2-year M.Tech. Computer Science & Engineering

Specialization : Software Engineering

Rules, Regulations, Syllabi and Scheme of Instruction & Evaluation

with effect from

2007-2008

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

(Sponsored by Ekasila Education Society)

WARANGAL – 506 015.

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE, WARANGAL – 15
APPROVED BY BOARD OF STUDIES, COMPUTER SCIENCE & ENGINEERING, KAKATIYA UNIVERSITY

KAKATIYA UNIVERSITY, WARANGAL.
ACADEMIC REGULATIONS FOR TWO-YEAR M.TECH. DEGREE PROGRAMMES

1.0 MINIMUM QUALIFICATION FOR ADMISSION

1.0.1 For GATE candidates

The candidates should have passed BE/B.Tech./AMIE in any branch of Engg, / Tech. (or) equivalent Master's Degree in Physics, Statistics, Mathematics or Applied Mathematics, Applied Statistics, Applied Physics, Geophysics, M.Sc. (Comp. Sc.), M.Sc. (Information Systems) (Computer Applications and Electronics) and MCA or equivalent. They should have qualified at the GATE and possess a valid GATE score. The seats will be assigned purely on the basis of merit at GATE.

1.0.2 For Sponsored seats

The candidates should have passed B.E./ B.Tech./AMIE in any branch of Engg, / Tech. (or) equivalent Master's Degree in Physics, Statistics, Mathematics or Applied Mathematics, Applied Statistics, Applied Physics, Geophysics, M.Sc. (Comp. Sc.), M.Sc. (Information Systems) (Computer Applications and Electronics) and MCA or equivalent

The criterion for selection of sponsored candidates shall be their merit at the entrance examination to be conducted by the PGECET.

- Admission shall made into sponsored category only with the candidates who are qualified either GATE / PGECET or as decided by the admission committee.
- His / Her application shall be duly recommended by the sponsoring agency for admission to the court and forwarded to the Convener, PGECET
- He / She must be permanent employee with the sponsoring agency for at least two years as on 30th June,2007, after obtaining the qualifying degree.
- The sponsoring agency must be a Government establishment or a public-sector undertaking, or a reputed private undertaking.
- The sponsoring agency shall certify that the candidates will be granted leave for pursuing the M.E. / M.Tech ./ M.Pharm. / M.Arch. / M.Plan Regular course of study.
- The candidates who are working in Research Projects approved by the competent authority are also required to fulfill the above conditions before they are sponsored for admission.

2.0 CONFERMENT OF THE DEGREE

The degree of Master of Technology in a specified Branch of Engineering will be conferred on a candidate who has fulfilled the following conditions.

2.0.1 The candidate, after admission to the first year of the two year M.Tech. program, has to pursue a regular course of study for two academic years and

2.0.2 The candidate must have satisfied the academic requirements of the specified field of specialization in each semester / year herein after prescribed.

3.0 THE PROGRAMMES OF STUDY

The programs of study prescribed for the degree of Master of Technology shall provide for specialization in the following branch.

3.0.1 Computer Science and Engineering with specialization in Software Engineering.

4.0 REGULAR PROGRAMME OF STUDY

A candidate will be deemed to have pursued a regular program of study as a full time student provided he/she satisfies the following condition:

4.0.1 The candidate must not have enrolled as a student in any other degree or diploma program recognized by the Government or Kakatiya University.

5.0 ATTENDANCE REQUIREMENTS

5.0.1 Attendance requirements of a semester shall be deemed to have been satisfied provided:

5.0.1.1 The candidate puts in a minimum attendance of 75 per cent in each course of instruction prescribed for the semester.

NOTE: The attendance in case of practical classes shall be counted on the basis of the contact periods provided in the scheme of instruction and not on the sessions of engagement. The attendance at the mid-session tests shall not be considered in the computation of the percentage of attendance.

5.0.2 A candidate, who failed to satisfy the above requirements of attendance shall be detained and will not be permitted to appear at the University examinations of that course. A maximum of 10% of attendance can be condoned, on medical grounds, by the Principal with a prior intimation for all the courses of that semester.

5.0.3 The candidate, who has been detained due to shortage of attendance, shall re-register for those courses of the semester when they are next offered.

6.0 DURATION OF A SEMESTER

6.0.1 First and second semester of the M.Tech. degree Programme shall consist of 18 weeks of instruction, including the period of mid-session tests and the University examinations.

6.0.2 Third and fourth semester of the M.Tech. degree program shall consist of Dissertation work for 18 & 24 weeks respectively and 8 weeks of Industrial Training.

7.0 REGISTRATION

7.0.1 All the students are required to get themselves registered for the course work by paying the prescribed tuition fee before the start of course work of each semester failing which they shall not be allowed to attend the course work prescribed for that semester.

7.0.2 Candidates detained due to shortage of attendance are to register within 7 days of commencement of semester failing which they shall not be allowed to attend the course work prescribed for that semester.

7.0.3. Registration shall be the sole responsibility of the student.

8.0 EVALUATION

8.0.1 The performance of the student in every semester thereafter shall be evaluated course-wise as detailed in the scheme of instruction and evaluation.

8.0.2 The pattern of allocation of marks for University Examinations and sessional work shall be the following.

8.0.2.1 Theory courses:

University Examinations	100
Internal Examination	50

8.0.2.2 Laboratory/Seminar/Comprehensive Viva

	Lab	Seminar	Comprehensive Viva-voce
University Examinations	50	--	100
Internal Examinations (by Continuous Evaluation)	50	100	--

8.0.3 Internal evaluation of theory courses in each of the semesters shall be based on two mid-session tests of two hours duration. Best of the two tests shall be considered for the award of Internal marks.

8.0.4 For the elective courses the department has the "choice" not to offer the elective course if five or less than five students only have opted for the course.

8.0.5 Guidelines for Evaluating Laboratory Classes:

The evaluation of Laboratory classes should be divided in to two major components namely, Evaluation on a continued basis and end semester test.

Component 1: (Evaluation on continued basis)
It is recommended to allocate 35 marks to this component. These marks are to be awarded for every experiment carried out by the student in his/her regular practical class on weekly basis.

Component 1.1: Experiment (20 marks)
The student is required to write the principle, theory and calculation method of the experiment allotted to him either in the observation notebook or on a separate sheet immediately after entering the laboratory. At the end of the experiment the student should show the observations and the result to the teacher. The marks of this sub-component are to be awarded taking all the points mentioned above into consideration.

Component 1.2 : Submission of Record Book (15 marks)
The student has to submit the practical record book updated every week. The teacher has to ask a few viva questions based on the experiment carried out by the student in the previous class. The marks awarded in this sub-component should be reduced depending on the extent of delay in the submission of record book.

The marks of component 1.1 & component 1.2 are to be entered separately by the staff members in students attendance registers regularly.

Component 2: (Evaluation at the end of the semester): (15 Marks)

An internal assessment laboratory test and the viva-voce are to be conducted at the end of the semester.

8.0.6 Guidelines for Seminar:

8.0.6.1 The Students of M.Tech. I semester are to register a relevant topic with in 4 weeks of commencement of semester class work and submit the same to the department.

8.0.6.2 Evaluation of seminar consists of two components namely Report (50 marks) and Presentation (50 marks)

8.0.6.2.1 Report: Students are required to submit a report on the chosen seminar topic as per the prescribed format and last date specified by the Departmental Post Graduate Review Committee (DPGRC)

8.0.6.2.2 Presentation: The students are required to deliver the seminar before the DPGRC as per the schedule notified by the department.

DPGRC will decide the course of action on the students who fail to submit the report and present the seminar.

8.0.7 Guidelines for Industrial Training:

1. M.Tech. Coordinator in consultation with the Training & Placement section has to procure training-cum-dissertation slots, for the students before the last day of instruction of II semester.
2. The students are to confirm their training slot by the last day of II semester.
3. The students after 8 weeks of Industrial Training shall submit a certificate, and the last date specified and a report in prescribed format by the DPGRC.

   The DPGRC will decide the course of action on the students who fail to submit the training certificate and report.

8.0.8 Guidelines for Dissertation:

The **Department Post-Graduate Review committee** is to be constituted with 5 members i.e. Chairman – Head of the Department, Convenor – M.Tech. Coordinator and 3 other faculty members including supervisor.

The committee is to evaluate the progress of the Dissertation conducting 2 presentations in third semester and monthly presentations in fourth semester.

III – Semester **Total Marks – 100**

50 marks for presentations
50 marks for regular evaluation by supervisor.

1st presentation (Registration Seminar) after 6 weeks from the commencement of the semester for 25 marks
2nd presentation (Progress Seminar) after 12 weeks from the commencement of the semester for 25 marks

Registration Seminar : Project proposal (problem specification, expected out come)

IV – Semester Total Marks – 100

Progress Seminar : Status of the dissertation – work already carried out, balance of work to be carried out – Progress seminars are to be carried out every month between 1st and 5th.

Synopsis Seminar: Together with synopsis a presentation to be made and the dissertation should be demonstrated two weeks before the submission date.

Supervisors are to evaluate the Dissertation regularly, based on the progress report submitted by the students in every week and the same should be recorded.

The committee should give final marks (evaluation and supervisor marks) and grade them into the following categories.

A - Excellent (90 +)
B - Good (60 – 89)
C - Satisfactory (40 – 59)
D - Not Satisfactory (< 39)

Project work will be carried out in III and IV semesters under the supervision of a faculty member from within the respective department. Students may be permitted to work under the joint guidance of two members of the faculty – in which case, one of the guides may be from an allied department.

