

COURSE STRUCTURE

AND

DETAILED SYLLABUS

For

M. Tech Two Year Degree Course

2015-2016

SOFTWARE ENGINEERING (SE)



'Because, Life is all about taking the right decisions'

A U T O N O M O U S

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

Yamnampet, Ghatkesar Mandal, Hyderabad - 501 301.

Department of Computer Science and Engineering
M.Tech (Software Engineering) Course Structure and Syllabus
Academic Regulations: 2014-2015

| I Year | | COURSE STRUCTURE | | | I Semester | | | |
|--------|--------------|---|-----------|----------|------------|-----------|------------|------------|
| S. No. | Subject Code | Subject Name | L | T | P | C | Marks | |
| | | | | | | | Internal | External |
| 1 | 5S101 | Software Requirements and Estimation | 3 | 1 | - | 3 | 25 | 75 |
| 2 | 5S102 | Software Development Methodologies | 3 | 1 | - | 3 | 25 | 75 |
| 3 | 5S103 | Software Testing | 3 | 1 | - | 3 | 25 | 75 |
| 4 | 5P102 | Advanced Data Structures and Algorithms | 3 | 1 | - | 3 | 25 | 75 |
| 5 | | PROFESSIONAL ELECTIVE I | 3 | 1 | - | 3 | 25 | 75 |
| 6 | | PROFESSIONAL ELECTIVE II | 3 | 1 | - | 3 | 25 | 75 |
| 7 | 5P118 | Research Methodology | 2 | - | - | 2 | 25 | 75 |
| 8 | 5S171 | Software Testing and ADS Lab | - | - | 4 | 2 | 25 | 75 |
| 9 | 5S172 | Literature Review and Seminar-1 | - | - | 3 | 1 | 100 | - |
| 10 | 5S173 | Comprehensive Viva – Voce -1 | - | - | - | 1 | 100 | - |
| | | Total | 20 | 6 | 7 | 24 | 400 | 600 |

| PROFESSIONAL ELECTIVE I | | PROFESSIONAL ELECTIVE II | |
|-------------------------|--|--------------------------|-----------------------------------|
| Subject Code | Subject Name | Subject Code | Subject Name |
| 5PC06 | Cloud Computing | 5P113 | Artificial Intelligence |
| 5P110 | Information Retrieval Systems | 5PC20 | Network Security and Cryptography |
| 5S104 | Cyber Security & Cyber Laws | 5P117 | Mobile Computing |
| 5P112 | Advanced Computer Networks | 5P108 | Advanced Operating Systems |
| 5P103 | Advanced Databases | 5P109 | Human Computer Interaction |
| 5P111 | Software metrics and Quality Assurance | 5P119 | Software Reuse |
| 5S105 | Software Configuration Management | 5S106 | Secure Software Engineering |

| | | |
|---------------|-------------------------|--------------------|
| I Year | COURSE STRUCTURE | II Semester |
|---------------|-------------------------|--------------------|

| S. No. | Subject Code | Subject Name | L | T | P | C | Marks | |
|--------|--------------|---|----|---|----|----|----------|----------|
| | | | | | | | Internal | External |
| 1 | | OPEN ELECTIVE | 3 | 1 | - | 3 | 25 | 75 |
| 2 | 5S207 | Software Architecture and Design Patterns | 3 | 1 | - | 3 | 25 | 75 |
| 3 | 5S208 | Software Process and Project Management | 3 | 1 | - | 3 | 25 | 75 |
| 4 | 5P222 | Web Technologies & Services | 3 | 1 | - | 3 | 25 | 75 |
| 5 | 5PC23 | Data warehousing and Data Mining | 3 | 1 | - | 3 | 25 | 75 |
| 6 | | PROFESSIONAL ELECTIVE III | 3 | 1 | - | 3 | 25 | 75 |
| 7 | 5P273 | Web Technologies and Informatica Lab | - | - | 4 | 2 | 25 | 75 |
| 8 | 5S274 | Literature Review and Seminar-2 | - | - | 3 | 1 | 100 | - |
| 9 | 5S275 | Project Seminar – I (Abstract Seminar) | - | - | 3 | 2 | 100 | - |
| 10 | 5S276 | Comprehensive Viva – Voce-2 | - | - | - | 1 | 100 | - |
| 11 | | Total | 18 | 6 | 10 | 24 | 475 | 525 |

| PROFESSIONAL ELECTIVE III | | OPEN ELECTIVE | |
|----------------------------------|--|----------------------|---|
| Subject Code | Subject Name | Subject Code | Subject Name |
| 5PC24 | Image Processing and Pattern Recognition | 5ZC03 | Banking Operations, Insurance and Risk Management |
| 5P225 | Machine Learning | 5QC33 | Intellectual Property Rights |
| 5RC16 | Big data Analytics | 5T217 | Embedded Systems |
| 5P226 | Wireless Networks | 5ZC13 | Entrepreneurship and Innovation |
| 5PC14 | Semantic Web and Social Networks | 5H233 | Ethics, Morals, Gender Sensitization and Yoga |
| 5P221 | Mobile Application Development | 5QC47 | Bio-informatics |
| 5P228 | Software Risk Management And Maintenance | | |

| II Year | COURSE STRUCTURE | I Semester |
|---------|------------------|------------|
|---------|------------------|------------|

| S. No. | Subject Code | Subject Name | L | T | P | C | Marks | |
|--------------|--------------|---|---|---|---|-----------|------------|----------|
| | | | | | | | Internal | External |
| 1 | 5S377 | Project Seminar - II (Design & Development) | - | - | - | 4 | 100 | - |
| 3 | 5S378 | Project Work (PART- I) (Project Status Report) (Excellent/ Good/ Satisfactory/ Un-Satisfactory) | - | - | - | 20 | grading | - |
| Total | | | - | - | - | 24 | 100 | - |

| II Year | COURSE STRUCTURE | II Semester |
|---------|------------------|-------------|
|---------|------------------|-------------|

| S. No. | Subject Code | Subject Name | L | T | P | C | Marks | |
|--------------|--------------|---|---|---|---|-----------|------------|----------|
| | | | | | | | Internal | External |
| 1 | 5S479 | Project Seminar - IV (Execution) | - | - | - | 2 | 100 | - |
| 2 | 5S480 | Pre – Project Submission Seminar (Final) | - | - | - | 2 | 100 | - |
| 2 | 5S481 | Project Work and Dissertation (Excellent/ Good/ Satisfactory/ Un-Satisfactory) | - | - | - | 20 | - | grading |
| Total | | | - | - | - | 24 | 200 | - |

Note: Eligibility for admission to this course is B.E./B.Tech. In CSE or IT

L - Lectures; T = Tutorial; P = Practical; C = Credits

**Syllabus for M. Tech I Year I Semester
Software Engineering
SOFTWARE REQUIREMENTS AND ESTIMATION**

Code: 5S101

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| L | T | P | C |
| 3 | 1 | - | 3 |

Course Objectives

- Students must demonstrate knowledge of the distinction between critical and non- critical systems.
- Students will be able to manage a project including planning, scheduling and risk assessment/management.
- Students should author a software requirements document.
- Students will demonstrate an understanding of the proper contents of a software requirements document.
- Students will author a formal specification for a software system.
- Students will demonstrate an understanding of distributed system architectures and application architectures.
- Students will demonstrate an understanding of the differences between real-time and non-real time systems.
- Students will demonstrate proficiency in rapid software development techniques.
- Students will demonstrate proficiency in software development cost estimation
- Students will formulate a software testing plan.

UNIT I

Software Requirements: What and Why Essential Software requirement, Good practices for requirements engineering, Improving requirements processes, Software requirements and risk management

UNIT II

Software Requirements Engineering Requirements elicitation, requirements analysis documentation, review, elicitation techniques, analysis models, Software quality attributes, risk reduction through prototyping, setting requirements priorities, verifying requirements quality.

UNIT III

Software Requirements Management Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain

Software Requirements Modeling Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames

UNIT IV

Software Estimation Components of Software Estimations, Estimation methods, Problems associated with estimation, Key project factors that influence estimation

Size Estimation Two views of sizing, Function Point Analysis, Mark II FPA, Full Function Points, LOC Estimation, Conversion between size measures,

UNIT V

Effort, Schedule and Cost Estimation What is Productivity? Estimation Factors, Approaches to Effort and Schedule Estimation, COCOMO II, Putnam Estimation Model, Algorithmic models, Cost Estimation

UNIT VI

Tools for Requirements Management and Estimation Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber – RM, implementing requirements management automation.

Software Estimation Tools: Desirable features in software estimation tools, IFPUG, USC's COCOMO II, SLIM (Software Life Cycle Management) Tools.

TEXT BOOK:

1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, Tata Mc Graw Hill.

REFERENCE BOOKS:

1. Software Requirements by Karl E. Weigers, Microsoft Press.
2. Managing Software Requirements, Dean Leffingwell & Don Widrig, Pearson Education, 2003.
3. Mastering the requirements process, second edition, Suzanne Robertson & James Robertson, Pearson Education, 2006.
4. Estimating Software Costs, Second edition, Capers Jones, TMH, 2007.
5. Practical Software Estimation, M.A. Parthasarathy, Pearson Education, 2007.
6. Measuring the software process, William A. Florac & Anita D. Carleton, Pearson Education, 1999.

**Syllabus for M. Tech I Year II Semester
Software Engineering
SOFTWARE DEVELOPMENT METHODOLOGIES**

Code: 5S102

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|----------|----------|----------|----------|
| L | T | P | C |
| 3 | 1 | - | 3 |

Course Objectives :

The aim is to understand

1. A broad and critical understanding of all the processes for engineering high quality software and the principles, concepts and techniques associated with software development.
2. An ability to analyze and evaluate problems and draw on the theoretical and technical knowledge to develop solutions and systems.
3. A range of skills focused on the analysis of requirements, design and implementation of reliable and maintainable software, with strong emphasis on engineering principles applied over the whole development lifecycle.
4. An awareness of current research in software development, the analytical skills and research techniques for their critical and independent evaluation and their application to new problems.

UNIT I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, legacy software, Software myths.

A Generic view of process: Software engineering - A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, specialized process models, The Unified process.

UNIT II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT III

Design Engineering: Design process and Design quality, Design concepts, the design model, pattern based software design.

Creating an architectural design: software architecture, Data design, Architectural styles and patterns, Architectural Design, assessing alternative architectural designs, mapping data flow into software Architecture.

UNIT IV

Modeling component-level design: Designing class-based components, conducting component level design, Object constraint language, designing conventional components.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT V

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Frame work for Product metrics, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT VI

Risk management: Reactive vs Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

Configuration Management: Configuration Management planning, Change management, Version and release management, System building, CASE tools for configuration management.

TEXT BOOKS:

1. Software Engineering: A practitioner's Approach, Roger S Pressman, sixth edition. McGraw Hill International Edition, 2005
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education, 2004.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modeling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition, 2006.
7. Software Engineering Foundations, Yingxu Wang, Auerbach Publications, 2008.
8. Software Engineering 3: Domains, Requirements and Software Design, D.Bjorner, Springer, International Edition.
9. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, Wiley India edition.
10. Introduction to Software Engineering, R.J.Leach, CRC Press.
11. Software Engineering Fundamentals, Ali Behforooz and Frederick J.Hudson, Oxford University Press, rp2009
12. Software Engineering Handbook, Jessica Keyes, Auerbach,

Syllabus for M. Tech I Year I Semester
Software Engineering
SOFTWARE TESTING

Code: 5S103

| L | T | P | C |
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Course Objective:

- To understand various standards to measure quality.
- To clearly understand the concept of metrics and their types.
- To set a strategy for testing environment and to learn the testing methodologies in detail.
- To understand and implement various testing techniques and to make a thorough study on various testing tools.

UNIT I

Software Quality Assurance Framework and Standards

SQA Framework: What is Quality? Software Quality Assurance, Components of Software Quality Assurance – Software Quality Assurance Plan: Steps to develop and implement a Software Quality Assurance Plan – Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcolm Bal ridge, 3 Sigma, 6 Sigma, TMMI maturity model

UNIT II

Software Quality Assurance Metrics and Measurement

Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs – Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, implement the software quality metrics, analyze software metrics results, and validate the software quality metrics ,Linguistic Metrics , Structural Metrics, Hybrid Metrics, Metrics Implementation, Software quality indicators, Fundamentals in Measurement theory.

UNIT III

Software Testing Strategy and Environment

Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing, comparison of STLC with SDLC

UNIT IV

Software Testing Methodology and management

Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist
 Basic concepts – Testing and debugging goals and policies – Test planning – Test plan components – Test plan attachments – Locating test items – Reporting test results.

