



**HINDUSTAN
UNIVERSITY**

HINDUSTAN INSTITUTE OF TECHNOLOGY & SCIENCE

(Estd. u/s 3 of the UGC Act, 1956)

Padur, Kancheepuram District - 603 103.

**DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING**

**Regulations Curriculum
and Syllabus
2013**

**M.Tech.
SOFTWARE ENGINEERING**

ACADEMIC REGULATIONS
(M.TECH./ M.B.A. / M.C.A.) (Full - Time / Part - Time)
(Effective 2013-14)

1. Vision, Mission and Objectives

1.1 The Vision of the Institute is "To make every man a success and no man a failure".

In order to progress towards the vision, the Institute has identified itself with a mission to provide every individual with a conducive environment suitable to achieve his / her career goals, with a strong emphasis on personality development, and to offer quality education in all spheres of engineering, technology, applied sciences and management, without compromising on the quality and code of ethics.

1.2 Further, the institute always strives

- To train our students with the latest and the best in the rapidly changing fields of Engineering, Technology, Management, Science & Humanities.
- To develop the students with a global outlook possessing, state of the art skills, capable of taking up challenging responsibilities in the respective fields.
- To mould our students as citizens with moral, ethical and social values so as to fulfill their obligations to the nation and the society.
- To promote research in the field of science, Humanities, Engineering, Technology and allied branches.

1.3 Our aims and objectives are focused on

- Providing world class education in engineering, technology, applied science and management.

- Keeping pace with the ever changing technological scenario to help our students to gain proper direction to emerge as competent professionals fully aware of their commitment to the society and nation.
- To inculcate a flair for research, development and entrepreneurship.

2. Admission

2.1 The admission policy and procedure shall be decided from time to time by the Board of Management (BOM) of the Institute, following guidelines issued by Ministry of Human Resource Development (MHRD), Government of India. The number of seats in each branch of the (M.TECH / M.B.A. / M.C.A.) programme will be decided by BOM as per the directives from Ministry of Human Resource Development (MHRD), Government of India and taking into account the market demands. Some seats for Non Resident Indians and a few seats for foreign nationals shall be made available.

2.2 The selected candidates will be admitted to the (M.TECH / M.B.A. / M.C.A.) programme after he/she fulfills all the admission requirements set by the Institute and after payment of the prescribed fees.

2.3 Candidates for admission to the first semester of the Master's Degree Programme shall be required to have passed an appropriate Degree Examination recognized by Hindustan University.

2.4 In all matters relating to admission to the (M.TECH / M.B.A. / M.C.A.). Programme, the decision of the Institute and its interpretation given by the Chancellor of the Institute shall be final.

2.5 If at any time after admission, it is found that a candidate has not fulfilled any of the requirements stipulated by the Institute, the Institute may revoke the admission of the candidate with information to the Academic Council.

3. Structure of the programme

3.1 The programme of instruction will have the following structure

- i) Core courses of Engineering / Technology / Management.
- ii) Elective courses for specialization in areas of student's choice

3.2 The minimum durations of the programmes are as given below:

Program	No. of Semesters
M.Tech.(Full-Time)	4
M.Tech.(Part -Time)	6
M.B.A. (Full - Time)	4
M.B.A. (Part - Time)	6
M.C.A.(Full - Time)	6
M.C.A.(Part-Time)	8

Every (M.TECH / M.B.A. / M.C.A.) programme will have a curriculum and syllabi for the courses approved by the Academic Council.

3.3 Each course is normally assigned certain number of credits. The following norms will generally be followed in assigning credits for courses.

- One credit for each lecture hour per week per semester
- One credit for each tutorial hour per week per semester

- One credit for each laboratory practical of three hours per week per semester.
- One credit for 4 weeks of industrial training and
- One credit for 2 hours of project per week per semester.

3.4 For the award of degree, a student has to earn certain minimum total number of credits specified in the curriculum of the relevant branch of study. The curriculum of the different programs shall be so designed that the minimum prescribed credits required for the award of the degree shall be within the limits specified below.