A student may, however, be permitted by the Head of the Department concerned to work on a project in an Industrial / Research organization, in the project semesters. In such case, the faculty guiding the student shall be called the internal guide and the scientist / manager guiding, the student (at site) shall be called the external guide.

No student will be allowed to submit the project report before 48 weeks and after 52 weeks from commencement of III semester.

The DPGRC will decide the course of action on the students who fail to submit the dissertation.

9.0 MINIMUM REQUIREMENTS FOR PASSING A COURSE:

9.0.1 A candidate shall be deemed to have passed in a course if he/she secured 40 percent of the marks assigned to the University examination of the course, and

9.0.2 40 percent of the marks assigned to the sessionals and University examination of the course taken together.

10.0 EXAMINATIONS

10.0.1 Examinations for each semester will be conducted once in an academic year.

10.0.2 A candidate who failed in a course (theory or practical) can appear at a subsequent University examination in the same course. However, the sessional marks secured by the candidate in that course during the semester of study shall remain unaltered.

10.0.3 Any candidate appearing for examinations in any course, two years after the first appearance in that course, will be governed by the syllabus in force at the subsequent time.

11.0 ELIGIBILITY FOR AWARD OF DEGREE

11.0.1 A candidate shall be deemed to have satisfied the requirements for the award of the M.Tech. degree provided he/she passes in all the courses including dissertation prescribed in the scheme of instruction within a period of four consecutive years from the year of admission to the Programme.

11.0.2 A candidate who fails to fulfil all the requirements for the award of M.Tech. degree in a period of four consecutive academic years from the year of his/her admission to the M.Tech. degree Programme shall forfeit his/her enrolment to the Programme.

11.0.3 A candidate who is permitted to discontinue may rejoin the course at the appropriate semester only along with the regular students at the time of normal commencement of that semester.

11.0.4 A candidate who discontinues and rejoins shall be governed by the rules, regulations, courses of study and syllabus in force, at the time of his / her rejoining the course.

11.0.5 A student may be permitted by the Head of the Institute to withdraw from the programme for a year, for reasons of ill-health or other valid reasons on the recommendation of the Head of the Department. Such student who discontinues and rejoins shall be governed by the rules, regulations, courses of study and syllabus in force, at the time of his / her rejoining the course.

12.0 AWARD OF DIVISION

Division is awarded as follows:

First Class with Distinction:
Single attempt in every exam and securing 70% or more in aggregate.
First Class:
Securing 60% or more in aggregate.
Second Class:
Securing less than 60% and more than 40% in aggregate.

13.0 GENERAL

13.0.1 The award of degree to a candidate shall be withheld if:-

13.0.1.1 He/she has not cleared dues to the institution/Hostel and/or
13.0.1.2 A case of disciplinary action is pending against him/her

13.0.2 The marks secured in sessional evaluation and University examinations shall be shown separately in the marks sheet.

13.0.3 Whenever ambiguities arise in interpreting the regulations, the Standing Committee of Kakatiya University shall have the power to make rules or to issue clarifications for removing such ambiguities.

13.0.4 The Academic Regulations should be read as a whole for purposes of any interpretation.

13.0.4.1 These academic regulations shall come into force from the year 2007-2008 for the batches of students who will be admitted in 2007-2008 and subsequent academic years.

13.0.5 The Total duration for the course shall normally be 24 calendar months. No course shall commence more than once in an academic year.

13.0.6 A candidate shall have to appear in overall comprehensive Viva-voce examination as laid down in the schemes of instruction and evaluation.

13.0.7 A candidate who had completed the course work of two-semesters shall be required to register in third semester of Master of Technology to the dissertation and defend it through oral examination after the fourth semester.

13.0.8 A candidate who fails in the oral examination for dissertation shall have to defend it again as per recommendation of the Departmental Post-Graduate Review Committee.

13.0.9 For evaluation of each theory examination there shall be two examiners, one from Kakatiya University and another from outside Kakatiya University. Theory papers evaluated in such manner shall be subjected to moderation as per the norms of the Kakatiya University.

For laboratory examination there shall be two examiners, one from Kakatiya University (internal examiner) and another from outside Kakatiya University (external examiner). In case the external examiner does not turn up, another internal examiner appointed by Chief Supdt. of Exams will conduct exam as per schedule.

13.0.10 An examination board will be set up for comprehensive Viva-voce for M.Tech. course as per scheme of instruction and evaluation. The Board shall consist of the following.

(i) Four internal faculty including the Chairman of DPGRC and
(ii) One external examiner.

The Chairman, DPGRC and the external examiner will award marks.

13.0.11 For each dissertation examination there shall be a panel of examiners consisting of one internal examiner and one external examiner.

13.0.12 Every student has to under go Industrial Training for 8 weeks after second semester course work. However the students who are from Industry/ R&D organization are exempted from undergoing industrial Training.

Kakatiya Institute of Technology & Science, Warangal

Department of Computer Science and Engineering

The scheme of instruction and evaluation (Semester wise) for

Post-Graduate Program in

M.Tech(CSE with Specialization in Software Engineering)

SEMESTER – I

Course Number	Name of the Course	Periods per Week		Internal Examination		End Semester Examination		Total
		L/T	P/D	Time (Hrs)	Max Marks	Time (Hrs.)	Max Marks	
SE 1.1	Discrete Mathematics & Optimization Techniques	4	-	2	50	3	100	150
SE 1.2	Object Oriented Software Engineering	3	-	2	50	3	100	150
SE 1.3	Software Project Management	3	-	2	50	3	100	150
SE 1.4	Advanced Operating System	3	-	2	50	3	100	150
SE 1.5	Advanced Computer Architecture	3	-	2	50	3	100	150
SE 1.6	Elective-I	3		-	50	3	100	150
SE 1.7	Seminar		1	Report & Presentation	100	-	-	100
SE 1.8	OOSE Laboratory		3	3	50	3	50	100
SE 1.9	CASE Tools Laboratory		3	3	50	3	50	100
	Total	**19**	**7**		**500**		**700**	**1200**

Elective-I

SE 1.6.1 Data Structures and Algorithms
SE 1.6.2 Intelligent Systems
SE 1.6.3 Advances in Compiler Construction
SE 1.6.4 Genetic Algorithms

SEMESTER – II

Course Number	Name of the Course	Periods per week		Internal Examination		End Semester Examination		Total
		L/T	P/D	Time (Hrs)	Max. Marks	Time (Hrs.)	Max. Marks	
SE 2.1	Advanced DBMS	3	-	2	50	3	100	150
SE 2.2	Information Systems & Auditing	3	-	2	50	3	100	150
SE 2 3	Embedded Systems	3	-	2	50	3	100	150
SE 2.4	Software Architecture	3	-	2	50	3	100	150
SE 2.5	Software Testing & Metrics	3	-	2	50	3	100	150
SE 2.6	Elective-II	3		2	50	3	100	150
SE 2.7	Advanced Software Laboratory	-	3	3	50	3	50	100
SE 2.8	Testing Tools Laboratory	-	3	3	50	3	50	100
SE 2.9	Comprehensive Viva-Voce	--	-	-	-	-	100	100
	Total	**18**	**6**		**400**		**800**	**1200**

Elective-II

SE 2.6.1 Data Mining & Data ware housing
SE 2.6.2 Real-time Systems
SE 2.6.3 Network Management
SE 2.6.4 Mobile Computing

KAKATIYA UNIVERSITY, WARANGAL

Scheme of Instruction and Evaluation

SEMESTER – III

SE 3.1	**Industrial Training**	**08 Weeks**	**Report Submission**
SE 3.2	**Dissertation**	**18 Weeks**	

SEMESTER – IV

SE 3.2	**Dissertation**	**24 Weeks**	**Excellent/Good/Satisfactory/ Not Satisfactory**

SE 1.1 Discrete Mathematics & Optimization Techniques

Class : **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

Network Flows: Transport Networks, Flows in a Network, Maximal flows, max flow Mincut theorem, Matching problems, Network scheduling by CPM/PERT, Resource analysis in Network scheduling.

UNIT - II

Introduction to Fuzzy Sets and Fuzzy Logic: Basic concepts of Fuzzy sets, Operation on fuzzy sets, Fuzzy complements, Fuzzy intersections, Fuzzy union, t-norms, α-cuts. Basic concepts of fuzzy logic, fuzzy propositions, fuzzy quantifiers, inferences from conditional fuzzy propositions, qualified propositions and quantified propositions.

UNIT-III

Constrained optimization: Linear programming concepts, Simplex method, Revised simplex method, Bounded variable algorithm, Decomposition algorithm, Duality, Integer linear programming, branch and bound algorithm, Cutting plane
Algorithm. Introduction to Non - linear programming, Lagrange's multipliers, Kuhn-Tucker Conditions, Sequential Linear Programming, Penalty function method.

UNIT-IV

Decision Analysis and Game Theory: Introduction to Decision making Problems, Decision making under uncertainty, Laplace criterion, Max-min criterion, Savage Criterion, Hurwitz criterion. Introduction to Game Theory, Max-Min, Min- Max Principle, Mixed Strategies, Optimal solution of Two person, zero sum game, Dominance property, Solutions of Mixed strategy games, using Graphical and Linear programming methods.

SUGGESTED BOOKS:

1. Kandell, J.L Mott and Backer, "Discrete Mathematics", Prentice Hall Of India, Second Edition, 1986.
2. George J.Kilr / Boyuan, "Fuzzy Sets and Fuzzy logic", Prentice Hall Of India, 2003.
3. Kanti Swaroop, P.K. Gupta, ManMohan, "Operations Research", S.Chand Publications, Eleventh Edition, 2003.

