PAAVAI ENGINEERING COLLEGE, NAMAKKAL - 637 018 (AUTONOMOUS) B.E. COMPUTER SCIENCE AND ENGINEERING REGULATIONS 2015 CURRICULUM

S.No.	Category	Course Code	Course Title	L	Т	Р	С
Theory	7						
1	PC	CS15701	Open Source Software	3	0	0	3
2	PC	CS15702	Mobile Computing	3	0	0	3
3	PC	CS15703	Data Warehousing and Data Mining	3	0	0	3
4	PC	CS15704	Cloud Computing	3	0	0	3
5	PE	CS15***	Programme Elective III	3	0	0	3
6	PE	CS15***	Programme Elective IV	3	0	0	3
Practic	cal						
7	PC	CS15705	Open Source Software Laboratory	0	0	4	2
8	PC	CS15706	Mini Project	0	0	4	2
			Total	18	0	8	22

SEMESTER VII

SEMESTER VIII

S.No.	Category	Course Code	Course Title	L	Т	Р	С
Theory		-					
1	PC	CS15801	Software Project Management	3	0	0	3
2	PC	BA15151	Professional Ethics and Human Values	3	0	0	3
3	PE	CS15***	Programme Elective V	3	0	0	3
4	PE	CS15***	Programme Elective VI	3	0	0	3
Practica	1						
5	PC	CS15802	Project Work	0	0	12	6
			Total	12	0	12	18

SEMESTER VII PROGRAMME ELECTIVE III

S.NO.	Category	Course Code	Course Title	L	Т	Р	С
1.	PE	CS15351	Semantic Web	3	0	0	3
2.	PE	CS15352	Wireless Sensor Networks	3	0	0	3
3.	PE	CS15353	Advanced Computer Architecture	3	0	0	3
4.	PE	CS15354	Internet of Things	3	0	0	3
5.	PE	BA15351	Engineering Economics and Financial Accounting	3	0	0	3

PROGRAMME ELECTIVE IV

S.NO.	Category	Course Code	Course Title	L	Т	Р	С
1.	PE	CS15451	Advanced Database Technology	3	0	0	3
2.	PE	CS15452	Ad-hoc Networks	3	0	0	3
3.	PE	CS15453	Graph Theory and Applications	3	0	0	3
4.	PE	CS15454	User Interface Design	3	0	0	3
5.	PE	CS15455	Distributed Systems	3	0	0	3

SEMESTER VIII

PROGRAMME ELECTIVE V

S.NO.	Category	Course Code	Course Title	L	Т	Р	С
1.	PE	CS15551	Agile Software Development	3	0	0	3
2.	PE	CS15552	Service Oriented Architecture	3	0	0	3
3.	PE	CS15553	Digital Image Processing	3	0	0	3
4.	PE	CS15554	Soft Computing	3	0	0	3
5.	PE	BA15451	Entrepreneurship Development	3	0	0	3

PROGRAMME ELECTIVE VI

S.NO.	Category	Course Code	Course Title	L	Т	Р	С
1.	PE	CS15651	Software Testing	3	0	0	3
2.	PE	CS15652	Robotics	3	0	0	3
3.	PE	MA15153	Operations Research	3	0	0	3
4.	PE	CS15653	Grid Computing	3	0	0	3
5.	PE	CS15654	E-Commerce	3	0	0	3

SEMESTER VII

CS15701

OPEN SOURCE SOFTWARE

COURSE OBJECTIVES

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

PRE - REQUISITE: Nil

UNIT I INTRODUCTION

Introduction to open sources - Need of open sources - Advantages of open sources - Open source operating systems. LINUX: Introduction - General overview - The Linux shell and File Structure: The shell - The shellscripts and programming - Shell Configuration.

UNIT II MYSQL

MySQL: Introduction - Setting up account - Starting - Terminating and Writing SQL programs - Record Selection Technology - Working with strings - Date and Time - Sorting query results - Generating Summary - Working with metadata - Using sequences - MySQL and Web.

UNIT III INTRODUCTION TO PHP

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

UNIT IV ADVANCED PHP

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

UNIT V R PROGRAMMING

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

TOTAL PERIODS45

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COURSE OUTCOMES

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

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

TEXT BOOKS

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

REFERENCES

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

- 1. http://www.gnu.org/doc/using.html.
- 2. https://www.tutorialspoint.com/php/php_and_mysql.html.
- 3. https://www.udemy.com/r basics/.



	Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1- Weak														
COs		Programme Outcomes POs Specific Outcomes PSOs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2													
	PO1	I PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02													
CO1	3	3	2	2	-	-	-	-	-	-	-	2	2	2	
CO2	3	2	2	2	-	-	-	-	-	-	-	1	2	3	
CO3	3	2	2	3	-	-	-	-	-	-	-	1	3	3	
CO4	3	2	3	1	-	-	-	-	-	-	-	1	2	3	
CO5	3	2	3	2	-	-	-	-	-	-	-	1	2	3	

MOBILE COMPUTING

COURSE OBJECTIVES

CS15702

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

PRE - REQUISITE: Computer Networks.

UNIT I INTRODUCTION

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

UNIT II MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER

Overview of Mobile IP- Features of Mobile IP- Key Mechanism in Mobile IP- Route OptimizationOverview of TCP/IP- Architecture of TCP/IP- Adaptation of TCP Window- Improvement in TCPPerformance.----

UNIT III MOBILE TELECOMMUNICATION SYSTEM

Global System for Mobile Communication (GSM)- General Packet Radio Service (GPRS)- UniversalMobile Telecommunication System (UMTS) - Case Study: 2G - 3G - 4G - LTE.

UNIT IV MOBILE AD-HOC NETWORKS

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

UNIT V MOBILE PLATFORMS AND APPLICATIONS

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

TOTAL PERIODS 45

COURSE OUTCOMES

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

- explain the basics of mobile telecommunication system.
- choose the required functionality at each layer for given application.
- identify solution for each functionality at each layer.
- apply simulator tools and design ad hoc networks.
- develop a mobile application.

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 Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi - 2012.

REFERENCES

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

- 1. https://onlinecourses.nptel.ac.in/noc16_cs13.
- 2. www.nptelvideos.in/2012/12/wireless communication.html.
- 3. http://nptel.ac.in/courses/106106147/.

	Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1- Weak														
COs						Progra	mme C)utcom	es POs				Progr Speci Outco PSOs	ramme fic omes	
	PO1	PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02													
CO1	3	2	2	2	-	-	-	-	-	-	-	1	2	3	
CO2	3	3	2	1	-	-	-	-	-	-	-	2	2	2	
CO3	3	2	2	3	-	-	-	-	-	-	-	1	2	3	
CO4	3	2	2	1	-	-	-	-	-	-	-	1	3	3	
CO5	3	2	2	2	-	-	-	-	-	-	-	1	2	3	



COURSE OBJECTIVES

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

PRE - REQUISITE: Data Base Management System

UNIT I DATA WAREHOUSING

Data warehousing components - Building a data warehouse - Mapping the data warehouse to a multiprocessor Architecture - DBMS schemas for decision support - Data extraction - Cleanup and transformation tools - Metadata.

UNIT II BUSINESS ANALYSIS

Reporting and query tools and applications - Tool categories - The need for applications - Cognos impromptu - Online Analytical Processing - Need - Multidimensional data model - OLAP guidelines - Multidimensional versus multi relational OLAP - Categorization of OLAP tools - OLAP tools and the Internet.

UNIT III DATA MINING

Introduction - Data - Types of data - Data mining functionalities - Interestingness of patterns - Classification of data Mining systems - Data mining task primitives - Integration of a data mining system with a data warehouse - Data Preprocessing - Cleaning - Integration - Transformation - Reduction - Discretization - Concept Hierarchy Generation.

