- Implement all the CPU scheduling algorithms.
- implement sequential, Indexed and linked file allocation algorithms.
- work with different page replacement algorithms.

Computer Science & Computer Scie

TOTAL PERIODS

60

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Standalone desktops with C / C++ / Java / Equivalent complier 30 Nos.

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

	CO/PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
COs]	Progra	mme O	utcom	es(POs	5)				Progra Specif Outco (PSOs	amme ïc mes
	РО	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	1	1	-	1	-	-	-	-	-	-	-	3	3
CO2	2	1	2	-	2	-	1	-	-	-	-	-	1	3
CO3	3	2	-	-	3	-	-	-	-	-	-	-	-	3
CO4	3	1	-	-	-	2	-	-	-	-	-	-	1	3

EN16501

COURSE OBJECTIVES

To enable the students to

- understand their capabilities and enhance their grooming and showcasing his/ her capabilities to a prospective employer
- provide opportunity for the students to become acquainted with corporate opportunities relevant to • their academic learning
- practice and score well in Aptitude tests conducted by corporate / prospective employers
- prepare for any group discussion evaluation or presenting their credentials during a face to face interview leading to selection and employment
- become a knowledgeable person on the various evaluation processes leading to employment.

UNIT I **BASIC SELF ANALYSIS**

Introduction - Self Explorations: Who Am I, Personal Attributes, Self Confidence and Self Esteem -Communication Skills : Introduction to communication, Flow of communication, Listening, Barriers of communications, How to overcome the barriers of communications - Leadership Qualities : Skills for a good Leader, Leadership styles, SWOT Analysis, - Time Management: Time is a resource, Identify Time wasters, Time Management Styles, Techniques for better time management - Group Dynamics/ Team Building : Importance of group in organizations, Team Building, Interaction with the team, How to build the good team

UNIT II PERSONALITY DEVELOPMENT

Motivation : Introduction, Relevance and types of motivation, Analysis of motivation - Attitude : Factors, Influencing Attitude, Challenges and lessons from attitude - Creativity : Out of box thinking, Lateral thinking -Goal Setting : Wish list ; Blue print for success; Short, long, life time goals

UNIT III QUANTITATIVE APTITUDE

Number System - LCM & HCF - Square root & Cube root - Percentage - Time speed & Distance

UNIT IV OUANTITATIVE APTITUDE

Trains - Boats & Streams - Average - Ages - Area

LOGICAL AND VERBAL REASONING UNIT V

	TOTAL PERIODS 3	<i>6</i> 0
Logical Sequence - Analogy - Character Puzzles - Classification	- Data sufficiency	
Series Completion : Number Series, Letter series, Symbol Series -	Blood Relation - Coding and decoding	-

COURSE OUTCOMES

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

- demonstrate aptitude and reasoning skills
- Enhance verbal and written ability. •

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- Improve his/her grooming and presentation skills.
- Interact effectively on any recent event/happenings/ current affairs.
- be a knowledgeable person on the various evaluation processes leading to employment and face the same with Confidence.

REFERENCES

- 1. Agarwal, R.S." A Modern Approach to Verbal & Non Verbal reasoning", S.Chand& co ltd, New Delhi.
- 2. Abhijitguha, "Quantitative Aptitude ", Tata Mcgraw hill.
- 3. word power made easy by normanlewis ,W.R.Goyal publications.
- 4. Johnson, D.W. Boston: Allyn and Bacon" reaching out interpersonal effectiveness and self actualization..
- 5. Agarwal, R.S." objective general English", S.Chand& co
- 6. "Infosys campus connect program students" guide for soft skills.

		M (1	apping of /2/3 ind	of Cours icates s	se Outco trength	omes w	ith Prog relatio 1	grammin n) 3-Str	ng Outc ong, 2-	omes Medium	1, 1-Wea	ık		
COs					Progra	amme (Outcon	nes(PO	s)				Progr Specif Outco (PSOs	amme fic omes s)
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2	3	3	1	-	-	-	-	-	-	3	2
CO2	-	2	3	-	2	-	2	-	-	-	-	-	3	2
CO3	3	2	2	2	-	-	1	-	-	-	-	-	2	3
CO4	3	2	-	2	3									
CO5	2	2	3	2	1	3	3	1	-	1	2	-	2	3



COURSE OBJECTIVES

To enable the students to

- Understand the basic concepts of OOAD.
- Make utilization of software objects to build robust systems. •
- To learn the UML design diagrams. .
- Familiarize the object oriented analysis and design concepts for developing object oriented Projects. •
- Understand the quality issues in implementations. •

PRE - REQUISITE: Nil

UNIT I **INTRODUCTION**

Introduction to OOAD - UML - Unified process(UP) phases - Case study - the Next Gen POS system - Inception Use case Modeling - Relating Use cases - include - extend and Generalization.