REFERENCE BOOK:

1. H.A. Taha, "Operations Research An Introduction", Prentice Hall Of India, Sixth Edition, 1999.

SE1.2 Object Oriented Software Engineering

Class : **M.Tech I Semester** Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Introduction to Software Engineering-Introduction: Software Engineering Failures, What Is Software Engineering?, Software Engineering Concepts, Software Engineering Development Activities, Managing Software Development.

Modeling with UML: Introduction, An Overview of UML, Modeling Concepts, A Deeper View into UML.

Project Organization and Communication-Introduction: A Rocket Example, An Overview of Projects, Project Organization Concepts, Project Communication Concepts, Organizational Activities.

UNIT – II

Requirements Elicitation-Introduction: Usability Examples, An Overview of Requirements Elicitation, Requirements Elicitation Concepts, Requirements Elicitation Activities, Managing Requirements Elicitation.

Analysis-Introduction: An Optical Illusion, An Overview of Analysis, Analysis Concepts, Analysis Activities: From Use Cases to Objects, Managing Analysis.

UNIT – III

System Design: Decomposing the System-Introduction: A Floor Plan Example, An Overview of System Design, System Design Concepts, System Design Activities: From Objects to Subsystems.

System Design: Addressing Design Goals, Introduction: A Redundancy Example, An Overview of System Design Activities, Concepts: UML Deployment Diagrams, System Design Activities: Addressing Design Goals, Managing System Design.

UNIT – IV

Object Design: Reusing Pattern Solutions, Introduction: Bloopers, An Overview of Object Design, Reuse Concepts: Solution Objects, Inheritance, and Design Patterns, Reuse Activities: Selecting Design Patterns and Components, Managing Reuse.

Object Design: Specifying Interfaces, Introduction: A Relational Example, An Overview of Interface Specification, Interface Specification Concepts, Interface Specification Activities, Managing Object Design.

Mapping Models to Code, Introduction: A book Example, An Overview of Mapping, Mapping Concepts, Mapping Activities, and Managing Implementation.

Testing, Introduction: Testing The Space Shuttle, An Overview of Testing, Testing Concepts, Testing Activities, Managing Testing.

SUGGESTED BOOKS:

1. Bernd Bruegge, Allen H.Dutoit, "Object Oriented Software Engineering Using UML, Patterns and Java", Second Edition, Pearson Education, 2004.

SE1.3 Software Project Management

Class : **M.Tech I Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Introduction to Software Project Management:
What is project?, software projects versus other types of project, Contract management and technical project management, Activities covered by software project management, Plans-methods and methodologies, Some ways of categorizing software projects, What is management?, Problems with software projects, Setting objectives, Stakeholders, The business case, Requirement specification, Management control.

Steps Wise: an overview of project planning:
Introduction to Step Wise project planning, Select project, Identity project scope and objectives, Identify project infrastructure, Analyse project characteristics, Identify project products and activities, Estimate effort for each activity, Identify activity risks, Allocate resources, Review/publicize plan, Execute plan and lower levels of planning.

Project Evaluation:
Strategic assessment, Technical assessment, Cost-benefit analysis, Cash flow forecasting, Cost-benefit evaluation techniques, Risk evaluation.

UNIT – II

Selection of an appropriate project approach:
Choosing technologies, Technical plan contents list, Choice of process models, Structure versus speed of delivery, The waterfall model, The V-process model, The Spiral Model, Software Prototyping, Other ways of categorizing prototypes, Controlling changes during prototyping, Incremental delivery, Dynamic Systems Development Method, Extreme programming, Managing iterative process, Selecting the most appropriate process model.

Software effort estimation:
Where are estimates done?, Problems with over-and under-estimates, The basis for software estimating, Software estimating techniques, Expert judgement, Estimating by analogy, Albrecht function point analysis, Function points Mark II, Object points, A procedural code-oriented approach, COCOMO: a parametric model.

Activity planning:
The objectives of activity planning, When to plan, Project schedules, Projects and activities, Sequencing and scheduling activities, Network planning models, Formulating a network model, Adding the time dimension, The forward pass, The backward pass, Identifying the critical path, Activity float, Shortening the project duration, Identifying critical activities, Activity-on-arrow networks.

UNIT – III

Risk management:

The nature of risk, Types of risk, Managing risk, Hazard identification, Hazard analysis, Risk planning and control, Evaluating risks to the schedule.

Resource allocation:

The nature of resources, Identifying resource requirement, Scheduling resources, Creating critical paths, Counting the cost, Being specific, Publishing the resource schedule, Cost scheduling sequence.

Monitoring and Control:

Creating the framework, Collecting the data, Visualizing process, Cost monitoring, Earned value, Prioritizing monitoring, Getting the project back to target, Charge control.

UNIT – IV

Managing contracts:

Types of contract, Stages in contract placement, Typical terms of a contract, Contract management, Acceptance.

Managing people and organizing teams:

Understanding behavior, Organizational behavior: a background, Selecting the right person for the job, Instruction in the best methods, Motivation, The Oldham-Hackman job characteristics model, Working in groups, Becoming a team, Decision making, Leadership, Organizational structures, Stress, Health and safety.

Software quality:

The place of the software quality in project planning, The importance of software quality, Defining software quality, ISO 9126, Practical software quality measures, Product versus Process quality management, External standards, Techniques to help enhance software quality, Quality plans.

SUGGESTED BOOKS:

1. Bole Hughes and Mike Cotterell, "Software Project Management", Tata McGraw Hill, Third Edition, 2002.

SE1.4 Advanced Operating Systems

Class : **M.Tech I Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Process Synchronization:
Functions of an operating system, Design Approaches, why Advanced Operating Systems, Types of Advanced Operating Systems.
Architectures of Distributed Systems:
Motivations, System Architecture types, Distributed Operating Systems, Issues in Distributed Operating Systems, Communication Networks, Communication Primitives.
Distributed Mutual Exclusion:
The Classification of Mutual Exclusion Algorithms, Preliminaries, A Simple Solution to Distributed Mutual Exclusion, Non_Token_Based Algorithms, Lamport's Algorithm, The Ricart-Agrawala Algorithm, Maekawa's Algorithm, A Generalized Non_Token_Based Algorithm, Token Based Algorithm, Suzuki-Kasami's Broadcast Algorithm, Singhal's Heuristic Algorithm, Raymond's Tree Based Algorithm, A Comparitive Performance Analysis.

UNIT - II

Distributed Deadlock Detection:
Preliminaries, Deadlock Handling Strategies In Distributed Systems, Issues in Deadlock Detection and Resolution, Control Organizations for Distributed Deadlock Detection, Centralized Deadlock Detection Algorithms, Distributed Deadlock Detection Algorithms, Hierarchical Deadlock Detection Algorithms.
Distributed Resource Management:
Distributed File Systems, Introduction, Architecture, Mechanism for Building Distributed File Systems, Design Issues, Log Structured File Systems.
Distributed Shared Memory:
Architecture and Motivation, Algorithms for Implementing DSN, Memory Coherence, Coherence Protocols, Design Issues.

UNIT-III

Distributed Scheduling:
Issues in Load Distributing, Components of a Load Distributing Algorithm, Stability, Load Distributing Algorithm, Performance Comparison, Selecting a Suitable Load Sharing Algorithm, Requirements for Load Distributing, Task Migration, Issues in Task Migration.
Failure Recovery:
Recovery, Introduction, Basic Concepts, Classification of Failures, Backward And Forward Error Recovery, Backward Error Recovery: Basic Approaches, Recovery in Concurrent Systems, Consistent Set of Checkpoints, Synchronous Check pointing and Recovery, Asynchronous Check pointing and Recovery, Check pointing for Distributed Database Systems, Recovery in Replicated Distributed Database Systems.

Fault Tolerance:
Issues, Atomic Actions and Committing, Commit Protocols, Nonblocking Commit Protocols, Voting Protocols, Dynamic Voting Protocols, The Majority Based Dynamic Voting Protocols, Dynamic Vote Reassignment Protocols.

UNIT - IV

Multiprocessor Operating Systems:
Structures Of Multiprocessor Operating Systems, Operating System Design Issues, Threads, Process Synchronization, Process Scheduling, Memory Management: The Mach Operating System, Reliability / Fault Tolerance: The Sequoia System.

Database Operating Systems:
Introduction to Database Operating Systems, What is Different, Requirements of a Database Operating, Concurrency Control: Theoretical Aspects, Introduction, Database Systems, A Concurrency Control Model of Database Systems, The Problem of Concurrency Control, Serializability theory, Distributed Database Systems.

Concurrency Control Algorithm:
Basic Synchronization Primitives, Lock Based Algorithms, Timestamp Based Algorithms, Optimistic Algorithms, Concurrency Control Algorithms: Data Replication.

SUGGESTED BOOKS:

1) Mukesh Singhal, Niranjan G.Shivaratri, "Advanced Concepts In Operating Systems", Tata McGraw Hill Edition, 2001.

REFERENCE BOOKS:

1. Singhal and Shivaratri, **"**Advanced Concepts in Operating Systems", McGraw Hill, 1994;
2. Sinha, "Distributed Operating Systems Concepts and Design", IEEE Computer Society Press, 1997, ISBN - 0-7803-1119-1;
3. Tanenbaum and Steen, "Distributed Systems Principles and Paradigms", Prentice Hall Of India, 2002.

SE1.5 Advanced Computer Architecture

Class : **M.Tech I Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Parallel Computer Models: The state of Computing, Multiprocessors and Multi-computers, Multi-vector and SIMD Computers, PRAM and VLSI Models.

Program and Network Properties: Conditionals of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms, System Interconnect Architectures.