Program	Minimum prescribed credit range
M.Tech. (Full time / Part time)	75 - 85
M.B.A. (Full time / Part time)	85 - 95
M.C.A (Full time / Part time)	115 - 125

3.5 The medium of instruction, examination and the language of the project reports will be English.

4. Faculty Advisor

4.1 To help the students in planning their courses of study and for getting general advice on the academic programme, the concerned Department will assign a certain number of students to a Faculty member who will be called their Faculty Advisor.

5. Class Committee

5.1 A Class Committee consisting of the following will be constituted by the Head of the Department for each class:

- (i) A Chairman, who is not teaching the class.

- (ii) All subject teachers of the class.
- (iii) Two students nominated by the department in consultation with the class.

The Class Committee will meet as often as necessary, but not less than three times during a semester.

The functions of the Class Committee will include:

- (i) Addressing problems experienced by students in the classroom and the laboratories.
- (ii) Analyzing the performance of the students of the class after each test and finding ways and means of addressing problems, if any.
- (iii) During the meetings, the student members shall express the opinions and suggestions of the class students to improve the teaching / learning process.

6. Grading

6.1 A grading system as below will be adhered to.

Range of Marks	Letter Grade	Grade points
95-100	S	10
85 - 94	A	09
75- 84	B	08
65-74	C	07
55-64	D	06
50-54	E	05
< 50	U	00
	I (Incomplete)	–

6.2 GPA & CGPA

GPA is the ratio of the sum of the product of the number of credits C_i of course "i" and the grade points P_i earned for that course taken over all courses "i" registered by the student to the sum of C_i for all "i". That is,

$$GPA = \frac{\sum_i C_i P_i}{\sum_i C_i}$$

CGPA will be calculated in a similar manner, at any semester, considering all the courses enrolled from first semester onwards.

6.3 For the students with letter grade I in certain subjects, the same will not be included in the computation of GPA and CGPA until after those grades are converted to the regular grades.

6.4 Raw marks will be moderated by a moderation board appointed by the Vice-Chancellor of the University. The final marks will be graded using an absolute grading system. The Constitution and composition of the moderation board will be dealt with separately.

7. Registration and Enrollment

7.1 Except for the first semester, registration and enrollment will be done in the beginning of the semester as per the schedule announced by the University.

7.2 A student will be eligible for enrollment only if he/she satisfies regulation 10 (maximum duration of the programme) and will be permitted to enroll if (i) he/she has cleared all dues in the Institute, Hostel & Library up to the end of the previous semester and (ii) he/she is not

debarred from enrollment by a disciplinary action of the University.

7.3 Students are required to submit registration form duly filled in.

8. Registration requirement

8.1 (i) A Full time student shall not register for less than 16 credits or more than 26 credits in any given semester.

8.1 (ii) A part time student shall not register for less than 10 credits or more than 20 credits in any given semester.

8.2 If a student finds his/her load heavy in any semester, or for any other valid reason, he/she may withdraw from the courses within three weeks of the commencement of the semester with the written approval of his/her Faculty Advisor and HOD. However the student should ensure that the total number of credits registered for in any semester should enable him/her to earn the minimum number of credits per semester for the completed semesters.

9. Minimum requirement to continue the programme

9.1 For those students who have not earned the minimum required credit prescribed for that particular semester examination, a warning letter to the concerned student and also to his parents regarding the shortage of his credit will be sent by the HOD after the announcement of the results of the university examinations.

10. Maximum duration of the programme

The minimum and maximum period for the completion of various programs are given below.

Program	Min. No. of Semesters	Max. No. of Semesters
M.Tech (Full - time)	4	8
M.Tech (Part - time)	6	10
M.B.A. (Full Time)	4	8
M.B.A. (Part Time)	6	10
M.C.A. (Full - Time)	6	12
M.C.A (Part -Time)	8	14

11. Temporary discontinuation

11.1 A student may be permitted by the Director(academic) to discontinue temporarily from the programme for a semester or a longer period for reasons of ill health or other valid reasons. Normally a student will be permitted to discontinue from the programme only for a maximum duration of two semesters.

12. Discipline

12.1 Every student is required to observe discipline and decorum both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the University.