UNIT II MODEL

Elaboration - Domain Models - Finding conceptual classes and description classes - Associations - Attributes -Domain model refinement - Finding conceptual class hierarchies - Aggregation and Composition - UML activity diagrams and modeling.

UNIT III UML

System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram - Logical architecture refinement - UML class diagrams - UML interaction diagrams UML state diagrams and modeling - Operation contracts - Mapping design to code - UML deployment and component diagrams.

UNIT IV **APPLICATIONS**

GRASP: Designing objects with responsibilities - Creator - Information expert - Low Coupling - Controller High Cohesion - Designing for visibility - Applying code sign patterns - adapter - singleton - factory and observer Patterns.

UNIT V **IMPLEMENTATIONS**

View layer - Designing Interface Objects - User interface design as a creative process -Designing View layer classes - Macro level process - Micro level process - Purpose of view layer interface - Software Quality Assurance - System Usability.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Perform a comprehensive object oriented analysis and design of larger object oriented software using the Unified Process (UP).
- Recognize the concepts and notations used for finding objects and classes. •
- Demonstrate the functional behavior of UML diagrams. •

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- Depict the utility of object oriented methodologies.
- Determine the quality factors of object oriented design process.

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- Mike O"Docherty, "Object Oriented Analysis & Design: Understanding System Development with UML 2.0", John Wiley & Sons, 2005.
- 3. James Rumbaugh, Ivar Jacobson and Grady Booch, The Unified Modeling Language Reference Manual, Addison Wesley, 2006.
- 4. MichealBlaha, James Rambaugh, "Object Oriented Modeling and Design with UML", Second Edition, Prentice Hall of India Private Limited, 2007.

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



COURSE OBJECTIVES

To enable the students to

- Learn the methods of different problem solving and searching.
- Know the concepts of knowledge representation.
- Understand about inferring the knowledge. •
- Know the concepts of planning and learning. •
- Understand about the expert system. •

PRE - REQUISITE: Data Structures and algorithm, Calculus

UNIT I **INTRODUCTION**

Introduction to AI - Problem formulation - Problem Definition - Production systems - Control strategies Search strategies. Problem characteristics - Production system characteristics - Specialized productions 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 search algorithms.

UNIT II **REPRESENTATION OF KNOWLEDGE**

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 of knowledge.

UNIT III **KNOWLEDGE INFERENCE**

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

UNIT IV PLANNING AND MACHINE LEARNING

Basic plan generation systems - Strips - Advanced plan generation systems - K strips - Strategic explanations -Learning - Machine learning - adaptive Learning.

UNIT V EXPERT SYSTEMS

COURSE OUTCOMES

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 PERIODS 45

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

- Demonstrate awareness of intelligent agents and problem solving using uninformed, informed and local • search methods.
- Develop knowledge about usage of propositional logic and first order logic for making inferences.
- Use the knowledge and the process of inference to derive new facts. •
- Describe the use of planning and explain about various learning methods. .
- To gain knowledge about expert system concepts.



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- Kevin Night and Elaine Rich, Nair B, "Artificial Intelligence (SIE)", McGraw Hill 2008. (Units - I, II, IV& V).
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REFERENCES

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- 2. Stuart Russel and Peter Norvig "AI A Modern Approach", 2nd Edition, Pearson Education 2007.
- 3. DeepakKhemani "Artificial Intelligence", Tata McGraw Hill Education 2013.

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CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3	
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CRYPTOGRAPHY AND NETWORK SECURITY

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COURSE OBJECTIVES

To enable the students to

- Know the number theory for the understanding of encryption algorithms.
- Learn the techniques used for message authentication and confidentiality maintenance.
- Understand the concepts of network security tools and applications.
- Learn the network security practices.
- Understand the concepts of system security.