Processors and Memory Hierarchy: Advanced Processor Technology, Superscalar and Vector Processors.

UNIT-II

Bus, Cache, and Shared Memory: Backplane Bus Systems, Cache Memory Organizations, Shared Memory Organizations, Sequential and Weak Consistency Models.

Pipelining and Superscalar Techniques: Linear Pipeline Processors, Nonlinear Pipeline Processors, Instruction Pipeline Design, Arithmetic Pipeline Design, Superscalar and Super pipeline Design.

UNIT –III

Multiprocessors and Multicomputers: Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Three Generations of Multicomputers, Message Passing Mechanisms.

Multi vector and SIMD Computers: Vector Processing Principles, Multi vector Multi processors, Compound Vector Processing, SIMD Computer Organizations, The Connection Machine CM-5.

UNIT-IV

Scalable, Multi threaded, and Data flow Architectures: Latency-Hiding Techniques, Principles of Multithreading, Fine-Grain Multi computers, Scalable and Multithreaded Architectures, Data flow and Hybrid Architecture.

Parallel Models, Languages, and Compilers: Parallel Programming Models, Parallel Languages and Compilers, Dependence Analysis of Data Arrays, Loop Parallelization and Pipelining.

UNIX, Mach, and OSF/1 for Parallel Computers: Multi processor UNIX Design Goals, Master-Slave and Multi threaded UNIX, Multi-Computer UNIX Extensions, Mach/OS Kernel Architecture.

SUGGESTED BOOKS:

1. Kai Hwang, "Advanced Computer Architecture, Parallelism, Scalability Programmability", Tata McGraw Hill Edition, 2001.

REFERENCE BOOKS:

1. J.P.Hayes, "Computer Architecture and Organization", McGraw Hill-3rd Edition, 1998.

SE1.6.1 Data Structures & Algorithms

Class : **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

Introduction to DS: Lists, Stacks, and Queues, Abstract Data Types, The list ADT- The Stack ADT, The Queue ADT.

Trees: Preliminaries, Binary Trees, The search Tree ADT, Binary Search Trees, AVL Trees, Splay Trees, B-Trees.

UNIT - II

Sorting: Internal Sorting, Preliminaries, Insertion Sort, A lower Bound for Simple sorting Algorithms, Shell sort, Heapsort, Merge sort, Quick sort, Bucket Sort, External sorting.

UNIT - III

Graph Algorithms: Definitions, Topological sort, Shortest–Path Algorithms, Minimum spanning Tree, Applications of Depth-First Search: Undirected Graphs, Bio-connectivity, Directed Graphs, Finding Strong Components

Hashing: Hash Function, Separate Chaining, Open Addressing, Rehasing, Extendable Hashing.

UNIT - IV

Algorithm Design Techniques: Greedy Algorithms, Divide and Conquer, Dynamic Programming.

Introduction to NP-Completeness: Easy Vs Hard, The class NP, NP-Complete problems.

SUGGESTED TEXT BOOKS:

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Second Edition, Pearson Education, 2004.

REFERENCE BOOKS:

1. A.V.Aho, J.E.Hopcroft, J.D. Ulman, "The Design & Analysis of Computer Algorithms", Addison Wesley, 2000.
2. Sartaj Sahni, "Data Structures, Algorithms, and Applications", Mc Graw Hill,2000.
3. Ellis Horowitz and Sartaj Sahani, "Fundamentals of Computer Algorithms", Galgotia, 1998.
4. Knuth, Donald.E "The Art of Computer Programming", Addison Wesley, 3rd Edition, 2000.

SE1.6.2 Intelligent Systems

Class : **M.Tech I Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

Artificial Intelligence: An overview, Intelligent Systems, Evolution of the concept.
Intelligent Agents: Agent Action, Structure of Intelligent Agents, Environments.
Problem Solving: Solving Problems by Searching, Informed Search Methods, Game Playing.
Knowledge and Reasoning: A Knowledge Based Agent, The Wumpus World Environment, Representation, Reasoning, Logic, Proportional Logic, First Order Logic, Syntax and Semantics, Extensions and Notational Variation, Using First Order Logic.

UNIT-II

Building a Knowledge Base: Properties of Good and Bad Knowledge Base, Knowledge Engineering, General Ontology.
Interfacing First Order Logic: Interface Rules Involving Quantifiers, An Example Proof, Forward and Backward Chaining, Completeness.
Acting Logically: Planning, Practical Planning, Practical Planners, Hierarchical Decomposition, Conditional Planning.

UNIT-III

Uncertain Knowledge Reasoning: Uncertainty, Representing Knowledge in an Uncertain Domain, The Semantics of Belief Networks, Inference in Belief Networks.
Learning: Learning From Observations, General Model of Learning Agents, Inductive Learning, Learning Decision Trees, Learning in Neural And Belief Networks, Introduction to Neural Networks, Perceptrons, Multilayer Feed Forward Network, Application Of ANN, Reinforcement Learning, Passive Learning in a Known Environment, Generalization in Reinforcement Learning, Genetic Algorithms.

UNIT-IV

Communicating Agents: Communicate as Action, Types of Communicating Agents, A Formal for a Subset of English.
Expert System: Introduction to Expert System, Representing and Using Domain Knowledge, Expert System Shells, Explanation, Knowledge Acquisition.
Application: Natural Language Processing, Perception, Robotics.

SUGGESTED TEXT / REFERENCE BOOKS:

1. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Second Edition, Prentice Hall India, ISBN 81-2032-382-3, 2003.
2. George F.Luger,"Artificial Intelligence: Structures and Strategies for Complex Problem Solving", Fourth Indian Reprint, Pearson Education Asia, ISBN 81-7808- 491-0, 2004.
3. Elarine Rich and Kevin Knight," Artificial Intelligence", Second edition, Tata McGraw-Hill, ISBN 0-07-460081-8, 1991.

SE1.6.3 Advances in Compiler Construction

Class : **M.Tech I Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

Informal Compiler Algorithm Notation (ICAN) :
Extended Backus-Naur Form Syntax Notation, Introduction to ICAN, A Quick Overview of ICAN, Whole programs, Type Definitions, Declarations, Data Types and Expressions, Statements.

Symbol – Table Structure :
Storage Classes, Visibility, and Lifetimes, Symbol Attributes and Symbol, Table Entries, Local Symbol, Table Management, Global Symbol, Table Structure, Storage Binding and Symbolic Registers, Approaches to Generating Loads and Stores.

Intermediate Representations:
Issues in Designing an Intermediate Language, High-Level Intermediate Languages, Medium-Level Intermediate Languages, Low-Level Intermediate Languages, Multi-Level Intermediate Languages, Our Intermediate Languages : MIR, HIR, and LIR, Representing MIR, HIR, and LIR in ICAN, ICAN Naming of Datastructures and Routines that Manipulate Intermediate Code, Other Intermediate-Language Forms.

UNIT - II

Producing Code Generators Automatically:
Introduction to Automatic Generation of Code Generators, A Syntax-Directed Technique, Introduction to Semantics, Directed Parsing, Tree Pattern Matching and Dynamic Programming.

Control-Flow Analysis:
Approaches to Control-Flow Analysis, Depth-First Search, Preorder Traversal, Postorder Traversal, and Breadth-First Search, Dominators And Postdominators, Loops and Strongly Connected Components, Reducibility, Interval Analysis and Control Trees, Structural Analysis.

Dependence Analysis and Dependence Graphs:
Dependence Relations, Basic-Block Dependence DAGs, Dependences in Loops, Dependence Testing, Program-Dependence Graphs, Dependences Between Dynamically Allocated Objects.

UNIT - III

Introduction to Optimization:
Global Optimizations, Flow Sensitivity and May vs. Must Information, Importance of Individual Optimizations, Order and Repetition of Optimizations.

Early Optimizations:
Constant-Expression Evaluation (Constant Folding), Scalar Replacement of Aggregates, Algebraic Simplifications and Reassociation, Value Numbering, Copy Propagation, Sparse Conditional Constant Propagation.

Redundancy Elimination:
Common-Subexpression Elimination, Loop-Invariant Code Motion, Partial-Redundancy Elimination, Redundancy Elimination and Reassociation, Code Hoisting.

UNIT - IV

Loop Optimizations:

Induction-Variable Optimizations, Unnecessary Bounds-Checking Elimination.

Procedure Optimizations:

Tai-Call Optimization and Tail-Recursion Elimination, Procedure Integration, In-Line Expansion, Life-Routine Optimization and Shrink Wrapping.

Register Allocation:

Register Allocation and Assignment, Local Methods, Graph Coloring**,** Priority-Based Graph Coloring, Other Approaches to Register Allocation.

SUGGESTED BOOK:

1) Steven S. Muchnick, "Advanced Compiler Design and Implementation", Harcourt Asia PTE LTD, 1997.

REFERENCE BOOK:

1) A.Aho, J.D.Ullman, "Principles of Compiler Design", Narosa, 2002.

SE1.6.4 Genetic Algorithms

Class : **M.Tech I Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Introduction To Genetic Algorithm: Robustness of Traditional Optimization and Search Methods – Goals of Optimization-GA Versus Traditional Methods – Simple GA – GA at Work –Similarity Templates (Schemata) – Learning the Lingo - Mathematical Foundations: The Fundamental Theorem - Schema Processing at Work. – The 2-Armed & K-Armed Bandit Problem. –The Building Block Hypothesis. – Minimal Deceptive Problem.

UNIT-II

Data Structures: Reproduction- Roulette-Wheel Selection – Boltzman Selection – Tournament Selection-Rank Selection – Steady –State Selection –Crossover Mutation – A Time to Reproduce, A Time to Cross. – Get with the Main Program. – How Well Does it Work. – Mapping Objective Functions to Fitness Forum. – Fitness Scaling. Coding – A Multi Parameter, Mapped, Fixed – Point Coding – Discretization – Constraints.