12.2 Any act of indiscipline of a student reported to the Director (Academic) will be referred to a Discipline Committee so constituted. The Committee will enquire into the charges and decide on suitable punishment if the charges are substantiated. The committee will also authorize the Director(Academic) to recommend to the Vice-Chancellor the implementation of the decision. The student concerned may appeal to the Vice-Chancellor whose decision will be final. The Director (Academic) will report the action taken at the next meeting of the Council.

12.3 Ragging and harassment of women are strictly prohibited in the University campus and hostels.

13. Attendance

13.1 A student whose attendance is less than 75% is not eligible to appear for the end semester examination for that semester. The details of all students who have attendance less than 75% will be announced by the teacher in the class. These details will be sent to the concerned HODs and Director (Academic).

13.2 Those who have less than 75% attendance will be considered for condonation of shortage of attendance. However a condonation of 10% in attendance will be given on medical reasons. Application for condonation recommended by the Faculty Advisor, concerned faculty member and the HOD is to be submitted to the Director (Academic) who, depending on the merits of the case, may permit the student to appear for the end semester examination. A student will be eligible for this concession at most in two semesters during the entire degree programme. Application for medical leave, supported by medical certificate with endorsement by a Registered Medical Officer, should reach the HOD within seven days after returning from leave or, on or before the last instructional day of the semester, whichever is earlier.

13.3 As an incentive to those students who are involved in extra curricular activities such as representing the University in Sports and Games, Cultural Festivals, and Technical Festivals, NCC/ NSS events, a relaxation of up to 10% attendance will be given subject to the

condition that these students take prior approval from the officer-in-charge. All such applications should be recommended by the concerned HOD and forwarded to Director (Academic) within seven instructional days after the programme/activity.

14. Assessment Procedure

14.1 The Academic Council will decide from time to time the system of tests and examinations in each subject in each semester.

14.2 For each theory course, the assessment will be done on a continuous basis as follows:

Test / Exam	Weightage	Duration of Test Exam
First Periodical Test*	10%	2 Periods
Second Periodical Test*	10%	2 Periods
Model exam	20%	3 hours
Seminar/ Assignments/Quiz	20%	
End - semester examination	50%	3 Hours

* Best out of the two tests will be considered.

14.3 For practical courses, the assessment will be done by the subject teachers as below:

- (i) Weekly assignment/Observation note book / lab records - weightage 60%.
- (ii) End semester examination of 3 hours duration including viva - weightage 40%

15. Make up Examination/model examination

15.1 Students who miss the end-semester examinations / model examination for valid reasons are eligible for make-up examination /model examination. Those

who miss the end-semester examination / model examination should apply to the Head of the Department concerned within five days after he / she missed examination, giving reasons for absence.

- 15.2** Permission to appear for make-up examination / model exam will be given under exceptional circumstances such as admission to a hospital due to illness. Students should produce a medical certificate issued by a Registered Medical Practitioner certifying that he/she was admitted to hospital during the period of examination / model exam and the same should be duly endorsed by parent / guardian and also by a medical officer of the University within 5 days.

16. Project evaluation

- 16.1** For Project work, the assessment will be done on a continuous basis as follows:

Review / Examination	Weightage
First Review	10%
Second Review	20%
Third Review	20%
End semester Examination	50%

For end semester exam, the student will submit a Project Report in a format specified by the Director (Academic). The first three reviews will be conducted by a Committee constituted by the Head of the Department. The end - semester examination will be conducted by a Committee constituted by the Controller of Examinations. This will

include an external expert.

17. Declaration of results

- 17.1** A candidate who secures not less than 50% of total marks prescribed for a course with a minimum of 50% of the marks prescribed for the end semester examination shall be declared to have passed the course and earned the specified credits for the course.

- 17.2** After the valuation of the answer scripts, the tabulated results are to be scrutinized by the Result Passing Boards of PG programmes constituted by the Vice-Chancellor. The recommendations of the Result Passing Boards will be placed before the Standing Sub Committee of the Academic Council constituted by the Chancellor for scrutiny. The minutes of the Standing Sub Committee along with the results are to be placed before the Vice-Chancellor for approval. After getting the approval of the Vice-Chancellor, the results will be published by the Controller of Examination/ Registrar.