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION

Mining frequent patterns - Associations and correlations - Mining methods - Mining various kinds of association Rules - Correlation analysis - Constraint based association mining - Classification and prediction - Basic concepts - Decision tree Induction - Bayesian classification - Rule - based classification - Classification by back Propagation - Support vector machines - Associative classification - Lazy learners - Other classification methods -Prediction.

UNIT V CLUSTERING, TRENDS IN DATA MINING AND APPLICATIONS

Cluster analysis - types of data - Categorization of major clustering methods - K - means - Partitioning methods - Hierarchical methods - Density - based methods - Grid - based methods - Model - based clustering methods - Clustering high - dimensional data - Constraint - Based cluster analysis - Outlier analysis - Data mining Applications.

TOTAL PERIODS 45

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COURSE OUTCOMES

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

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

TEXT BOOKS

- Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw Hill, 2007.
- 2. Jiawei Han and Miche line Kamber, "Data Mining Concepts and Techniques", 2nd Edition, Elsevier, 2011.

REFERENCES

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

- 1. http://www.tutorialspoint.com/data_mining/dm_applications_trends.htm
- 2. http://home.deib.polimi.it/matteucc/Clustering/tutorial_html/
- 3. http://www.youtube.com/watch?v=zqKFH7WNmf



	Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1- Weak														
COs		Programme Outcomes POs Specific Outcomes PSOs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2													
	PO1	D1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02													
CO1	3	3	2	2	-	-	-	-	-	-	-	1	2	2	
CO2	3	3	3	3	-	-	-	-	-	-	-	2	2	3	
CO3	3	3	2	3	-	-	-	-	-	-	-	1	3	3	
CO4	3	3 2 3 2 1 2 3													
CO5	2	2	2	2	-	-	-	-	-	-	-	1	2	3	

COURSE OBJECTIVES

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

PRE - REQUISITE: Nil

UNIT I INTRODUCTION

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

UNIT II VIRTUALIZATION

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

UNIT III CLOUD INFRASTRUCTURE

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

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

UNIT V SECURITY IN THE CLOUD

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

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COURSE OUTCOMES

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

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

TEXT BOOKS

- 1. Rajkumar Buyya, Christian Vecchiola, S. Tamarai Selvi, "Mastering Cloud Computing", TMGH, 2013.
- 2. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.

REFERENCES

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

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



COURSE OBJECTIVES

- To gain the knowledge MySQL open source database.
- To be familiar with Server side programming language like PHP.
- To implement and design the advanced PHP Concept.
- To exposing the students to the concepts of R programming.

LIST OF EXPERIMENTS:

- 1. Developing Dynamic Internet Applications using PHP.
- 2. Client Side Scripting and Server Side Scripting using PHP.
- 3. PHP"'s Database APIs.
- 4. Simple SQL Queries via PHP.
- 5. Retrieving Data from Forms using PHP.
- 6. Using HTTP & FTP Protocols to Pass Data using PHP.
- 7. You want to use PHP to protect parts of your web site with passwords. Instead of storing the passwords in an external file and letting the web server handle the authentication, write the PHP program for password verification logic.
- 8. When users sign up for your web site, it's helpful to know that they ve provided you with a correct email address. To validate the email address they provide, send an email to the address they supply when they sign up. If they don't visit a special URL included in the email after a few days, deactivate their account.
 - a. Create & Manage Database and tables in MySQL Connecting to and Disconnecting from the Server.
 - b. Entering Queries.
 - c. Creating and Using a Database.
 - d. Creating and Selecting a Database.
 - e. Creating a Table.
 - f. Loading Data into a Table.
 - g. Retrieving Information from a Table.
 - h. Getting Information about Databases and Tables.
- 9. Write an R program to implement the simple calculator using functions.
- 10. Write an R program to implement the Data frames.
- 11. Write an R program to implement the vectors and matrices.
- 12. Write an R program to implement the list.

COURSE OUTCOMES

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

- demonstrate the working with MYSQL.
- implement the simple application in PHP.
- ability to create strong application in PHP.
- develop a simple problem solving application in R programming.

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



MINI PROJECT

COURSE OUTCOMES

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

- Formulate a real world problem, identify the requirement and develop the design solutions.
- Identify technical ideas, strategies and methodologies.
- Utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
- Test and validate through conformance of the developed prototype and analysis the cost effectiveness.

GUIDELINES

- 1. The students are expected to get formed into a team of convenient groups of not more than 3 members on a project.
- 2. Every project team shall have a guide who is the member of the faculty of the institution. Identification of student group and their faculty guide has to be completed within the first two weeks from the day of beginning of 7th semester.
- 3. The group has to identify and select the problem to be addressed as their project work; make through literature survey and finalize a comprehensive aim and scope of their work to be done.
- 4. A project report has to be submitted by each student group for their project work.
- 5. Three reviews have to be conducted by a team of faculty (minimum of 3 and maximum of 5) along with their faculty guide as a member of faculty team (for monitoring the progress of project planning and implementation).

COURSE OUTCOMES

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

- formulate a real world problem, identify the requirement and develop the design solutions.
- identify technical ideas, strategies and methodologies.
- utilize the new tools, algorithms, techniques that contribute to obtain the solution of the project.
- test and validate through conformance of the developed prototype and analysis the cost effectiveness.

TOTAL PERIODS 60

	Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1- Weak													
COs	Programme Programme Specific Outcomes PSOs PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2													
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS01												
CO1	3	3	2	2	-	-	-	-	-	-	-	2	2	3
CO2	3	2	2	3	-	-	-	-	-	-	-	1	2	3
CO3	3	3 2 2 3 1 3 3												
CO4	3	2 3 2 1 2 2												



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COURSE OBJECTIVES

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

PRE - REQUISITE: Software Engineering

UNIT I INTRODUCTION TO PROJECT PLANNING AND EVALUATION

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

UNIT II SOFTWARE EFFORT ESTIMATION AND ACTIVITY PLANNING

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

UNIT IIIRISK MANAGEMENT AND RESOURCE ALLOCATION

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

UNIT IV MONITORING AND CONTROLING OF PROJECTS AND ITS QUALITY

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

UNIT V MANAGING PEOPLE AND CONTRACTS

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

TOTAL PERIODS 45

COURSE OUTCOMES

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

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

TEXT BOOKS

- 1. Bob Hughes, Mikecotterell, "software project management", Fifth edition, TataMcgrawHill, 2004.
- 2. Wattshumphrey, "Managing the Software Process", PearsoneducationInc.2006.

REFERENCES

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

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



PROFESSIONAL ETHICS AND HUMAN VALUES

COURSE OBJECTIVES

- To understand the basic human values for a professional.
- To discuss the significance of ethics in engineering and the theories related to it. .
- To familiarize oneself with the role of engineer as responsible experimenters. •
- To expose the students to their roles and responsibilities in assessing safety and reducing risks. .
- To describe the global issues in ethics and role of engineers as manager and consultants.

PRE - REOUISITE: Nil

UNIT I **HUMAN VALUES**

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

UNIT II **ENGINEERING ETHICS**

Senses of 'Engineering Ethics' - Variety of Moral issued - Types of inquiry - Moral dilemmas - Moral Autonomy - Kohlberg's theory - Gilligan's theory - Consensus and Controversy - Models of Professional Roles - Theories about Right action -Self - interest - Customs and Religion - Uses of Ethical Theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION

- Engineers as Responsible Experimenters - Codes of Ethics Engineering as Experimentation - A Balanced Outlook on Law - the challenger case study.

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and Risk - Assessment of Safety and Risk - Risk Benefit Analysis and Reducing Risk - the Three Mile Island and Chernobyl case studies. Collegiality and loyalty - Respect for Authority - Collective Bargaining -Confidentiality - Conflicts of Interest - Occupational Crime - Professional Rights - Employee Rights -Intellectual Property Rights (IPR) - Discrimination.