UNIT-III

The Rise Of GA: GA Application of Historical Interaction. – Dejung & Function Optimization – Current Applications of GA - Advanced Operators & Techniques In Genetic Search :Dominance, Diploid & Abeyance – Inversion & Other Reordering Operators. – Other Mine-Operators – Niche & Speciation – Multi Objective Optimization – Knowledge-Based Techniques. – GA & Parallel Processes – Real Life Problem.

UNIT-IV

Genetics: Based Machine Learning – Classifier System – Rule & Message System – Apportionment of Credit: The Bucket Brigade – Genetic Algorithm – A Simple Classifier System in Pascal. – Results Using the Simple Classifier System. The Rise of GBMC – Development of CS-1, The First Classifier System. – Smitch's Poker Player. – Other Early GBMC Efforts. –Current Applications.

SUGGESTED TEXT / REFERENCE BOOKS :

1. David E. Gold Berg, "Genetic Algorithms In Search, Optimization & Machine Learning", Pearson Education, 2001.
2. S.Rajasekaran, G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic And Genetic Algorithms", PHI , 2003.
3. Kalyanmoy Deb, "Optimization For Engineering Design, Algorithms And Examples", PHI 1995.

SE 1.7 Seminar

Class : **M.Tech I Semester** Practicals: **1 Period**

Internal Examination: **100 Marks**

Note: Each student has to give independent seminars on the topics covering the following:

1. A Seminar Topic covering the state-of-the-art technical topics relevant up to the second Semester theory subjects, which would supplement and complement the programme are to be assigned to each student.

Guidelines:

1. The Students of M.Tech. I semester are to register a relevant topic with in 4 weeks of commencement of semester class work and submit the same to the department.
2. Evaluation of seminar consists of two components namely Report (50 marks) and Presentation (50 marks)
   (a) Report: Students are required to submit a report on the chosen seminar topic as per the prescribed format and last date specified by the Departmental Post Graduate Review Committee (DPGRC)
   (b) Presentation: The students are required to deliver the seminar before the DPGRC as per the schedule notified by the department.

DPGRC will decide the course of action on the students who fail to submit the report and present the seminar.

SE1.8 OOSE Laboratory

Class : **M.Tech I Semester** Practicals : **3 Periods**
Duration of University Examination: **3 Hours** University Examination : **50 Marks**
Sessionals: **50 Marks**

Suggested Experiments in this laboratory are based on the theory Object Oriented Software Engineering. Experiments list include the following.

1) Developing Use-Case Analysis.

2) Developing Class Diagrams.

3) Developing Interaction Diagrams.

4) Developing State Chart Diagrams

5) Developing Activity Diagrams.

6) Developing Forward Engineering and Reverse Engineering Diagrams.

SE 1.9 CASE Tools Laboratory

Class : **M.Tech I Semester** Practicals : **3 Hours**
Duration of University Examination: **3 Hours** Univ.Examination : **50 Marks**
Sessionals : **50 Marks**

Suggested Experiments list include the following:

1) Requirement Specification Tools.

2) Project Estimation Tools.

3) Software Maintenance Tools.

SE2.1 Advanced Database Management Systems

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

DATA STORAGE AND INDEXING : Memory Hierarchy, RAID, Disk Space Management, Buffer Manager, Files and Indexes, Page Formats, Record Formats.

FILE ORGANIZATION AND INDEXES : Cost Model, Comparison of three file Organizations, Overview Indexes, Properties of Indexes, Index Specification in SQL-92.

TREE STRUCTURED INDEXING : ISAM, B+ TREE, Format of a node, Search, Insert, Delete, Duplicates, B+ Tree in Practice.

UNIT-II

HASH BASED INDEXING : Static Hashing, Extendible Hashing, Linear Hashing, Extendable Hashing vs Linear Hashing

PARALLEL AND DISTRIBUTED DATABASES : Architecture for Parallel Databases, Parallel Query Evaluation, Parallelising , Individual Operations, Parallel Query Optimization, Introduction to Distributed Databases, Distributed DBMS Architecture, Storing Data in a Distributed DBMS, Distributed Catalog Management, Distributed Query Processing, Updating Distributed data, Introduction to distributed data, Introduction to Distributed Transaction , Distributed Concurrency Control, Distributed Recovery.

UNIT-III

DATABASE APPLICATION DEVELOPMENT: Accessing Databases from Applications, An Introduction to JDBC, JDBC Classes and Interfaces, SQLJ, Stored Procedures.

INTERNET APPLICATIONS: Internet Concepts, HTML Documents, XML Documents, The Three-Tier Application Architecture, The Presentation Layer, The Middle Tier.

UNIT-IV

OBJECT-DATABASE SYSTEMS : User Defined Data types, Structured Types, Objects Identity and Reference Types, Inheritance, Database Design for ORDBMS, Implementation, OODBMS, Comparisons.

SPATIAL DATAMANAGEMENT : Types, Application, Indexing Based on Space Filling, Curves, Grid Files, R-Trees, High dimensional Indexing.

DEDUCTIVE DATABASES: Introduction to recursive Queries, Theoretical Foundations, Recursive Queries with Negation, Efficient Evaluation.

SUGGESTED BOOK:

1. Raghu Ramakrishna and Johannes Gehrke, "Database Management System", Tata McGrawHill-2003, Third Edition.

REFERENCE BOOKS:

1. C.J.Date, "Introduction to Database Systems", Addison Wesley, 1981, Third Edition.
2. Elmasri and Navathe, "Fundamentals of Database systems", Addison Wesley, 1998.
3. J.L.Warrington, "Object Oriented Database Design", Morgan Kaufmann Publishers.
4. T.J.Tewrey, "Database Modeling and Design", Morgan Kaufmann Publishers.

SE2.2 Information Systems And Auditing

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Overview of Information Systems Auditing: Need for Control and Audit of Computers, Effects of Computers on Internet Controls, Effects of Computers on Auditing, Foundations of Information Systems Auditing.

Conducting an Information Systems Audit: The Nature of Controls, Dealing with Complexity, Audit Risks, Types of Audit Procedures, Overview of Steps in an Audit, Auditing Around or through the Computers.

Top Management Controls: Evaluating the Planning Function, Evaluating the Organizing Function, Evaluating the Leading Function, Evaluating the Controlling Function.

Systems Development Management Controls: Approaches to Auditing Systems Development, Normative Models of the Systems Development Process, evaluating the Major Phases in the Systems Development Process.

Programming Management Controls: The Program Development Life Cycle, Organizing the Programming Team, Managing the System Programming Group.

UNIT – II

Data Resource Management Controls: Motivations Toward the DA and DBA Roles, Functions of the DA and DBA, Some Organizational Issues, Data Repository Systems, Control over the DA and DBA.

Security Management Controls: Conducting a Security Program, Major Security Threats and Remedial Measures, Controls of Last Resort, Some Organizational Issues.

Operations Management Controls: Computer Operations, Network Operations, Data Preparation and Entry, Production Control, File Library, Documentation and Program Library, Help Desk/Technical Support, Capacity Planning and Performance Monitoring, Management of Outsourced Operations.

Quality Assurance Management Controls: Motivations Toward the QA Role, QA Functions, Organizational considerations.

Boundary Controls: Cryptographic Controls, Access Controls, Personal Identification Numbers, Digital Signatures, Plastic Cards, Audit Trail Controls, Existence Controls.

UNIT – III

Input Controls: Data Input Methods, Source Document Design, Data-entry Screen Design, Data Code Controls, Check Digits, Batch Controls, Validation of Data Input, Instruction Input, Validation of Instruction Input, Audit Trail Controls, Existence Controls.

Communication Controls: Communication Subsystem Exposures, Physical Component Controls, Line Error Controls, Flow controls, Link Controls, Topological Controls, Channel Access Controls, Channel Access Controls, Controls over Subversive Threats, Internetworking Controls, Communication Architectures and Controls, Audit Trail Controls, Existence Controls.

Processing Controls: Processor Controls, Real Memory Controls, Virtual Memory Controls, Operating System Integrity, Application Software Controls, Audit Trail Controls, Existence Controls.

Database Controls: Access Controls, Integrity Controls, Application Software Controls, Concurrency Controls, Cryptographic Controls, File Handling Controls, Audit Trail Controls, Existence Controls.

Output Controls: Inference Controls, Batch Output Production and Distribution Controls, Batch Report Design Controls, Online Output Production and Distribution Controls, Audit Trail Controls, Existence Controls.

UNIT - IV

1. **Audit Software:** Generalized Audit Software, Industry-specific Audit Software, High-level Languages, Utility Software, Expert Systems, Neural Network Software, Specialized Audit Software control Audit Software.
2. **Concurrent Auditing Techniques:** Basic Nature of Concurrent Auditing Techniques, Need for Concurrent Auditing Techniques, Types of Concurrent Auditing Techniques, Implementing Concurrent Auditing Techniques, Strengths/Limitations of Concurrent Auditing Techniques.
3. **Performance Measurement Tools:** The Objects of Measurement, General Characteristics of Performance Measurement Tools, Types of Performance Measurement Tools, Presenting Performance Measurement Results, Performance Measurement and Data Integrity.
4. **Evaluating System Effectiveness:** Overview of the Effectiveness Evaluation Process, A model of Information System Effectiveness, Evaluating System Quality, Evaluating Perceived Usefulness, Evaluating Perceived Ease of Use, Evaluating Computer Self-efficacy, Evaluating Information System Use, Evaluating Individual Impact, Evaluating information System Satisfaction, Evaluating Organizational Impact.
5. **Evaluating System Efficiency:** The Evaluation Process, Performance Indices, Workload Models, System Models.