PRE - REQUISITE: Computer Networks

UNIT I INTRODUCTION AND NUMBER THEORY

Security trends -	Attacks and services - Classical crypto systems -	Different types of ciphers LFSR sequences -
Basic Number	theory-Congruences-ChineseRemainder	theorem-Modular exponentiation -
Fermat and Euler	's theorem - Legendre and Jacobi symbols - Finite fie	lds - continued fractions.

UNIT II SYMMETRIC CIPHERS

Block Ciphers and the Data Encryption Standard - Introduction to Finite Fields - Advanced Encryption Standard - More on Symmetric Ciphers - Confidentiality using Symmetric Encryption.

UNIT III PUBLIC - KEY ENCRYPTION AND HASH FUNCTION

Public - Key Cryptography and RSA - Key Management -Diffie - Hellman Key Exchange -Elliptic CurveCryptography - Message Authentication and Hash Functions- Hash and MAC Algorithms - Digital Signaturesand Authentication Protocols.

UNIT IV NETWORK SECURITY PRACTICE

Authentication Applications - Kerberos - X.509 Authentication Service - Electronic mail Security - Pretty Good privacy - S/MIME - IP Security - Web Security.

UNIT V SYSTEM SECURITY

Intruders - Intrusion Detection - Password Management - Malicious Software - Viruses and Related Threats – Virus Countermeasures - Distributed Denial of Service Attacks - Firewalls - Firewall Design Principles - SET for E -Commerce Transactions - Trusted Systems.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Demonstrate the fundamental representation of Network Security.
- Analyze and implement the cryptographic algorithms and protocols.
- Demonstrate the concepts of public key cryptosystems.
- Analyze the algorithms for Internet security.
- Demonstrate an ability to use techniques, skills, and modern computing tools to implement and organize.

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

REFERENCES

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- 2. AtulKahate, "Cryptography and Network Security", Tata McGraw Hill, 2003.
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CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3
CO5	3	3	3	-	-	2	-	-	-	-	-	3	3	2



CS16604

COMPILER DESIGN

3 2 0 4

COURSE OBJECTIVES

To enable the students to

- Understand the design principles of a compiler. •
- Learn the LEX, and various conversion techniques. •
- Familiarize with different types of parsing techniques. •
- Know how to perform type conversion and storage allocation.
- Learn how to effectively generate machine codes. •

PRE - REQUISITE: Theory of Computation

UNIT 1 **INTRODUCTION TO COMPILERS**

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

UNIT II LEXICAL ANALYSIS

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

UNIT III SYNTAX ANALYSIS

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

UNIT IV SYNTAX DIRECTED TRANSLATION AND RUN TIME ENVIRONMENT 12

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

CODE OPTIMIZATION AND CODE GENERATION UNIT V

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

TOTAL PERIODS 60

COURSE OUTCOMES

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

- Design and implement a prototype compiler. •
- Use the knowledge of patterns, tokens and regular expressions for solving a problem. .

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- Apply the various optimization techniques.
- Describe the runtime structures used to represent constructs in typical programming languages.
- Use the different compiler construction tools.

- 1. Alfred V Aho, Monica S. Lam, Ravi Sethi and Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", 2nd Edition, Pearson Education, 2007.
- 2. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence based Approach", Morgan Kaufmann Publishers, 2002.

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- 1. Steven S. Muchnick, "Advanced Compiler Design and Implementation, "Morgan Kaufmann Publishers -Elsevier Science, India, Indian Reprint 2003.
- 2. Keith D Cooper and Linda Torczon, "Engineering a Compiler", Morgan Kaufmann Publishers Elsevier Science, 2004.
- 3. Charles N. Fischer, Richard. J. LeBlanc, "Crafting a Compiler with C", Pearson Education, 2008.

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- $2. \ https://www.tutorialspoint.com/compiler_design/compiler_design_pdf_version.htm$
- 3. http://nptel.ac.in/downloads/106108113/

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



CS16605 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY 0 0 4 2

COURSE OBJECTIVES

To enable the students to

- Learn how to identify objects, relationships, services and attributes through UML.
- Get familiarized on object oriented design process.
- Build a conceptual model during analysis and design.
- Be familiar with various testing techniques.

LIST OF EXPERIMENTS

- 1. Passport automation system.
- 2. Exam Registration.
- 3. Stock maintenance system.
- 4. Online course reservation system.
- 5. E ticketing.
- 6. Software personnel management system.
- 7. Credit card processing.
- 8. E book management system.
- 9. Recruitment system.
- 10. BPO Management System.