UNIT V **GLOBAL ISSUES**

Multinational Corporations - Environmental Ethics - Computer Ethics - Weapons Development - Engineers as Managers - Consulting Engineers - Engineers as Expert Witnesses and Advisors - Moral Leadership

sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- Describe the basic human values for a professional. •
- Understand the significance of ethics in engineering and the theories related to it. .
- Be familiar with the role of engineer as responsible experimenters.
- Acquire knowledge about their roles and responsibilities in assessing safety and reducing risks. •
- Discuss the global issues in ethics and role of engineers as manager and consultants. .

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

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- 1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, (1999).
- 2. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, (2003).
- 3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, (2001).
- 4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, "Business Ethics An Indian Perspective", Biztantra, New Delhi, (2004).
- 5. David Ermann and Michele S Shauf, "Computers, Ethics and Society", Oxford University Press, (2003).

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- 2. http://smallbusiness.chron.com/professional ethical behavior workplace 10026.html.
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CO5	3	3	2	2	-	-	-	-	-	-	-	1	2	3



PROJECT WORK

COURSE OUTCOMES

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

- Prepare a literature survey in a specific domain as a team / individual to motivate lifelong learning.
- Identify the problem by applying acquired knowledge.
- Choose efficient tools for designing project modules.
- Design engineering solutions to complex problems utilizing a systems approach and combine all the modules for efficient testing.

GUIDELINES

- 1. The students are expected to get formed into a team of convenient groups of not more than 3 memberson a project.
- 2. Every project team shall have a guide who is the member of the faculty of the institution. Identification of student group and their faculty guide has to be completed within the first two weeks from the day of beginning of 7th semester
- 3. The group has to identify and select the problem to be addressed as their project work. Make through literature survey and finalize a comprehensive aim and scope of their work to be done.
- 4. A project report has to be submitted by each student group for their project work.
- 5. Three reviews have to be conducted by a team of faculty (minimum of 3 and maximum of 5) along with their faculty guide as a member of faculty team (for monitoring the progress of project planning and implementation).

COURSE OUTCOMES

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

- Prepare a literature survey in a specific domain as a team / individual to motivate lifelong learning.
- Identify the problem by applying acquired knowledge
- Choose efficient tools for designing project modules
- Design engineering solutions to complex problems utilizing a systems approach and combine all the modules for efficient testing. □ Demonstrate the knowledge, skills and attitudes of a professional engineer.

TOTAL PERIODS 180

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SEMANTIC WEB

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COURSE OBJECTIVES

- To understand the introduction of the Semantic Web.
- To identify the languages of the Semantic Web and ontologies.
- To illustrate the algorithms of the Semantic Web.
- To understand certain tools of the Semantic Web technologies.
- To sketch the overall applications of the Semantic Web.

PRE - REQUISITE: Nil

UNIT I INTRODUCTION

Fundamentals: Defining the Semantic Web
Semantic Web Roadblocks Components
Types
Major
Programming Components – Impacts
Establishing a Web Data
Centric Perspective
Expressing Semantic Data
Avoiding the Road blocks – Myths and Hype
Ontological Commitments
Categories
Philosophical Background
Knowledge Representation Ontologies
Top Level
Linguistic
Domain
Semantic Web
Need
Foundation
Layers
Architecture.

UNIT II LANGUAGES FOR SEMANTIC WEB AND ONTOLOGIES

Web Documents in XML - RDF - Schema - Web Resource Description using RDF - RDF Properties – Topic - Maps and RDF – Overview - Syntax Structure – Semantics - Pragmatics Traditional Ontology Languages LOOM

- OKBC - OCML - Flogic Ontology Markup Languages - SHOE - OIL - DAML OIL - OWL.

UNIT III ONTOLOGY LEARNING FOR SEMANTIC WEB

Taxonomy for Ontology Learning - Layered Approach - Phases of Ontology Learning - Importing and -Processing Ontologies and Documents Ontology Learning Algorithms - Evaluation ontological and non ontological resources.

UNIT IV ONTOLOGY MANAGEMENT AND TOOLS

Overview - Need for management - development process - target ontology - ontology mapping - skills Management system - ontological class - constraints - issues. Evolution - Development of Tools and Tool Suites - OntologyMerge Tools - Ontology based Annotation Tools.

UNIT V APPLICATIONS

WSMO - OWL - S Web Services - Semantic Web Services - Case Study for specific domain Security issues - Current Trends.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand the basics of semantics web and XML.
- know the significance of RDF.
- construct an ontology for semantic web.

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- identify the ontology management and tools.
- explain the applications of semantic web technologies.

- 1. Allemang, D., &Hendler, J. (2011). Semantic Web for the working oncologist. 2nd Edition, Morgan & Kaufmann Publisher.
- 2. Asuncion Gomez Perez, OscarCorcho, Mariano Fernandez Lopez, "Ontological Engineering: with examples from the areas of Knowledge Management, e-Commerce and the Semantic Web" Springer, 2004.

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- 1. Heath, T., & Bizer, C. (2011). Linked Data: Evolving the Web into a Global Data Space. Morgan& Claypool Publisher.
- 2. Daconts, M.C., Orbst, L.J., & Smith, K.T.(2003). The Semantic Web: A Guide to the Future of XML, Web Services and Knowledge Management. New York: Wiley. [ISBN: 0 471 43257 1].
- 3. Alexander Maedche, "Ontology Learning for the Semantic Web", Springer; First edition, 2002.
- John Davies, Dieter Fensel, Frank Van Harmelen, "Towards the Semantic Web: Ontology Driven Knowledge Management", John Wiley & Sons Ltd., 2003.
- 5. Dieter Fensel (Editor), Wolfgang Wahlster, Henry Lieberman, James Hendler, "Spinning the Semantic Web: Bringing the World Wide Web to Its Full Potential", the MIT Press, 2002.

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- 2. www.semantic web journal.net
- 3. www.cambridgesemantics.com

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WIRELESS SENSOR NETWORKS

COURSE OBJECTIVES

- To impart the fundamentals of WSN and its advantages.
- To learn about the MAC Layer and Routing Process.
- To know about the Routing Protocols.
- To get an idea about the Sensor Network databases.
- To gain knowledge about applications of Wireless Sensor Networks.

PRE - REQUISITE: Computer Networks

UNIT I INTRODUCTION TO WIRELESS SENSOR NETWORKS

Over view of sensor networks - Constraints and challenges- Advantages of Sensor networks - Applications.Collaborative processing - Key definitions in sensor networks- Tracking scenario -Problem formulationDistributed representation and interference of states-Tracking multiple Objects- Sensor ModelsPerformance Comparison and metrics.

UNIT II MAC LAYER

Medium Access Control Protocols: Fundamentals of MAC protocols - Low duty cycle protocols and wakeup concepts - Contention - based protocols - Schedule - based protocols - SMAC - BMAC - Traffic - adaptive medium access protocol (TRAMA) - The IEEE 802.15.4 MAC protocol and Zig Bee - General Issues

- Geographic, Energy - Aware Routing - Attribute Based Routing.

UNIT III ROUTING PROTOCOLS

Routing Challenges and Design Issues in Wireless Sensor Networks, Flooding and - Gossiping - Data centric Routing
SPIN - Directed Diffusion - Energy aware routing - Gradient - based routing - Rumor Routing - COUGAR
ACQUIRE - Hierarchical Routing - LEACH - PEGASIS - Location Based Routing GF - GAF - GEAR - GPSR - Real Time routing Protocols - TEEN - APTEEN - SPEED - RAP.