SUGGESTED BOOK:

1. Ron Weber, “Information Systems Control and Audit”, Pearson Education, 2004.

SE2.3 Embedded Systems

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

Introduction to Embedded Systems : An Embedded Systems, Processor in the System, Other Hardware Units, Software Embedded into a System, Exemplary Embedded Systems, Embedded System-On-Chip (SOC) and in VLSI Circuit.

Processor and Memory Organization : Structural Units in a Processor, Processor Selection for an Embedded System, Memory Devices, Memory Selection for an Embedded System, Allocation of Memory to Program Segments and Blocks and Memory Map of a System, Direct Memory Access, Interfacing Processor, Memories and I/O Devices.

UNIT - II

Devices and Buses for Device Networks: I/O Devices, Timer and Counting Devices, Serial Communication Using the 'I^2C','CAN' and Advanced I/O Buses between the Networked Multiple Devices, Host System or Computer Parallel Communication between the Networked I/O Multiple Devices Using the ISA,PCI,PCI-X and Advanced Buses.

Device Drivers and Interrupts Servicing Mechanism: Device Drivers, Parallel Port Device Drivers in a System, Serial Port Device Drivers in a System, Device Drivers for Internal Programmable Timing Devices, Interrupt Servicing (Handling) Mechanism, Context and the Periods for Context-Switching, Deadline and Interrupt Latency.

UNIT - III

Program Modeling Concepts in Single and Multiprocessor Systems Software-Development Process : Modeling Processes for Software Analysis Before Software Implementation, Programming Models for Event Controlled or Response Time Constrained real Time Programs, Modeling of Multiprocessor Systems.

Software Engineering Practices in the Embedded Software Development Process: Software Algorithm Complexity, Software Development Life Cycle and its Models, Software Analysis, Software Design, Software Implementation, Software Testing **,** Validating and Debugging, Real Time Programming Issues During the Software Development Process, Software Project Management, Software Maintenance , Unified Modeling Language(UML).

UNIT-IV

Inter-Process Communication and Synchronisation of Processes, Tasks And Threads: Multiple Processes in an Application, Problem of Sharing Data by Multiple Tasks and Routines, Inter Process Communication.

Real Time Operating Systems: Operating System Services, I/O Subsystems, Network Operating Systems, Real-Time and Embedded System Operating Systems, Interrupt Routines in RTOS Environment : Handling of Interrupt Source Call by the RTOS's, RTOS Task Scheduling Models, Interrupt Latency and Response Times of the Tasks as Performance Metrics, Performance Metric in Scheduling Models for Periodic , Sporadic and Aperiodic Tasks, IEEE Standard POSIX 1003.LB Functions for Standardization of RTOS and Inter_Task Communication Functions, List of Basic Actions in a Preemptive Scheduler and Expected Times Taken at a Processor, Fifteen-Point Strategy for Synchronisation between the Processes , ISR's , OS Functions and Tasks and for Resource Management, Embedded Linux Internals : Linux Kernel for the Device Drivers and Embedded System, OS Security Issues, Mobile OS.

SUGGESTED BOOK:

1) Raj Kamal, "Embedded Systems", Tata McGraw Hill, 2003.

REFERENCE BOOKS:

1) Daniel W.Lewis, "Fundamentals of Embedded Software-where C and Assembly meet", Pearson Education, 2002.
2) Dream Tech Software Team, "Programming Embedded Systems", John Wiley Pub, 2004.

SE 2.4 Software Architecture

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

The Nature of the Design Process: Design – The role of the design activity – Design as a problem solving process – Design as a 'wicked' problem

The Software Design Process: Software – Building models – Transferring design knowledge – Constraints upon the design process and product - Recording design decisions – Designing with others

Design in the Software Development Process: A context for design – Linear development processes – Incremental development processes – Economic factors – The longer term

Design Qualities: The quality concept – Assessing design quality – Quality attributes of the design product – Assessing the design process

UNIT-II

Describing a Design Solution: Representing abstract ideas – Design viewpoints for software – Forms of notation

Transferring Design Knowledge: The need to share knowledge – The architecture concept – Design methods – Design patterns – A unified interpretation

Some Design Representations: A problem of selection – Black box notations – Developing a diagram.

UNIT-III

Stepwise Refinement: The historical role of stepwise refinement – Architectural consequences – Strengths and weakness of the stepwise strategy

Incremental Design: Black box to white box in stages – Prototyping - DSDM

Structured Systems Analysis and Structured Design: Origins, development and philosophy – Representation forms for SSA/SD – The SSA/SD process- The role of heuristics in SSA/SD – Extended forms of SSA/SD

Jackson System Development(JSD): The JSD model – JSD representation forms – The JSD process – JSD heuristics

UNIT-IV

Software Reuse Success Factors: Software reuse, pragmatic reuse work, changes in processors, changes in organization, principles.

Reuse Driven Software Engineering is a Business: Make reuse cost effective, A reuse business has business characteristics, Architect components and applications, establishing and managing a reuse business

Organizing a Reuse business: Transition to a reuse business, Incremental approach, the incremental transition process, creating a directive to reengineer the existing system, envisioning the new reuse business

Managing a Reuse business: Ongoing management, measurement to managing the reuse business, economic models and reuse investment decisions, managing people and organization.

SUGGESTED TEXT / REFERENCE BOOKS:

1. David Budge, “Software Design”, Second Edition, Pearson Education, ISBN 81-297-0393-9, 2004.
2. Stephen T. Albin, ”The Art of Software Architecture”, Wiley, First edition, ISBN 81-265-0387-4, 2003.

SE2.5 Software Testing And Metrics

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Software Testing Background: Infamous Software Case Studies, Bug, Why Do Bugs Occur, The Cost of Bugs, What Exactly Does a Software Testing Do, What Makes a Good Software Tester.

The Realities of Software Testing: Testing Axioms, Software Testing Terms and Definitions, Precision and Accuracy, Verification and Validation Quality and Reliability, Testing and Quality Assurance.

Examining the Specification: Black-Box and White-Box Testing, Static and Dynamic Testing, Performing a High Level Review of the Specification, Low Level Specification Test Techniques.

Testing the Software with Blinders : Dynamic Black-Box Testing, Test-To-Pass and Test-To-Fail, Equivalence Partitioning Data Testing, State Testing, Other Black-Box Test Techniques.

UNIT-II

Examining the Code: Static White-Box Testing: Examining the Design Code, Formal Reviews, Peer Reviews, Walk Through, Inspectors, Coding Standards and Guidelines, Examples of Programming Standards and Guidelines, Obtaining Standards, Generic Code Review Checklist.

Testing the Software with Dynamic White-Box Testing: Dynamic White-Box Testing, Dynamic White-Box Testing Vs. Debugging, Testing the Pieces, Data Coverage, Code Coverage.

Configuration Testing: An Overview of Configuration Testing, Approaching the Task, Obtaining the Hardware, Identifying Hardware Standards, Configuration Testing Other Hardware.

Compatibility Testing: Compatibility Testing Overview, Platform and Application Versions, Standards and Guidelines Data Sharing Compatibility.

Usability Testing: User Interface Testing, What Makes Good User Interface Testing, Guidelines, Intuitive Consistent, Flexible, Comfortable, Correct, Useful, Accessibility Testing, Accessibility Features in Software.

UNIT-III

Testing the Documentation: Types of Software Documentation, The Importance of Documentation Testing, What to Look for When Reviewing Documentation, The Realities of Documentation Testing.

Web Site Testing: Web Page Fundamentals, Black-Box Testing, Gray-Box Testing, White-Box Testing, Configuration and Compatibility Testing, Usability Testing, Introducing Automation.

Automated Testing and Test Tools: The Benefits of Automation and Tools, Test Tools, Software Test Automation, Random Testing, Realities of Using Test Tools and Automation.
Bug Bashes and Beta Testing: Test Sharing, Beta Testing, Outsourcing Testing.

UNIT-IV

Planning Test Effort: The Goal of Test Planning, Test Planning Topics.
Writing and Tracking Test Cases: The Goals of Test Case Planning, Test Case Planning Overview, Test Case Organization and Tracking.
Reporting: Bugs Fixation, Isolating and Reproducing Bugs, A Bug's Life Cycle, Bug Tracking Systems.
Measuring Testing Results: Metrics for Testing, Common Project-Level Metrics.
Software Quality Assurance: Testing and Quality Assurance, Test Management and Organizational Structures, Capability Maturity Model(CMM), ISO 9000.

SUGGESTED TEXT / REFERENCE BOOKS:

1. Ron Patton, "Software Testing", Techmedia, First Edition, ISBN 81-7635-507-0, 2002.

SE2.6.1 Datamining And Data Warehousing

Class : **M.Tech II Semester**
Duration of Univ. Exam: **3 Hours**

Lectures : **3 Periods**
Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT – I

Data Warehouse: What is Data Warehouse, Importance, Comparison with Relational Database System, Basics: Partitioning Strategy, Aggregation, Metadata, Fact and Dimensional Tables, Star Snowflake and Fact Constellation Schemas, Data Marts.
Architecture: Process Architecture, Design Architecture, Three Tier Architecture, Multidimensional Model, Implementing OLAP Servers.

Data Warehouse Design: Developing a Data Warehouse – Design Consideration, Crucial decisions in designing a Data Warehouse, Technological considerations – Data Warehousing for the Government of Tamil Nadu, Data Warehousing for the Government of Andhra Pradesh, Data Warehousing for the Ministry of Commerce.

