

PAAVAI ENGINEERING COLLEGE, NAMAKKAL-637018

(AUTONOMOUS)

B.Tech. INFORMATION TECHNOLOGY

REGULATIONS 2015

CURRICULUM

SEMESTER VII

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

SEMESTER VIII

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

ELECTIVE – III

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

ELECTIVE – IV

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

ELECTIVE – V

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

ELECTIVE – VI

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

IT15701

DATA WAREHOUSING AND DATAMINING

3 0 0 3

COURSE OBJECTIVES

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

UNIT I DATA WAREHOUSING

9

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

UNIT II BUSINESS ANALYSIS

9

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

UNIT III DATA MINING

9

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

UNIT IV ASSOCIATION RULE MINING AND CLASSIFICATION

9

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

UNIT V CLUSTERING, TRENDS IN DATA MINING AND APPLICATIONS

9

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

TOTAL HOURS 45

COURSE OUTCOMES

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

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

TEXT BOOKS

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

REFERENCES

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II VIRTUALIZATION 9

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

UNIT III CLOUD INFRASTRUCTURE 9

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

UNIT IV PROGRAMMING MODEL 9

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

UNIT V SECURITY IN THE CLOUD 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

TEXT BOOKS

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II MOBILE INTERNET PROTOCOL AND TRANSPORT LAYER 9

Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of TCP Window – Improvement in TCP Performance.

UNIT III MOBILE TELECOMMUNICATION SYSTEM 9

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

UNIT IV MOBILE AD-HOC NETWORKS 9

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

UNIT V MOBILE PLATFORMS AND APPLICATIONS 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

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

TEXT BOOK

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

REFERENCES

1. Jochen H. Schller, –Mobile Communicationsll, 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.
3. .UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile Computingll, Springer, 2003.
4. William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systemsll, Second Edition,TataMcGraw Hill Edition ,2006.

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



COURSE OBJECTIVES

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

LIST OF EXPERIMENTS

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

1. Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
2. Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
3. Install a C compiler in the virtual machine and execute a sample program.
4. Show the virtual machine migration based on the certain condition from one node to the other.
5. Find procedure to install storage controller and interact with it.
6. Find procedure to set up the one node Hadoop cluster.
7. Mount the one node Hadoop cluster using FUSE.
8. Write a program to use the API's of Hadoop to interact with it.
9. Write a wordcount program to demonstrate the use of Map and Reduce tasks.
10. Setup a Private Cloud Using Open Nebula. Develop a simple application and make it available to the intended user.

TOTAL: 60 HOURS

COURSE OUTCOMES

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

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

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

SOFTWARE: OpenNebula or Equivalent.

HARDWARE: Standalone desktops 30 Nos.

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

LIST OF EXPERIMENTS

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

TOTAL HOURS 60**COURSE OUTCOMES**

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

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

LAB EQUIPMENT FOR A BATCH OF 30 STUDENTS

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

HARDWARE : Standalone desktops 30 Nos.

CO-PO MAPPING:

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



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

TOTAL: 60 HOURS

COURSE OUTCOMES

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

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I HUMAN VALUES**9**

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

UNIT II ENGINEERING ETHICS**9**

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

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION**9**

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

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

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

UNIT V GLOBAL ISSUES**9**

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

- propose possible solutions using articulated ethical theories.

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

TEXT BOOKS

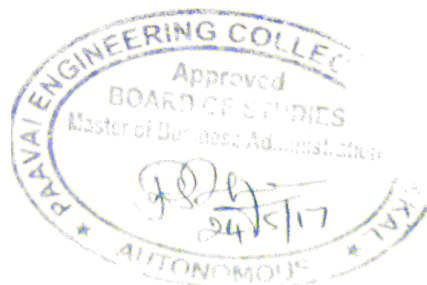
1. Mike Martin and Roland Schinzinger, —Ethics in Engineering, McGraw-Hill, New York 2007.
2. Charles E Harris, Michael S Pritchard and Michael J Rabins, —Engineering Ethics –Concepts and Cases, Thompson Learning, (2000).

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO PROJECT PLANNING AND EVALUATION 8

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

UNIT II SOFTWARE EFFORT ESTIMATION AND ACTIVITY PLANNING 10

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

UNIT III RISK MANAGEMENT AND RESOURCE ALLOCATION 9

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

UNIT IV MONITORING AND CONTROLLING OF PROJECTS AND ITS QUALITY 9

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

UNIT V MANAGING PEOPLE AND CONTRACTS 9

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

terms of a Contract.

TOTAL HOURS 45

COURSE OUTCOMES

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

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

TEXT BOOKS

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

REFERENCES

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

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



COURSE OBJECTIVES

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination.