UNIT IV SENSOR NETWORK DATABASE AND TOOLS

Sensor Database Challenges - Querying the Physical Environment - Interfaces - IN- network Node level Aggregation
Data Centric Storage - Data indices and Range Queries - Distributed Hierarchical Aggregation - Temporal data - Sensor Node Hardware - Sensor Network Programming Challenges - Software Platforms - Operating System TinyOS
Node Level Simulators - State Centric Programming - Applications and Future Directions.

UNIT V APPLICATTIONS OF WSN

WSN Applications - Home Control - Building Automation - Industrial Automation - MedicalApplications
 Reconfigurable Sensor Networks - Highway Monitoring - Military Applications - Civil and Environmental
 Engineering Applications - Wildfire Instrumentation - Habitat Monitoring - Nano scopic Sensor.

TOTAL PERIODS 45

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COURSE OUTCOMES

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

- understand the concepts of wireless sensor networks.
- identify the MAC layer functions.
- analyses the mechanisms of routing protocols.
- design the network database and their tools.
- apply the concepts of wireless sensor networks in real-time applications.

TEXT BOOKS

- 1. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks An Information process Approach
- 2. KazemSohraby, Daniel Minoli and TaiebZnati, "Wireless Sensor Networks Technology, Protocols, and Applications", John Wiley & Sons, 2007.

REFERENCES

- Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, Ltd, 2005.
- 2. WaltenegusDargie, Christian Poellabauer "Fundamentals of Wireless Sensor Networks: Theory and Practice", Wiley, 2010.
- 3. Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.
- 4. Yan Zhang; Laurence T. Yang ., "RFID and Sensor Networks: Architectures, Protocols, Security, and
- 5. Integrations", CRC Press, Francis Xavier University, Antigonish NS, Canada, 2009.

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ADVANCED COMPUTER ARCHITECTURE

COURSE OBJECTIVES

- To introduce the concept of Instruction level parallelism.
- To understand the basic concept of thread level parallelism under shared memory architectures.
- To gain knowledge about VLIW and EPIC.
- To provide a thorough understanding about various memory technologies.
- To know about the various multi core architecture.

PRE - REQUISITE: Computer Architecture

UNIT I INSTRUCTION LEVEL PARALLELISM

ILP - concepts and challenges - Pipelining overview - Compiler Techniques for Exposing ILP - Dynamic
 Branch Prediction - Dynamic Scheduling - Multiple instruction Issue - Hardware Based Speculation Static scheduling - Multi - threading - Limitations of ILP.

UNIT II THREAD LEVEL PARALLELISM

Introduction; Symmetric shared - memory architectures; Performance of symmetric shared - memory multiprocessors Distributed shared memory and directory - based coherence - Basics of synchronization - Models of Memory Consistency.

UNIT III HARDWARE AND SOFTWARE FOR VLIW AND EPIC

Introduction: VLIW and EPIC - Detecting and Enhancing Loop - Level Parallelism - Scheduling and Structuring Code for Parallelism - Hardware Support for Exposing Parallelism - Predicated Instructions - Hardware Support for Compiler Speculation - The Intel IA - 64 Architecture and Itanium Processor.

UNIT IV MEMORY AND I/O

Introduction - Cache performance - Cache Optimizations - Virtual memory - Advanced optimizations of Cache performance - Memory technology and optimizations - Protection: Virtual memory and virtual machines. Types of storage devices - Buses - RAID - Reliability - availability and dependability - I/O performance measures - Designing an I/O system.

UNIT V MULTICORE ARCHITECTURES

Software and Hardware multithreading - SMT and CMP architectures - Design issues - Case studies - Intel Multi - core architecture - SUN CMP architecture - heterogeneous multi - core processors - case study: IBM Cell Processor.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- analyze the performance of different ILP Techniques.
- evaluate the performance of different parallelism with respect to various parameters.
- understand the concept of parallelism.
- identify cache and memory related issues in multi processors.
- know different types of multi core architectures.

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1. John L Hennessey and David A Patterson, "Computer Architecture A Quantitative Approach", Morgan Kaufmann/ Elsevier, Fifth Edition, 2012.

REFERENCES

- 1. Kai Hwang and Zhi.WeiXu, "Scalable Parallel Computing", Tata McGraw Hill, New Delhi, 2003.
- 2. Sima D, Fountain T and Kacsuk P,"Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 2000.
- 3. Kai Hwang and Faye Briggs, "Computer Architecture and Parallel Processing", McGraw Hill International Edition, 2000.

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INTERNET OF THINGS

COURSE OBJECTIVES

- To understand the overview of Internet of Things with various design levels and templates.
- To describe the generic design methodology for internet of things with python programming.
- To describe the characteristics and applications of domain specific IoTs for real life scenarios.
- To provide an introduction to raspberry pi device and use of cloud platforms and frameworks for developing IoT applications.
- To describe the approaches for collecting and analyzing data generated by IoT systems in the cloud.

PRE - REQUISITE: Wireless Sensor Networks

UNIT I **INTRODUCTION TO IoT**

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

UNIT II **DEVELOPING INTERNET OF THINGS**

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

UNIT III **DOMAIN SPECIFIC IoTs**

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

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

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

UNIT V DATA ANALYTICS FOR IoT

Introduction - Apache Hadoop - Using Hadoop Map Reduce for Batch Data Analysis - Apache Oozie - Apache Spark - Apache Storm - Using Apache Storm for Real - time Data Analysis - Case Study on weather monitoring. **TOTAL PERIODS 45**

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COURSE OUTCOMES

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

- understand the basic concepts and technologies used in Internet of Things.
- Apply the generic design methodology for internet of things with python programming to design the model.
- Obtain the knowledge of the different types of domain specific IoTs for real life applications.
- Gain the knowledge of Raspberry Pi device and its use in cloud platforms and other frameworks for developing IoT applications.
- Understand the processes of collecting and analyzing data generated by IoT systems in the cloud.

REFERENCES

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

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ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING BA15351 3 0 0 3

COURSE OBJECTIVES

- To know the fundamentals of Managerial Economics. •
- To be familiar with Demand and Supply analysis. •
- To understand the Production and cost analysis. •

- To describe the various financial accounting techniques. •
- To understand the significance of Capital Budgeting. •

PRE - REQUISITE: Nil

UNIT I	INTRODUCTION 9
Managerial Ec	conomics - Relationship with other disciplines - Firms: Types - objectives and goals -
Managerial D	ecisions - Decision analysis.
UNIT II	DEMAND AND SUPPLY ANALYSIS 9
Demand -	Types of demand - Determinants of demand - Demand function - Demand elasticity -
Demand Fore	casting - Supply - Determinants of supply - Supply function.
UNIT III	PRODUCTION AND COST ANALYSIS 9
Production fur	nction - Returns to scale - Production optimization - Least cost input - Isoquant -
Managerial us	ses of production function. Cost Concepts - Cost function - Determinants of cost - Short run
and Long run	cost curves - Cost Output Decision - Estimation of Cost.
UNIT IV	FINANCIAL ACCOUNTING 9
Final Account	ts - Trading Accounts - Profit and Loss Accounts - Balance sheet - Cash flow analysis -
Funds flow an	alysis.
UNIT V	CAPITAL BUDGETING9
Investments	- Risks and return evaluation of investment decision - Average rate of return – Payback Period -
Net Present V	alue - Internal rate of return.
	TOTAL PERIODS 45

COURSE OUTCOMES

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

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

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- 1. Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.
- 2. G S Gupta, Samuel Paul, V. L. Mote, "Managerial Economics Concepts and Cases" McGraw Hill Education, New Delhi, 2004.
- 3. Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill PublishingLtd., 4th edition, 2005.

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ADVANCED DATABASE TECHNOLOGY

COURSE OBJECTIVES

- To familiarize the basic data base concepts, data models and to conceptualize a database system using ER diagrams.
- To know the concepts of parallel and distributed databases.
- To familiarize the object oriented concepts in databases.
- To learn the active database concepts to enhance the data models.
- To learn the emerging technologies related to the advanced database system.