UNIT – II

Data Preprocessing: Cleaning, Integration, Transformation & reduction.
Data Mining: What is Data Mining, Functionalities, Classification: Major Issues, Priorities, System Architecture, and DMQL.
Descriptive Data Mining: Concept Description – Generalized Characterization, Summarized Characterization, Analytical Characterization, Class Comparison, Descriptive Statistical Measures. Associative Rule Mining – Basic Concepts, Single and Multi Dimensional Boolean and Multilevel association rules for transaction databases, Correlation Analysis, Constrained based associative rules.

UNIT – III

Predictive Data Mining: What is Predictive Data Mining, Classification – Preparing Data, criteria for comparing algorithms,
Classification: Issues regarding Classification, classification by decision tree, Bayesian Classification, Classification by back propagation, Classification based on concepts from Association Rule Mining, k-nearest neighbor Classifiers, Genetic Algorithms, Fuzzy Set Approaches, Regression – Linear and Multiple Regression, Nonlinear Regression, classifier accuracy.

UNIT – IV

Cluster Analysis: Cluster analysis, Types of data in Cluster Analysis, partitioning methods, hierarchical methods, Density based methods, Grid based methods, Model based clustering methods.
Mining complex types of data: Mining Spatial Databases, Mining Multimedia Databases, Mining Text Databases, Mining Web Based Databases.

SUGGESTED TEXT / REFERENCE BOOKS:

1. Jiawei Han, Micheline Kambler, "Data Mining Concepts and Techniques" Morgan Kaufmann Publishers, ISBN-81-7867-023-2, 2002.
2. Sam Anahory, Dennis Murray, "Data Warehousing in the real world", Low Price Edition, Pearson Education, ISBN-81-7808-387-6, 2003.
3. C.S.R. Prabhu, "Data Warehousing Concepts, Techniques, Products and Applications", Second Edition, Prentice-Hall of India, ISBN – 81-203-2068-9, 2002.

SE2.6.2 Real-Time Systems

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Typical Real-Time Application: Digital control, high-level controls, signal processing, other real-time application.

Hard Versus Soft Real-Time Systems: Jobs and processors, release times, deadlines, and timing constraints, hard and soft timing constraints, hard real-time systems, soft real-time systems.

A Reference Model Of Real-Time Systems: Processor and resources, temporal parameters of real-time workload, periodic task model, precedence constraints and data dependency, other types of dependencies, functional parameters, resources parameters of jobs and parameters of resources, scheduling hierarchy.

UNIT-II

Commonly Used Approaches To Real-Time Scheduling: Clock driven approach, weighted round-robin approach, priority driven approach, dynamic versus static systems, effective release times and deadlines, optimality of the EDF and LST algorithms, non-optimality of the EDF and the LST algorithms, challenges in validating timing constraints in priority-driven systems, Off-line Vs On-line scheduling.

Clock-Driven Scheduling: Notations and assumptions, static timer-driven scheduler, general structure of cyclic schedules, cyclic executives, improving the average response time of periodic jobs, scheduling sporadic jobs, practical considerations and generalizations, algorithms for constructing static schedules, pros and cons of clock-driven scheduling.

Priority driven scheduling of periodic task: static assumption, fixed-priority versus dynamic priority algorithms, maximum schedulable utilization, optimality of the RM and DM algorithms , a schedulability test for fixed-priority tasks with short response times, schedulability test for priority tasks with arbitrary response times. Sufficient schedulability conditions for the RM and DM algorithms.

UNIT-III

Scheduling Periodic And Sporadic Jobs In Priority-Driven System : Assumptions and approaches, deferrable servers, sporadic servers, constant utilization, total bandwidth and weighted fair –queuing server, slack stealing in deadline-driven systems, slack stealing in fixed priority system, scheduling of sporadic jobs, real-time performance for jobs with soft timing constraints, a two-level scheme for integrated scheduling.

Resources and Resource Access Control: Assumptions on resources and their usage, effects of resource contention and resource access control, non-preemptive critical sections, basic priority-inheritance protocol, basic priority-ceiling protocol, stack-based, priority-ceiling protocol, use of priority-ceiling protocol in dynamic-priority systems, preemptive-ceiling protocol, controlling access to multiple-unit resources, controlling concurrent access to data objects.

UNIT-IV

Real-Time Databases: Basic Definitions, Real-Time vs. General Purpose Databases, Main Memory Databases, Transaction Priorities, Transaction Aborts, Concurrency Control Issues, Disk Scheduling Algorithm, A Two-Phase Approach to Improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real-Time Systems.

Fault-Tolerance Techniques: What Causes Failures? Fault Types, Fault Detection, Fault And Error Containment, Redundancy, Data Diversity, Reversal Checks, Malicious or Byzantine Failures, Integrated Failure Handling.

SUGGESTED BOOKS:

1. Jane W.S.LIU, "Real-Time Systems", Pearson Education Asia, 2003.
2. C.M.Krishna, Kang G. Shin, "Real-Time Systems", Tata McGraw Hill International Edition, 1997.

SE2.6.3 Network Management

Class : **M.Tech II Semester** Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT-I

Data communications and Network management overview:
Analogy of Telephone Network Management, Data (Computer) and Telecommunication Network, Distributed Computing Environments, TCP/IP- Based Networks: The Internet and Intranets, Communication Protocols and Standards, Case Histories of networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions Network and System Management, Network Management System Platform, Current Status and Future of Network Management.

Basic Foundations: Standards, Models, and Language
Network Management Standards, Network Management Model, Organization Model, Information Model, Communication Model, and Abstract Syntax Notation One: ASN.1Encoding structure, Macros, Functional Model.

SNMPv1 Network Management: Organization and Information Models
Managed Networks: Case Histories and Examples, The History of SNMP Management, Internet Organization and Standards, The SNMP Model, The Organization Model, System Overview, The Information Model.

UNIT – II

SNMPv1 Network Management: Communication and Functional Models
The SNMP Communication Model, Functional Model.

SNMP Management: SNMPv3
SNMPv3 Documentation, SNMPv3 Documentation Architecture, Architecture, SNMPv3 Applications, SNMPv3 Management Information Base, Security, SNMPv3 User-Based Security Model, Access control.

SNMP Management: RMON
RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring.

Broadband Network Management: ATM Networks
Broadband Networks and Services, ATM Technology.

UNIT – III

ATM Network Management:
The ATM Network Reference Model, The Integrated Local Management Interface, The ATM Management Information Base, The Role of SNMP AND ILMI in ATM management, M1 Interface Management of ATM Network Element, M2 Interface: Management of Private Networks, M3 Interface: Customer Network Management of Public Networks, M4 Interface: Public Network Management, Management of LAN Emulation, ATM Digital Exchange Interface Management.

Broadband Network Management:
Broadband Access Networks and Technologies, HFC Technology, Data over Cable Reference Architecture, HFC Management, DSL technology, Asymmetric Digital Subscriber Line Technology, ADSL Management.

Telecommunication Management Network:
Operating Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated view of TMN, Implementation Issues.

UNIT – IV

Network Management Tools and Systems:
Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management Systems.

Network Management Applications:
Configuration Management, Fault Management, Event Correlation Techniques, Security Management, Policy-Based Management, Service Level Management.

Web- Based Management
NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-based Management, Desktop Management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation.

SUGGESTED BOOK:
1. Mani Subramanian, "Network Management", Pearson Education, 2004.

SE2.6.4 Mobile Computing

Class : **M.Tech II Semester** | Lectures : **3 Periods**
Duration of Univ. Exam: **3 Hours** | Max Marks : **100 Marks**
Sessionals : **50 Marks**

UNIT - I

Introduction: Applications: Vehicles, Emergencies, Business. A short history of Wireless Communication.

Wireless Transmission: Frequency for radio transmission, Signals, Antennas, Signal propagation, Multiplexing, Modulation, Spread spectrum, Cellular systems.

Medium Access Control: Motivation for a specialized MAC: Hidden and Exposed terminals. Near and Far terminals. SDMA, FDMA. TDMA: Fixed TDM, Classical Aloha, Slotted Aloha, Carrier sense multiple access, Demand assigned multiple access, PRMA packet reservation multiple access, Reservation TDMA, Multiple access with collision avoidance, Polling, Inhibit sense multiple access.

UNIT - II

Medium Access Control: CDMA: Spread Aloha multiple access , Comparision of SDMA, FDMA, TDMA, CDMA.

Telecommunication Systems: GSM: Mobile Services, System Architecture, radio interface, Protocols, Localization and Calling, Handover, Security, New Data Services. DECT: Systems Architecture, Protocol Architecture. Over view of Satellite Systems and Broadcast Systems

UNIT - III

Wireless LAN: Infrared Vs Radio Transmission, Infrastructure and Ad-Hoc Networks, IEEE 802.11: System Architecture, Protocol Architecture, Physical Layer, Medium Access Control Layer, MAC Management. Bluetooth: User Scenarios, Physical Layer, MAC Layer, Networking, Security, Link Management.

Mobile Network Layer: Mobile IP: Goals, Assumptions and Requirements, Entities and Terminology, IP Packet Delivery, Agent Discovery, Registration, Tunneling and Encapsulation, Optimizations, Reverse Tunneling, Ipv6. Dynamic Host Configuration Protocol, Mobile Ad-Hoc Networks: Routing, Destination Sequence Distance Vector, Dynamic Source Routing, Alternative Metrics, Over View of Ad-Hoc Routing Protocols.