The students in a group of 3 to 4 works on a topic approved by the head of the department under the guidance of a faculty member and prepare a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

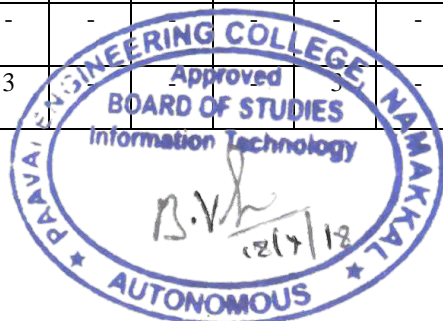
TOTAL: 180 PERIODS**COURSE OUTCOMES**

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

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

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



ELECTIVE - III

IT15351

ADHOC AND SENSOR NETWORKS

3 0 0 3

COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II MAC PROTOCOLS FOR AD HOC WIRELESS NETWORKS 9

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

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

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

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

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

UNIT V WSN ROUTING, LOCALIZATION & QOS 9

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

TOTAL HOURS 45

COURSE OUTCOMES

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

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

TEXT BOOK

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

REFERENCES

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I BASICS OF C# AND .NET 9

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

UNIT II OBJECT ORIENTED ASPECTS OF C# 9

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

UNIT III APPLICATION DEVELOPMENT ON .NET 9

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

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 9

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

UNIT V CLR AND THE .NET FRAMEWORK 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

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

TEXT BOOK

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

REFERENCES

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE 9

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

UNIT II MANAGING SOFTWARE QUALITY 9

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

UNIT III SOFTWARE QUALITY ASSURANCE METRICS 9

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

UNIT IV SOFTWARE QUALITY PROGRAM 9

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

UNIT V SOFTWARE QUALITY ASSURANCE STANDARDIZATION 9

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

TOTAL HOURS 45

COURSE OUTCOMES

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

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

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

TEXT BOOKS

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO BIG DATA AND HADOOP 8

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

UNIT II HDFS(Hadoop Distributed File System) 10

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

UNIT III MAP REDUCE 9

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

UNIT IV HADOOP ECO SYSTEM 9

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

UNIT V DATA ANALYTICS WITH R 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

- identify Big Data, Hadoop and its Business Implications.

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

TEXT BOOKS

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I RETRIEVAL STRATEGIES**9**

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

UNIT II RETRIEVAL UTILITIES**9**

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

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

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

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

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

UNIT V WEB BASED RETRIEVAL**9**

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

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

TEXT BOOK

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

REFERENCES

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

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



ELECTIVE - IV

IT15451

ADVANCED J2EE

3 0 0 3

COURSE OBJECTIVES

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

UNIT I J2EE OVERVIEW

9

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

UNIT II GETTING STARTED WITH WEB APPLICATIONS

9

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

UNIT III JAVA SERVER PAGES TECHNOLOGY

9

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

UNIT IV ENTERPRISE BEANS

9

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

UNIT V SECURITY

9

Understanding Login Authentication - HTTP basic authentication - Form based login

authentication - Client certificate authentication - Mutual authentication - Digest authentication.
 The Java Message service API: Overview - Basic JMS API concepts - The JMS API programming model. HTTP OVERVIEW: HTTP Requests - HTTP Responses.

TOTAL HOURS 45

COURSE OUTCOMES

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

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

TEXT BOOK

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I FUNDAMENTALS OF AGILE**9**

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

UNIT II AGILE SCRUM FRAMEWORK**9**

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

UNIT III AGILE TESTING**9**

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

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

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

UNIT V INDUSTRY TRENDS**9**

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

COURSE OUTCOMES

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

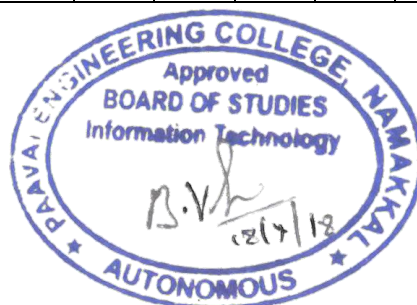
- understand the background and driving forces for taking an Agile approach to software development.
- understand the business value of adopting Agile approaches and Agile development practices.
- drive development with unit tests using Test Driven Development.
- apply design principles and refactoring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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I OVERVIEW 8

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

UNIT II FILE SUBSYSTEM 8

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

UNIT III SYSTEM CALLS FOR THE FILE SYSTEM 10

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

UNIT IV PROCESSES 10

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

UNIT V MEMORY MANAGEMENT AND I/O 9

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

FOR FURTHER READING:

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

TOTAL HOURS 45

COURSE OUTCOMES

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

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

Testing as an Engineering Activity –Testing as a Process –Basic definitions –Software Testing Principles –The Tester’s Role in a Software Development Organization –Origins of Defects –Cost of defects –Defect Classes – The Defect Repository and Test Design –Defect Examples – Developer/Tester Support of Developing a Repository.