UNIT V

Software Testing Techniques

Black-Box, White-Box Testing, Gray-Box, Boundary value, Equivalence Class Partitioning (ECP), Test adequacy criteria ,Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walkthroughs, Thread Testing, Performance Testing,

UNIT VI

Software Testing Tools

Taxonomy of Testing tools, Methodology to evaluate automated testing tools(QTP), Static code analyzers, Test case generators, GUI Capture/Playback, Stress Testing, Testing Client -server applications, Testing compilers and language processors, Testing web-enabled applications. Study on tools like QTP, RFT (IBM), OpenSTA, JMetra, JUNIT, selenium and Cactus.

TEXT BOOKS

1. Effective Methods for Software Testing, 2nd Edition by William E. Perry, Second Edition, published by Wiley
2. Software Quality, by Mordechai Ben-Menachem/Garry S. Marliss, by Thomson Learning publication

REFERENCES

1. Testing and Quality Assurance for Component-based Software, by Gao, Tsao and Wu, Artech House Publishers
2. Software Testing Techniques, by Bories Beizer, Second Edition, Dreamtech Press
3. Managing the Testing Process, by Rex Black, Wiley
4. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press
5. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.
6. Software Testing and continuous Quality Improvement, by William E.Lewis, Gunasekaran Veerapillai, Second Edition, Auerbach Publications
7. Metrics and Models for Software Quality Engineering, by Stephen H. Kan, by Pearson Education Publications.
8. <http://www.tmmifoundation.org/>
9. Edward Kit, "Software Testing in the Real World - Improving the Process", Pearson Education, 2004.

Syllabus for M.Tech I Year I Semester
Computer Science and Engineering
ADVANCED DATA STRUCTURES AND ALGORITHMS

Code: 5P102

| L | T | P | C |
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Course Objectives:

1. The fundamental design, analysis, and implementation of basic data structures.
2. Basic concepts in the specification and analysis of programs.
3. Principles for good program design, especially the uses of data abstraction.
4. Significance of algorithms in the computer field
5. Various aspects of algorithm development
6. Qualities of a good solution

UNIT I

Algorithms, Performance analysis- time complexity and space complexity, Asymptotic Notation-Big Oh, Omega and Theta notations, Complexity Analysis Examples.

Data structures-Linear and non linear data structures, ADT concept, Linear List ADT, Array representation, Linked representation, Vector representation, singly linked lists -insertion, deletion, search operations, doubly linked lists-insertion, deletion operations, circular lists. Representation of single, two dimensional arrays, Sparse matrices and their representation.

UNIT II

Stack and Queue ADTs, array and linked list representations, infix to postfix conversion using stack, implementation of recursion, Circular queue-insertion and deletion, Dequeue ADT, array and linked list representations, Priority queue ADT, implementation using Heaps, Insertion into a Max Heap, Deletion from a Max Heap, java.util package-ArrayList, Linked List, Vector classes, Stacks and Queues in java.util, Iterators in java.util.

UNIT III

Searching-Linear and binary search methods, Hashing-Hash functions, Collision Resolution methods-Open Addressing, Chaining, Hashing in java.util-HashMap, HashSet, Hashtable.

UNIT IV

Sorting -Bubble sort, Insertion sort, Quick sort, Merge sort, Heap sort, Radix sort, comparison of sorting methods.

UNIT V

Trees- Ordinary and Binary trees terminology, Properties of Binary trees, Binary tree ADT, representations, recursive and non recursive traversals, Java code for traversals, Threaded binary trees.

Graphs- Graphs terminology, Graph ADT, representations, graph traversals/search methods-dfs and bfs, Java code for graph traversals, Applications of Graphs-Minimum cost spanning tree using Kruskal's algorithm, Dijkstra's algorithm for Single Source Shortest Path Problem.

UNIT VI

Search trees- Binary search tree-Binary search tree ADT, insertion, deletion and searching operations, Balanced search trees, AVL trees-Definition and examples only, Red Black trees - Definition and examples only, B-Trees-definition, insertion and searching operations, Trees in java.util- TreeSet, Tree Map Classes, Tries(examples only),Comparison of Search trees.

Text compression-Huffman coding and decoding, Pattern matching-KMP algorithm.

TEXT BOOKS:

1. Data structures, Algorithms and Applications in Java, S.Sahni, Universities Press.
2. Data structures and Algorithms in Java, Adam Drozdek, 3rd edition, Cengage Learning.
3. Data structures and Algorithm Analysis in Java, M.A.Weiss, 2nd edition, Addison-Wesley (Pearson Education).

REFERENCE BOOKS:

1. Java for Programmers, Deitel and Deitel, Pearson education.
2. Data structures and Algorithms in Java, R.Lafore, Pearson education.
3. Java: The Complete Reference, 8th editon, Herbert Schildt, TMH.
4. Data structures and Algorithms in Java, M.T.Goodrich, R.Tomassia, 3rd edition, Wiley India Edition.
5. Data structures and the Java Collection Frame work, W.J.Collins, Mc Graw Hill.
6. Classic Data structures in Java, T.Budd, Addison-Wesley (Pearson Education).
7. Data structures with Java, Ford and Topp, Pearson Education.
8. Data structures using Java, D.S.Malik and P.S.Nair, Cengage learning.
9. Data structures with Java, J.R.Hubbard and A.Huray, PHI Pvt. Ltd.
10. Data structures and Software Development in an Object-Oriented Domain, J.P.Tremblay and G.A.Cheston, Java edition, Pearson Education.

Syllabus for M. Tech I Year I Semester
Software Engineering
CLOUD COMPUTING
(PROFESSIONAL ELECTIVE –I)

Code: 5PC06

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Course Objectives:

At the end of the course, the student shall be able to:

- Understand the current cloud computing technologies, including technologies for Infrastructure as a Service, Platform as a Service, Software as a Service, and Physical Systems as a Service.
- Understand the different layers of the cloud technologies, practical solutions such as Google, Amazon, Microsoft, Salesforce.com, etc. as well as theoretical solutions are introduced.
- . The course helps to understand the technologies and applications of cloud computing and its virtualization foundation used in servers, desktops, embedded devices and mobile devices.
- In this course students will learn the cloud components to construct, scale, and operate efficient and highly scalable systems. During the course, students will build a small but functional and scalable application using these essential components.

UNIT - I

Introductory Concepts & overview: Distributed Systems - Parallel Computing Architectures: Vector Processing, Symmetric Multi Processing and Massively parallel processing systems - High Performance Computing - Grid Computing - Service Oriented Architecture Overview - Virtualization.

UNIT - II

Overview of Cloud Computing : Meaning of the terms Cloud and cloud computing - cloud based service offerings - Grid Computing Vs Cloud Computing - Benefits of Cloud Model - limitations - legal issues - key characteristics of cloud computing - challenges for the cloud - the evolution of cloud computing.

UNIT - III

Web services delivered from the cloud: Infrastructure as a service - platform as a service - software as a service. Building Cloud networks: Evolution from the MSP model to cloud computing and software as a service - the cloud data center - SOA as step toward cloud computing - basic approach to a data center based SOA.

UNIT - IV

Federation Presence, Identity & Privacy in the Cloud: Federation in the cloud - presence in the cloud - privacy in the cloud - Privacy and its relation to cloud based information system. security in the cloud: cloud security challenges - software as a service security.

UNIT - V

Common Standards in cloud computing: the open cloud consortium - the distributed management task force - standards for application developers -standards for messaging - standards for security.

UNIT - VI

Mobile internet devices and the cloud: smartphone - mobile operating systems for smartphones - mobile platform virtualization - Collaboration Applications for mobile platforms - future trends.

Casestudies: Map Reduce, HDFS.

TEXT BOOKS:

1. Cloud Computing Implementation, Management and Security by John W. Rittinghouse, James F. Ransome, CRC Press, Taylor & Francis group, 2010.

2. Cloud Computing a practical approach by Anthony T. Velte, Toby J. velte Robert Elsenpeter, Tata McGrawHill edition, 2010.

REFERENCES:

1. Cloud Application Architectures by George Reese, Oreilly publishers.

2. Cloud Computing and SOA convergence in your enterprise, David S. Linthicum, Addison- Wesley.

3. George Coulouris, JeanDollimore and Tim Kindberg. Distributed Systems:Concepts and Design (Edition 3).Addison-Wesley2001 .

**Syllabus for M. Tech I Year I semester
Software Engineering
INFORMATION RETRIEVAL SYSTEMS
(PROFESSIONAL ELECTIVE –I)**

Code: 5P110

| L | T | P | C |
|---|---|---|---|
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Course Objectives:

The student should have gained a good understanding of the foundation concepts of information retrieval techniques and be able to apply these concepts into practice. Specifically, the student should be able to:

- To use different information retrieval techniques in various application areas.
- To apply IR principles to locate relevant information large collections of data.
- To analyze performance of retrieval systems when dealing with unmanaged data sources.
- To implement retrieval systems for web search tasks.

UNIT I

Boolean retrieval. The term vocabulary and postings lists. Dictionaries and tolerant retrieval. Index construction. Index compression.

UNIT II

Scoring, term weighting and the vector space model. Computing scores in a complete search system. Evaluation in information retrieval. Relevance feedback and query expansion.

UNIT III

XML retrieval. Probabilistic information retrieval. Language models for information retrieval. Text classification.

UNIT IV

Vector space classification. Support vector machines and machine learning on documents

UNIT V

Flat clustering, Hierarchical clustering, Matrix decompositions and latent semantic indexing.

UNIT VI

Web search basics, Web crawling and indexes, Link analysis.

TEXT BOOKS:

1. Introduction to Information Retrieval , Christopher D. Manning and Prabhakar
2. Raghavan and Hinrich Schütze, Cambridge University Press, 2008.

REFERENCE BOOKS:

1. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark T Maybury, Springer.
2. Modern Information Retrieval, Ricardo Baeza-Yates, Pearson Education, 2007.
3. Information Retrieval: Algorithms and Heuristics, David A Grossman and Ophir Frieder, 2nd Edition, Springer, 2004.
4. Information Retrieval Data Structures and Algorithms, William B Frakes, Ricardo Baeza- Yates, Pearson Education, 1992.
5. Information Storage & Retrieval, Robert Korfhage , John Wiley & Sons.

**Syllabus for M.Tech I Year I semester
Software Engineering
CYBER SECURITY AND CYBER LAWS
(PROFESSIONAL ELECTIVE –I)**

Code: 5S104

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | - | 3 |

Course Objectives:

- To learn Internet, E-commerce and E-governance with reference to Free Market Economy
- To learn International Efforts relating to Cyberspace laws and Cyber crimes
- To learn Law relating to electronic records and intellectual property rights in India
- To learn Penalties, Compensation and Offences under the Cyberspace and Internet in India
- To learn Miscellaneous provisions of IT Act and Conclusions

UNIT-I

Internet, E-commerce and E-governance with reference to Free Market Economy

Understanding Computers, Internet and Cyber laws, Conceptual Framework of E-commerce: governance, the role of Electronic Signatures in E-commerce with Reference to Free Market Economy in India.

UNIT-II

Law relating to electronic records and intellectual property rights in India

Legal aspects of Electronic records / Digital signatures, The roles and regulations of Certifying Authorities in India, Protection of Intellectual Property Rights in Cyberspace in India.

UNIT-III

International Efforts relating to Cyberspace laws and Cyber crimes

International efforts related to Cyber laws, Council of Europe (COE) convention on Cyber Crimes.

UNIT-IV

Penalties, Compensation

Penalties, Compensation and Adjunction of violations of provisions of IT Act and Judicial review

UNIT-V

Offences under the Cyberspace and Internet in India

Some important offences under the Cyberspace law and the Internet in India, Other offences under the Information Technology Act in India.

UNIT-VI: Miscellaneous provisions of IT Act and Conclusions

The role of Electronic Evidence and miscellaneous provisions of the IT Act.

TEXT BOOK:

1. Cyber Laws and IT Protection, Harish Chander, PHI, 2012

REFERENCE BOOKS:

1. Cyberspace and Cybersecurity, George Kostopoulos, Auerbach Publications, 2012.
2. Cyber Forensics: A Field Manual for Collecting, Examining, and Preserving Evidence of Computer Crimes, Second Edition, Albert Marcella, Jr., Doug Menendez, Auerbach Publications, 2007.

