PAAVAI ENGINEERING COLLEGE, NAMAKKAL – 637 018
(AUTONOMOUS)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

REGULATIONS 2016

(CBCS)

CURRICULUM AND SYLLABUS
III – IV SEMESTER

M.C.A.Programme

(3 Years Duration)

PAAVAI ENGINEERING COLLEGE

(Autonomous)

Vision

To strive to be a globally model Institution all set for taking 'lead-role' in grooming the younger generation socially responsible and professionally competent to face the challenges ahead.

Mission

- To provide goal- oriented, quality – based and value – added education through state – of – the – art technology on a par with international standards.
- To promote nation – building activities in science, technology, humanities and management through research
- To create and sustain a community of learning that sticks on to social, ethical, ecological, cultural and economic upliftment.

PAAVAI ENGINEERING COLLEGE

(Autonomous)

DEPARTMENT OF MASTER OF COMPUTER APPLICATIONS

Vision

To strive to be globally model institutions all set for taking lead role in grooming the younger generation socially responsible and professionally competent to face the challenges ahead

Mission

- To upgrade the academic activities by continuous improvement in the teaching - learning process with value based education.
- To enhance social responsibilities of the students necessary for successful practice of the profession.
- To facilitate research and industrial interaction.
- To mould the students into competent and creative technocrats to meet the growing global changes and challenges.
- To encourage the students as entrepreneurs and leaders of the society for the betterment of the Country.

Programme Educational Objectives (PEOs)		
Master of Computer Applications Graduates will be able to :		
PEO1	Global Reputation	To create value added, disciplined high profile Master of Computer Applications professionals for successful careers in their related industry that makes them globally reputed.
PEO2	Fundamental Knowledge	To develop the students with a sound foundation in mathematical, scientific and engineering fundamentals necessary to synthesize the technical core concepts focusing on skill development and knowledge up gradation which will lead to technical innovations.
PEO3	Continuous Learning	To practice and demonstrate the ability to use the domain knowledge and expertise through periodic assignments, performances and projects to continuously prove the functionality of Master of computer applications learning in social environmental aspects and to make allowances for further improvements.

Programme Outcomes (POs)		
Master of Computer Applications Graduates will be able to :		
PO1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem Analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/Development of Solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communications	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)		
PSO1	Core Competencies:	Foundation of Computer System and Software development: Ability to understand the principles and working of computer systems for the development of software solutions
PSO2	Creativity and Design:	Applications of Computing and Research Ability: Ability to use knowledge in various domains to identify research gaps and hence to provide solution with new ideas and innovations.

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(AUTONOMOUS)

MASTER OF COMPUTER APPLICATIONS

REGULATIONS 2016

(CHOICE BASED CREDIT SYSTEM)

CURRICULUM & SYLLABUS

SEMESTER I

S.No.	Category	Course	Course Title	L	T	P	C
			Theory				
1	BS	PMA16108	Mathematical Foundation for Computer Applications	3	2	0	4
2	PC	CA16101	Computer Organization	3	0	0	3
3	PC	CA16102	Problem Solving Techniques	3	0	0	3
4	PC	CA16103	Programming in C	3	0	0	3
5	PC	CA16104	Data structures and Algorithms	3	0	0	3
			Practical				
6	PC	CA16105	Programming in C Laboratory	0	0	4	2
7	PC	CA16106	Data Structures and Algorithms Laboratory	0	0	4	2
8	PC	CA16107	Office Automation Laboratory	0	0	4	2
			TOTAL	**15**	**2**	**12**	**22**

SEMESTER II

S.No.	Category	Course	Course Title	L	T	P	C
			Theory				
1	PC	CA16201	Object Oriented Programming	3	0	0	3
2	PC	CA16202	Database Management Systems	3	0	0	3
3	PC	CA16203	System Software	3	0	0	3
4	PC	CA16204	Operating Systems	3	0	0	3
5	PC	CA16205	Computer Graphics and Multimedia	3	0	0	3
			Practical				
6	PC	CA16206	Object Oriented Programming Laboratory	0	0	4	2
7	PC	CA16207	DBMS Laboratory	0	0	4	2
8	PC	CA16208	Graphics and Multimedia Laboratory	0	0	4	2
			TOTAL	**15**	**0**	**12**	**21**

SEMESTER III

S.No.	Category	Course	Course Title	L	T	P	C
			Theory				
1	BS	PMA16301	Resource Management Techniques	3	2	0	4
2	PC	CA16301	Computer Communication Networks	3	0	0	3
3	PC	CA16302	Object Oriented Software Engineering	3	0	0	3
4	PC	CA16303	Enterprise Resource Planning	3	0	0	3
5	PC	CA16304	Internet Programming	3	0	0	3
			Practical				
6	PC	CA16405	Case Tools Laboratory	0	0	4	2
7	PC	CA16306	Internet Programming Laboratory	0	0	4	2
8	HS	PEN16201	Communication and Soft Skills Laboratory	0	0	2	1
			TOTAL	**15**	**2**	**10**	**21**

SEMESTER IV

S.No.	Category	Course	Course Title	L	T	P	C
			Theory				
1	PC	CA16401	C# and .NET Framework	3	0	0	3
2	PC	CA16402	Data Mining and Data Warehousing	3	0	0	3
3	PC	CA16403	Web Programming	3	0	0	3
4	PC	CA16404	Cloud Computing	3	0	0	3
5	PE	CA16***	Elective I	3	0	0	3
			Practical				
6	PC	CA16405	C# and .NET Programming Laboratory	0	0	4	2
7	PC	CA16406	Web Programming Laboratory	0	0	4	2
8	EEC	CA16407	Technical Seminar and Report Writing	0	0	4	2
9	EEC	PCA16408	Career Development Laboratory	0	0	2	1
			TOTAL	**15**	**0**	**14**	**22**

SEMESTER V

S.No	Category	Course	Course Title	L	T	P	C
			Theory				
1	PC	CA16501	Mobile Application Development	3	0	0	3
2	PC	CA16502	Big Data Analytics	3	0	0	3
3	PC	CA16503	Agile Software Engineering	3	0	0	3
4	PE	CA16***	Elective II	3	0	0	3
5	PE	CA16***	Elective III	3	0	0	3
			Practical				
6	PC	CA16504	Mobile App Development Laboratory	0	0	4	2
7	PC	CA16505	XML and Web Services Laboratory	0	0	4	2
8	EEC	CA16506	Mini Project(Socially Relevant)	0	0	4	2
			TOTAL	**15**	**0**	**12**	**21**

SEMESTER VI

S.No	Category	Course	Course Title	L	T	P	C
1	EEC	CA16601	Project Work	0	0	24	12
			TOTAL	**0**	**0**	**24**	**12**

PROFESSIONAL ELECTIVES (PE)

ELECTIVE I

S.No	Category	Course	Course Title	L	T	P	C
1	PE	CA16151	Financial Accounting	3	0	0	3
2	PE	CA16152	Information Security	3	0	0	3
3	PE	CA16153	Network Protocols	3	0	0	3
4	PE	CA16154	Software Testing and Quality Assurance	3	0	0	3
5	PE	CA16155	Game Programming	3	0	0	3
6	PE	CA16156	Advanced Data Base	3	0	0	3