TOTAL PERIODS 60

COURSE OUTCOMES

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

- Demonstrate the functional behavior of UML diagrams.
- Recognize the concepts and notations used for finding objects and classes.
- Depict the utility of object oriented methodologies.
- Compare and contrast various testing techniques.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE:Rational Suite (or) Argo UML (or) equivalent, Eclipse IDE and Junit. **HARDWARE:** Flavor of any WINDOWS and Standalone desktops 30 Nos.



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CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
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CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3

COMPILER DESIGN LABORATORY

COURSE OBJECTIVES

To enable the students to

- Be exposed to compiler writing tools.
- Learn to implement the different phases of compiler.
- Be familiar with control flow and data flow analysis.
- Learn simple optimization techniques.

LIST OF EXPERIMENTS:

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

TOTAL PERIODS 60

COURSE OUTCOMES

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

- Implement the different phases of compiler using tools.
- Analyze the control flow and data flow of a typical program.
- Optimize a given program.
- Generate an assembly language program equivalent to a source language program.

RECOMMENDED SYSTEM/SOFTWARE REQUIREMENTS

SOFTWARE: Turbo C, LEX and YACC, UNIX.

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

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



COURSE OBJECTIVES

To enable the students to

- Provide a strong foundation of fundamental concepts in artificial intelligence.
- Enable the students to apply AI techniques in applications which involve perception, reasoning and learning.
- Empowering humans to perform collaborative activities in complex and dynamic settings.
- Exploiting and integrating information coming from different (and possibly heterogeneous) information sources.

LIST OF EXPERIMENTS USING C/C++, PERFORM THE FOLLOWING EXPERIMENTS

- 1. Depth first search.
- 2. Breadth first search.
- 3. Best first search.
- 4. Travelling sales man problem.
- 5. Water jug problem.
- 6. Tower of Hanoi problem.
- 7. Eight puzzle problem.
- 8. A* search.
- 9. AO* search.
- 10. Design Expert System.

TOTAL PERIODS 60

COURSE OUTCOMES

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

- Demonstrate the use of different search techniques for problem solving.
- Develop solutions for some AI problems.
- Demonstrate the use of "Prolog" for predicate logic applications.
- Design an expert system.

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



COURSE OBJECTIVES

To enable the students to

- Enhance career competency and employability skills
- Demonstrate effective leadership and interpersonal skills
- Improve professional capabilities through advanced study and researching current market strategy. •
- Develop problem solving and decision making capabilities •
- Solve the quantitative aptitude in the advance level tests to get place in tier 1 company.

UNIT I **CORPORATE READINESS**

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

UNIT II INTERVIEW SKILLS

Interview Basics : General Selection process, Grooming, Dress code, Supporting Documents to carry - Resume Building : Impact of Powerful CV, Do"s and don"ts in CV - Group Discussion : Introduction to GD, Important of

Listening and Speaking skills, Do"s and Don"ts in GD - Face to face interview / Hire me: Rules for face to face interview, body language, Self-Introduction - Psychometric Assessment : Importance of Psychometric assessment, Why psychometric assessment

UNIT III	QUANTITATIVE APTITUDE	6
Simplification	n - Time and work - Pipes and cisterns - Ratio and Proportion - Partnership	

UNIT IV QUANTITATIVE APTITUDE

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

UNIT V LOGICAL AND VERBAL REASONING

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

TOTAL PERIODS 30

COURSE OUTCOMES

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

- Develop team work capabilities •
- Boost their problem solving skills
- Enhance the transformation from college to corporate. .
- Enhance their verbal and written ability
- Practice soft skills to EXCEL in their jobs. •

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REFERENCES

- 1. Agarwal, R.S."a modern approach to verbal &non verbal reasoning", , S.Chand& co ltd, New Delhi.
- 2. Abhijitguha, "quantitative aptitude for competitive examinations", Tata Mcgraw hill
- 3. "Word power made easy" by normanlewis ,wr.goyal publications.
- 4. Johnson, D.W. (1997). "Reaching out interpersonal effectiveness and self Actualization" -- Boston: Allyn and bacon.
- 5. "Infosys Campus Connect Program student" guide for soft skills.
- 6. Mitra, barun.K, "Personalaity Development & Softskills ", Oxford University.