Syllabus for M. Tech I Year I Semester
Software Engineering
ADVANCED COMPUTER NETWORKS
(PROFESSIONAL ELECTIVE –I)

Code: 5P112

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| 3 | 1 | - | 3 |

Course Objective:

Features of advanced computer networks are deeply rooted to concepts of computer networks. One should have very good understanding of computer networks which may help in learning advanced computer networks in an easy manner. This course handles the networking concepts in detail to a greater extent which is very important as per the growing business of this area. The student is trained with the networking essentials such as standards and protocols in establishing successful communication between two ends over a vast network space.

UNIT I

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet – **(Chapter 1) of T1.**

Foundation of Networking Models: 5-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **(Chapter 2) of T2.**

UNIT II

The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, Ethernet – **(Chapter 5) of T1**

Unit - III

Routing and Internetworking: Network-Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer – **(Chapter 7) of T2**

UNIT IV

Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **(Chapter 19, 20) of T3**

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **(Chapter 8) of T2**

Application Layer: Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing – **(Chapter 2) of T1**

UNIT V

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Mobile Ad-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks – **Wireless Sensor Networks** and Protocol Structures - **(Chapter 6, 19, 20) of T2**

UNIT VI

VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony – **(Chapters 16, 18) of T2**

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, *James F. Kurose, Keith W. Ross*, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, *Nader F. Mir*, Pearson Education, 2007

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networking , *S.Keshav*, Pearson Education, 1997
2. Computer Networks: Principles, Technologies And Protocols For Network Design, *Natalia Olifer, Victor Olifer*, Wiley India, 2006.
3. Computer Networks, *Andrew S. Tanenbaum*, Fourth Edition, Prentice Hall.

4. Fundamentals of Business Data Communications, Jerry FitzGerald and Alan Dennis, Tenth Edition, Wiley, 2009.
5. Campus Network Design Fundamentals, *Diane Teare, Catherine Paquet*, Pearson Education (CISCO Press)
6. Data Communications and Networking, *Behrouz A. Forouzan*, Fourth Edition, Tata McGraw Hill, 2007

Syllabus for M. Tech I Year I Semester
Software Engineering
ADVANCED DATABASES
(PROFESSIONAL ELECTIVE – I)

Code: 5P103

| L | T | P | C |
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Course Objectives:

1. History and Structure of databases
2. How to design a database
3. How to convert the design into the appropriate tables
4. Handling Keys appropriately
5. Enforcing Integrity Constraints to keep the database consistent
6. Normalizing the tables to eliminate redundancies
7. Querying relational data
8. Optimizing and processing the queries
9. Storage Strategies for easy retrieval of data through index
10. Triggers, Procedures and Cursors ,Transaction Management
11. Distributed databases management system concepts and Implementation

UNIT I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL,DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, ER diagrams,.

UNIT II

Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views –Altering Tables and Views, Relational Algebra, Basic SQL Queries, Nested Queries, Complex Integrity Constraints in SQL, Triggers

UNIT III

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form.

UNIT IV

Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking –Transaction Support in SQL.
 Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.
 Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, and Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing
 Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.
 Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM)
 B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.
 Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

UNIT VI

Distributed databases: Introduction to distributed databases, Distributed DBMS architectures, Storing data in a distributed DBMS, Distributed catalog management, Distributed query processing Updating distributed data, Distributed transactions, Distributed concurrency control, Distributed recovery

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan, McGraw hill, VI edition, 2006.
3. Fundamentals of Database Systems 5th edition. Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

REFERENCE BOOKS:

1. Introduction to Database Systems, C.J.Date,Pearson Education.
2. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
3. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
4. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
5. Database-Principles, Programming, andPerformance, P.O'Neil&E.O'Neil, 2nd ed., ELSEVIER
6. Fundamentals of Relational Database Management Systems, S.Sumathi, S.Esakkirajan, Springer.
7. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
8. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
9. Distributed Databases Principles & Systems, Stefano Ceri, Giuseppe Pelagatti, TMH.
10. Principles of Distributed Database Systems, M. Tamer Ozsü, Patrick Valduriez , Pearson Education, 2nd Edition.
11. Distributed Database Systems, Chhanda Ray, Pearson.
12. Distributed Database Management Systems, S.K.Rahimi and F.S.Haug, Wiley.

Syllabus for M. Tech I Year I Semester
 Software Engineering
SOFTWARE METRICS AND QUALITY ASSURANCE
(PROFESSIONAL ELECTIVE –I)

Code: 5P111

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Course Objectives:

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

- Understand quality management processes
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand the importance of standards in the quality management process and their impact on the final product.

UNIT I : INTRODUCTION TO SOFTWARE METRICS

Fundamentals of measurement, Scope of software metrics, Measurement theory, Software measurement validation software metrics data collection, Analysis methods.

UNIT II PRODUCT AND QUALITY METRICS

Measurement of internet product attributes, size and structure, external product attributes, measurement of quality, Software quality metrics, product quality-process quality, metrics for software maintenance.

UNIT III MANAGEMENT METRICS

Quality Management Models - Rayleigh Model, Problem Tracking Report (PTR) Model, Reliability Growth Model, Model Evaluation, Orthogonal Classification.

UNIT IV FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE

SQA basics, Software quality in business context, planning for software quality assurance , Product quality and process quality, Software process models, Total Quality Management, QC Tools and Modern Tools.

UNIT V QUALITY ASSURANCE MODELS

Models for Quality Assurance, ISO-9000 – Series CMM, CMMI, Test Maturity Models, SPICE, Malcolm ,Baldrige Model- P-CMM.

UNIT VI SOFTWARE QUALITY ASSURANCE TRENDS

Software Process PSP and TSP , OO Methodology, Clean-room software engineering, Defect injection and prevention -Internal Auditing and Assessments-Inspections & Walkthroughs

TEXTBOOKS:

1. Norman E-Fentor and Share Lawrence Pflieger.” Software Metrics”. International Thomson Computer Press, 1997.
2. Stephen H.Kan.”Metric and Models in software Quality Engineering”, Addison QWesley 1995.
3. S.A.Kelkar,”Software quality and Testing, PHI Learning, Pvt, Ltd., New Delhi 2012.

Syllabus for M. Tech I Year I Semester
 Software Engineering
SOFTWARE CONFIGURATION MANAGEMENT
(PROFESSIONAL ELECTIVE –I)

Code: 5S105

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Course Objectives:

- Understand the basics of software configuration management
- Establish a configuration management infrastructure including libraries & tools
- Implement configuration identification
- Control change to your configuration items & baselines
- Report configuration status & conduct configuration audits
- Manage your software releases
- Learn about the different types of software configuration libraries and how they are used to balance the needs for both flexibility and stability in the software development process
- Learn to identify software configuration items and baselines including methods for assigning unique identifiers to versions and revisions of different types of items and baselines
- Explore the use of different levels of configuration control and the roll of Configuration Control Boards (CCBs) including performing impact analysis on proposed changes
- Learn about the types of questions that a good configuration status accounting system should be able to answer

UNIT I INTRODUCTION TO CONFIGURATION MANAGEMENT

What is Configuration Management, Where does Configuration Management fit in the software engineering life-cycle: The software development process , Pitfalls in the software development process, The need and importance of Configuration Management

UNIT II BASIC CONFIGURATION MANAGEMENT CONCEPTS

Configuration identification, Configuration control, Status accounting, Change management, Source and derived items, Revisions/Versions, Deltas, Branching, parallel development, Baselines and releases, Conditional code, Check-in and checkout, Verification and audits, Configuration Management responsibilities.

UNIT III CONTROLLING CHANGE ACTIVITY, THE KEY QUESTIONS

What is my current software configuration, what is its status, How do I control changes to my configuration, How do I inform everyone else of my changes, What changes have been made to my software, Do anyone else's changes affect my software?

UNIT IV CONFIGURATION MANAGEMENT AT THE TEAM

Small team Configuration Management, Medium team Configuration Management, Large (enterprise) team Configuration Management, and who do we really work with? The importance of intergroup coordination. The Configuration Management team, Quality Assurance, Engineering (both R&D and maintenance), the client, the account and project manager

UNIT V THE BUILD PROCESS

What gets built? Where do the builds go: Development environment, QA environment, Customer testing environment, Daily or weekly builds? Automation

UNIT VI CONFIGURATION MANAGEMENT IN STANDARDS AND PROCESS IMPROVEMENT MODELS

Military standards: DOD, MIL

International/commercial standards: ANSI, IEEE, ISO

Process improvement models: CMM/CMMI, ISO/IEC 15504 (SPICE), BOOTSTRAP, Trillium Model.

TEXTBOOKS:

1. Leon, Alexis, *Software Configuration management Handbook, Second Edition*. Artech House Publishers; 2nd edition, 2004. ISBN: 1580538827

2. Humphrey, Watts, *Managing the Software Process*. Addison-Wesley Publishing Company, 1989. ISBN 0-201-18095-2

REFERENCES:

1. Chrissis, Mary Beth, Konrad, Mike, Shrum, Sandy, *CMMI: Guidelines for Process Integration and Product Improvement*. Addison-Wesley Professional, 1st edition, 2003. ISBN: 0321154967

2. Hass, Anne Mette Jonassen, *Configuration Management Principles and Practice*. Addison-Wesley Professional, 1st edition, 2002. ISBN: 0321117662

**Syllabus for M. Tech I Year I Semester
Software Engineering
ARTIFICIAL INTELLIGENCE
(PROFESSIONAL ELECTIVE – II)**

Code: 55113

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Course Objectives:

- To understand the different types of AI agents (c, i).
- Know various AI search algorithms (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms) (a, b).
- To understand the fundamentals of knowledge representation (logic-based, frame-based, semantic nets), inference and theorem proving (a, b, c).
- Know how to build simple knowledge-based systems (i).
- Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information (a, c).
- Ability to apply knowledge representation, reasoning, and machine learning techniques to real-world problems (c, i).
- Ability to carry out independent (or in a small group) research and communicate it effectively in a seminar setting.

UNIT I

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT II

Searching: Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search, A* search Game Playing: Adverbial search, Games, minimax, algorithm, optimal decisions in multiplayer games, Alpha-Beta pruning, Evaluation functions, cutting of search. **Case studies:** Tic-tac-toe game

UNIT III

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propos ional logic, Resolution, Forward & Backward, Chaining.

UNIT IV

First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT V

Planning: Classical planning problem, Language of planning problems, Expressiveness and extension, planning with state – space search, Forward states space search, Backward states – space search, Heuristics for states space search. Planning with state space search, partial order planning, Graphs. **Case studies:** STRIPS

UNIT VI

Learning: Forms of learning, Induction learning, Learning Decision Tree, Statistical learning methods, Learning with complex data, learning with hidden variables – EM algorithm, Instance based learning, Neural Networks.

Case studies: Constructing Neural Network with MATLAB or SCILAB for AND, OR and EX-OR gates

TEXT BOOKS

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
2. Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education.

REFERENCES

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
2. Artificial Intelligence and Expert Systems – Patterson PHI.
3. Expert Systems: Principles and Programming- Fourth Edn, Giarrantana/ Riley, Thomson.
 4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education

Syllabus for M.Tech I Year I Semester
Software Engineering
NETWORK SECURITY AND CRYPTOGRAPHY
(PROFESSIONAL ELECTIVE –II)

Code: 5PC20

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Course Objective:

The students should learn all cryptographic algorithms, attacks on information passing through the network. After completion of this course, they are in a position to implement several authentication and encryption algorithm. They understand the security protocols in different layers.

UNIT - I

Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs.

UNIT - II

Conventional Encryption Principles, Conventional encryption algorithms: DES, TDES, AES, cipher block modes of operation, location of encryption devices, key distribution, Approaches of Message Authentication, Secure Hash Functions: SHA1 and HMAC.

Public key cryptography principles, public key cryptography algorithms: RSA, DIFFIE HELL MAN, digital signatures, digital Certificates, Certificate Authority and key management
 Kerberos, X.509 Directory Authentication Service.

UNIT - III

Email privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT - IV

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT – V

Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Intruders, Viruses and related threats.

UNIT - VI

Firewall Design principles, Trusted Systems. Intrusion Detection Systems.

TEXT BOOKS :

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn Ido Dubrawsky, Steve W.Manzuik and Ryan Perme, wiley Dreamtech

REFERENCES :

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.

Syllabus for M. Tech. I Year I semester
Software Engineering
MOBILE COMPUTING
(PROFESSIONAL ELECTIVE –II)

Code: 5P117

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Course Objectives:

1. Identify vast application areas for mobile / wireless communication / computing. They also understand the working principle of GSM technology.
2. Discuss various media access control methods that are meant for wireless communication along with SDMA, FDMA, TDMA and CDMA.
3. Identify IP mobile primitives in Network layer in the wireless communication and recognize suitable solutions for the same.
4. Explain the issues in the Transport layer in wireless communication and identifying suitable solutions for the same
5. Discuss MANETs with examples and explain hoarding, client sever computing along with the data delivery mechanisms.
6. Discuss protocols and tools such as WAP, Blue Tooth and explain emerging mobile operating systems.