ELECTIVE II

S.No	Category	Course	Course Title	L	T	P	C
1	PE	CA16251	Linux Internals	3	0	0	3
2	PE	CA16252	High Performance Computing	3	0	0	3
3	PE	CA16253	Software Project Management	3	0	0	3
4	PE	CA16254	Data Tuning and Administration	3	0	0	3
5	PE	CA16255	Soft Computing	3	0	0	3
6	PE	CA16256	Ad hoc and Sensor Networks	3	0	0	3
7	PE	CA16257	Python and R Programming	3	0	0	3

ELECTIVE III

S.No	Category	Course	Course Title	L	T	P	C
1	PE	CA16351	Internet of Things	3	0	0	3
2	PE	CA16352	Machine Learning	3	0	0	3
3	PE	CA16353	Health Care Analytics	3	0	0	3
4	PE	CA16354	Green Computing	3	0	0	3
5	PE	CA16355	Human Resource Management	3	0	0	3
6	PE	CA16356	Social Network Analysis	3	0	0	3

BASIC SCIENCES (BS)

S.No	Category	Course	Course Title	L	T	P	C
1	BS	PMA16108	Mathematical Foundation for Computer Applications	3	2	0	4
2	BS	PMA16301	Resource Management Techniques	3	2	0	4
			Total	**6**	**4**	**0**	**8**

PROFESSIONAL CORE (PC)

S.No.	Category	Course	Course Title	L	T	P	C
1	PC	CA16101	Computer Organization	3	0	0	3
2	PC	CA16102	Problem Solving Techniques	3	0	0	3
3	PC	CA16103	Programming in C	3	0	0	3
4	PC	CA16104	Data structures and Algorithms	3	0	0	3
5	PC	CA16105	Programming in C Laboratory	0	0	4	2
6	PC	CA16106	Data Structures and Algorithms Laboratory	0	0	4	2
7	PC	CA16107	Office Automation Laboratory	0	0	4	2
8	PC	CA16201	Object Oriented Programming	3	0	0	3
9	PC	CA16202	Database Management Systems	3	0	0	3
10	PC	CA16203	System Software	3	0	0	3
11	PC	CA16204	Operating Systems	3	0	0	3
12	PC	CA16205	Computer Graphics and Multimedia	3	0	0	3
13	PC	CA16206	Object Oriented Programming Laboratory	0	0	4	2
14	PC	CA16207	DBMS Laboratory	0	0	4	2
15	PC	CA16208	Graphics and Multimedia Laboratory	0	0	4	2
16	PC	CA16301	Computer Communication Networks	3	0	0	3
17	PC	CA16302	Object Oriented Software Engineering	3	0	0	3
18	PC	CA16303	Enterprise Resource Planning	3	0	0	3
19	PC	CA16304	Internet Programming	3	0	0	3
20	PC	CA16405	Case Tools Laboratory	0	0	4	2
21	PC	CA16306	Internet Programming Laboratory	0	0	4	2

22	PC	CA16401	C# and .NET Framework	3	0	0	3
23	PC	CA16402	Data Mining and Data Warehousing	3	0	0	3
24	PC	CA16403	Web Programming	3	0	0	3
25	PC	CA16404	Cloud Computing	3	0	0	3
26	PC	CA16405	C# and .NET Programming Laboratory	0	0	4	2
27	PC	CA16406	Web Programming Laboratory	0	0	4	2
28	PC	CA16501	Mobile Application Development	3	0	0	3
29	PC	CA16502	Big Data Analytics	3	0	0	3
30	PC	CA16503	Agile Software Engineering	3	0	0	3
31	PC	CA16504	Mobile App Development Lab	0	0	4	2
32	PC	CA16505	XML and Web Services Laboratory	0	0	4	2
Total				**60**	**0**	**48**	**84**

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S.No.	Category	Course	Course Title	L	T	P	C
1	EEC	CA16407	Technical Seminar and Report Writing	0	0	4	2
2	EEC	PCA16408	Career Development Laboratory	0	0	2	1
3	EEC	CA16506	Mini Project (Socially Relevant)	0	0	4	2
4	EEC	CA16601	Project Work	0	0	24	12
Total				**0**	**0**	**30**	**17**

HUMANITIES AND SOCIAL SCIENCES (HS)

S.No.	Category	Course	Course Title	L	T	P	C
1	HS	PEN16201	Communication and Soft Skills Laboratory	0	0	2	1
Total				**0**	**0**	**2**	**1**

Curriculum Structure

S.No	Category Name	Actual Credit Break Up	No. of Subjects
1	Professional Core (PC)	84	32
2	Professional Elective (PE)	09	03
3	Humanities and Social Sciences (HS)	01	01
4	Basic Science (BS)	08	02
5	Employability Enhancement Courses (EEC)	17	04
Total		119	42

SUMMARY									
S. No	SUBJECT AREA	CREDITS AS PER SEMESTER						CREDITS TOTAL	CREDITS IN %
		I	II	III	IV	V	VI		
1	HS	-	-	1	-	-	-	**1**	**0.84 %**
2	BS	4	-	4	-	-	-	**8**	**6.72 %**
3	PC	18	21	16	16	13	-	**84**	**70.59 %**
4	PE	-	-	-	3	6	-	**9**	**7.56 %**
5	EEC	-	-	-	3	2	12	**17**	**14.29 %**
TOTAL		**22**	**21**	**21**	**22**	**21**	**12**	**119**	**100 %**
Non Credit / Mandatory		-	-	-	-	-	-	-	-

CA16301   **RESOURCE MANAGEMENT TECHNIQUES**   **3   2   0   4**

COURSE OBJECTIVES

To enable the students to

- provide the concept and an understanding of basic concepts in Operations Research
- understand the Techniques for Analysis and Modeling in Computer Applications
- understand, develop and solve mathematical model of linear programming problems
- understand, develop and solve mathematical model of Transport and assignment problems
- understand network modeling for planning and scheduling the project activities

UNIT I   LINEAR PROGRAMMING MODELS   15

Mathematical Formulation - Graphical Solution of linear programming models – Simplex method – Artificial variable Techniques- Variants of Simplex method

UNIT II   TRANSPORTATION AND ASSIGNMENT MODELS   15

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution– optimum solution - degeneracy – Mathematical formulation of assignment models – Hungarian Algorithm –Variants of the Assignment problem

UNIT III   INTEGER PROGRAMMING MODELS   15

Formulation – Gomory's IPP method – Gomory's mixed integer method – Branch and Bound technique.

UNIT IV   SCHEDULING BY PERT AND CPM   15

Network Construction – Critical Path Method – Project Evaluation and Review Technique – Resource Analysis in Network Scheduling

UNIT V   QUEUEING MODELS   15

Characteristics of Queuing Models – Poisson Queues - $(M / M / 1) : (FIFO / \infty /\infty)$, $(M / M / 1) : (FIFO/ N / \infty)$, $(M / M / C) : (FIFO / \infty / \infty)$, $(M / M / C) : (FIFO / N / \infty)$ models.