UNIT II TEST CASE DESIGN 9

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

UNIT III LEVELS OF TESTING 9

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

UNIT IV TEST MANAGEMENT 9

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

UNIT V TEST AUTOMATION 9

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

TOTAL HOURS 45

COURSE OUTCOMES

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

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

TEXT BOOKS

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

REFERENCES

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS 9

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

UNIT II FEEDFORWARD NEURAL NETWORKS 9

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

UNIT III FEEDBACK NEURAL NETWORKS & SELF ORGANIZING FEATURE MAP 9

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

UNIT IV FUZZY LOGIC 9

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

UNIT V GENETIC ALGORITHMS 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

TEXT BOOK

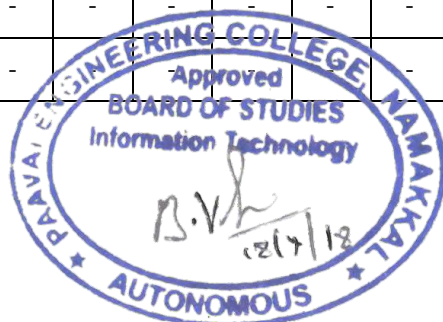
1. S.N.Sivanandam and S.N.Deepa, Principles of Soft computing, Wiley India Edition, 2nd Edition, 2013
2. S. Rajasekaran, VijaylakshmiPari (2003), Neural networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications, Prentice Hall of India, New Delhi, India. Rob Farber, —CUDA design and developmentl,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

REFERENCES

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

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



ELECTIVE-V

IT15551

E - COMMERCE

3 0 0 3

COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II INFRASTRUCTURE FOR E COMMERCE 9

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

UNIT III WEB BASED TOOLS FOR E COMMERCE 9

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

UNIT IV SECURITY 9

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

UNIT V INTELLIGENT AGENTS 9

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

TOTAL HOURS 45

COURSE OUTCOMES

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

- Understand the various aspects of E-Commerce.

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

TEXT BOOKS

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

REFERENCES

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION**9**

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

UNIT II TQM PRINCIPLES**9**

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

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

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

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

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

UNIT V QUALITY SYSTEMS**9**

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

TEXT BOOKS

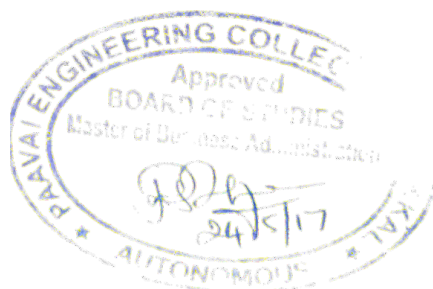
1. Dale H. Besterfield, et al., "Total quality Management", Third Edition, Pearson Education Asia, Indian Reprint, 2006.
2. D.R Kiran, "Total quality Management", Butterworth-Heinemann, 2016.

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I BASICS OF SOA 9

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

UNIT II WEB SERVICES 9

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

UNIT III SERVICE DESIGN 9

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

UNIT IV SOA PLATFORM BASICS 9

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

UNIT V BUILDING SOA-BASED APPLICATIONS 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

quality assurance.

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

TEXT BOOK

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II REPRESENTATION OF KNOWLEDGE 9

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

UNIT III KNOWLEDGE INFERENCE 9

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

UNIT IV PLANNING AND MACHINE LEARNING 9

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

UNIT V Expert Systems 9

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

TOTAL
HOURS 45

COURSE OUTCOMES

At end of this course , students will be able to

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

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

TEXT BOOKS

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT-I INTRODUCTION 9

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

UNIT-II MODELING AND VISUALIZATION

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

UNIT-III MINING COMMUNITIES 9

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

UNIT-IV EVOLUTION 9

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

UNIT-V TEXT AND OPINION MINING 9

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

TOTAL HOURS 45

COURSE OUTCOMES

At end of this course, students will be able to

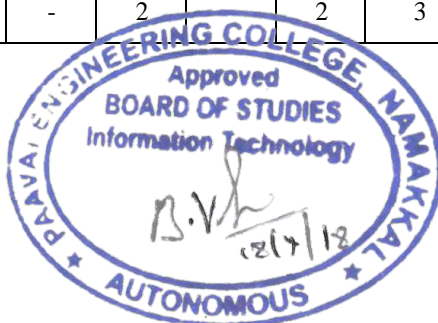
- explain about the internal components of the social networks.
- model and visualize the social network
- outline the features of community mining
- explain about the evolution of social networks
- summarize the algorithms and systems for Expert Location in Social Networks

REFERENCES

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

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



ELECTIVE – VI

IT15651

INTELLECTUAL PROPERTY RIGHTS

3 0 0 3

COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II THE LAW OF TRADEMARK AND COPYRIGHT 9