UNIT - I

Introduction to Mobile Communications and Computing: Mobile Computing (MC): Introduction to MC, novel applications, limitations, introduction to mobile architecture - UMTS, GSM.

Architecture GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services.

UNIT - II

(Wireless) Medium Access Control: Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT - III

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

UNIT - IV

Mobile Transport Layer: Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT - V

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing algorithms.

Database: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, data delivery mechanisms

UNIT - VI

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management), introduction to mobile operating systems- Android, Java OS (J2ME).

TEXT BOOKS

1. Jochen Schiller, "Mobile Communications", *Addison-Wesley*. (Chapters 1, 2, 3, 4, 7, 8 and 9). Second edition, 2004.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing", *Wiley*, 2002, ISBN 0471419028. (Chapters 6, 11, 15, 17, 18, 19, 26 and 27)

REFERENCES

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004,
2. Adelstein, Frank, [Gupta, Sandeep KS](#), [Richard III, Golden](#), [Schwiebert, Loren](#), "Fundamentals of Mobile and Pervasive Computing", ISBN: 0071412379, McGraw-Hill Professional, 2005.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", *Springer*, second edition, 2003.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", *Wiley DreamTech*, 2003
5. A. Tanenbaum "Computer Networks", 4th edition.

**Syllabus for M. Tech I Year I Semester
ADVANCED OPERATING SYSTEMS
(PROFESSIONAL ELECTIVE –II)**

Code: 5P108

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Course Objectives:

On successful completion of the course, the student should be able to

1. Study and explore the internals of different types of operating system.
2. Explain advanced concepts in distributed operating systems.
3. Identify advanced topics such as multimedia operating systems, real-time operating systems and mobile computing.
4. To understand different memory management techniques.
5. Identify the methods used in defining and assessing criteria for measuring the extent to which a computer system is appropriate for its current deployment and future evolution

UNIT – I:

Operating System Introduction, Structures-Simple Batch, Multi Programmed, time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating-System Services, System Calls, Virtual Machines, System Design and Implementation, Microsoft Windows Overview, Modern UNIX Systems Overview, Linux Overview .

UNIT – II: Process and CPU Scheduling - Process concepts and scheduling, Operation on processes, Cooperating Processes, Threads, and Inter process Communication Scheduling Criteria, Scheduling Algorithm, Multiple -Processor Scheduling, Real-Time Scheduling, Windows XP Thread and SMP Management , Linux Process and thread Management , Linux Scheduling , Windows XP Scheduling.

UNIT – III: Memory Management and Virtual Memory, Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging. Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithm, Allocation of Frames, Thrashing, Linux Memory Management, Windows XP Memory Management.

UNIT – IV: File System Interface and Implementation -Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free space Management, Directory Management, Directory Implementation, Efficiency and Performance. Deadlocks – System Model, Dead locks Characterization, Methods for Handling Dead locks, Dead lock, Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

UNIT – V: Process Management and Synchronization - The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors, UNIX Concurrency Mechanism, Linux Kernel Concurrency Mechanism, Windows XP Concurrency Mechanism.

UNIT – VI : Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues. Communication in Distributed systems: remote procedure call and group communication. Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, Election algorithms, the Bully algorithm, a ring algorithm, atomic transactions, Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection. Shared Memory, page based Distributed shared memory, shared variable distributed shared memory.

Text Books:

- 1 Abraham Silberchatz, Peter B. Galvin, Greg Gagne : Operating System Principles, 7th Edition, John Wiley, 2006. (I, II, III, IV, V).
 - 2 Andrew. S.Tanenbaum : Distributed Operating Systems, 1st Edition, PHI, 1995. (VI, VII, VIII).
- Reference Books: 1. Stallings : Operating Systems – Internals and Design Principles, 6th Edition, Pearson Education/PHI, 2009. 2. Charles Crowley : Operating System - A Design Oriented Approach, 1st Edition, TMH, 1998.
3. Andrew S Tanenbaum : Modern Operating Systems, , 3rd Edition, Pearson/PHI,2008. 18
 4. Dhamdhare : Operating Systems – A concept based approach, 2nd Edition, TMH, 2006. 5. Daniel P Bovet and Marco Cesati : Understanding the Linux Kernel, 3rd Edition, O'Reilly, 2005. 6. Distributed Operating Systems – Concepts and Design – Pradeep K. Sinha, IEEE 1997.

Syllabus for M. Tech I Year I semester
Software Engineering
HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE –II)

Code: 5P109

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Course Objectives:

A successful student will be able to:

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Recognize how a computer system may be modified to include human diversity.
3. Select an effective style for a specific application.
4. Design mock ups and carry out user and expert evaluation of interfaces.
5. Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.
6. Use the information sources available, and be aware of the methodologies and technologies supporting advances in HCI.

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design - A brief history of Screen design.

UNIT II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT III

Design process – Human interaction with computers, importance of human characteristics human consideration in Design, Human interaction speeds, understanding business functions.

UNIT IV

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colours, uses problems, choosing colors.

Case studies: windows GUI.

UNIT VI

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices - speech recognition digitization and generation – image and video displays – Printers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES:

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education

Syllabus for M. Tech I Year I Semester
Software Engineering
SOFTWARE REUSE
(PROFESSIONAL ELECTIVE –II)

Code: 5P119

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Course Outcome:

The student must learn

- 1) The basics of software reuse.
- 2) About Establishing and managing reuse Business.
- 3) About Various models used for software reuse.
- 4) About object oriented business engineering

UNIT I INTRODUCTION

Organizing Reuse - Introduction - Motivation for Reuse - Reuse driven organizations - Managing a reuse project - the characteristics of reuse of project - Roles in reuse projects - Adopting a project to reuse - Reuse tools.

UNIT II REUSE METRICS

Managing a repository - The REBOOT component model - Classification - Configuration management of the repository - Managing the repository - Computer supported cooperative working - Process metrics for reuse - Product metrics - Cost estimation - Forming a reuse Strategy - Assessing reuse maturity.

UNIT III REUSABLE COMPONENTS

Practicing reuse - Generic reuse development processes - Develop for reuse - Develop with reuse – Testing reusable components - Object oriented components - Techniques and life cycles

UNIT IV OBJECT ORIENTED DEVELOPMENT FOR REUSE

Object oriented development for reuse - Detailed design for reuse - Implementation for reuse - Verification, test and validation.

UNIT V REUSE PHASES

Development with reuse - with reuse specific activities - Common reuse processes - Phases of development with reuse - Impact of reuse on development cycle.

UNIT VI CLEAN ROOM SOFTWARE ENGINEERING

Re-engineering for reuse - Methodology - Retrieving objects in non-object oriented code-Measurements – Tools support for re-engineering - Overview of clean room software engineering - Phases in clean room method - Box structures algorithms - Adapting the box structures.

Text Books:

1. Even-Andre Karisson, " Software Reuse - A Holistic Approach ", John Wiley and Sons, 1996.
2. Karma McClure, " Software Reuse Techniques - Additional reuse to the systems development process ", Prentice Hall, 1997.

**Syllabus for M. Tech I Year I Semester
Software Engineering
SECURE SOFTWARE ENGINEERING
(PROFESSIONAL ELECTIVE –II)**

Code: 5S106

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Course Objectives:

- Students will demonstrate knowledge of the distinction between critical and non-critical systems.
- Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- Students will author a software requirements document, and formal specification for a software system.
- Students will demonstrate an understanding of the proper contents of a software requirements document.
- Students will demonstrate an understanding of distributed system architectures and application architectures. And the differences between real-time and non-real time systems.
- Students will demonstrate proficiency in rapid software development techniques.
- Students will be able to identify specific components of a software design that can be targeted for reuse.
- Students will demonstrate proficiency in software development cost estimation.
- Students will author a software testing plan.

UNIT – I

Security a software Issue: introduction, the problem, Software Assurance and Software Security, Threats to software security, Sources of software insecurity, Benefits of Detecting Software Security

What Makes Software Secure: Properties of Secure Software, Influencing the security properties of software, Asserting and specifying the desired security properties?

UNIT – II

Requirements Engineering for secure software: Introduction, the SQUARE process Model, Requirements elicitation and prioritization

UNIT – III

Secure Software Architecture and Design: Introduction, software security practices for architecture and design: architectural risk analysis, software security knowledge for architecture and design: security principles, security guidelines and attack patterns

UNIT – IV

Secure coding and Testing: Code analysis, Software Security testing, Security testing considerations throughout the SDLC

UNIT – V

Security and Complexity: System Assembly Challenges: introduction, security failures, functional and attacker perspectives for security analysis, system complexity drivers and security

UNIT – VI

Governance and Managing for More Secure Software: Governance and security, Adopting an enterprise software security framework, How much security is enough?, Security and project management, Maturity of Practice

TEXT BOOK:

7. Software Security Engineering: Julia H. Allen, Pearson Education

REFERNCE BOOKS:

1. Developing Secure Software: Jason Grembi, Cengage Learning
2. Software Security : Richard Sinn, Cengage Learning

**Syllabus for M. Tech I Year I Semester
Software Engineering
Research Methodology**

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Code: 5P118

Course Outcomes:

1) After completing the course students are able to understand

- 1) Study the concepts of Research, Characteristics and Prerequisites of research, Research needs in Engineering, Education, Science and Management.
- 2) Study the concepts of conducting a literature search, Evaluating, Organizing, and synthesizing the literature.
- 3) Identifying and describing the research, finding the research Problem, Sources of research problem
- 4) Perform Quantitative / Qualitative Research Design, basic principles of research design.
- 5) Familiar with concept of formatting a research proposal.
- 6) Familiar with writing Research report

UNIT-I

1. Research Methodology: An Introduction

Meaning of Research, Objectives of Research Motivation in Research, Types of Research, Research Approaches, Significance of Research, Research Methods versus Methodology, Research and Scientific Method. Importance of Knowing How Research is Done, Research Process, Criteria of Good Research, Problems Encountered by Researchers in India,

UNIT-II

2. Defining the Research Problem

What is a Research Problem?, Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem, An Illustration, Conclusion .

UNIT-III

3. Research Design

Meaning of Research Design, Need for Research Design, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs, Developing a Research Plan, Conclusion.

UNIT-IV**4. Sampling Design**

Census and Sample Survey, Implications of a Sample Design, Steps in Sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of Sample Designs, How to Select a Random Sample, Random Sample from an Infinite Universe, Complex Random Sampling Designs, Conclusion.

UNIT-V**5. Methods of Data Collection**

Collection of Primary Data, Observation Method, Interview Method, Collection of Data through Questionnaires, Collection of Data through Schedules, Difference between Questionnaires and Schedules, Some Other Methods of Data Collection, Collection of Secondary Data.

UNIT-VI**6. Concept of Hypothesis and Testing**

What is a Hypothesis? Basic Concepts Concerning Testing of Hypotheses, Procedure for Hypothesis Testing, Flow Diagram for Hypothesis Testing, Measuring the Power of a Hypothesis Test, Tests of Hypotheses. Important Parametric Tests, Hypothesis Testing of Correlation Coefficients, Limitations of the Tests of Hypotheses, Chi-square as a Test for Comparing Variance, Chi-square as a Non-parametric Test, Conditions for the Application of χ^2 Test, Steps Involved in Applying Chi-square Test.