PRE - REQUISITE: Database Management System

UNIT 1 DATABASE SYSTEM CONCEPTS

Database System Architecture - Data Model - Relational Model - Entity Relationship Model - Normalization - QueryProcessing - Query Optimization - Transaction Processing - Concurrency Control - Recovery - Database Tuning.UNIT IIPARALLEL AND DISTRIBUTED DATABASES9

Parallel Databases: I/O parallelism - Inter and Intra query parallelism - Inter and Intra Issues - operation parallelism
 Distributed Databases: Introduction to Distributed Database Systems
 Distributed Database

System Architecture - Top - Down Approach - Distributed Database Design Fragmentation - Allocation - Database Integration - Bottom - up approach - Schema Matching - Schema Integration - Schema Mapping.

UNIT III OBJECT AND OBJECT RELATIONAL DATABASES

Concepts for object databases: Object identity - Object structure - Type constructors - - OQL - Encapsulation of operations - Methods - Persistence - Type and class hierarchies - Inheritance Complex objects - Object database standards - languages and design: ODMG model - ODL - Object relational and extended - Relational systems: Object relational features in SQL / Oracle.

UNIT IV ENHANCED DATA MODELS

Active database concepts and triggers - Temporal databases-Spatial databases - Multimedia databases -Deductive databases - XML databases: XML data model-DTD - XML schema - XML querying -Geographic information systems.--

UNIT V EMERGING TECHNOLOGIES

Mobile Databases: Location and handoff management -Effect of mobility on data management -Locationdependent data distribution -Mobile transaction models -Concurrency control -Transaction commitprotocols - Information retrieval-Web databases.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand the basic database system concepts.
- design parallel and distributed databases for application development.

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- apply the object oriented concepts in databases.
- design Active database concepts for enhancing the data models and for managing the Geographic information systems.
- apply the Emerging Technologies in Mobile and Web databases.

- Thomas Connolly and Carlolyn Begg, "Database Systems, A Practical Approach to Design, Implementation
- 2. M T Ozsu, Patrick Valduriez, Principles of Distributed Database Systems, Prentice Hall, 1999.

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- 1. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Fifth Edition, Pearson Education, 2006.
- 2. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fifth Edition, Tata McGraw Hill, 2006.
- 3. C.S.R.Prabhu, "Object oriented data base system approaches and architectures" PHI, India, 2004.
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- 5. Rob cornell "Data Base System And Implementation" cengage learning 2011.

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AD-HOC NETWORKS

COURSE OBJECTIVES

- To understand the fundamental and design issues in ad hoc.
- To learn the different types of MAC protocols.
- To be familiar with different types of ad hoc routing protocols.
- To be exposing to the Multicast Routing and Transport Layer issues in ad hoc networks.
- To be familiar with Security Protocols and QOS in Ad Hoc Wireless Networks

PRE - REQUISITE: Computer Networks

UNIT I INTRODUCTION

Fundamentals of Wireless Communication Technology - The Electromagnetic Spectrum - Radio propagation Mechanisms - Characteristics of the Wireless Channel - Fundamentals of WLANs - Mobile ad hoc networks (MANETs) - ad hoc wireless network - Applications of ad hoc wireless networks - Issues in ad hoc wireless networks.

UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS

Issues in designing a MAC Protocol for ad hoc wireless networks - Classification of MAC Protocols Contention based protocols - Contention based protocols with Reservation Mechanisms - Contention based MAC protocols with Scheduling Mechanisms - Multi channel MAC - IEEE 802.11.

UNIT III ROUTING PROTOCOLS FOR AD HOC WIRELESS NETWORKS

Issues in designing a routing protocol for Ad hoc wireless networks -Classifications of Routing Protocols -Table Driven Routing Protocols-On Demand Routing Protocols -Hybrid Routing Protocols -RoutingProtocols with Efficient Flooding Mechanisms - Hierarchical Routing Protocols.-NoNoNo

UNIT IV MULTICAST ROUTING ,TRANSPORT LAYER IN AD HOC WIRELESS NETWORKS

Issues in Designing a Multicast Routing Protocol - Classification of Multicast Routing Protocols - Application Dependent Multicast Routing - Issues & Design Goals of a Transport Layer - Protocol for Ad Hoc Wireless Networks - Classification of Transport Layer Solutions.

UNIT V SECURITY PROTOCOLS AND QOS IN AD HOC WIRELESS NETWORKS

Security in Ad Hoc Wireless Networks - Issues and Challenges in Security Provisioning - Attacks - Key Management -Secure Routing in Ad Hoc Wireless Networks - Issues and Challenges of QOS -Classifications of QOS - MAC & Network Layer Solutions - QOS Frameworks.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- explain the concepts, network architectures and applications of ad hoc Networks.
- analyze the protocol design issues of ad hoc Wireless Networks.
- design routing protocols for ad hoc wireless networks with respect to some protocol design issues.
- explain the Multicast Routing and Transport Layer Solutions.

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• evaluate the QoS related performance measurements of ad hoc wireless networks.

TEXT BOOKS

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REFERENCES

- 1. Charles .E. Perkins, "AdHocNetworking", Pearson Education, 2008.
- 2. C.K.Toh, "Ad Hoc Mobile Wireless Networks Protocols and Systems", Pearson Education, 2007.
- 3. Marco Conti, Jon Crowcroft, Andrea Passarella,"MultihopAdHoc Networks from Theory to Reality" Nova Science Publishers, Inc, NewYork, 2007.

- 1. http://www.cs.jhu.edu/~cs647/intro_adhoc.pdf
- 2. http://www.ericsson.com/ericsson/corpinfo/publications/review/2000_04/files/2000046.pdf
- 3. http://textofvideo.nptel.iitm.ac.in/117102062/lec2.pdf.

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GRAPH THEORY AND APPLICATIONS

COURSE OBJECTIVES

- To understand the basic concepts of graph and tree.
- To gain knowledge in concept of network flow, spanning tree and planar graph.
- To gain knowledge in colorings the graph and understand the directed graph.
- To implement the arrangement and grouping concepts mathematically.
- To gain knowledge of generating functions.

PRE - REQUISITE: Data Structure, Discrete Mathematics

UNIT I INTRODUCTION

Graphs - Introduction - Isomorphism - Sub graphs - Walks- Paths - Circuits - Connectedness -Components - Euler graphs - Hamiltonian paths and circuits -Trees - Properties of trees - Distanceand centers in tree - Rooted and binary trees.Trees - Properties of trees - Distance

UNIT II TREES, CONNECTIVITY AND PLANARITY

Spanning trees - Fundamental circuits - Spanning trees in a weighted graph - cut sets - Properties of cut set

- All cut sets - Fundamental circuits and cut sets - Connectivity and separability - Network flows - 1

- Isomorphism - 2 - Isomorphism - Combinational and geometric graphs - Planer graphs - representation of a planer graph.

UNIT III MATRICES, COLOURING AND DIRECTED GRAPH

Chromatic number - Chromatic partitioning - Chromatic polynomial - Matching - Covering - Four color problem
Directed graphs - Types of directed graphs - Digraphs and binary relations
Directed paths and connectedness - Euler graphs.

UNIT IV PERMUTATIONS AND COMBINATION

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

UNIT V GENERATING FUNCTIONS

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

TOTAL PERIODS 45

COURSE OUTCOMES

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

- learn the basic concepts of graph and tree.
- understand and able to design the spanning tree, network flow and planar graph.
- able to design and implement the graph coloring.
- implement the permutations & combination concepts.
- implement and design the generating function.