                                                              TOTAL PERIODS   75
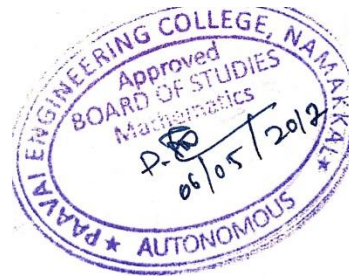
COURSE OUTCOMES

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

- understand and apply linear, integer programming to solve operational problem with constraints
- apply transportation and assignment models to find optimal solution in warehousing
- prepare project scheduling using PERT and CPM
- identify and analyze appropriate queuing model to reduce the waiting time in queue
- use optimization concepts in real world problems

REFERENCES

1. Taha H.A., "Operations Research : An Introduction" 8th Edition, Pearson Education, 2011.

2. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2013.

3. Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand& Company Ltd, New Delhi, 3rd Edition, 2013.

4. John W. Chinneck "Feasibility and Infeasibility in Optimization Algorithms and Computational Methods' Springer, 2013

5. Ravindran, Phillips, Solberg, "Operations Research: Principles And Practice", 2ndEdition, John Wiley& Sons, 01-Jul-2012

Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-	-	2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA16301 **COMPUTER COMMUNICATION NETWORKS** **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand networking concepts and basic communication model
- understand network architectures and components required for data communication
- analyze the function and design strategy of physical, data link, network layer and transport layer
- acquire knowledge of various application protocol standard developed for internet
- analyze the trace for the flow of information from one node to another node in the network

UNIT I   INTRODUCTION   9

Data Communications – Networks – Protocols and Standards. Network Models – OSI Model – Layers – TCP/IP Protocol Suite–Addressing. Digital Transmission – Digital-to-Digital Conversion – Analog-to-Digital Conversion– Transmission Modes. Analog Transmission – Digital-to-Analog Conversion – Analog-to-analog Conversion. Transmission Media – Guided and Unguided Media.

UNIT II   DATA LINK LAYER   9

Error – detection and correction – Parity – LRC – CRC – Hamming code – Flow Control and Error control – stop and wait – go back-N ARQ – selective repeat ARQ- sliding window – HDLC. - LAN - IEEE 802.4 - IEEE 802.5IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III   NETWORK LAYER   9

Internetworks–Circuit Switching- Packet Switching and Datagram approach – IP addressing methods– Sub netting– Routing – Distance Vector Routing – Link State Routing – BGP -Routers.

UNIT IV   TRANSPORT LAYER   9

Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP)– Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V   APPLICATIONS   9

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- identify the components required to build different types of networks
- understand the functionalities needed for data communication into layers
- choose the required functionality at each layer for given application
- understand the working principles of various application protocols
- acquire knowledge about security issues and services available

REFERENCES

1. Larry L. Peterson & Bruce S. Davie, "Computer Networks – A systems Approach", Fourth Edition, Harcourt Asia / Morgan Kaufmann, 2013.

2. William Stallings, "Data and Computer Communications", Ninth Edition, Prentice Hall, 2013.

3. Forouzan, " Data Communication and Networking", Fifth Edition , TMH 2013

4. Andrew S.Tannenbaum David J. Wetherall, "Computer Networks" Fifth Edition , Pearson Education 2013

5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-down Approach, Pearson Education, Limited,   sixth edition,2013

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week
COs	Programme Outcomes (POs)
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	1	3
CO4	2	1	2	3	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	2	-	-	-	2	-	-	-	3	2	3

CA16302   **OBJECT ORIENTED SOFTWARE ENGINEERING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand the phases in a software project and activities in project management
- comprehend the purpose of different UML diagrams
- understand the major considerations in collecting, documenting and analyzing project requirements
- cognize the activities in the crucial phase of system design
- identify the key phases in the recent trends of RUP and agile development

UNIT I   INTRODUCTION   9

Introduction to Software Engineering-Concepts-Software engineering development activities-Managing software development

UNIT II   MODELING WITH UML   9

UML Diagrams: Use Case Diagrams - Class Diagrams – Interaction Diagrams - State Machine Diagrams - Activity Diagrams. Modeling Concepts - Diagram Organization - Diagram Extension

UNIT III   REQUIREMENTS AND ANALYSIS   9

Requirements Elicitation - Concepts - Activities & Managing Requirements Elicitation - **Analysis:** Concepts - Analysis Activities - Analysis Model

UNIT IV   SYSTEM DESIGN   9

Decomposing the System - Addressing Design Goals - Reusing Patterns - Specifying Interfaces - Mapping Models to Code

UNIT V   AGILE DEVELOPMENT AND RATIONAL UNIFIED PROCESS   9

Rational Unified Process Key Features - Software Best Practices – Static Structure – Dynamic Structure. Agile Development: Adapting to Scrum - Patterns for Adopting to Scrum - New Roles – Changed Roles – Sprints-Product Backlogs - Teamwork

TOTAL PERIODS   45

COURSE OUTCOMES

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

- conceive the basics concepts of object oriented software engineering
- use Knowledge documentation for object oriented software engineering using UML
- analyze Problem and alternative solutions using object oriented software engineering approach
- manage Software process and build software engineering teams based on engineering approach
- acquire knowledge about security issues and services available

REFERENCES

1. Bernd Bruegge, Alan H Dutoit, "Object-Oriented Software Engineering Using UML, Patterns, and Java",
   3rd Edition, ISBN-10: 0136061257 | ISBN-13: 978-0136061250, 2010

2. Philippe Kruchten, "The Rational Unified Process: An Introduction", 3rd Edition, ISBN-10: 0321197704,
   ISBN-13: 978-0321197702

3. Mike Cohn, "Succeeding with Agile: Software Development Using Scrum", 1st Edition, ISBN-10: 032157936
   ISBN-13: 9780321579362. 2010.

4. Grady Booch, James Rumbaugh and Ivar Jacobson, "The Unified Modeling Language User Guide", Addison
   -Wesley Longman, USA, 2nd Edition, ISBN-10: 0321267974, ISBN-13: 9780321267979, 2005.

5. Timothy Lethbridge, Robert Laganiere, "Object-Oriented Software Engineering: Practical Software
   Development using UML and Java", ISBN-10: 0077109082 | ISBN-13: 978-0077109080, 2010

Mapping of Courses Outcomes with Programme Outcomes:													
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		3	1	2	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	2	-	-	1	-	-	-	3	1	2

CA16303   **ENTERPRISE RESOURCE PLANNING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand the concept of ERP
- comprehend the purpose of Enterprise Systems
- understand the major process of ERP
- cognize the activities in Integration
- identify the key phases in the recent trends of ERP development

UNIT I   INTRODUCTION TO ERP   9
ERP essentials – ERP evolution – ERP market – ERP tiers – information systems – Presentation tier – Application tier – database tier.

UNIT II   ENTERPRISE SYSTEMS   9
Enterprise systems – stand alone mainframe systems – client server architecture – service oriented architecture – types of enterprise systems – types of data – SAP overview.

UNIT III   PROCESS IN ERP   9
Basic Procurement process – physical flow – document flow – information flow – financial impact - role of enterprise systems in the procurement process – fulfillment process – production process.

UNIT IV   INTEGRATION   9
Integrated processes – Integrated processes execution – additional intra company processes – extended (intra company) processes.

UNIT V   CASE STUDY   9
ERP for construction industry – ERP for a corrugated box manufacturing company – ERP for lens making company–ERP for furniture manufacturing company – ERP for toys manufacturing company - Mc Donald's story – Automobile enterprises.