Text Books

1. C.R. Kothari, Research Methodology Methods and Techniques, 2/e, Vishwa Prakashan, 2006
2. Donald H.McBurney, Research Methods, 5th Edition, Thomson Learning, ISBN:81-315-0047-0,2006

Reference Books

1. Donald R. Cooper, Pamela S. Schindler, Business Research Methods, 8/e, Tata McGraw-Hill Co. Ltd., 2006.
2. Fuzzy Logic with Engg Applications, Timothy J.Ross, Wiley Publications, 2nd Ed[d]
3. Simulated Annealing: Theory and Applications (Mathematics and Its Applications, by P.J. van Laarhoven & E.H. Aarts[e]
4. Genetic Algorithms in Search, Optimization, and Machine Learning by David E. Goldberg

Syllabus for M. Tech I Year I Semester
Software Engineering
SOFTWARE TESTING LAB AND ADS LAB

Code: 5S171

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Course Objective:

1. In software testing lab the various manual and automation testing processes are carried out to efficiently learn the testing activities.
2. Both commercial and open source testing tools are being taught to better the software testing in detail.
3. According to the software industry requirements the testing tools are taught so that the students can directly make use of testing tools in industry.
4. Enable the students to analyze various data transformation techniques thus simulating the real world scenarios. Students use the data mining tool to perform data mining algorithms (clustering, logistic regression, decision tree, neural network ...) and model implementation.
5. Students will have chance to have hands-on experience on popular data mining tools in the marketplace.
 - Take any system and study its system specifications and report the various bugs.
 - Create a test plan document for any application using any testing standards.
 - Write the test cases for any known application and check their granularity.
6. Perform the following in manual testing process:
 - Understand the functionality of program
 - Prepare a test environment
 - Execute test case(s) manually
 - Verify the actual result
7. Do the following measurements on a chosen software implementation
 1. Halstead's Metrics
 2. McCabe's Metrics
8. Do the following testing for a chosen software implementation using any commercial or freeware tools:
 1. Path-testing
 2. Transaction-flow testing
 3. Data-flow testing
9. Study and related exercises on automated testing tool ((QTP (Quick Test Professional))
10. Study of any open source web testing tool like Selenium.
11. Study on defect tracking and prevention tools like Bugzilla..
12. Study of any open source- testing tool (e.g. test link, OpenSTA).
13. Simulate a test driver: Develop a simple software testing tool implementing any testing technique of your choice.

ADS Lab

1. Write Java programs that use both recursive and non-recursive functions for implementing the following searching methods:
 - a) Linear search
 - b) Binary search
2. Write Java programs to implement the following using arrays and linked lists
 - a) List ADT
3. Write Java programs to implement the following using an array.
 - a) Stack ADT
 - b) Queue ADT
4. Write a Java program that reads an infix expression and converts the expression to postfix form. (Use stack ADT).
5. Write a Java program to perform the following operations:

- a) Construct a binary search tree of elements.
 - b) Search for a key element in the above binary search tree.
 - c) Delete an element from the above binary search tree.
6. Write a Java program to implement all the functions of a dictionary (ADT) using Hashing.
 7. Write a Java program to implement Dijkstra's algorithm for Single source shortest path problem.
 8. Write Java programs that use recursive and non-recursive functions to traverse the given binary tree in
 - a) Preorder b) Inorder c) Postorder.

REFERENCE BOOKS:

1. Data Structures and Algorithms in java, 3rd edition, A.Drozdek, Cengage Learning.
2. Data Structures with Java, J.R.Hubbard, 2nd edition, Schaum's Outlines, TMH.
3. Data Structures and algorithms in Java, 2nd Edition, R.Lafore, Pearson Education.

Syllabus for M. Tech I Year I Semester
Software Engineering
Literature Review and Seminar-1

Code: 5S172

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Max. Marks: 100

After studying this course, the students will be able to

1. Identify a research topic
2. Collect literature
3. Present seminar
4. Discuss the queries

There shall be three seminar presentations during I year I semester and I year II Semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 25 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 20 marks
- Final Report : 20 marks
- Presentation : 60 marks (20 Abstract seminar +40 Final Presentation)

The presentation includes content (5) + Participation (5) + Presentation (10) for a total of 20 marks and double for 40 marks for final presentation

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents:

- Identification of specific topic
- Analysis
- Organization of modules
- Naming Conventions
- Writing style
- Figures
- Feedback
- Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

- I. <http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm>
- II. <http://www.cse.psu.edu/~yuanxie/advice.htm>
- III. <http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf>

NOTE: A student can use any references for this process, but must be shared in classroom.

Syllabus for M. Tech I Year I Semester
Computer Science and Engineering
Comprehensive Viva-Voce-1

Code: 5S173

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Max. Marks: 100

There shall be a Comprehensive Viva-Voce in II year I Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the M.Tech course of study. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce. A candidate has to secure a minimum of 50% to be declared successful.

Syllabus for M. Tech I Year II Semester

Software Engineering

Syllabus for M. Tech I Year II Semester
 Software Engineering
SOFTWARE ARCHITECTURE AND DESIGN PATTERN

Code: 5S207

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Course Objective:

The main purpose of the course is to understanding of the concept of software architecture and how this phase in the development between requirement specification and detailed design plays a central role for the success of a software system. The students will get knowledge of some well-known architecture patterns, and be able to design, construct and evaluate architectures for software systems. The Student understands what a design pattern is, how to describe the design patterns, how design pattern solve design problems, and student be able to identify appropriate patterns for design problems.

UNIT I

Envisioning Architecture

The Architecture Business Cycle, What is Software Architecture, Architectural styles and patterns.

UNIT II

Creating an Architecture

Quality Attributes, Moving from quality to Architecture, UNIT Operations, Achieving qualities, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture, shared information systems

UNIT III

Analyzing Software Architecture

Analyzing development qualities at the architectural level, SAAM, ATAM, CBAM, Architecture Reviews

Moving from Architecture to Systems

Software Product Lines, Building systems from off the shelf components, Reuse of Architectural assets within an organization.

UNIT IV

Patterns

what is pattern? Pattern categories, Pattern Description, Patterns and Software Architecture, Pattern Systems, Classification, Selection, Creational Patterns.

UNIT V

Design Patterns Catalogue, Structural Pattern, Behavioural Patterns, Pattern Community, Designing a document editor

Tools for Architectural design, Unicon, A4 - Exploiting style in architectural design, Architectural Interconnection.

UNIT VI

Case Studies:

Key word in Context, The World Wide Web - a case study in interoperability, Instrumentation software, cruise control, three vignettes in mixed styles, CORBA - a case study on Industry Standard computing infrastructure, Flight Simulation – a case study in architecture for integration, Celsius Tech – a case study in product line development.

TEXT BOOKS

- 1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Edition
2. Design Patterns, by Erich Gamma, Pearson Education
3. Mary Shaw David Garlan, "Software Architectural Perspectives on an emerging discipline ",
EEE, PHI 1996

Syllabus for M. Tech I Year II Semester
Software Engineering
SOFTWARE PROCESS AND PROJECT MANAGEMENT

Code: 5S208

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Course Objectives:

At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project.
- To compare and differentiate organization structures and project structures.
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools.

UNIT I

Software Process Maturity : Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

Process Reference Models Capability Maturity Model (CMM), CMMi, PCMM, PSP, TSP.

UNIT II

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way.

UNIT III

Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model based software architectures.

UNIT IV

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, Minor milestones, Periodic status assessments.

Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT V

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation.

Project Control and process instrumentation The seven core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT VI

CCPDS-R Case Study and Future Software Project Management Practices Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS:

1. Managing the Software Process, Watts S. Humphrey, Pearson Education.
2. Software Project Management, Walker Royce, Pearson Education.

REFERENCE BOOKS:

1. Effective Project Management: Traditional, Agile, Extreme, Robert Wysocki, Sixth edition, Wiley India, rp2011.
2. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
3. Process Improvement essentials, James R. Persse, O'Reilly, 2006
4. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
5. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
6. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007
7. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon 2ed, Wiley India, 2004.

**Syllabus for M. Tech I Year II Semester
Software Engineering
WEB TECHNOLOGIES & SERVICES**

Code: 5P222

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Course Objectives:

The student who has knowledge of programming with java should be able to develop web based solutions using multi-tier architecture. She / He should have good understanding of different technologies on client and server side components as Follows:

Client Side: HTML5, CSS, Javascript, Ajax, and JSON

Server Side: PHP

Web services fundamentals, Axis framework for WS

UNIT I

HTML5: Introduction, Editing HTML5, First HTML5 Example, W3C HTML5 Validation Service, Headings, Linking, Images, Special Characters and Horizontal Rules, Lists, Tables, Forms, Internal Linking, meta Elements, New HTML5 Form input Types, input and datalist Elements and autocomplete Attribute, Page-Structure Elements
Cascading Style Sheets: Introduction, Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking External Style Sheets, Positioning Elements, Backgrounds, Element, Box Model and Text Flow, Media Types and Media Queries, Drop-Down Menus, Text Shadows, Rounded Corners, Color, Box Shadows, Linear Gradients; Introducing Vendor Prefixes, Radial Gradients, Multiple Background Images, Image Borders, Animation; Selectors, Transitions and Transformations, Layouts.

UNIT II

JavaScript: Introduction to Scripting, Control Statements, Functions, Arrays, Objects

UNIT III

XML : Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs) W3C XML Schema Documents, XML Vocabularies, Extensible Stylesheet Language and XSL Transformations, Document Object Model (DOM)

Ajax-Enabled Rich Internet Applications with XML and JSON: Introduction, Rich Internet Applications (RIAs) with Ajax, History of Ajax, "Raw" Ajax Example Using the XMLHttpRequest Object, Using XML and the DOM, Creating a Full-Scale Ajax-Enabled Application.

UNIT IV

PHP Introduction, Simple PHP Program, Converting Between Data Types, Arithmetic Operators, Initializing and Manipulating Arrays, String Comparisons, String Processing with Regular Expressions, FormProcessing and Business Logic, Reading from a Database, Using Cookies, Dynamic Content.

UNIT V: Web Services I

Web Services and Service-Oriented Architecture, History of Web Services, What Is REST?, Review of HTTP Requests and Responses, HTTP as an API, A First RESTful Example, Why Use Servlets for RESTful Web Services? **RESTful Web Services:** The Service Side, The Client Side

UNIT VI: Web Services II

SOAP-Based Web Services, SOAP Handlers and Faults, Web Services Security, Web Services and Java Application Servers

TEXT BOOKS:

1. Internet & World Wide Web How to Program, 5/e Paul J. Deitel, Harvey M. Deitel, Abbey Deitel
2. Java Web Services: Up and Running, 2nd Edition, Martin Kalin, O'Reilly Media

REFERENCE BOOKS:

1. Programming the world wide web,4th edition,R.W.Sebesta,Pearson
2. Web Programming, building internet applications, Chris Bates 3 edition, WILEY Dreamtech .
3. The complete Reference Java 7 Edition , Herbert Schildt., TMH.
4. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp –2008.
5. Understanding SOA with Web Services, Eric Newcomer and Greg Lomow, Pearson Edition –2009
6. Java Web Service Architecture, James McGovern, Sameer Tyagi et al., Elsevier - 2009
7. Beginning Web Programming-Jon Duckett ,WROX.
8. Java Script,D.Flanagan,O'Reilly,SPD.
9. Building Web Services with Java, 2 Edition, S. Graham and others, Pearson Edn., 2008.
10. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
11. McGovern, et al., Java Web Services Architecture, Morgan Kaufmann Publishers,2005.

Syllabus for M. Tech I Year II semester
Software Engineering
DATA WAREHOUSING AND DATA MINING

Code: 5PC23

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Course Objectives:

To enable students to understand and implement classical algorithms in data mining and data warehousing; students will be able to assess the strengths and weaknesses of the algorithms, identify the application area of algorithms, and apply them.

- Define the terminology and explain the basic concepts of data warehousing
- Define the decision support purpose and end goal of a data warehouse
- Develop familiarity with the various technologies required to implement a data warehouse
- Identify the technology and tools from Oracle to implement a successful data warehouse
- Describe methods and tools for extracting, transforming, and loading data
- Identify the tools for accessing and analyzing warehouse data
- Describe the OLAP and Data mining techniques and tools
- Explain the implementation and organizational issues surrounding a data warehouse project

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems

UNIT II

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation

Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes

UNIT III

Concepts Description: Characterization and Comparison: Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

UNIT IV

Mining Association Rules in Large Databases : Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

UNIT V

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT VI

Cluster Analysis Introduction: Introduction to machine learning, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

TEXT BOOK:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India.
2. Introduction to Data Mining - First Edition, by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, ISBN-13: 978-0321321367

REFERENCES:

1. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION.
5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION

Syllabus for M.Tech I Year II Semester
Software Engineering
IMAGE PROCESSING AND PATTERN RECOGNITION
(PROFESSIONAL ELECTIVE –III)

Code: 5PC24

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Course Objectives

1. Covers the basic theory and algorithms that are widely used in digital image processing
2. Expose students to current technologies and issues that are specific to image processing systems
3. Develop applications using image processing techniques
4. Develop critical thinking about shortcomings of the state of the art in image processing
5. Understand fundamental methods of pattern recognition related to Image Processing applications

UNIT I

The digitized image and its properties: Applications of image processing, image function, image representation, sampling, quantization, colour images, metrics and topological properties of digital images, histograms, image quality, noise image. Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform– Separable Image Transforms -Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms, DWT.