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

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- 1. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
- 2. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians", Prentice Hall of India, 1996.
- 3. Liu C.L., "Elements of Discrete Mathematics", McGraw Hill, 1985.

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- 3. https://www.jstor.org/stable/24344961

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COURSE OBJECTIVES

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

PRE - REQUISITE: Graphics and Multimedia

UNIT I INTRODUCTION

Human - Computer Interface - Characteristics of Graphics Interface - Direct Manipulation Graphical System Web User Interface - Popularity - Characteristic & Principles.

UNIT II HUMAN COMPUTER INTERACTION

User Interface Design Process - Obstacles - Usability - Human Characteristics In Design - Human Interaction Speed

- Business Functions - Requirement Analysis - Direct - Indirect Methods - Basic Business Functions

- Design Standards - System Timings - Human Consideration In Screen Design - Structures Of Menus - Functions Of Menus - Contents Of Menu - Formatting - Phrasing The Menu - Selecting Menu Choice - Navigating Menus -Graphical Menus.

UNIT III WINDOWS

Characteristics - Components - Presentation Styles - Types - Management - Organizations - Operations - Web Systems - Device - Based Controls Characteristics - Screen - Based Controls - Operate Control - Text Boxes - Selection Control - Custom Control - Custom Control - Presentation Control.

UNIT IV MULTIMEDIA

Text For Web Pages - Effective Feedback - Guidance & Assistance – Internationalization - Accessibility - Icons - Image - Multimedia - Coloring.

UNIT V WINDOWS LAYOUT - TEST

Prototypes - Kinds of Tests - Retest - Information Search - Visualization - Hypermedia - WWW - Software Tools. TOTAL PERIODS 45

COURSE OUTCOMES

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

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

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

REFERENCES

- 1. Ben Sheiderman, "Design The User Interface", Pearson Education, 2016.
- 2. Alan Cooper, "The Essential Of User Interface Design", Wiley Dream Tech Ltd., 2002.

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DISTRIBUTED SYSTEMS

3003

COURSE OBJECTIVES

- To study the communication in the distributed environment.
- To learn few operating system concepts in distributed level.
- To gain the knowledge of scheduling and file systems
- To learn the fault tolerance in distributed systems
- To learn about Distributed Object and Coordination Based Systems

PRE - REQUISITE: Operating system, Computer Networks

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT 9

Introduction - Various Paradigms in Distributed Applications - Remote Procedure Call - Remote Object Invocation Message - Oriented Communication - Unicasting, Multicasting and Broadcasting - Group Communication.

UNIT II DISTRIBUTED OPERATING SYSTEMS 9 Issues in Distributed Operating System Threads in Distributed Systems Clock Exclusion Synchronization Causal Ordering Global States Election Algorithms Distributed Mutual Distributed Transactions Distributed Deadlock Agreement Protocols.

UNIT IIIDISTRIBUTED RESOURCE MANAGEMENT9Distributed Shared Memory- Data- Centric Consistency Models- Client- Centric Consistency-Models – Ivy Munin- Distributed Scheduling- Distributed File Systems- Sun NFS.-UNIT IVFAULT TOLERANCE9

Introduction to Fault Tolerance - Distributed Commit Protocols - Byzantine Fault Tolerance - Impossibilities in Fault Tolerance.

UNIT VDISTRIBUTED OBJECT AND COORDINATION - BASED SYSTEMS9Introduction to Distributed Object- Based Systems- CORBA- DCOM- Globe -Distributed

Coordination based System - JINI.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand the communication in distributed system.
- correlate the OS concepts with distributed system.
- understand the shared memory and scheduling.
- analyze the fault tolerance in distributed system.
- analyze and apply the distributed object systems.

- George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and design", Third Edition, Pear Education Asia, 2002.
- 2. HagitAttiya and Jennifer Welch, "Distributed Computing: Fundamentals, Simulation and advanced topics", Wiley, 2004.

REFERENCES

- Andrew S. Tannenbaum and Maarten Van Steen, "Distributed Systems: Principles and Paradigms", Second Edition, Pearson, 2007.
- 2. M.L.Liu, "Distributed Computing Principles and Applications", Pearson Addison Wesley, 2004.
- 3. George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair, "Distributed Systems: Concepts and Design", Fifth Edition, Addison Wesley, 2011.
- 4. A.S.Tanenbaum, M.Van Steen, "Distributed Systems", Pearson Education, 2004.
- MukeshSinghal, "Advanced Concepts In Operating Systems", McGraw Hill Series in Computer Science, 1994.

- 1. http://www.ejbtutorial.com/category/distributed systems.
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CO5	3	2	2	2	-	-	-	-	-	-	-	1	2	3



COURSE OBJECTIVES

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

PRE - REQUISITE: Software Engineering

UNIT I FUNDAMENTALS OF AGILE

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

UNIT II AGILE SCRUM FRAMEWORK

Introduction to Scrum - Project Phases - Agile Estimation - Planning Game - Product Backlog - Sprint Backlog - Iteration planning - User Story Definition - Characteristics and Content of User Stories - Acceptance Tests and Verifying Stories - Project Velocity - Burn down chart - Sprint Planning and Retrospective - Daily Scrum - Scrum Roles - Product Owner - Scrum Master - Scrum Team - Scrum Case Study - Tools for Agile Project Management.

UNIT III AGILE TESTING

The Agile Lifecycle and its Impact on Testing - Test - Driven Development (TDD) - xUnit framework and tools for TDD - Testing user stories - Acceptance Tests and Scenarios - Planning and Managing Testing Cycle - Exploratory Testing - Risk Based Testing - Regression Tests - Test Automation - Tools to Support the Agile Tester.

UNIT IV AGILE SOFTWARE DESIGN AND DEVELOPMENT

Agile Design Practices - Role of Design Principles including Single Responsibility Principle - Open Closed Principle - Liskov Substitution Principle - Interface Segregation Principles - Dependency Inversion Principle in Agile Design - Need and Significance of Refactoring - Refactoring Techniques - Continuous Integration - Automated build Tools - Version control.

UNIT V INDUSTRY TRENDS

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

TOTAL PERIODS 45

COURSE OUTCOMES

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

• understand the background and driving forces for taking an Agile approach to software development.

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- understand the business value of adopting Agile approaches and Agile development practices.
- drive development with unit tests using test driven development.
- apply design principles and refactoring to achieve agility.
- deploy automated build tools, version control and continuous integration and perform testing activities within an agile project.

REFERENCES

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

- 1. www.it ebooks.info/tag/agile
- 2. http://martinfowler.com/agile.html

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SERVICE ORIENTED ARCHITECTURE

COURSE OBJECTIVES

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

PRE - REQUISITE: Internet and Java Programming

UNIT I BASICS OF SOA

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

II WEB SERVICES

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

UNIT III SERVICE DESIGN

Service oriented ana ysi - Business - centric SOA - Deriving business services - service modeling - Service Orien ed De ign - WSDL basics - SOAP basics - SOA composition guidelines - Entity - centric business service design - Application service design - Task - centric business service design.

UNIT IV SOA PLATFORM BASICS

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

UNIT V BUILDING SOA - BASED APPLICATIONS

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

TOTAL PERIODS 45

COURSE OUTCOMES

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

- understand the basics of SOA.
- understand the service layers of web services.
- understand and discuss service and design.
- understand the basic platforms of SOA.
- understand the applications of SOA.