                                                          TOTAL PERIODS   45

COURSE OUTCOMES

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

- conceive the basics concepts of ERP
- use Knowledge documentation for Enterprise Systems
- analyze Problem and Process in ERP
- manage Integration of ERP
- acquire knowledge about security issues and services available

REFERENCES

1. Simha R Magal, Jeff Word, "Essentials of Business Processes and Information Systems", Wiley Publications, 2009.

2. Marianne Bradford, "Modern ERP: Select, Implement and use Today's advanced business systems", Second Edition, Lulu Publishers, 2010.

3. JyotindraZaveri, "Enterprise Resource Planning", Second edition, Himalaya Publishing House, 2012.

Mapping of Courses Outcomes with Programme Outcomes:													
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	2	2	2	2	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-		3	1	2	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	2	1	2	-	-	1	-	-	-	3	1	2

CA16304   **INTERNET PROGRAMMING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand an overview of oops concepts
- know the basics of java, AWT and String handling
- understand the knowledge in java spring framework and able to develop programs used
- develop programs in java and java swings
- understand and practice web development techniques on client-side and server side

UNIT I   FUNDAMENTALS OF JAVA   9

Introduction to java-Features of java-basic-Access controls-Static and fixed methods-Inner classes-String class-Inheritance-Overriding- methods- Using Super- Abstract classes-Packages-Interfaces-Exception Handling-Threads.

UNIT II   I/O STREAMS   9

The Java I/O Classes and Interfaces, the Stream Classes. The Byte Streams: InputStream, OutputStream, File InputStream, FileOutputStream, PrintStream, DataInputStream, DataOutputStream. The Character Streams: Reader, Writer, FileReader, FileWriter, CharArrayReader, CharArrayWriter, BufferedReader, BufferWriter,

UNIT III   APPLET AND AWT   9

AWT package – Layouts – Containers – Event Package – Event Model – Garbage Collection– Multithreading – Language Packages.

UNIT III   JDBC & RMI   9

JDBC – Introduction to JDBC and its components – implementing JDBC in Applet in – Introduction to RMI–Structure of RMI–implementing RMIRequest scope

UNIT V   SWINGS   9

GUI Programming with Java -Introduction to swings, JLabel, JImageIcon, JTextField, JButton, JToggleButton, JChekcBoxes, JRadioButtons, JTabbedPane, JScrollPane, JList, JComboBox, JTrees, JTable.

                                        TOTAL PERIODS   45

COURSE OUTCOMES

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

- acquire knowledge about the overview on oops concepts
- explore the basics of java, AWT and String handling
- learn and design in java spring framework and able to develop programs using it
- acquire knowledge in java and java swings
- able to design web development techniques on client-side and server side

REFERENCES

1. RajkumarBuyya, S.ThamaraiSelvi, Xingchen Chu, "Object–Oriented Programming with JAVA: Essentials and Applications", Fourth Edition, Tata McGraw Hill Education Private Limited, 2013.

2. Herbert Schildt , " Java: The Complete Reference ", Ninth Edition, McGraw-Hill , 2014.

3. Felipe Gutierrez, "Introducing Spring Framework: A Primer" Apress, 2014.

4. P.Naughton and H.Schildt, "Java 2(Complete Reference)" by fourth Edition.

5.Kathy Sierra & Bert Bates, "Head First Servlets &Jsp" by O'Reilly publications.

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
CO	Programme Outcomes (POs)													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	3	3	3	3	-	-	-	-		2	2	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	3	2	-	-	-	1	-	-	-	2	2	2

CA16305   **CASE TOOLS LABORATORY**   **0   0   4   2**

COURSE OBJECTIVES

To enable the students to

- understand and practice the various fields such as analysis, design, development testing of Software Engineering.

- develop skills to construct software of high quality with high reliability

1. Practicing the different types of case tools such as Rational Rose / other Open Source to be used for all the phases of Software development life cycle.

2. Data modeling

3. Source code generators

4. Apply the following to typical application problems:
   a. Project Planning
   b. Software Requirement Analysis
   c. Software Design
   d. Data Modeling& Implementation

5. Software Estimation

6. Software Testing

7. A possible set of applications may be the following:
   a. Library System
   b. Student Marks Analyzing System
   c. Text Editor.
   d. Create a dictionary.
   e. Telephone directory.
   f. Inventory System.

TOTAL PERIODS   60

COURSE OUTCOMES

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

- model software projects into high level design using DFD,UML diagrams
- measure the product and process performance using various metrics

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA16306   **INTERNET PROGRAMMING LABORATORY**   **0   0   4   2**

COURSE OBJECTIVES

To enable the students to

- understand and practice basics of java, AWT and String handling

- understand and practice of JSP and java Servlet

1.Writing Java programs by making use of class, interface, package, etc for the following

    a.   Different types of inheritance study

    b.   Uses of 'this' keyword

    c.   Polymorphism

    d.   Creation of user specific packages

    e.   User specific exception handling

2. Write programs in Java for event handling Mouse and Keyboard events.

3. Write programs in Java to manipulate Text Area, Canvas, Scroll Bars, Frames and Menus using AWT.

4. Write programs in Java using Layout Manager create different applications

5. Create an application using Java Applets.

6. Database using JDBC concept

7. Applications in RMI concept

8. Event Handling concept using Swing

                                                  TOTAL PERIODS   60

COURSE OUTCOMES

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

- explore the features and create interactive web pages using them
- acquire knowledge about the JSP and Servlet programs

	Mapping of Courses Outcomes with Programme Outcomes:													
	(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

PEN16201   **COMMUNICATION AND SOFT SKILLS LABORATORY**   **0   0   2   1**

COURSE OBJECTIVES

To enable the students to

- develop the ability to communicate effectively in spoken english
- draft flawless resume in English and participate successfully in group discussions
- enhance their soft skills and interpersonal skill
- equip the learners to make effective presentations on topics in engineering and technology

UNIT I   FORMAL & INFORMAL CONVERSATION PRACTICE   6

Role Play1- with family members, neighbours, friends, relatives etc. Simple Expressions – agreeing / disagreeing, persuading, wishing, consoling, advising, arguing, expressing opinions etc - Professional dialogues with the superiors-Conversation with different professionals- Situations like - Government and Corporate Offices, Official Meetings, Educational Institutions, (At the railway junction, malls, post office, bank) etc.

UNIT II   ORAL REVIEW, RADIO SHOW &NARRATIVE TECHNIQUES   6

Oral review of movies and discussion or sharing the view on various concepts of the movie, Presentation of various radio programs like news, announcements, advertisements, entertainment programs etc. as a team activity, Understanding the basic narrative techniques-Narrating short stories with message, Narrating real life experiences.

UNIT III   RÉSUMÉ / LETTER WRITING   6

Preparation of résumé–structure – use of words and language style – Types of letter – structure of a letter – format for writing letters – use of language in letters

UNIT IV   RESENTATION SKILLS&GROUP DISCUSSION   6

Elements of effective presentation – Structure of presentation - Presentation tools – Voice modulation – effective use to presentation tools - Audience analysis - Body language – Video samples- Importance of GD – GD in selection process - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work – Body Language - Mock GD -Video samples

UNIT V   INTERVIEW SKILLS   6

Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews-Video samples.