UNIT II

Image pre-processing: Pixel brightness transformation, position dependent brightness correction, grey scale transformation; geometric transformation, Histogram equalization ,local pre-processing- image smoothening, Sharpening filters – Homomorphic filtering, edge detectors, zero-crossing, scale in image processing, canny edge detection, parametric edge models, edges in multi spectral images, local pre-processing and adaptive neighbourhood pre processing; image restoration

UNIT III

Image Segmentation-Threshold detection methods, optimal thresholding, multispectral thresholding, thresholding in hierarchical data structures; edge based image segmentation- edge image thresholding, edge relaxation, border tracing, border detection.

UNIT IV

Mathematical Morphology—Basic morphological concepts, four morphological principles, binary dilation, erosion, Hit or miss transformation, opening and closing; thinning and skeleton algorithms; Morphological segmentation - particles segmentation and watersheds, particles segmentation.

UNIT V

Image textures-statistical texture description, methods based on spatial frequencies, co-occurrence matrices, edge frequency, and texture recognition method applications
 Image representation and description-representation, boundary descriptors, regional descriptors

UNIT VI

Pattern recognition fundamentals: Basic concepts of pattern recognition, fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

TEXT BOOKS

1. Image Processing Analysis and Machine Vision by Millan sonka, Vaclav Hiavac, Roger Boyle, Vikas publishing House, Brooks/Cole.
2. Digital Image Processing Second Edition by Rafel C. Gonzalez Richard E. Woods. Pearson Education
3. Pattern Recognition principles by Julius T. Tou and Rafel C. Gonzalez, Addison –Wesley publishing company.
4. Pattern Recognition and Image Analysis by Earl Gose, Richard Johnsonbaugh, Prentice Hall of India private limited, 1999.
5. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.

Syllabus for M. Tech I Year II Semester
Software Engineering
MACHINE LEARNING
(PROFESSIONAL ELECTIVE –III)

Code: 5P225

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Course Objectives:

- IV. This course will cover several advanced topics in Artificial Intelligence.
- V. This is a course of studying common state-of-the-art algorithms for both data compression and error-correcting codes which use the same tools and techniques as machine learning.
- VI. By the end of this course, students should possess a firm grounding in the existing techniques and component areas of Artificial Intelligence and be able to apply this knowledge to the development of Intelligent Systems or to the exploration of research problems.

Unit I

Introduction: Designing a learning system, perspectives and issues in machine learning, a concept learning task, concept learning as search, finding a maximally specific hypotheses, version spaces and the Candidate-Elimination algorithm

Unit II

Decision tree learning: Introduction, representation, appropriate problems for decision tree learning, the basic decision tree learning algorithms, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning

Unit III

Introduction to information theory, probability, entropy and inference, Data compression: The source coding theorem (without proof), limits of compressibility- Huffman coding, hash codes

Unit IV

Probabilities and inference: An example inference task: Clustering, exact inference by complete enumeration, maximum likelihood and clustering, Model comparison and Occam's razor, Monte Carlo methods, efficient Monte Carlo methods

Unit V

Neural networks: Introduction to neural networks, the single neuron as a classifier, capacity of a single neuron, learning as inference

Unit VI

Hopfield networks, boltzmann machines, supervised learning in multilayer networks

Text Books:

1. Machine Learning, Tom M. Mitchell, McGraw Hill, first edition, 1997.
2. Information Theory, Inference, and Learning Algorithms, David J.C. MacKay, first edition, 2005.

Reference Book:

- Pattern Classification, [Richard O. Duda](#), [Peter E. Hart](#), David E Strok, second edition

**Syllabus for M. Tech I Year I semester
Computer Science and Engineering
BIG DATA ANALYTICS
(PROFESSIONAL ELECTIVE –II)**

Code: 5RC16

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BIG DATA ANALYTICS**Course Outcomes:**

The students must able to understand

- 1) The big Data platform, Challenges of Conventional Systems, Predictive Analytics, Data Mining, and Real Time Analysis by providing an advanced, practical background that allows the students to lead and participate in Big Data and Data Analytics projects.
- 2): Regression Modeling - Multivariate Analysis - Bayesian Modeling and Time series analysis.
- 3) The course incorporates a deep-dive into Big Data, the Data Analytics lifecycle, Machine Learning (ML), Hadoop (MapReduce, HDFS) and Tez, as well as the Apache projects Zookeeper, Storm, Kafka, Cassandra, HBase, and Mahout. Various Machine Learning algorithms are scrutinized and actual cases studies are conducted to solve comprehensive Big Data problems.

UNIT I

INTRODUCTION TO BIG DATA: Introduction to BigData Platform – Traits of Big data -Challenges of Conventional Systems - Web Data – Evolution Of Analytic Scalability - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - ReSampling - Statistical Inference - Prediction Error.

UNIT II

DATA ANALYSIS : Regression Modeling - Multivariate Analysis - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Neural Networks: Learning And Generalization - Competitive Learning - Principal Component Analysis and Neural Networks - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees - Stochastic Search Methods.

UNIT III

MINING DATA STREAMS : Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT IV

FREQUENT ITEMSETS AND CLUSTERING : Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And

PROCLUS – Frequent Pattern based Clustering Methods – Clustering in NonEuclidean Space – Clustering for Streams and Parallelism.

UNIT V

FRAMEWORKS AND VISUALIZATION : MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Visualizations - Visual Data Analysis Techniques - Interaction Techniques;

UNIT VI:

Systems and Analytics Applications - Analytics using Statistical packages-Approaches to modeling in Analytics – correlation, regression, decision trees, classification, associationIntelligence from unstructured information-Text analytics-Understanding of emerging trends and technologies-Industry challenges and application of Analytics

TEXT BOOKS:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6. Jiawei Han, MichelineKamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

**Syllabus for M. Tech I Year II Semester
Software Engineering
WIRELESS NETWORKS
(PROFESSIONAL ELECTIVE –III)**

Code: 5P226

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Course Objectives

- To provide an overview of Wireless Communication networks area and its applications in communication engineering.
- To appreciate the contribution of Wireless Communication networks to overall technological growth.
- To understand the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
- To understand the basics of Wireless Communication Networks.
- To motivate the students to pursue research in the area of wireless communication.

UNIT I**MULTIPLE RADIO ACCESS**

Medium Access Alternatives: Fixed-Assignment for Voice Oriented Networks Random Access for Data Oriented Networks , Handoff and Roaming Support, Security and Privacy.

UNIT II WIRELESS WANS

First Generation Analog, Second Generation TDMA – GSM, Short Messaging Service in GSM, Second Generation CDMA – IS-95, GPRS - Third Generation Systems (WCDMA/CDMA 2000)

UNIT III WIRELESS LANS

Introduction to wireless LANs - IEEE 802.11 WLAN – Architecture and Services, Physical Layer- MAC sublayer- MAC Management Sublayer, Other IEEE 802.11 standards, HIPERLAN, WiMax standard.

UNIT IV ADHOC AND SENSOR NETWORKS

Characteristics of MANETs, Table-driven and Source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Classification, MAC and Routing protocols.

UNIT V WIRELESS MANS AND PANS

Wireless MANs – Physical and MAC layer details, Wireless PANs – Architecture of Bluetooth Systems, Physical and MAC layer details, Standards.

UNIT VI PROTOCOLS:

Wireless Application Protocol-WAP. (Introduction, Protocol architecture, and treatment of protocols of all layers), Bluetooth(user scenarios, physical layer, MAC layer, networking, security, link management).

TEXT BOOKS:

1. William Stallings, "Wireless Communications and networks" Pearson / Prentice Hall of India, 2nd Ed., 2007.
2. Dharma Prakash Agrawal & Qing-An Zeng, "Introduction to Wireless and Mobile Systems", Thomson India Edition, 2nd Ed., 2007.

REFERENCES:

1. Vijay. K. Garg, "Wireless Communication and Networking", Morgan Kaufmann Publishers, 2007.
2. Kaveth Pahlavan, Prashant Krishnamurthy, "Principles of Wireless Networks", Pearson Education Asia, 2002.
3. Gary. S. Rogers & John Edwards, "An Introduction to Wireless Technology", Pearson Education, 2007.
4. Clint Smith, P.E. & Daniel Collins, "3G Wireless Networks", Tata McGraw Hill, 2nd Ed,

Syllabus for M. Tech. I Year II semester
Software Engineering
SEMANTIC WEB AND SOCIAL NETWORKS
(PROFESSIONAL ELECTIVE –III)

Code: 5PC14

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Course Objectives

Understanding the basic principles of knowledge representation and the Semantic Web. Familiarity with the Propositional Logic and the Predicate Logic. Ability to represent a problem as a CSP. Understanding the use of algorithms for solving CSPs. Familiarity with the Satisfiability concept. Ability to understand and use structured Web documents. Ability to understand and use ontology description languages. Ability to understand and use ontology querying languages.

Unit I

Web Intelligence: Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web.

Unit II

Machine Intelligence: Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Unit III

Knowledge Representation for the Semantic Web: Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web –Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

Unit IV

Ontology Engineering: Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

Unit V

Semantic Web Applications, Services and Technology: Semantic web Vision, Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

Unit VI

Social Network Analysis and Semantic web: What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.
3. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J.Davies,Rudi Studer,Paul Warren,JohnWiley&Sons.

REFERENCE BOOKS:

1. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers (Taylor & Francis Group)
2. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
3. Programming the Semantic Web, T. Segaran, C. Evans, J. Taylor, O'Reilly, SPD.
4. A Semantic Web Primer, G. Antoniou and V. Harmelen, PHI.

Syllabus for M. Tech I Year II Semester
Software Engineering

Mobile Application Développement

Code: 5P221

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Course Outcome:

The student must learn

- 1) Skills learned in the Multimedia Technology.
- 2) Students will be exposed to a variety of software applications (includes the Internet, Adobe Photoshop, Illustrator, InDesign, Premiere, Flash and Dreamweaver). Students will be assigned projects in which they will work closely with staff. These projects will included but are not limited to: creating a multimedia graphics presentation, researching information from the Internet and other library sources, taking and editing photographs, creating a layered image for publishing, creating an advertisement, creating a business brochure, creating a cartoon, creating a tourism movie on a specified town, creating website(s), and creating an animated movie.

UNIT-I

Fundamental concepts in Text and Image: Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT-II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT-III

Multimedia data compression: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT-IV

Action Script I: ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class

UNIT-V

Action Script II: Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions

UNIT VI

Application Development: An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.
2. Essentials ActionScript 2.0, Colin Moock, SPD O,REILLY.

REFERENCE BOOKS:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson.
6. Multimedia Technology and Applications, David Hilman , Galgotia.

Syllabus for M. Tech. I Year II semester
Software Engineering
SOFTWARE RISK MANAGEMENT AND MAINTAINANCE
(PROFESSIONAL ELECTIVE –III)

Code: 5P228

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Course Objectives

Upon completion of the course, students would have obtained:

- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, safety, and sustainability.
- Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
- An ability to identify, formulate, and solve engineering problems.
- An understanding of professional and ethical responsibility.
- An ability to communicate effectively.
- Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.
- A recognition of the need for, and an ability to engage in life-long learning.

UNIT I: RISK CULTURE PROCESS

Risk- Basic Terms- Risk Vocabulary – Risk- Driven Project Management- Controlling the Process, Environment and Risk- Maturity in Risk Culture – Risk Scale – Preparing for Risk

UNIT II MANAGEMENT PROCESS

Risk Management- Paradigms- Five Models of Risk Management – Thinking about Less Risky alternatives – Risk Management at Different Levels – Risk Escalation – Risk Models- Risk Intelligence - Software Risk Management steps.

UNIT III: DISCOVERING RISK AND ASSESSMENT

Identifying software risk- Classification of Risks – Risk Taxonomy – Risk Mapping – Statements – Risk Reviews – Risk Ownership and stakeholder management – Risk Assessment Approach – Risk Assessment tools and techniques – Risk Probability, impact, exposure, matrix and Application Problem- Self- assessment checklist.

UNIT IV : RESPONDING TO RISKS AND TRACKING

Special Treatment for Catastrophic risks- Constraint Risks – Risk Mitigation Plan Case Study – Contingency Plans- Implementing Risk Response- Tracking Risk Response and Hazards – Trigger Levels- Tracking Project Risks and Operational Risks- Learning by Tracking and Risk Tracker Tool.

UNIT V: MAINTENANCE PROCESS

Software Maintenance- Customer's Viewpoint- Economics of Maintenance- Issues in Maintenance- Software Maintenance Standard, Process, Activities and Categories – Maintenance Measurement – Service Measurement and Benchmarking – Problem Resolution- Reporting – Fix Distribution.

UNIT VI: ACTIVITIES FOR MAINTENANCE

Role of SQA for Support and Maintenance – SQA tools for Maintenance- Configuration Management and Maintenance – Maintenance of Mission Critical Systems – Global Maintenance Teams – Foundation of S3m Process Model- Exemplary Practices.