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

UNIT III THE LAW OF TRADE SECRETS AND UNFAIR COMPETITION 9

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

UNIT IV PATENT AND INTERNATIONAL CONVENTION 9

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

UNIT V NEW DEVELOPMENTS IN COPYRIGHT LAW 9

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

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

TOTAL HOURS 45

COURSE OUTCOMES

At end of this course, students will be able to

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

TEXT BOOK

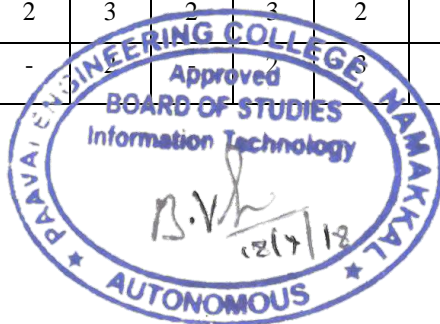
1. Deborah E. Bo choux, —Intellectual Property Rights, Cengage Learning India Private Ltd, 2005.

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION**9**

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

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

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

UNIT III MODELING FOR BIOINFORMATICS**9**

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

UNIT IV PATTERN MATCHING AND VISUALIZATION**9**

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

UNIT V MICROARRAY ANALYSIS**9**

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

TOTAL HOURS 45**COURSE OUTCOMES**

At end of this course, students will be able to

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

TEXT BOOKS

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

REFERENCES

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

CO-PO MAPPING:

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION 9

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

UNIT II IMAGE ENHANCEMENT 9

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

UNIT III IMAGE RESTORATION 9

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

UNIT IV IMAGE COMPRESSION 9

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

UNIT V IMAGE SEGMENTATION, REPRESENTATION & DESCRIPTION 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

TEXT BOOKS

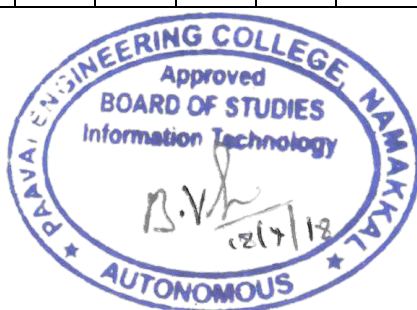
1. Rafael C. Gonzalez, Richard E. Woods, —Digital Image Processingl , 2nd edition , Pearson Education, 2007.
2. Anil Jain K. —Fundamentals of Digital Image Processingl, PHI Learning Pvt. Ltd., 2011.

REFERENCES

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

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



IT15654

DIGITAL ENTERPRISE RESOURCE PLANNING

3 0 0 3

COURSE OBJECTIVES

- to understand why information systems are so important today for business and management.
- to evaluate the role of the major types of information systems in a business environment and their relationship to each other.
- to assess the impact of the Internet and Internet technology on business electronic commerce and electronic business.
- to identify the major management challenges to building and using information systems and learn how to find appropriate solutions to those challenges.
- to define an IT infrastructure and describe its components.

UNIT I RP AND TECHNOLOGY

9

Introduction – Related Technologies – Business Intelligence – E-Commerce and EBusiness – Business Process Reengineering – Data Warehousing – Data Mining – OLAP – Product life Cycle management – SCM – CRM.

UNIT II ERP IMPLEMENTATION

9

Implementation Challenges – Strategies – Life Cycle – Pre-implementation Tasks – Requirements Definition – Methodologies – Package selection – Project Teams – Process Definitions – Vendors and Consultants – Data Migration – Project management – Post Implementation Activities.

UNIT III ERP IN ACTION & BUSINESS MODULES

9

Operation and Maintenance – Performance – Maximizing the ERP System – Business Modules – Finance – Manufacturing – Human Resources – Plant maintenance – Materials Management – Quality management – Marketing – Sales, Distribution and service.

UNIT IV ERP MARKET

9

Marketplace – Dynamics – SAP AG – Oracle – PeopleSoft – JD Edwards – QAD Inc. – SSA Global – Lawson Software – Epicor – Intuitive.

UNIT V MORDEN ERP

9

Modern ERP introduction - Characteristics of Modern ERP - Deploy Modern ERP Systems – ERP with Cloud Computing – Modern ERP tools – Role of modern ERP in Marketing Industry – Latest Trends in ERP.

TOTAL HOURS 45

COURSE OUTCOMES

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

- understand the basic concepts and technologies used in the field of management information

systems.

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

TEXT BOOKS

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

REFERENCES

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

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



COURSE OBJECTIVES

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

UNIT I INTRODUCTION TO IoT 9

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

UNIT II DEVELOPING INTERNET OF THINGS 9

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

UNIT III DOMAIN SPECIFIC IoTS 9

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

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

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

UNIT V DATA ANALYTICS FOR IoT 9

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

TOTAL HOURS 45**COURSE OUTCOMES**

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

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

REFERENCES

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

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