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

REFERENCES

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

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- To understand the fundamentals of image processing. •
- To gain knowledge on various Image enhancement techniques. •
- To know the various Image restoration techniques. •
- To understand the needs of various Image compression techniques. •
- To gain knowledge about various Image segmentation, representation and description methods. •

PRE - REQUISITE: Digital electronics, Transforms and Partial Differential Equations

UNIT I **INTRODUCTION**

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

UNIT II **IMAGE ENHANCEMENT**

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

UNIT III **IMAGE RESTORATION**

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

UNIT IV **IMAGE COMPRESSION**

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

UNIT V IMAGE SEGMENTATION, REPRESENTATION AND DESCRIPTION

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

COURSE OUTCOMES

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

- Apply the digital image fundamentals for the digital image representation..
- apply image enhancement techniques and describe the underlying mathematical principles. •
- apply image restoration techniques.. •
- analyze the constraints in image processing when dealing with larger data sets and use image . compression techniques.

TOTAL PERIODS 45

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• describe and apply the concepts of feature detection and contour finding algorithms in the field of biomedical imaging to other engineering disciplines

TEXT BOOKS

- 1. Rafael C. Gonzalez, Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education, 2007.
- 2. Anil Jain K. "Fundamentals of Digital Image Processing", PHI Learning Pvt. Ltd., 2011.

REFERENCES

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

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



SOFT COMPUTING

COURSE OBJECTIVES

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

PRE - REOUISITE: Nil

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS UNIT I

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

UNIT II FEEDFORWARD NEURAL NETWORKS

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

UNIT III FEEDBACK NEURAL NETWORKS AND SELF ORGANIZING FEATURE MAP 9

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

- applications of self - organizing feature map.

UNIT IV FUZZY LOGIC

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

UNIT V **GENETIC ALGORITHMS**

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

TOTAL PERIODS

COURSE OUTCOMES

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

- describe the essentials of artificial neural network and soft computing. •
- describe supervised learning and its applications. •
- gain knowledge on feedback neural networks.

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- define fuzzy systems and use fuzzy logic.
- understand genetic algorithm concepts and Write Genetic Algorithm to solve the optimization problem.

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

REFERENCES

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

- 1. sourcecodesonline.blogspot.com/.../cs1018 soft computing syllabus.html
- 2. www2.cs.uh.edu/~ceick/6367/Soft Computing.pdf

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



BA15451

ENTREPRENEURSHIP DEVELOPMENT

COURSE OBJECTIVES

- To acquire the knowledge about competencies required for an entrepreneur. •
- To impart knowledge in motivation techniques in entrepreneurship. •
- To discuss the various factors that has to be considered while preparing a business plan. •
- To understand the various sources of finance and accounting for business. .
- To acquire the knowledge about supporting Entrepreneurs through entrepreneurship development. •

PRE - REQUISITE: Nil

UNIT I **ENTREPRENEURSHIP**

Entrepreneur - Types of Entrepreneurs -Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth - Factors Affecting Entrepreneurial Growth.

UNIT II MOTIVATION

Major Motives Influencing an Entrepreneur - Achievement Motivation Training - Self Rating, Business Games, Thematic Apperception Test - Stress Management - Entrepreneurship Development Programs -Need -Objectives.

UNIT III BUSINESS

- Definition - Classification - Characteristics - Ownership Structures Small Enterprises - Project Formulation - Steps involved in setting up a Business - identifying, selecting a Good Business opportunity -Market Survey and Research -Techno Economic Feasibility Assessment - Preparation of Preliminary Project Reports - Project Appraisal - Sources of Information - Classification of Needs and Agencies.

UNIT IV FINANCING AND ACCOUNTING

Sources of Finance - Term Loans -Need -Capital Structure - Financial Institution - Management of working Capital - Costing - Break Even Analysis - Taxation - Income Tax - Excise Duty - Sales Tax.

UNIT V SUPPORT TO ENTREPRENEURS

Sickness in small Business - Concept - Magnitude - Causes and Consequences - Corrective Measures _ Business Incubators - Government Policy for Small Scale Enterprises - Growth Strategies in small industry Expansion Diversification - Joint Venture - Merger and Sub - Contracting.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- acquire skills necessary to become an entrepreneur
- exhibit the skills required to manage small business •
- analyze and develop a business plan.. •
- identify the various factors to be considered for launching a small business. .
- comprehend the support rendered by government and other agencies in entrepreneurship development. •

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- Khanka. S.S., "Entrepreneurial Development" S.Chand& Co. Ltd., Ram Nagar, New Delhi, 2013.
- Donald F Kuratko, "Entreprenuership Theory, Process and Practice", 9th Edition, CengageLearning, 2014.

REFERENCES

- 1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw Hill, 2013.
- 2. Mathew J Manimala, "Enterprenuership theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005.
- 3. Rajeev Roy, "Entrepreneurship" 2nd Edition, Oxford University Press, 2011.
- 4. EDII "Faulty and External Experts A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad, 1986.

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



SOFTWARE TESTING

COURSE OBJECTIVES

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

PRE - REQUISITE: Software Engineering

UNIT I **INTRODUCTION**

Basic definitions - Software Testing Principles Testing as an Engineering Activity - Testing as a Process -

- The Tester"s Role in a Software Development Organization - Origins of Defects - Cost of defects - Defect Classes

- The Defect Repository and Test Design - Defect Examples - Developer/Tester Support of

Developing a Defect Repository.

TEST CASE DESIGN UNIT II

Test case Design Strategies - Using Black Box Approach to Test Case Design - Random Testing -Requirements based testing - Boundary Value Analysis - Equivalence Class Partitioning - State - based testing - Cause - effect graphing - Compatibility testing - user documentation testing - domain testing - Using White Box Approach to Test design - Test Adequacy Criteria - static testing vs. structural testing - code functional testing -Coverage and Control Flow Graphs - Covering Code Logic - Paths - code complexity testing.

LEVELS OF TESTING **UNIT III**

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

UNIT IV **TEST MANAGEMENT**

People and organizational issues in testing - organization structures for testing teams - testing services - Test Planning - Test Plan Components - Test Plan Attachments - Locating Test Items - test management

- test process Reporting Test Results The role of three groups in Test Planning and Policy Development
- Introducing the test specialist Skills needed by a test specialist Building a Testing Group.

UNIT V **TEST AUTOMATION**

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

TOTAL PERIODS 45

3003

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CS15651

COURSE OUTCOMES

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

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

TEXT BOOKS

- Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing Principles and Practices", Pearson education, 2006
- 2. AdityaP.Mathur, "Foundations of Software Testing", Pearson Education, 2008.

REFERENCES

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

- 1. http://nptel.ac.in/courses/106101061/18
- 2. http://nptel.ac.in/courses/106105150/

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



ROBOTICS

3003

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COURSE OBJECTIVES

- introduce the functional elements of Robotics
- impart knowledge on the direct and inverse kinematics
- introduce the manipulator differential motion and control
- educate on various path planning techniques
- establish the dynamics and control of manipulators

PRE - REQUISITE: Discrete Mathematics, Numerical Methods

UNIT I SCOPE OF ROBOTS

Introduction - The scope of industrial Robots - Definition of an industrial robot - Need for industrial robots - Usage - applications.

UNIT II ROBOT COMPONENTS WITH ROBOT MANIPULATOR

Fundamentals of Robot Technology - Automation and Robotics - Robot anatomy - Work volume - Precisionofmovement - End effectors - Sensors- Kinematics of serial robots - Direct and inversekinematics - Linear and angular velocity of links - Dynamics of serial and parallel manipulators.

UNIT III MODELING AND CONTROL OF FLEXIBLE ROBOTS AND ROBOT

PROGRAMMING

Models of flexible links and joints - Kinematic modeling of multi - link flexible robots - Dynamics and control of flexible link manipulators - Robot Programming - Methods - interlocks textual languages. Characteristics of Robot level languages, characteristic of task level languages.