REFERENCES:

1. C. RavindranathPandian, "Applied Software Risk Management: A guide for Software Project Managers", Auerbach Publications, 2007.
2. John Mcmanus, "Risk Management in Software Development Projects", Elsevier Butterworth- Heinemann, First Edition, 2004.
3. Alian April and Alain Abran, "Software Maintenance Management: Evaluation and Continuous Improvement", John Wiley & Sons Inc, 2008.
4. Gopalswamy Ramesh and Ramesh Bhattiprolu, "Software Maintenance: Effective Practices for Geographically Distributed Environments", Second Reprint, Tata McGraw- Hill, 2009.

M. Tech I year II semester
 Software Engineering
BANKING OPERATIONS, INSURANCE & RISK MANAGEMENT
 Open Elective – I

| L | T | P/D | C |
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Code: 5ZC03

Course Objective: The objective of the course is to provide to students an understanding of Banking Operations, Insurance Market, and Risk Management Principles and techniques to control the risk, & the major Institutions involved and the Services offered within this framework.

UNIT I

INTRODUCTION TO BANKING BUSINESS: Introduction to Banking sectors-History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank New Dimensions and products- E-Banking, Mobile-Banking, Net Banking, CRM, cheque system and KYC system.

UNIT II

BANKING REFORMS AND REGULATIONS: Banking regulation Act-1949, Reserve Bank of India Act-1934, Establishment of RBI, Functions and credit control system; Role of commercial banks and its functions. Banking sector reforms in India and deficiencies in Indian banking including problems accounts and Non-Performing Assets.

UNIT III

INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance; life insurance and its products: Role of Agents and brokers.

UNIT IV

INSURANCE BUSINESS ENVIRONMENT: Regulatory and legal frame work governing the insurance sector, history of IRDA and its functions: Business and economics of insurance, need for changing mindset and latest trends.

UNIT V

INTRODUCTION TO RISK MANAGEMENT: Introduction to Risk, meaning and types of risk in business and individual, Risk management process, methods: Risk identification and measurement, Risk management techniques; Non insurance methods.

UNIT VI

FINANCIAL RISK MANAGEMENT: Introduction to Financial markets. Financial risk management techniques –Derivatives, Hedging and Portfolio management techniques: Derivatives and types of Derivatives-Futures, options and swaps: Shares, Commodity and Currency trading in India.

Books Recommended:

- Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
- General Principles of Insurance Harding and Evariantly
- Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
- Reddy K S and Rao R N: Banking and Insurance, Paramount publishers, 2013

References:

- Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
- Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
- G. Koteswar: Risk Management Insurance and Derivatives, Himalaya, 2008.
- Gulati: Principles of Insurance Management, Excel, 2009.
- James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 2009.
- Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
- P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
- Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.
- Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e,PHI, 2012.

M. Tech I year II semester
Software Engineering
INTELLECTUAL PROPERTY RIGHTS
Open Elective – I

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Code: 5QC33

Unit I: Introduction: Discovery, Creativity, Innovation, Invention, Need for IPR, Types of IPR, Genesis & development of IPR in India

Unit II: Patents: Definition, Scope, Protection, Patentability Criteria, Types of Patents (Process, Product & Utility Models), Case studies on Patents (Basmati Rice, Turmeric, Neem), Software Patenting.

Unit III: Patent Searching & Filing: Types of Searching, Public & Private Searching Databases, Drafting & Filing of Patent applications, Patent Cooperation Treaty (PCT), Patent infringement.

Unit IV: Types of IPR-I: Copyrights – Definition, granting, infringement, searching & filing, distinction between copy rights and related rights; Trade Marks - role in commerce, importance, protection, registration, Domain names; Case Studies.

Unit V: Types of IPR-II: Trade Secrets, Unfair competition; Industrial Designs – Scope, protection, filing, infringement; Semiconductors, Integrated Circuits & Layout design; Geographical Indications & Appellations of Origin; Case Studies.

Unit VI: International and National Conventions & Treaties: Overview, WTO, GATT, TRIPS, WIPO, Berne Convention, Universal Copyright Convention, the Paris Convention, Madrid Protocol, Rome convention, Budapest Treaty, Hague agreement, Locarno agreement, Indian Patents Law, Copyright Law, Trademark Law, Trade secret Law, GI Law, Designs Act.

Text Book:

1. Deborah E. Bouchoux, Intellectual Property for Paralegals – The law of Trademarks, Copyrights, Patents & Trade secrets, 3rd Edition, Cengage learning, 2012
2. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property, Eastern Book Company, Lucknow, 2009.

References

1. M. M. S. Karki , Intellectual Property Rights: Basic Concepts, Atlantic Publishers, 2009
2. Neeraj Pandey & Khushdeep Dharni, Intellectual Property Rights, Phi Learning Pvt. Ltd
3. Ajit Parulekar and Sarita D' Souza, Indian Patents Law – Legal & Business Implications; Macmillan India Ltd, 2006.
4. B. L. Wadehra. Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000.
5. P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010

M. Tech I year II semester
Software Engineering
EMBEDDED SYSTEMS
Open Elective – I

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Code: 5T217

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UNIT-1

Introduction to Embedded Systems : Introduction, Complex Systems and Microprocessor, The Embedded System Design Process, Formalisms for System Design. (Chapter I from Text Book 1, Wolf).

Unit – II

8051 Micro controller : Hardware, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/Output, Interrupts. (Chapter 3 from Text Book 2, Ayala).

UNIT-III

Basic Assembly Language Programming Concepts : The Assembly Language Programming Process, Programming Tools and Techniques, Programming the 8051. Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instruction. (Chapters 4,5,6,7 and 8 from Text Book 2, Ayala).

UNIT –IV

8051 Interfacing : Interfacing with Keyboards, Displays, D/A and A/D Converters, Programming multiple Interrupts, Serial Data Communication. (Chapter 10 and 11 from Text Book 2, Ayala).

UNIT – V

Introduction to Real – Time Operating Systems : Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management. (Chapter 6 and 7 from Text Book 3, Simon).

UNIT – VI

Basic Design Using a Real-Time Operating System : Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS uC-OS / Vx-Works / RT Linux; Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

TEXT BOOKS :

1. Computers and Components, Wayne Wolf, Elseveir.
2. The 8051 Microcontroller, Third Edition, Kenneth J.Ayala, Thomson.
3. An Embedded Software Primer, David E. Simon, Pearson Education.

REFERENCES :

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Micro Controllers, Ajay V Deshmukhi, TMH.
4. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
5. Microcontrollers, Raj kamal, Pearson Education.

Syllabus for M. Tech I Year I Semester
Software Engineering

ENTREPRENEURSHIP AND INNOVATION
(OPEN ELECTIVE)

Code: 5ZC13

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After studying this course, the students will be able to

- 1: Acquire qualities of an Entrepreneur
- 2: Understand how to set up an organization
- 3: Carry out SWOT analysis for setting up small business unit
- 4: Acquire decision making managerial behavior
- 5: Develop knowledge on getting financial support from various funding agencies
- 6: Buildup strategies for a successful business

The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise with innovative skills.

Unit 1: Nature of Entrepreneurship; Characteristics, Qualities and skills of an Entrepreneur, functions of entrepreneur, Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, Joint Stock Company and other forms. First-Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies, and Managing Newness.

Unit 2: Aspects of Promotion: Generation of new entry opportunity, SWOT Analysis, Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights- Project Planning and Feasibility Studies- Major steps in product development.

Unit 3: MANAGEMENT OF SMALL BUSINESS:

Pre feasibility study - Ownership - budgeting - project profile preparation - Feasibility Report preparation - Evaluation Criteria- Market and channel selection- Product launching - Monitoring and Evaluation of Business- Effective Management of Small business.

Unit 4: SUPPORT SYSTEMS FOR ENTREPRENEURS:

Institutional Support, Training institution, Financial Institutions and Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments. Research and Development – Marketing and legal aspects, Taxation benefits, Global aspects of Entrepreneurship.

Unit 5: INTRODUCTION TO INNOVATION:

Meaning of innovation, sources of innovative opportunity, 7 sources of innovative opportunity, Principles of innovation, the enablers of innovation, business insights, insights for innovation, technical architecture for innovation, focus on the essence of innovation.

Unit 6: PROCESS AND STRATEGIES FOR INNOVATION:

Process of innovation, the need for a conceptual approach, Factors contributing to successful technological innovation, Strategies that aim at innovation, impediments to value creation and innovation.

Text Books:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009
2. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.

References:

1. Bholanath Dutta: Entrepreneurship – Text and cases, Excel, 2009.
2. Vasanth Desai: Entrepreneurship, HPH, 2009
3. Barringer: Entrepreneurship, Pearson,2009.
4. Peter Drucker (1993), “Innovation and Entrepreneurship”, Hyper Business Book.
5. C.K. Prahalad, M.S. Krishnan, The new age of Innovation – Tata McGraw-Hill, Edition 2008

M. Tech I year II semester
Software Engineering
ETHICS, MORALS, GENDER SENSITIZATION AND YOGA
Open Elective – I

Code: 5H233

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COURSE OUTCOMES**Students will be able to**

- Discriminate between right and wrong from their own behavior and judge the same in others.
- Understand how moral development involves thoughts, feelings, and behaviors regarding right and wrong and get intrapersonal and interpersonal dimensions.
- Understand Engineer's Responsibility for safety and risk.
- Understand rules and principles set by the society in a customary way.
- Perceive gender literacy and understand the importance of gender perspective and in turn delve into gender issues.
- Understand and appreciate the importance of yoga for an enriched life style.

UNIT I: HUMAN VALUES AND MORALS

Why Value Education, Understanding Social Factors, System, Structure and Source of Generic Values; Morals, Values and Ethics; Integrity; Work Ethics; Service Learning-Civic Virtue-Respect for Others-Living Peacefully-Caring-Sharing; Honesty; Courage; Value Time; Cooperation; Commitment; Empathy; Self Confidence; Spirituality; Character; Loyalty; Confidentiality

UNIT II: ENGINEERING ETHICS AND PERSONALITY DEVELOPMENT

Ethical Principles, Ethical Theories, , Use of Ethical Theories, Types of Inquiry, Engineering and Ethics, Engineering Ethics, Moral Autonomy of Engineers, Professional Ethics, Consensus and Controversy, Ethics in Business, Global business, Understanding Factors of Success, Human Aspirations, Personality and Our Identity, Understanding SELF, Happiness and Self-Interest, Positive Thinking, Custom and Religion, Understanding responsibility toward society, Understanding National and cultural Ethos; Professionalism

UNIT III:ENGINEERING AS SOCIAL EXPERIMENTATION

Comparison with Standard Experiments; Knowledge Gained; Learning from the Past; Engineer as Manager, Consultants and leaders and responsible social Experimenter; Engineers personality Trait, Big Five Personality model, Conscientiousness ,Accountability- Roles of Codes-Codes and Experimental Nature of Engineering; Engineer's Responsibility for safety and Risk, Concept of Safety-Types of Risks

UNIT IV: GLOBAL PERSPECTIVE

Distinguish between Bribes and Gifts; Occupational Crimes; Globalization- Cross-Cultural Issues; Environmental Ethics; Internet and Computer Codes of Ethics

Case Study:

Ethics in Military and Weapons Development-Ethics in Research work

UNIT V: GENDER SENSITIZATION

Introduction to Gender Study; Introduction to Gender Spectrum; Point of view; Gender and Structure of Knowledge; Contribution of Women in growth and development as Technologist, Scientist, R&D, GDP, Social Life, National Development, International Perspective”- Life Exemplary Madame Curie, Durga bai Deshmukh, Kalpana Chawla, Chanda Kochar, Mary Kom, Indra Gandhi, Mother Teresa, Indra Nooyi, Golda Meir, Margaret Thatcher and other achievers

UNIT VI: YOGA

Introduction to Yoga in India; Origin and Development; Theoretical understanding of yoga; Stress Management : Modern and Yogic perspectives ; Tackling ill-effects of Frustration, Anxiety and Conflict through modern and Yogic methods; Meditation Techniques; Suryanamaskar; Pranayama.

TEXT BOOKS:

1. *Indian Culture Values And Professional Ethics(For Professional Students)* by Prof.P.S.R.Murthy ; B.S.Publications.
2. *Professional Ethics and Human Values* by M. Jayakumar, Published by University Science Press,
3. Telugu Academy, Hyderabad, 2015, *Towards A World of Equals*, A Bilingual Text Book on Gender.