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



DISCRETE MATHEMATICS

COURSE OBJECTIVES

enable the students to

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

UNIT I PROPOSITIONAL CALCULUS

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

UNIT II PREDICATE CALCULUS

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

UNIT-III SET THEORY

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

UNIT IV FUNCTIONS

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

UNIT-V LATTICE THEORY

COURSE OUTCOMES

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

TOTAL PERIODS 45

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

- Construct mathematical arguments using logical connectives and quantifiers.
- Verify the correctness of an argument using propositional and predicate logic and truth tables.
- Demonstrate the ability to solve problems using counting techniques and combinatorics Construct proofs using direct proof, proof by contraposition, proof by contradiction, and proof by cases.
- Perform operations on discrete structures such as sets, functions, relations, and sequences.
- Understand the concepts of Boolean algebra.

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- 1. Kenneth H.Rosen, "Discrete Mathematics and its Applications (with Combinatorics and Graph Theory)", 6th Edition, Tata McGraw Hill, 5th Reprint 2008.
- 2. Trembly J.P and Manohar.R, "Discrete Mathematical Structures with Applications toComputer Science", Tata McGraw Hill, 35th Reprint 2008.

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- 1. Ralph.P.Grimaldi, "Discrete and Combinatorial Mathematics: An AppliedIntroduction", 4th Edition, Pearson Education, 2002.
- 2. A.Tamilarasi, A.M.Natarajan, "Discrete Mathematics and its Applications", 3rd Edition, Khanna Publishers, 2008.
- 3. T.Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics", TataMcGraw Hill, 2007.

	Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1-Weak													
COs	Programme Outcomes(POs)													
COS	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02													
CO1	3	3	3	3	-	-	-	-	-	-	-	3	3	3
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3
CO3	2	3	3	-	-	-	-	-	-	-	-	3	3	3
CO4	2	2	3	3	-	-	-	-	-	_	-	2	3	3
CO5	3	3	3	-	-	-	-	-	-	_	-	3	3	3



CS16151

XML AND WEB SERVICES

3COURSE OBJECTIVES

To enable the students to

- Provide an overview on role of web services in commercial applications and the principles of web service Provision.
- Understand Internet Service Provision, the Web Service concepts and XML Technology.
- Understand and explore design and implementation of distributed services.
- Classify different forms and protocols of Web services.
- Describe the challenges of Securing Web Services.PRE REQUISITE: Nil

UNIT I INTRODUCTION

Introduction to Internet and WWW - Introduction to HTML - XML - CSS - Creating Markup with XML - benefits Advantages of XML over HTML - EDL - XML Standards - Document Type Definition (DTD) - Attribute Types - Conditional Sections - Whitespace Characters.

UNIT II XML TECHNOLOGY

XML Schemas - DOM - DOM Components - Simple API for XML (SAX) - XML Path Language -Presentation Technologies - XSL - XFORMS - XHTML - Transformation - Extensible Style sheet Language Transformations (XSLT) - X link - X query - X Pointer - X Include and X Base.

UNIT III WEB SERVICES

Evolution of Distributed Computing - CORBA - Java RMI - Microsoft DCOM - Message Oriented Middleware - Introduction to Web Services - Core Web Services Standards - Building Web Services Architecture -Web Services Communication Models - Implementation view - Web services technology stack - Logical view - Composition of web services - Deployment view - From application server to peer to peer -Process view - Life in the runtime.

UNIT IV WEB SERVICES BUILDING BLOCKS

Transport protocols for web services - Messaging with web services - Protocols - SOAP - Describing web services - Anatomy of a SOAP message - SOAP Encoding - SOAP Message Exchange Model - SOAP Communication - SOAP Security. WSDL - Anatomy of WSDL - Manipulating WSDL - UDDI - Anatomy of UDDI.

UNIT V WEB SERVICES SECURITY

Challenges of Securing Web Services - XML Security Standards - Web Services Security implementation in WCF - Rapid fire Cryptography - XML Encryption - XML Signature - Types of XML Signature - Canonicalization -Implementations of XML Signature - XML key management specification.

TOTAL PERIODS 45

COURSE OUTCOMES

- Upon the completion of the course, students will be able to
- Develop web based applications.

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- Demonstrate the basics of web services.
- Understand the different forms and protocols of Web services.
- Describe the web service building blocks.

- 1. Deitel H M, Deitel P J, Nirto T R, Lin T M, XML How to Program, Pearson Edition, 2011.
- 2. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.
- 3. Eric Newcomer, Understanding Web Services: XML, WSDL, SOAP and UDDI, Addison Wesley, 2002.