                                             TOTAL PERIODS   30
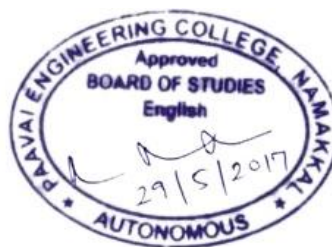
COURSE OUTCOMES

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

- speak effectively and confidently in English.
- attend job interviews with confidence
- write effective job applications with resume
- participate in GD with involvement and confidence

REFERENCES

1. Kalpana. V & Co., "Communication Skills Laboratory Manual", Vijay Nicole Imprints Pvt. Limited, Chennai. 2013

2. Anderson, P.V. "Technical Communication", Thomson Edition, New Delhi, 2012.

3. Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi, 2012

4. Kumar Sanjay, PushpLata, "Communication Skills (With CD)", Oxford University Press, New   Delhi. 2011

5. Dutt, Kiranmai P and Geetha Rajeevan, "Basic Communication Skills", Foundation Books, New Delhi. 2012.

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
CO	**Programme Outcomes (POs)**													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	2	-	-	3	3	-	-	-	-
CO2	-	-	-	3	3	-	2	2	3	-	-	-	-	-
CO3	-	-	2	1	3	-	3	3	3	3	2	3	-	-
	-	-	-	2	-	2	-	3	3	3	3	-	-	-

CA16401   **C# and .NET FRAMEWORK**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- learn the .NET framework concept and understand the syntax of basic C# Programs
- learn C# elements and OOPS concepts
- learn fundamentals of window application programming and how to create a window applications
- develop web based applications and learn advanced features of C#
- understand the foundation of CLR execution

UNIT I   INTRODUCTION TO C#   8

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

UNIT II   OBJECT ORIENTED ASPECTS OF C#   9

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

UNIT III   APPLICATION DEVELOPMENT ON .NET   8

Building Windows Applications, IDE, Standard Controls, Application Model, Accessing Data with ADO.NET- ADO .NET Architecture, Automatically generating SQL Statements

UNIT IV   WEB BASED APPLICATION DEVELOPMENT ON .NET   8

Programming Web Applications with Web Forms - ASP.Net, Programming Web Services, Asynchronous Communication

UNIT V   THE CLR AND THE .NET FRAMEWORK   12

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 PERIODS   45

COURSE OUTCOMES

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

- use Visual Studio .NET to implementing the .NET application and to Know the basic C# elements
- know the C# OOPS Concepts
- know the basic ADO.NET structures and Understand the ADO.NET database connectivity
- understand the ASP.NET Programming Model and able to create ASP pages for web applications
- understand the internal functions of CLR and develop Web based applications on .NET CLR

REFERENCES

1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2014. (Unit I, II)

2. J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2013. (Unit III, IV, V)

3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2014.

4. Robinson et al, "Professional C#", 2nd ed., Wrox Press, 2013.

5. Andrew Troelsen, "C# and the .NET Platform", A1 Press, 2014.

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
CO	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	-	-	-	-	-	-	-	2	2	3	3	1	3	1
CO2	-	-	-	2	3	-	1	2	-	3	3	1	2	2
CO3	-	-	-	-	-	-	-	-	-	3	1	1	2	-
CO4	-	-	-	-	3	1	1	-	2	3	3	1	3	2
CO5	-	-	-	-	-	2	-	2	1	3	1	1	3	2
CO	0	0	0	1	3	1.5	1	2	1.6	3	2.2	1	2.6	1.7

CA16402   **DATA MINING AND DATA WAREHOUSING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- expose the students to the concepts of Data warehousing Architecture and Implementation
- understand Data mining principles and techniques and Introduce DM as a cutting edge business intelligence
- understand the concept of classification for the retrieval purposes
- know the clustering techniques in details for better organization and retrieval of data
- identify Business applications and Trends of Data mining

UNIT I   DATA WAREHOUSE   8

Data Warehousing-Operational Database Systems vs. Data Warehouses-Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture – Indexing – OLAP queries& Tools.

UNIT II   DATA MINING & DATA PREPROCESSING   9

Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Pre-processing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

UNIT III   ASSOCIATION RULE MINING   8

Introduction-Data Mining Functionalities-Association Rule Mining - Mining Frequent Item Sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining.

UNIT IV   CLASSIFICATION & PREDICTION   10

Classification vs. Prediction–Data preparation for Classification and Prediction – Classification by Decision Tree Introduction–Bayesian Classification – Rule Based Classification – Classification by Back Propagation – SupportVector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction –Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods –Model Section.

UNIT V   CLUSTERING   10

Cluster Analysis:-Types of Data in Cluster Analysis–A Categorization of Major Clustering Methods– Partitioning Methods – Hierarchical methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High- Dimensional Data – Constraint-Based Cluster Analysis – Outlier Analysis.

                                                           TOTAL PERIODS   45

COURSE OUTCOMES

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

- understanding the Store voluminous data for online processing
- prepare the Pre-process the data for mining applications
- learn the association rules for mining the data
- practice and deploy appropriate classification techniques
- understand the high dimensional data for better organization of the data

REFERENCES

1. Jiawei Han and MichelineKamber, "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2012.

2. K.P. Soman, ShyamDiwakar and V. Ajay, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2012.

3. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2013.

4. BERSON, ALEX & SMITH, STEPHEN J, Data Warehousing, Data Mining, and OLAP, TMH Pub. Co. Ltd, New Delhi, 2012

5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Pearson Education, 2012

Mapping of Courses Outcomes with Programme Outcomes:														
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week														
COs	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	1	2	3	1	-	-	-	1	-	-	-	3	2	3
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	3	2	-	-	-	-		2	1	1	3
CO4	2	2	2	2	-	-	-	1	-	-	-	-	2	2
CO5	2	2	3	3	-	-	-	1	-	-	-	3	2	3

CA16403   **WEB PROGRAMMING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand and practice mark-up languages
- know of how to do project using PHP
- understand and practice embedded dynamic scripting on client side Internet Programming
- understand and practice of PYTHON concept
- understand and practice web development techniques on client-side and server side

UNIT I   MARKUP LANGUAGE   9

Introduction to HTML and HTML5-Formatting and Fonts-Commenting Code– Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.

UNIT II   STYLE SHEET   9

The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds - Manipulating text - Margins and Padding - Positioning using CSS.