REFERENCE BOOKS:

1. *The Yoga Sutras of Patanjali* by Swami Satchitananda
2. *The Secret Power of Yoga* by Nischala Joy Devi
3. *Light on Pranayama* by B.K.S. Iyengar
4. *Books on the Art of Living* by Poojya Sri Sri Ravi Shanker
5. *Making It Relevant: Mapping the meaning of women’s studies in Tamilnadu* by Anandi S and Swamynathan P
6. *Feminism is for Everybody; Passionate Politics* by Bell Hooks
7. *Gender* by Geetha V
8. *“Growing up Male” in what is worth teaching* by K Kumar
9. *The Lenses of Gender: Transforming the Debate on Sexual Inequality* - Sandra Lipsitz Bem
10. *The Lenses Of Gender* - by ANNE MURPHY

M. Tech I year II semester
Software Engineering
BIOINFORMATICS
Open Elective

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Code: 5Q4C47

UNIT I : SCOPE OF BIOINFORMATICS and BIOLOGICAL DATABASES

History, definition,, importance and applications of bioinformatics, Introduction to biological data, Organization and management of databases, Nucleotide databases (Genbank,), Protein Databases(SWISS PROT)

UNIT II: SEQUENCE ALIGNMENT

Basic concepts of sequence homology Dynamic Programming, Dot Matrix analysis, Smith-Waterman Algorithm , Needleman-Wunsch Algorithm ,Scoring matrices: PAM and BLOSUM matrices

UNIT III: SEQUENCE-BASED DATABASE SEARCHES

BLAST and FASTA algorithms, various versions of basic BLAST and FASTA, Use of these methods for sequence analysis including the on-line use of the tools and interpretation of results.

UNIT IV: MULTIPLE SEQUENCE ALIGNMENT

Basic concepts of various approaches for MSA (e.g. progressive, hierarchical etc.). Algorithm of CLUSTALW and its application

UNIT V: PHYLOGENETIC ANALYSIS

Definition and description of phylogenetic trees. Distance based and character based methods of phylogenetic analysis.

UNIT VI: PROTEIN STRUCTURE PREDICTION

Secondary structure prediction methods, Algorithms of Chou Fasman, GOR methods. Protein homology modeling.

TEXT BOOKS:

1. Bioinformatics. David Mount, 2000. CSH Publications

REFERENCES:

1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.
2. Genomics and Proteomics-Functional and Computational aspects. Springer Publications. Editor-Sandor Suhai.
3. Bioinformatics- Methods and Protocols-Human Press. Stephen Misener, Stephen A. Krawetz.
4. Bioinformatics – A Practical guide to the Analysis of Genes and Proteins – Andreas D.Baxevanis, B.F. Francis Ouellette.

Syllabus for M.Tech I Year II Semester

Software Engineering

WEB TECHNOLOGIES AND INFORMATICA LAB**Code: 5P273**

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Course Objectives:

1. Write syntactically correct HTTP messages and describe the semantics of common HTTP methods and header fields
2. Discuss differences between URIs, URNs, and URLs, and demonstrate a detailed understanding of http-scheme URLs, both relative and absolute
3. Describe the actions, including those related to the cache, performed by a browser in the process of visiting a Web address
4. Install a web server and perform basic administrative procedures, such as tuning communication parameters, denying access to certain domains, and interpreting an access log
5. Write a valid standards-conformant HTML document involving a variety of element types, including hyperlinks, images, lists, tables, and forms
6. Use CSS to implement a variety of presentation effects in HTML and XML documents, including explicit positioning of elements
7. Demonstrate techniques for improving the accessibility of an HTML document

LIST OF EXERCISES:

- 1) Create a simple webpage using HTML5.
- 2) Use frames to Include Images and Videos.
- 3) Add a Cascading Style sheet for designing the web page.
- 4) Design a dynamic web page with validation using JavaScript.
- 5) Design a catalogue in PHP with AJAX.
- 6) Simple application to demonstrate Web Service.
- 7) Design a simple online test web page in PHP.

Informatica Lab

1. Build a Data Warehouse to perform filter transformation for the employee database.
2. Add the commission of 1000 Rs in the Salary field of Employee table using Expression Transformation.
3. Using Aggregator transformation display the average salary of employees in each departments.
4. Using Joiner transformation display the Sailor_Name form Sailors table and Boat_Name from Boats table in a new table.

**M. Tech I year II semester
Software Engineering
LITERATURE REVIEW & SEMINAR - 2**

Code: 5S274

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Max. Marks: 100

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After studying this course, the students will be able to

1. Identify a research topic
2. Collect literature
3. Write technical review paper
4. Present seminar
5. Discuss the queries and Publish research paper

There shall be three seminar presentations during I year I semester and I year II Semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the Department in a report form and shall make an oral presentation before the Departmental Committee, which shall consist of the Head of the Department, a senior Faculty Member and the Supervisor and will jointly evaluate the report and presentation. For each Seminar there will be only internal evaluation of 25 marks. A candidate has to secure a minimum of 50% to be declared successful.

In the First semester the report must be in the form of the review paper with a format used by IEEE / ASME etc. In the Second semester Technical Seminar in the form of Independent Review Paper must be of high quality fit for publication in a reputed conference / journal.

The evaluation format for seminar is as follows:

- Day to day evaluation by the Supervisor : 20 marks
- Final Report : 20 marks
- Presentation : 60 marks (20 Abstract seminar +40 Final Presentation)

The presentation includes content (5) + Participation (5) + Presentation (10) for a total of 20 marks and double for 40 marks for final presentation.

A Student has to concentrate on the following sections while writing technical paper or presenting seminar.

Contents:

- Identification of specific topic, Analysis
- Organization of modules, Naming Conventions
- Writing style, Figures
- Feedback,
- Miscellaneous

REFERENCES:

Teach Technical Writing in Two Hours per Week by Norman Ramsey

For Technical Seminar the student must learn few tips from sample seminars and correcting himself, which is continues learning process

REFERENCE LINKS:

VII. <http://www.cs.dartmouth.edu/~scot/givingTalks/sld001.htm>

VIII. <http://www.cse.psu.edu/~yuanxie/advice.htm>

IX. <http://www.eng.unt.edu/ian/guides/postscript/speaker.pdf>

NOTE: A student can use any references for this process, but must be shared in classroom.

Syllabus for M. Tech I Year I semester
Software Engineering

PROJECT SEMINAR - 1

Code: 5P275

| L | T | P | C |
|----------|----------|----------|----------|
| - | - | 3 | 2 |

Max. Marks: 100

In I year II semester, a project seminar shall be conducted for 25 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 10 marks and the end semester seminar evaluation shall carry 15 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 5 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 50% to be declared successful.

Syllabus for M. Tech I Year I semester
Software Engineering

COMPREHENSIVE VIVA-VOCE – 2

Code: 5S276

| | | | |
|----------|----------|----------|----------|
| L | T | P | C |
| - | - | - | 1 |

Max. Marks: 100

There shall be a Comprehensive Viva-Voce in II year I Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the M. Tech course of study. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce. A candidate has to secure a minimum of 50% to be declared successful.

Syllabus for M. Tech II Year I Semester

Software Engineering

Syllabus for M. Tech II Year I semester
Software Engineering
PROJECT SEMINAR - 2

Code: 5S377

| L | T | P | C |
|----------|----------|----------|----------|
| - | - | - | 4 |

Max. Marks: 100

In II year I semester, a project seminar shall be conducted for 100 marks and for 4 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 20 marks and the end semester seminar evaluation shall carry 30 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 10 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 50% to be declared successful.

Syllabus for M. Tech II Year I semester
Software Engineering

PROJECT WORK (PART I)
PROJECT STATUS REPORT

Code: 5S378

| L | T | P | C |
|----------|----------|----------|-----------|
| - | - | - | 20 |

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the Project Review Committee.

A Project Review Committee (PRC) shall be constituted comprising of Heads of all the Departments which are offering the M.Tech programs and three other senior faculty members concerned with the M.Tech. programme.

Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the previous semesters and after obtaining the approval of the PRC.

After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the PRC for its approval. Only after obtaining the approval of PRC the student can initiate the Project work. This process is to be completed within four weeks of commencement of II year I semester.

The student shall submit a project report at the end of II year I semester, and the same shall be evaluated at the end of that semester by the PRC as Excellent/Good/Satisfactory/Unsatisfactory. In the case of Unsatisfactory declaration, the student shall re-submit the Project report after carrying out the necessary modifications / additions in the Project work, within the specified time as suggested by the PRC.

Syllabus for M. Tech II Year II semester
Software Engineering
PROJECT SEMINAR-3

Code: 5S479

| L | T | P | C |
|----------|----------|----------|----------|
| - | - | - | 2 |

Max. Marks: 100

A project seminar shall be conducted for 100 marks and for 2 credits (there is no external evaluation). The evaluation for the project seminar shall be done in two stages, i.e. in the middle of the semester and at the end of the semester. The mid-semester seminar evaluation shall carry 20 marks and the end semester seminar evaluation shall carry 30 marks. The report for the mid-semester project seminar will carry 5 marks and remaining marks shall be for presentation and discussion. The report for end semester project seminar shall be for 20 marks and the remaining marks shall be for presentation and discussion. A candidate shall secure a minimum of 50% to be declared successful.

Syllabus for M. Tech II Year II semester
Software Engineering
PRE-PROJECT SUBMISSION SEMINAR

Code: 5S480

| L | T | P | C |
|----------|----------|----------|----------|
| - | - | - | 2 |

Marks: 100

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the Project Review Committee.

A Project Review Committee (PRC) shall be constituted comprising of Heads of all the Departments which are offering the M.Tech programs and three other senior faculty members concerned with the M.Tech. programme.

Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the previous semesters and after obtaining the approval of the PRC.

After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work to the PRC for its approval. Only after obtaining the approval of PRC the student can initiate the Project work. This process is to be completed within four weeks of commencement of II year I semester.

The student shall submit a project report at the end of II year I semester, and the same shall be evaluated at the end of that semester by the PRC as Excellent/Good/Satisfactory/Unsatisfactory. In the case of Unsatisfactory declaration, the student shall re-submit the Project report after carrying out the necessary modifications / additions in the Project work, within the specified time as suggested by the PRC.

Syllabus for M. Tech II Year I semester
Software Engineering

PROJECT WORK AND DISSERTATION

Code: 5S481

| | | | |
|----------|----------|----------|-----------|
| L | T | P | C |
| - | - | - | 20 |

By the end of this course, students will be able to

1. Critically and theoretically analyze the systems/products they are going to design or develop.
2. Apply the theoretical knowledge gained to bring out innovative products.
3. Effectively communicate in a variety of forms including written, visual, verbal, online and technical literacy.
4. Work and participate as effective members in a group within a professional environment.
5. Develop an ongoing critical awareness of learning needs in the application of appropriate technologies.
6. Gain as much knowledge and experience in areas of the area of Digital Systems and Computer Electronics

A candidate is permitted to submit Project Dissertation only after successful completion of PG subjects (theory and practical), seminars, Comprehensive viva-voce, PG Project Part-I, and after the approval of PRC, not earlier than 40 weeks from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of thesis to the Head of the Department and shall make an oral presentation before the PRC. Along with the draft thesis the candidate shall submit draft copy of a paper in standard format fit for publication in Journal / Conference, based on the project thesis, to the Head of the Department with due recommendation of the supervisor.

- Four copies of the Project Dissertation certified by the Supervisor and Head of the Department shall be submitted to the College.
- The dissertation shall be adjudicated by one examiner selected by the College. For this, Head of Department shall submit a panel of 3 examiners, who are eminent in that field, with the help of the PRC. The Chief Superintendent of the college in consultation with the college academic committee shall nominate the examiner.
- If the report of the examiner is not favorable, the candidate shall revise and resubmit the Dissertation, in the time frame as prescribed by PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected. The candidate can re-register only once for conduct of project and evaluation of Dissertation, and will go through the entire process as mentioned above. The total duration for the M. Tech program is limited to four years.

If the report of the examiner is favorable, viva-voce examination shall be conducted by a Board consisting of the Head of the Department, Supervisor and the Examiner who adjudicated the Dissertation. The Board shall jointly report the student's performance in the project work as – (a) Excellent, or (b) Good, or (c) Satisfactory, or (d) Unsatisfactory, as the case may be. In case, the student fails in the viva-voce examination, or gets the Unsatisfactory grade, he can re-appear only once for the viva-voce examination, as per the recommendations of the Board. If he fails at the second viva-voce examination, the candidate can re-register only once for conduct of project and evaluation of Dissertation, and will go through the entire process as mentioned above. The total duration for the M. Tech program is limited to four years.