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- Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, Developing Java WebServices, Wiley PublishinInc., 2007.
- 2. Steve Graham and Doug Davis, Building Web services with Java, Pearson education 2000.
- 3. Charles F.Goldfarb and Paul Prescod, The XML Handbook, Pearson education asia, 2001.
- 4. Etbancarami, Web services Essential, O,,Reilly, 2006.

- 1. https://msdn.microsoft.com/en us/library/ms996507.aspx.
- 2. http://www.tutorialspoint.com/webservices.

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



COURSE OBJECTIVES

To enable the students to

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

PRE - REQUISITE: Nil

UNIT I INTRODUCTION TO MANAGEMENT

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

UNIT II PLANNING

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

UNIT III ORGANIZING

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

UNIT IV MANAGING HUMAN RESOURCES

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

UNIT V CONTROLLING

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

COURSE OUTCOMES

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

- Demonstrate history and development of management thought. •
- Exhibit the planning activities in management. •
- Know organizing, dimensions of organization structure, and choosing the right structural form. •
- Gain knowledge how to manage human resources.
- Develop various methods and techniques of control.

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TOTAL PERIODS 45

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

REFERENCES

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

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

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



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COURSE OBJECTIVES

To enable the students to

- Understand the Big Data and Hadoop.
- Acquire knowledge of HDFS and YARN.
- Provide Map reduce concepts and Interfacing.
- Gain knowledge about Eco system.
- Learn the fundamental concept of Data Analytics with R.

UNIT I INTRODUCTION TO BIG DATA AND HADOOP

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

UNIT II HDFS (Hadoop Distributed File System)

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

UNIT III MAP REDUCE

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

UNIT IV HADOOP ECO SYSTEM

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

UNIT V DATA ANALYTICS WITH R

Machine Learning: Introduction - Supervised Learning - Unsupervised Learning - Collaborative Filtering. Big Data Analytics with Big R.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Identify Big Data, Hadoop and its Business Implications.
- List the components of Hadoop Distributed File System.
- Manage Map Reduce in Hadoop Environment.
- Develop Big Data Solutions using Hadoop Eco System.
- Able to gain knowledge about Machine Learning Techniques using R

- 1. Tom White "Hadoop: The Definitive Guide" Third Edit on, O"reily Media, 2012.
- 2. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics" Wiley 2015.

REFERENCES

- 1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
- 2. Jay Liebowitz, "Big Data and Business Analytics" Auer Bach Publications, CRC press (2013).
- 3. Tom Plunkett, Mark Hornick, "Using R to Unlock the Value of Big Data: Big Data Analytics with Oracle R Enterprise and Oracle R Connector for Hadoop", McGraw Hill/Osborne Media (2013), Oracle press.

- 1. https://www.tutorialspoint.com/big_data_analytics/index.htm.
- 2. https://www.youtube.com/watch?v=3SK9iJNYehg.
- 3. https://www.youtube.com/watch?v=zez2Tv bcXY.

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



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COURSE OBJECTIVES

To enable the students to

- Learn the basics of parallel computing and programming.
- Learn the system development like architecture and memory.
- Gain the knowledge of network topologies in parallel computing.
- Understand the different parallel programming models.
- Know the various message passing interface models.

PRE - REQUISITE: Computer Architecture, Computer Networks, Operating System

UNIT I INTRODUCTION TO PARALLEL COMPUTING

Introduction to parallel computing - Parallel Programming Paradigm - Architecture - Design Dimensions of Scalability - Parallel Programming Models - Basic Concepts Of Clustering - Scalable Principles - Parallel Programming Overview - Processes, Tasks and Threads - Parallelism Issues - Interaction/ Communication Issues - Semantic Issues In Parallel Programs.

UNIT II ENABLING TECHNOLOGIES

System Development Trends - Principles of Processor Design - Microprocessor Architecture Families - Hierarchical Memory Technology - Cache Coherence Protocols - Shared Memory Consistency - Distributed Cache Memory Architecture - Latency Tolerance Techniques - Multithreaded Latency Hiding.

UNIT III SYSTEMS INTERCONNECTS

Basics of Interconnection Networks - Network Topologies and Properties - Buses, Crossbar and Multistage Switches, Software Multithreading - Synchronization Mechanisms.