UNIT III   INTRODUCTION TO PHP   9

PHP   Introduction-Basic   Development   concept-types-Variables-Constants-Expressions-Operators-Control Structures-Arrays-Function

UNIT IV   HANDLING FORM & SESSION HANDLING   9

Handling form with GET and POST – Cookies – Session – Server Variables

UNIT V   INTRODUCTION TO PYTHON   9

The basic elements of python-Branching Programs-Control Structures-Strings-Functions and scoping-Tuples-Lists and Dictionaries-Lists and Mutability-Functions as Objects

TOTAL PERIODS   45

COURSE OUTCOMES

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

- acquire knowledge about functionalities of scripting language
- explore mark-up languages features and create interactive web pages using them
- learn and design Client side validation using PHP scripting languages
- acquire knowledge about Open source PYTHON libraries
- able to design front end web page and connect to the back end databases

REFERENCES

1. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web – How to Program", Fifth Edition, Pearson Education, 2013

2. RasmusLerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2012

3. Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2012

4. Beginning PHP5 and MySQL: From Novice to Professional, W. Jason Gilmore, 2004

5.VikramVaswani, "PHP and MySQL", Tata McGraw-Hill, 2005

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
CO	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	3	3	3	3	-	-	-	-		2	2	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	3	2	-	-	-	1	-	-	-	2	2	2

CAE16404   **CLOUD COMPUTING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- introduce the broad perceptive of cloud architecture and model to understand the concept
- understand the features of cloud simulator
- apply different cloud programming model as per need
- learn to design the trusted cloud Computing system
- address the core issues of cloud computing such as security, privacy and interoperability

UNIT I   CLOUD ARCHITECTURE AND MODEL   9

Technologies for Network-Based System – System Models for Distributed and Cloud Computing – NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services – Cloud models (IAAS, PAAS, SAAS) – Public vs Private Cloud –Cloud Solutions - Cloud ecosystem – Service management – Computing on demand.

UNIT II   VIRTUALIZATION   9

Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization – Virtualization Structures - Tools and Mechanisms - Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-centre Automation.

UNIT III   CLOUD INFRASTRUCTURE   9

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

UNIT IV   PROGRAMMING MODEL   9

Parallel and Distributed Programming Paradigms – Map Reduce , Twister and Iterative Map Reduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments -Eucalyptus, Open Nebula, Open Stack, Aneka, Cloud Sim

UNIT V   SECURITY IN THE CLOUD   9

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

                                                              TOTAL PERIODS   45

COURSE OUTCOMES

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

- compare the strengths and limitations of cloud computing
- identify the architecture, infrastructure and delivery models of cloud computing
- apply suitable virtualization concept
- choose the appropriate cloud player, Programming Models and approach
- design Cloud Services and Set a private cloud

REFERENCES

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

2. John W.Rittinghouse and James F.Ransome, "Cloud Computing: Implementation, Management and Security", CRC Press, 2010.

3. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing, A Practical Approach", TMH, 2009.

4. Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India, 2011.

5. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure inthe Cloud" O'Reilly

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
CO	**Programme Outcomes (POs)**													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	3	2	3	-	-	-	-	-	-	2	1	2
CO3	1	2	2	3	3	-	1	-	-	-	2	2	1	2
CO4	2	1	2	2	-	-	-	2	-	-	-	-	2	2
CO5	2	2	2	1	-	-	-	2	-	-	-	3	2	2

CA 16405 **C# and .NET FRAMWORK LABORATORY** **0 0 4 2**

COURSE OBJECTIVES

To enable the students to

- learn the cost estimation techniques during the analysis of the project

- understand the quality concepts for ensuring the functionality of the software

1. Programs using Branching, Looping.

2. Programs using Methods, Arrays, Strings.

3. Programs using Structures, Enumerations.

4. Programs using Inheritance.

5. Programs using Polymorphism.

6. Programs using Interfaces.

7. Programs using Operator overloading.

8. Programs using Delegates, Events, Errors and Exceptions.

9. Program to Build an Calculator widget

10. Programs Using Multi Module Assembly

11. Programs using application development on .net.

12. Programs using Web applications.

TOTAL PERIOD   60

COURSE OUTCOMES

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

* learn the risk management activities and the resource allocation for the projects
* can apply the software estimation and recent quality standards for evaluation of the software projects

COs	Programme Outcomes (POs)													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO2	2	2	3	2	3	-	-	-	-		2	1	1	3

Table title: **Mapping of Courses Outcomes with Programme Outcomes:** **(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week**

CA16406   **WEB PROGRAMMING LABORATORY**   **0   0   4   2**

COURSE OBJECTIVES

To enable the students to

- understand and practice embedded dynamic scripting on client side Internet Programming

- understand and practice of PHP and Python concept

1. Create a web page with the following using HTML5

    a.   To embed an image map in a web page

    b.   To fix the hot spots

    c.   Show all the related information when the hot spots are clicked.

2. Create a web page with all types of Cascading style sheets.

3. Use of conditional statements in PHP

4. Use of looping statements in PHP

5. Creating different types of arrays

6. Usage of array functions

7. Creating user defined functions

8. Creating simple webpage using PHP

9. Use of conditional statements in Python

10. Use of looping statements in Python

11. Creating different types of arrays in Python

12. Usage of array functions in Python

13. Creating user defined functions in Python

TOTAL PERIODS   60

COURSE OUTCOMES

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

- explore mark-up languages features and create interactive web pages using them
- acquire knowledge about Open source PHP and Python libraries

	Mapping of Courses Outcomes with Programme Outcomes:													
	(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA16407   **TECHNICAL SEMIANR AND REPORT WRITING**   **0   0   4   2**

The goal of this course is to train the students to critically evaluate a well-defined set of research subjects and to summarize the findings concisely in a paper of scientific quality. The paper will be evaluated based on the ability to understand a topic, communicate it and identify the issues. Results from this term paper will be presented to Fellow students and a committee of faculty members.

1. Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct primary sources.
2. Every student must write a short review of the topic and present it to fellow students and faculty (discuss the topic – expose the flaws – analyze the issues) every week.
3. The faculty should evaluate the short review and award marks with respect to the following.
   a. Has the student analyzed – not merely quoted – the most significant portions of the primary sources
   b. Employed?
   c. Has the student offered original and convincing insights?
   d. Plagiarism to be checked.
4. Every student should re-submit and present the review article including issues/ comments/ conclusions which had arisen during the previous discussion.
5. Every student should submit a final paper as per project specifications along with all short review reports (at least 4 internal reviews) and corresponding evaluation comments.
6. Every student should appear for a final external review exam to defend themselves.

                                        TOTAL PERIODS   60

Mapping of Courses Outcomes with Programme Outcomes:													
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	**Programme Outcomes (POs)**												
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

PCA16408   **CAREER DEVELOPMENT LABORATORY**   0   0   2   1

UNIT I   CORPORATE READINESS   **6**

Business Communication–Inter & Intra Personal Skills–Business Etiquettes – Corporate Ethics – Communication Media Etiquette

UNIT II   INTERVIEW SKILLS   **6**

Resume Building – Group Discussions – Presentation Skills – Entrepreneur Skills – Psychometric Assessment – Mock Interview

UNIT III   QUANTITATIVE APTITUDE (QA) 2   **6**

Profit & Loss–Clock–Power & Square Roots – Train – Boats & Streams – Probability – Calendars – Permutations & Combinations - Partnership – Simplification – Pipes & Cisterns – Puzzles

UNIT IV   LOGICAL REASONING (LR) 2   **6**

Statements & Assumptions – Matching Definitions – Logical Games – Making Judgments – Statements &Conclusions – Verbal Classifications

UNIT V   VERBAL REASONING (VR) 2   **6**

Syllogisms – Data Sufficiency – Dice – Series Completion – Character Puzzles – Cube & Cuboid – Arithmetic Reasoning

TOTAL PERIODS   30

Mapping of Courses Outcomes with Programme Outcomes:														
(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week														
	Programme Outcomes (POs)													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO2	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA16151   **FINANCIAL ACCOUNTING**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand an overview of accounting concepts
- know the basics ratio analysis
- understand the knowledge in funds flow statement in accounting
- develop budget and budgetary control concept
- understand and practice of costing concept

UNIT I   ACCOUNTING   9

Definition, Objectives, Advantages, Accounting Concepts, Accounting- Conventions. Methods of Accounting– Single Entry and Double Entry System. – Journal and Ledger – Preparation of Trial Balance.-Final Accounts: Trading and Profit and Loss Account and Balance Sheet of Sole- Proprietary Concern.