UNIT IV PERMUTATIONS AND COMBINATION

Introduction- Robot Cell Design and Control- Remote Center Compilance- Safety in Robotics.UNIT VFUTURE TRENDS

Introduction to chaos- Non - linear dynamics and chaos in robot equations- Simulations of planar 2 DOFmanipulators- Analytical criterion for unforced motion- Gough - Stewart platform and its singularities -useofnear singularity for fine motion for sensing- design of Gough - Stewart platform based sensors.Advanced robotics - Advanced robotics in Space -Specific features of space robotics systems - long - termtechnical developments - Advanced robotics in under -- Water operations.- Future Applications.- Future Applications.

TOTAL PERIODS 45

COURSE OUTCOMES

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

- use matrix algebra and Lie algebra for computing the kinematics of robots.
- calculate the forward kinematics and inverse kinematics of serial and parallel robots.
- calculate the Jacobian for serial and parallel robot.
- do the path planning for a robotic system.
- proficient in the use of Maple or Matlab for the simulation of robots.

- 1. Barry Leatham Jones, "Elements of industrial Robotics" PITMAN Publishing, 1987.
- 2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.

REFERENCES

- 1. Clark J. and Holton D.A, "A First Look at Graph Theory", Allied Publishers, 1995.
- 2. Mott J.L., Kandel A. and Baker T.P. "Discrete Mathematics for Computer Scientists and Mathematicians",
- 3. Prentice Hall of India, 1996.
- 4. Liu C.L., "Elements of Discrete Mathematics", McGraw Hill, 1985.

- 1. http://www.mathworks.in/help/dsp/ref/matrixviewer.html
- 2. http://www.imatest.com/docs/colormatrix/
- 3. https://www.jstor.org/stable/24344961

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



MA15153

OPERATIONS RESEARCH

COURSE OBJECTIVES

- To provide the concept and an understanding of basic concepts in Operations Research.
- To understand develop and solve mathematical model of Transport and assignment problems.
- To understand the techniques of optimality.
- To develop an understanding and appreciation for the field of inventory and production management.
- To provide the student with a rigorous framework with which to model and analyze queuing systems.

PRE-REQUISITE : Nil

UNIT I LINEAR PROGRAMMING MODELS

Mathematical Formulation - Graphical Solution of linear programming models - Simplex method - Big M

- Method - Two phase method.

UNIT IITRANSPORTATION AND ASSIGNMENT MODELS

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

UNIT III DYNAMIC PROGRAMMING

Dynamic programming - Principle of optimality - Forward and backward recursion - Applications of dynamic programming - Problem of dimensionality.

UNIT IV INVENTORY MODELS AND NETWORKING MODELS

Inventory Models - EOQ and EBQ Models (With and without shortages), Quantity Discount Models - Networking Models - PERT & CPM.

UNIT V QUEUEING MODELS

Characteristics of Queuing Models - Poisson Queues - (M / M / 1): (FIFO / ∞ / ∞), (M / M / 1): (FIFO / N / ∞), (M / M / C): (FIFO / ∞ / ∞), (M / M / C): (FIFO / N / ∞) models.

TOTAL PERIODS 45

COURSE OUTCOMES

Upon the completion of the course, the student should 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 and Travelling.
- able to use optimization concepts in real world problems.
- logistics majors will be able to apply inventory models and techniques to create and recommend appropriate stocking solutions in various business settings.
- identify and analyze appropriate queuing model to reduce the waiting time in queue.

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- 1. R.Panneerselvam," Operations research", Second edition, Prentice hall USA 2007.
- Operations Research by Kanthiswarup, P.K. Gupta, Manmohan 9thRevised Edition 2001, Reprint 2002. Sultan Chand & Sons, New Delhi

REFERENCES

- 1. Taha H.A, "Operations Research: An Introduction ", 8th Edition, Pearson Education, 2008
- Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand& Company Ltd, New Delhi, Third Edition, 2008
- 3. John W. Chinneck, "Feasibility and Infeasibility in Optimization Algorithms and Computational Methods", Springer, 2008.
- Ravindran, Phillips, Solberg, "Operations Research: Principles and Practice", Second Edition, John Wiley & Sons, 2007.

- 1. https://www.youtube.com/watch?v=M8POtpPtQZc
- 2. https://www.youtube.com/watch?v= YBIR1UF UY
- 3. https://www.youtube.com/watch?v=ug7O1lSZyg0

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



CS15653	GRID COMPUTING	3	0	0	3
COURSE OB	JECTIVES				
• To kn	ow the basic concepts of Grid.				
• To un	derstand the infrastructure of Grid				
• To ac	quire the Knowledge of job management in grid.				
• To ex	pertise in Grid management				
• To lea PRE - REQU	rn the security and Resource management. ISITE: Nil				
UNIT I	INTRODUCTION				9
Introduction -	Evolution of grid Computing - Grid Architecture - Characteristics - Grid vs	. supe	r co	mpu	ıter
- Grid comput	ing organizations and their role - Pros and Cons of grid - Companies in the	ne gri	d To	day	-
Types of grid	- Benefits and challenges of grid computing.				
UNIT II	GRID INFRASTRUCTURE				9
Open grid serv	rices architecture(OGSA) - The Globus Toolkit 3(GT3) - OGSA - DAI - W	'SRF	- Se	ema	ntic
grid - Comput	ing - Grid Security infrastructure (GSI).				
UNIT III	SCHEDULING AND MANAGEMENT IN GRID				9
Grid schedulin Condor - Worl sharing facility	g and resource management - Sche uling paradigms - scheduling with (sing principles of Scheduling Sun G id Engine (SGE) - Portable batch System.	QoS -	Re PBS	viev), L	v of oad
UNIT IV	GRID MONITORING				9
Grid Monitoria	ng Architecture (GMA) - An Overview of Grid Monitoring Systems - G	rid IC	E N	etw	ork
Weather Servi	ce - R - GMA - Other Monitoring Systems - Ganglia and Grid Mon				
UNIT V	GRID SECURITY AND APPLICATION MANAGEMENT				9
Grid Security	- A Brief Security Primer - PKI - X509 Certificates - Grid Application Descrip	tion I	Lang	uage	- :
Application Pa	rtitioning - Meta - Scheduling - Mapping - Monitoring.				
	TOTAL	PER	JOE	DS	45

COURSE OUTCOMES

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

- define and explain the grid environment.
- demonstrate the access of grid for the service
- organize processes in a grid.
- define and explain the functionalities of Grid.
- explain the security and Application management in Grid.

TEXT BOOKS

1. Joshy Joseph and Craig Fellenstein, "Grid Computing", Pearson Education. 2004 IBM Press.

REFERENCES

- 1. Fran Berman, Geoffrey Fox, Anthony J.G. Hey, "Grid Computing: Making the Global Infrastructure a Reality", John Wiley and Sons, 2003. D Janaki Ram, "Grid Computing", TMH.
- 2. Ahmar Abbas, "Grid Computing: A Practical Guide to Technology and Applications", Charles River.

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	PO1	PO2	PO12	PSO1	PSO2									
CO1	3	3	2	2	3									
CO2	3	3	2	3	-	-	-	-	-	-	-	3	2	3
CO3	3	2	1	3	-	-	-	-	-	-	-	1	2	2
CO4	3	2	3	2	-	-	-	-	-	-	-	1	2	3
CO5	3	2	2	2	-	-	-	-	-	-	-	1	2	3



E-COMMERCE

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TOTAL PERIODS 45

COURSE OBJECTIVES

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

PRE - REQUISITE: Nil

UNIT I INTRODUCTION

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

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 - web protocol - 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 andDirectory registration - online advertisements - e-
shopping - online Money transaction.Portables and info mechanics - website design issues -

COURSE OUTCOMES

Upon the completion of the course, the student should 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 DebjaniNag, E Commerce the Cutting Edge of Business, Tata McGraw Hill, 2005.

REFERENCES

- 1. EfraimTurvanJ.Lee, David kug and chung, "Electronic commerce" PearsonEducation 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

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