UNIT IV PARALLEL PROGRAMMING

Fundamental concepts - Designing for threads Threading and parallel programming constructs - Synchronization - Critical sections - Deadlock. Threading APIs.

UNIT V MESSAGE PASSING

Message Passing Paradigm - Message Passing Interface - MPI Model - data decomposition –communicators and topologies - point -to - point communication - MPI Library Parallel Virtual Machine.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Understand the parallel programming models and issues in parallelism.
- Understand the programming Systems and memory.
- Correlate the network concepts with parallel programming.
- Design the threads in parallel programming.
- Understand the interfaces in message passing and virtual machine

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- 1. Peter S. Pacheco, "An Introduction to Parallel Programming", Morgan Kaufmann, 2011.
- 2. Michael J Quinn, "Parallel programming in C with MPI and Open MP", Tata McGraw Hill, 2003.

REFERENCES

- John L. Hennessey and David A. Patterson, "Computer Architecture A quantitative approach", Morgan Kaufmann / Elsevier Publishers, 5th. Edition, 2012.
- B. Lewis and D. J. Berg, "Multithreaded programming with Pthreads", Sun Microsystems Press, 1998.
- 3. Rob Farber, "CUDA application design and development", Morgan Haufmann, 2011.
- 4. B. Chapman, G. Jost, and Ruud van der Pas, "Using Open MP", MIT Press, 2008.
- 5. W. Gropp, E. Lusk, and R. Thakur, "Using MPI 2: Advanced features of the message passing interface", MIT Press, 1999.

- 1. http://nptel.ac.in/courses/106102114/
- 2. http://nptel.ac.in/courses/106104024/

	Mapping of Course Outcomes with Programming Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes(POs)													Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO 1	PSO 2		
CO1	2	3	3	3	-	-	-	-	-	-	-	3	3	3		
CO2	3	2	3	3	-	-	-	-	-	-	-	2	3	3		
CO3	2	3	1	-	-	-	1	-	-	-	-	2	3	3		
CO4	3	3	3	3	-	-	-	-	-	-	-	2	1	3		
CO5	3	3	3	-	-	2	-	-	-	-	-	3	3	2		



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COURSE OBJECTIVES

To enable the students to

- Understand the basics of R Programming.
- Gain the knowledge in R Programming structures and function.
- Be familiar with Object Oriented Programming concepts in R Programming.
- Provide the concept and an understanding of basic concepts in python programming.
- Analyze the manipulating directories and other functions PRE REQUISITE: Nil

UNIT I INTRODUCTIO TO R PROGRAMMING

Statistical Work in R Programming - Getting Started - Vector - Matrices - Lists - Data Frames - Factors and Tables.

UNIT II R PROGRAMMING STRUCTURES AND FUNCTION

Control Statements - Arithmetic and Boolean Operators and Values - Type Conversions. R Function: Functions Are Objects - Return Values - Functions Have No Side Effects.

UNIT III OBJECT - ORIENTED PROGRAMMING IN R PROGRAMMING

Managing Your Objects - Generic Functions - Writing Classes - Extended Example: a Procedure for Polynomial Regression.

UNIT IV INTRODUCTION TO PYTHON PROGRAMMING

History - Features - The Basic elements of python - Conditional operators - Branching Programs - Control Structures
Strings and Input - Iteration - Opening and closing - files - various types of file modes - reading and Writing to files
manipulating - directories - Iterables - Iterators, Problem - solving applications.

UNIT V FUNCTIONS, SCOPING AND ABSTRACTION

Functions and scoping - Specifications - Recursion - Global variables - Modules - System functions and Parameters - Structured types - Mutability - Higher - Order Functions - Strings, Tuples - Lists and Dictionaries - Lists and Mutability - Functions as objects.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand and gain knowledge in R Programming.
- understand the working with R Structure and Function.
- implement the simple application in OOPS Concept in R Programming.
- develop proficiency in creating based applications using the python Programming Language.
- understand the various functions, abstractions, tuples and Scope available in python programming language and apply them in solving computational problems.

- 1. Norman Matloff," The Art of R Programming: A Tour of Statistical Software Design", 1st Edition, 2011.
- 2. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India, 2nd Edition, 2016.

REFERENCES

- 1. R. Nageswara Rao, "Core Python Programming", dreamtech, 2nd Edition, 2017.
- 2. O'Reilly Media," R Cookbook", Paul Teetor, March 2011.