UNIT II   RATIO ANALYSIS   9

Meaning – Advantages – Limitations – Classification of Ratio : Profitability, Turnover and Solvency Ratios.

UNIT III   FUNDS FLOW STATEMENT   9

Concept of Funds – Funds flow Statement – Uses and Limitations – Preparation of Fund Flow Statement-– Cash Flow Statement

UNIT IV   BUDGET AND BUDGETARY CONTROL   9

Meaning and Definition - Objectives of Budgetary - Control, Advantages and Limitations Preparation of Different Types o f Bud gets.

UNIT V   COSTING   9

Definition, Nature and Importance Advantages and Limitations of Cost Accounting – Classifications of Cost — Preparation of Cost Sheet- Marginal Costing: Meaning, Advantages Cost – Volume Profit Analysis – Break Even Analysis – Uses and Assumptions – Applications of Marginal Costing.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- acquire knowledge about the overview of accounting concepts
- explore the basics ration analysis concept
- learn and understand the funds flow statement
- acquire knowledge in budget and budgetary control
- able to understand the concept of costing

REFERENCES

1. Decenzo and Robbins, financial Accounting, Wilsey, 10th edition, 2012.

2. Mamoria C.B. and Mamoria. S., Personnel Management, Himalaya Publishing Company, 1997.

3. Mirza S. Saiyadain Ration Analysis , Tata McGraw Hill , 4th edition 2009.

4. EugenceMckenna and Nic Beach Budget and Budgetary Control, Pearson Education Limited, 2002.

5.Dessler, Accounting and Costing, Pearson Education Limited, 2002

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-	-	2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA16152   **INFORMATION SECURITY**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand the basics of cryptography
- learn to find the vulnerabilities in programs and to overcome them,
- know the different kinds of security threats in networks and its solution
- know the different kinds of security threats in databases and solutions available
- learn about the models and standards for security

UNIT I   ELEMENTARY CRYPTOGRAPHY   9

Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms-
Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption – Cryptographic Hash
Functions– Key Exchange – Digital Signatures – Certificates .

UNIT II   PROGRAM SECURITY   9

Secure programs – Non-malicious Program Errors – Viruses – Targeted Malicious code – Controls   Against
Program Threat – Control of Access to General Objects – User Authentication – Good Coding Practices – Open
Web Application Security Project Flaws – Common Weakness Enumeration Most Dangerous Software Errors

UNIT III   SECURITY IN NETWORKS   9

Threats in networks – Encryption – Virtual Private Networks – PKI – SSH – SSL – IPSec – Content Integrity –
Access Controls – Wireless Security – Honeypots – Traffic Flow Security – Firewalls – Intrusion Detection
Systems – Secure e-mail.

UNIT IV   SECURITY IN DATABASES   9

Security requirements of database systems – Reliability and Integrity in databases –Redundancy – Recovery –
Concurrency/ Consistency – Monitors – Sensitive Data – Types of disclosures – Inference-finding and confirming
SQL injection

UNIT V   SECURITY MODELS AND STANDARDS   9

Secure SDLC – Secure Application Testing – Security architecture models – Trusted Computing Base – Bell-
LaPadula Confidentiality Model – Biba Integrity Model – Graham-Denning Access Control Model – Harrison-
Ruzzo-Ulman Model – Secure Frameworks – COSO – CobiT – Compliances – PCI DSS – Security Standards -
ISO 27000 family of standards – NIST.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- apply cryptographic algorithms for encrypting and decryption for secure data transmission
- understand the importance of Digital signature for secure e-documents exchange
- understand the program threats and apply good programming practice
- get the knowledge about the security services available for internet and web applications
- understand data vulnerability and sql injection

REFERENCES

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson   Education, 2007.

2. Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.

3. William Stallings, "Cryptography and Network Security : Principles and Practices", Fifth Edition, Prentice Hall, 2010.

4. Michael Howard, David LeBlanc, John Viega, "24 Deadly Sins of Software Security: Programming Flaws andHow to Fix Them", First Edition, McGrawHill Osborne Media, 2009.

5. Matt Bishop, "Computer Security: Art and Science", First Edition, Addison-wesley

Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week														
COs	**Programme Outcomes (POs)**													
CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	1	2	-	-	-	-	-	-	-	1	1	2
CO2	1	2	2	2	3	-	-	-	-	-	-	2	1	2
CO3	2	2	2	2	2	-	-	-	-	-	2	1	1	3
CO4	2	1	2	2	-	-	-	2	-	-	-	-	3	2
CO5	1	2	1	2	-	-	-	2	-	-	-	2	2	2

CA16153   **NETWORK PROTOCOLS**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand the existing network architecture models and analyze the performance
- understand the high speed network protocols and design issues
- learn gamin engine design
- learn Network Security Technologies and Protocols
- study various protocols in wireless LAN, MAN

UNIT I   FUNDAMENTALS OF NETWORKING STANDARDS ANDPROTOCOLS   9

Network Communication Architecture and Protocols - OSI Network Architecture seven Layers Model -Definition and Overview of TCP/IP Protocols -TCP/IP Four Layers Architecture Model - Other Network Architecture Models: IBM SNA

UNIT II   ROUTED AND ROUTING PROTOCOLS   9

Application Layer Protocols-Presentation Layer Protocols- Session Layer Protocols – Transport Layer Protocols - Network Layer Protocols - Data Link Layer Protocols - Routing Protocols - Multicasting Protocols - MPLS.

UNIT III   GAMING ENGINE DESIGN   9

Overview of ISDN − Channels − User access – Protocols Network management requirements – Network monitoring − Network control − SNMP V_1, V_2 and V_3 − Concepts, MIBs − Implementation issues-RMON.

UNIT IV   SECURITY AND TELEPHONY PROTOCOLS   9

Network Security Technologies and Protocols - AAA Protocols - Tunneling Protocols – Security Protocols-Private key encryption − Data encryption system, public key encryption − RSA – Elliptic curve cryptography−Authentication mechanisms− Web security -Secured Routing Protocols - IP telephony -Voice over IP and VOIP Protocols –Signaling Protocols- Media/CODEC.