UNIT - IV

Mobile Transport Layer: Traditional TCP: Congestion Control, Slow Start, Fast Retransmit/Fast Recovery, Implications on Mobility. Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Fast Retransmit/Fast Recovery, Transmission/Time-Out Freezing, Selective Retransmission, Transaction Oriented TCP, TCP Over 2.5/3G Wireless Networks.

Support for Mobility: World Wide Web: Hypertext Transfer Protocol, Some Approaches that might help Wireless Access, System Architectures. Wireless Application Protocol: Architecture, Wireless Datagram Protocol, Wireless Transport Layer Security, Wireless Transaction Protocol, Wireless Session Protocol, Wireless Application Environment.

SUGGESTED TEXT / REFERENCE BOOKS:

1. Jochen Schiller, "Mobile Computing", Second Edition, First Indian Reprint-2004, Pearson Education Asia, ISBN NO. 81-297-0350-5.
2. M.Richharia, "Mobile Satellite Communication: Principles and Trends", First Edition, 2001, Pearson Education Asia, ISBN NO. 8129700255.
3. Theodore S. Rappaport ,"Wireless Communications",2nd Editon, Pearson Education, ISBN:81- 7808-648-4,2002.

SE2.7 Advanced Software Laboratory

Class : **M.Tech II Semester** Practicals : **3 Periods**
Duration of University Examination: **3 Hours** University Examination : **50 Marks**
Sessionals: **50 Marks**

List of Experiments:

PART-A

.**Net Programming:**

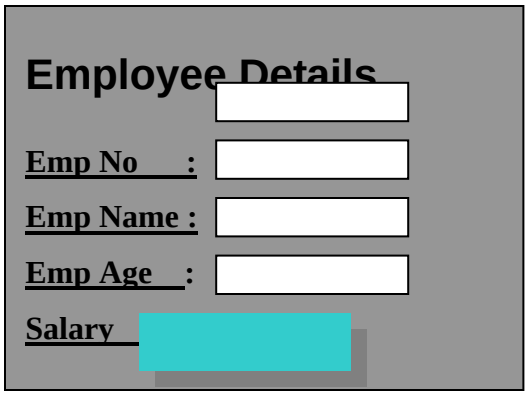
1. Program to implementation of Scientific Calculator.
2. Program to implement the bouncing ball.
3. Program to draw Circle, Rectangle, Line, Ellipse and to fill them.
4. Program for creation of Common Dialog Controls.(Open, Save, Font, Color).
5. Program to scroll the image using Scrollbars.
6. Program to handle the printer operations like Page setup, Print Preview and Printing the documents.
7. Program to Read/Write from/to Text files and Binary files.
8. Program to create a Web form using the Validation controls.
9. Program for create the Database table and perform the following operations.
    i) Insertion of the records.
    ii) Deletion of records.
    iii) Updation of records.
    iv) Editing the records.
    v) Navigating the records.
10. Write the above program in Web Application.
11. Program to Synchronize the threads.
12. Program to create a User control.
13. Program to create a Windows service and a Web service.

PART-B

Java 2 Enterprise Edition(J2EE):

1. Write a JSP program for displaying Employee details in a tabular format.

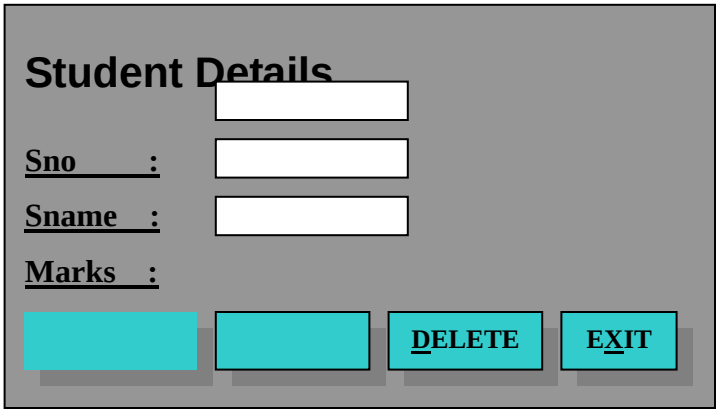
2. Write a JSP program to generate the following Employee form



Provide validations using Java Script for

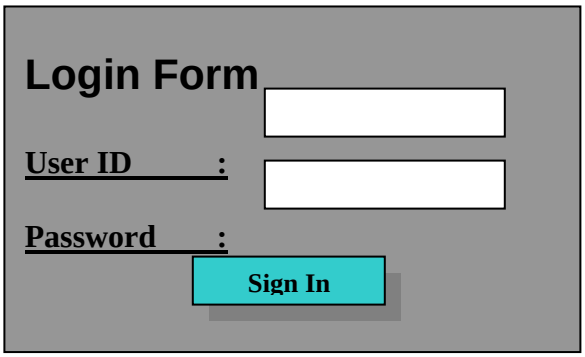
1) Al fields are mandatory
2) Empno, age, salary should be numeric
3) Age should lie between 20 and 30
4) Employee name should be alphanumeric and should start with upper letter.

3. Design a form as follows



1) Provide validations using JavaScript
2) Provide Multiple buttons and call appropriate Jsp files.

4. Design form as follows



- Provide all validations
- Display appropriate messages like
- –“ welcome to user” if user id exists and password is correct
- –“Welcome password “ if user id exists and password is wrong
- “ Invalid user” if user id does not exists
- Create a login table in oracle and connect to it.

5. Create a Bean for displaying welcome message, Invoke the Bean from JSP.

6. Create a Bean for implementing Account operations.

Account Consists:

Datamembers : Accno, Balance, Account Type

Methods **:** Deposit, withdraw, getBalance

- Write a JSP program which invoke the Account Bean and provide interface for invoking the methods of it.

7. Write a stateless Session Bean for accepting a string and returns “Welcome to “ followed by the accepted string.

8. Write a stateless Session Bean , which provides a remote interface consisting following interfaces.
   i. Void store(int a, int b)
   ii. int add();
   iii. int Mul();
9. Write implementation file which implements the above methods.

10. Write a Client program for locating Session object and invokes the above methods.

11. Write a Stateless Session Bean for the above problem and observe the difference.

12. Create a Entity Bean which Implements the Account Entity.
   i. Data Members:
      1. accountNo, balance, accountType.
   ii. Data Methods:

1. void deposit(double amt);
2. void withdraw(double amt);
3. double getBalance();

13. Use Bean Managed Persistence as persistent-type.

14. Create a Entity Bean which Implements the Account Entity as above problem by using Container Managed Persistence as persistent-type

SE2.8 Testing Tools Laboratory

Class : **M.Tech II Semester** Practicals : **3 Periods**
Duration of University Examination: **3 Hours** University Examination : **50 Marks**
Sessionals: **50 Marks**

List of Experiments:

1. Implementation of Equivalence Partitioning.
2. Implementation of Boundary Value Analysis.
3. Implementation of Cause effect Graphing.
4. Implementation of Basis Path Testing.
5. Implementation of Loop Testing.
6. Implementation of Validation Testing.
7. Implementation of Web Testing.
8. Implementation of Top Down Integration Testing.
9. Implementation of Bottom-Up Integration Testing.
10. Implementation of Performing testing using WINRUNNER tool.

SE 3.1 Industrial Training

Class : **M.Tech III Semester**

Guidelines for Industrial Training:

1. M.Tech. Coordinator in consultation with the Training & Placement section has to procure training-cum-dissertation slots, for the students before the last day of instruction of II semester.

2. The students are to confirm their training slot by the last day of II semester.

3. The students after 8 weeks of Industrial Training shall submit a certificate, and the last date specified and a report in prescribed format by the DPGRC.

   The DPGRC will decide the course of action on the students who fail to submit the training certificate and report.

SE 4.1 Dissertation

Class : **M.Tech IV Semester**

Guidelines for Dissertation :

The **Department Post-Graduate Review committee** is to be constituted with 5 members i.e. Chairman – Head of the Department, Convenor – M.Tech. Coordinator and 3 other faculty members including supervisor.

The committee is to evaluate the progress of the Dissertation conducting 2 presentations in third semester and monthly presentations in fourth semester.

III – Semester **Total Marks – 100**

50 marks for presentations
50 marks for regular evaluation by supervisor.

1st presentation (Registration Seminar) after 6 weeks from the commencement of the semester for 25 marks
2nd presentation (Progress Seminar) after 12 weeks from the commencement of the semester for 25 marks

Registration Seminar : Project proposal (problem specification, expected out come)

IV – Semester **Total Marks – 100**

Progress Seminar : Status of the dissertation – work already carried out, balance of work to be carried out – Progress seminars are to be carried out every month between 1st and 5th.

Synopsis Seminar: Together with synopsis a presentation to be made and the dissertation should be demonstrated two weeks before the submission date.

Supervisors are to evaluate the Dissertation regularly, based on the progress report submitted by the students in every week and the same should be recorded.

The committee should give final marks (evaluation and supervisor marks) and grade them into the following categories.

A	-	Excellent (90 +)
B	-	Good (60 – 89)
C	-	Satisfactory (40 – 59)
D	-	Not Satisfactory (< 39)

Project work will be carried out in III and IV semesters under the supervision of a faculty member from within the respective department. Students may be permitted to work under the joint guidance of two members of the faculty – in which case, one of the guides may be from an allied department.

A student may, however, be permitted by the Head of the Department concerned to work on a project in an Industrial / Research organization, in the project semesters. In such case, the faculty guiding the student shall be called the internal guide and the scientist / manager guiding, the student (at site) shall be called the external guide.

No student will be allowed to submit the project report before 48 weeks and after 52 weeks from commencement of III semester.

The DPGRC will decide the course of action on the students who fail to submit the dissertation.