- 1. https://www.udemy.com/r basics/
- 2. https://www.python.org
- 3. <u>https://pythonprogramming.net</u>

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



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COURSE OBJECTIVES

To enable the students to

- Differentiate database systems from file systems by enumerating the features provided by database systems and describe each in both function and benefit.
- Demonstrate an understanding of the relational data model.
- Gain experience with SQL.
- Formulate solutions to a broad range of query and data update problems using using SQL.
- Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.

PRE - REQUISITE: Nil

UNIT I INTRODUCTION

Database System Architecture: Purpose of Database Systems - Views of Data - Database Languages - Data Storage and Querying - Transaction Management – Database Architecture - Database Users and Administrators. Relational Databases: Structure of Relational Databases - Database Schema - Keys - Schema Diagram.

UNIT IIQUERY LANGUAGES AND E - R MODEL

Formal Relational Query Languages: Relational Algebra - Tuple and Domain Relational Calculus. Database Design and E - R Model: Overview - Entity Relationship Model - Constraints - Removing Redundant Attributes in Entity Sets - E - R Diagrams.

UNIT III STRUCTURED QUERY LANGUAGE (SQL)

Introduction to SQL: Overview of SQL Query Languages - SQL Data Definition - Basic Structure Of SQL Queries -Additional Basic Operations - Set Operations - Aggregate Functions - Nested Sub Queries - Join Expressions - Views - Transactions - Integrity Constraints - SQL Data Types and Schemes - Authorization.

UNIT IV ADVANCED SQL

Accessing SQL from a Programming Languages - Functions and Procedures - Triggers.

UNIT V RELATIONAL DATABASE DESIGN

Features of Good Relational Database Design - Informal Guide Lines For Relational Schemas - Decomposition Using Functional Dependencies - Functional Dependency Theory - First, Second, Third and Boyce Codd Normal Forms.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Define the fundamental elements of a database management system.
- Explain the basic concepts of relational data model, entity relationship model.
- Outline relational algebra and database query language (SQL).
- Explain relational database design.
- Construct a database for a given problem using E R model, normalization and SQL.

REFERENCES

- Abraham Silberschatz, Henry Korth, and S. Sudarshan, "Database System Concepts", Sixth Edition, McGraw - Hill, 2011.
- 2. Elmasri and S. Navathe, "Fundamentals of Database Systems", Pearson Education, Sixth Edition, 2011.
- 3. Thomas M. Connolly and Carolyn E. Begg, "Database Systems A Practical Approach to Design, Implementation, and Management", Pearson Education, Fifth edition, 2010.
- 4. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Pearson Education, Eighth Edition, 2006.

- 1. http://ocw.mit.edu/courses
- 2. http://docs.mongodb.org/manual/

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



E - COMMERCE

COURSE OBJECTIVES

To enable the students to

- Gain knowledge about E-Commerce and its business models.
- Understand the infrastructure of E-Commerce.
- Acquire the knowledge about web server software and tools.
- Identify the major security issues associated with Internet.
- Look toward a next generation approach to security engineering by Research

PRE - REQUISITE: Nil

UNIT I INTRODUCTION	9
History of E - Commerce - Overview of E - Commerce framework	- E - Business models - Network
infrastructure - Role of Internet - E - commerce and World wide Web.	
UNIT II INFRASTRUCTURE FOR E COMMERCE	9

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

UNIT III WEB BASED TOOLS FOR E COMMERCE

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

UNIT IV SECURITY

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

UNIT V INTELLIGENT AGENTS

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

TOTAL PERIODS 45

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COURSE OUTCOMES

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

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

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

REFERENCES

- 1. EfraimTurvanJ.Lee, David kug and chung, "Electronic commerce" Pearson Education Asia2001.2. Brenda commerce Business Prentice Hall, 2000.
- 2. Judy Strauss and Raymond Frost, "E Marketing", PHI, 2002.
- 3. Brenda Kienan, "Managing e Commerce Business", PHI, 2001.
- 4. Vivek Sharma and Rajiv Sharma, "Developing e Commerce Sites an integrated approach", Pearson Education Asia, 2000.

- 1. http://www.techtutorials.info/ecommerce.html
- 2. http://www.iseca.org/mirrors/sans.org/4 37.pdf
- 3. http://www.cs.berkeley.edu/~russell/aimale/chapter02.pdf

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