UNIT V   NETWORK ENVIRONMENTS AND PROTOCOLS   9

Wide Area Network and WAN Protocols - Frame relay - ATM - Broadband Access Protocols –PPP Protocols - Local Area Network and LAN Protocols - Ethernet Protocols - Virtual LAN Protocols -Wireless LAN Protocols - Metropolitan Area Network and MAN Protocol - Storage Area Network and SAN Protocols.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- study, analyze and design seven layers of protocols of wired and wireless networks
- design Cloud Services and Set a private cloud
- analyze design implementation issues
- design ISDN and Network Protocols
- implement the broadband access protocol

REFERENCES

1.Javvin, "Network Protocols", Javvin Technologies Inc , second edition, 2005

2. William Stallings, "Cryptography and Network Security", PHI, 2000.

3. Mani Subramanian, "Network Management−Principles and Practices", Addison Wesley, 2000

4.William Stallings, "SNMP, SNMPV2, SNMPV3 and RMON1 and 2", 3rd Edition, Addison Wesley, 1999

5. William Stallings, "Data and Computer Communications" 5th Edition, PHI, 1997.

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CO	**Programme Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	1	2	2	2	-	-	-	-	-	-	-	1	1	2
CO2	2	3	2	2	3	-	-	-	-	-	-	2	2	2
CO3	2	2	3	2	3	-	-	-	-		1	2	2	2
CO4	1	2	2	1	-	-	-	2	-	-	-	-	3	2
CO5	1	3	2	2	-	-	-	2	-	-	-	2	2	2

CA16154   **SOFTWARE TESTING AND QUALITY ASSURANCE**   **3   0   0   3**

COURSE OBJECTIVES

To enable the students to

- understand an overview of software testing concepts
- know the basics analysis of quality assurance
- understand the knowledge in activity planning
- develop the risk management concept
- understand and practice of software quality assurance

UNIT I   INTRODUCTION   9

Software Projects various other types of projects - Problems with software projects - an overview of project-planning - Project evaluation - Project Analysis and technical planning - Project estimates - Preparation of Estimates - COCOMO model - Function Point Analysis - Putnam Model - Non-development overheads.

UNIT II   ACTIVITY PLANNING   9

Project schedules - Sequencing and scheduling projects - Network planning models - Shortening project duration Identifying critical activities.

UNIT III   RISK MANAGEMENT   9

Resource allocation - Monitoring and Control - Managing people and organizing teams - Planning for small projects- Handling large projects - Divide and Conquer - Software Project survival.

UNIT IV   SOFTWARE CONFIGURATION MANAGEMENT   9

Basic functions, responsibilities, standards, configuration Management, Prototyping - Models of prototyping.

UNIT V   SOFTWARE QUALITY ASSURANCE   9

Quality and the quality system - standards and procedures - Technical activities – components - Continuous Improvement - Software Tasks - Management responsibility - Quality System - Contract Review – Document Control - Product identification and trace ability.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- acquire knowledge about the overview of software testing concepts
- explore the basics activity planning concept
- learn and understand the risk management concept
- acquire knowledge in software configuration management control
- able to understand the software quality assurance

REFERENCES

1. Mike Cotterell and Bob Hughes, "Software Project Management - Inclination", Tata McGraw Hill, 2006.

2. Robert K. Wysocki, Robert Beck Jr and David B. Crane, "Effective Project Management", John Wiley & Sons Inc, 2002.

3. Steve McConnell, "Software Project Survival Guide", Microsoft Press, 2000

4. Gerald M. Weinberg," Quality Software Management", Volume I, Systems Thinking, Dorset House Publishing, 2002

5. Gerald M. Weinberg," Quality Software Management", Volume II, First Order Measurement, Dorset House Publishing, 2002.

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<tr><td colspan="15">Mapping of Courses Outcomes with Programme Outcomes:
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COs	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
CO2	2	1	1	2	2	-	-	-	-	-	-	2	1	2
CO3	2	2	3	2	3	-	-	-	-		2	1	2	2
CO4	1	2	2	1	-	-	-	2	-	-	-	-	2	2
CO5	2	3	2	1	-	-	-	1	-	-	-	3	2	3

CA16155   **GAME PROGRAMMING**   **3 0 0 3**

COURSE OBJECTIVES

To enable the students to

- understand the concepts of Game design and development
- learn the processes, mechanics and issues in Game Design
- be exposed to the Core architectures of Game Programming
- know about Game programming platforms, frame works and engines
- learn to develop games

UNIT I   3D GRAPHICS FOR GAME PROGRAMMING   9

3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting, Color, Texturing, Camera and Projections, Culling and Clipping, Character Animation, Physics-based Simulation, Scene Graphs.

UNIT II   GAME ENGINE DESIGN   9

Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time. simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.

UNIT III   GAME PROGRAMMING   9

Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and caching game data, User Interface management, Game event management.

UNIT IV   NG PLATFORMS AND FRAMEWORKS   9

2D and 3D Game development using Flash, DirectX, Java, Python, Game engines – DX Studio, Unity.

UNIT V   GAME DEVELOPMENT   9

Developing 2D and 3D interactive games using DirectX or Python – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

                                        TOTAL PERIODS   45

COURSE OUTCOMES

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

- discuss the concepts of Game design and development
- design the processes, and use mechanics for game development
- explain the Core architectures of Game Programming
- use Game programming platforms, frame works and engines
- create interactive Games

REFERENCES

1. Mike McShaffrfy and David Graham, "Game Coding Complete", Fourth Edition, Cengage Learning, PTR, 2012

2. Jason Gregory, "Game Engine Architecture", CRC Press / A K Peters, 2009.

3. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", 2nd Edition Prentice Hall / New Riders 2009.

4.Eric Lengyel, "Mathematics for 3D Game Programming and Computer Graphics", 3rd Edition, Course Technology PTR, 2011

5. Jesse Schell, The Art of Game Design: A book of lenses, 1st Edition, CRC Press, 2008.

COs	Mapping of Courses Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Week													
CO	Programme Outcomes (POs)													
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	2	2	3	2	-	-	-	-	-	-	-	1	2	2
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CO3	2	2	3	2	3	-	-	-	-	-	2	1	1	3
CO4	2	2	2	2	-	-	-	2	-	-	-	-	2	2
CO5	1	2	3	1	-	-	-	1	-	-	-	3	2	3

CA16156   **ADVANCED DATABASE**   **3 0 0 3**

COURSE OBJECTIVES

To enable the students to
- learn the modeling and design of databases
- acquire knowledge on parallel and distributed databases and its applications
- study the usage and applications of Object Oriented database
- understand the principles of intelligent databases
- understand the usage of advanced data models

UNIT I   PARALLEL AND DISTRIBUTED DATABASES   9

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

UNIT II   OBJECT AND OBJECT RELATIONAL DATABASES   9

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

UNIT III   INTELLIGENT DATABASES   9

Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications- Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Datalog- Recursive Rules-Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships - Spatial Data Structures- Spatial Access Methods- Spatial DB Implementation.

UNIT IV   ADVANCED DATA MODELS   9

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols - Multimedia Databases- Information Retrieval- Data warehousing- Data Mining- Text Mining.

UNIT V   EMERGING TECHNOLOGIES   9

XML Databases: XML-Related Technologies-XML Schema- XML Query Languages-Storing XML in Databases -XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages- Introduction to Big Data-Storage-Analysis.

TOTAL PERIODS   45

COURSE OUTCOMES

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

- select the appropriate high performance database like parallel and distributed database
- model and represent the real world data using object oriented database
- design a semantic based database to meaningful data access
- embed the rule set in the database to implement intelligent databases
- represent the data using XML database for better interoperability

REFERENCES

1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education/ Addison Wesley, 2007.

2. Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Third Edition, Pearson Education, 2007.

3. Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database SystemConcepts", Fifth Edition, McGraw Hill, 2006.

4. C.J.Date, A.Kannan and S.Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

5. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, 3rd Edition 2004.

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