- 17.3** If a candidate fails to secure a pass in a course due to not satisfying the minimum requirement in the end semester examination, he/she shall register and re-appear for the end semester examination during the following semester. However, the sessional marks secured by the candidate will be retained for all such attempts.

- 17.4** If a candidate fails to secure a pass in a course due to insufficient sessional marks though meeting the minimum requirements of the end semester examination, wishes to improve on his/

her sessional marks, he/she will have to register for the particular course and attend the course with permission of the HOD concerned and the Registrar. The sessional and external marks obtained by the candidate in this case will replace the earlier result.

17.5 A candidate can apply for the revaluation of his/her end semester examination answer paper in a theory course within 2 weeks from the declaration of the results, on payment of a prescribed fee through proper application to the Registrar/Controller of Examinations through the Head of the Department. The Registrar/ Controller of Examination will arrange for the revaluation and the results will be intimated to the candidate concerned through the Head of the Department. Revaluation is not permitted for practical courses and for project work.

17.6 The weightage for internal marks in finalizing results and grades shall be waived off after completion of 5 semesters.

18. Grade Card

18.1 After results are declared, grade sheet will be issued to each student, which will contain the following details:

- (i) Program and branch for which the student has enrolled.
- (ii) Semester of registration.
- (iii) List of courses registered during the semester and the grade scored.
- (iv) Semester Grade Point Average (GPA)
- (v) Cumulative Grade Point Average (CGPA).

19. Class / Division

19.1 Classification is based on CGPA and is as follows:

CGPA \geq 8.0 : **First Class with distinction**

6.5 \leq CGPA < 8.0 : **First Class**

5.0 \leq CGPA < 6.5 : **Second Class.**

19.2 (i) Further, the award of 'First class with distinction' is subject to the candidate becoming eligible for the award of the degree having passed the examination in all the courses in his/her first appearance within the minimum duration of the programme.

(ii) The award of 'First Class' is further subject to the candidate becoming eligible to the award of the degree having passed the examination in all the courses within the below mentioned duration of the programme.

Program	No. of Semesters
M.Tech.(Full-Time)	5
M.Tech.(Part -Time)	7
M.B.A. (Full - Time)	5
M.B.A. (Part - Time)	7
M.C.A.(Full - Time)	7
M.C.A.(Part -Time)	9

(iii) The period of authorized discontinuation of the programme (vide clause 11.1) will not be counted for the purpose of the above classification.

20. Transfer of credits

20.1 Within the broad framework of these regulations, the Academic Council, based on the recommendation of the transfer of credits committee so constituted by the Chancellor may permit students to earn part of the credit requirement in other approved institutions of repute and status in the country or abroad.

21. Eligibility for the award of (M.TECH / M.B.A. / M.C.A.) Degree

21.1 A student will be declared to be eligible for the award of the (M.TECH / M.B.A. / M.C.A.). Degree if he/she has

- i) registered and successfully credited all the core courses,
- ii) successfully acquired the credits in the different categories as specified in the curriculum corresponding to the discipline (branch) of his/her study within the stipulated time,
- iii) has no dues to all sections of the Institute including Hostels, and

iv) has no disciplinary action pending against him/her.

The award of the degree must be recommended by the Academic Council and approved by the Board of Management of the University.

22. Power to modify

22.1 Notwithstanding all that has been stated above, the Academic Council has the right to modify any of the above regulations from time to time subject to approval by the Board of Management.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
M.Tech. (Software Engineering)
CURRICULUM 2013-2014

SEMESTER I

Sl. No.	Course Code	Course Title	L	T	P	C	TCH
Theory							
1.	PMA105	Applied Mathematics for Computer Science*	4	0	0	4	4
2.	PCE101	Advanced Data Structures and Algorithms\$\$	4	0	0	4	4
3.	PCE103	Advanced Data Base Management Systems \$\$	4	0	0	4	4
4.	PIT101	Advanced Data Communications\$\$\$	4	0	0	4	4
5.	PSE101	Software Architecture and Design	4	0	0	4	4
6.	PSE102	Advanced Software Engineering	4	0	0	4	4
Practical							
7.	PCE104	Data Structures and Algorithms Lab	0	0	4	2	4
8.	PSE103	Software Engineering Lab	0	0	4	2	4
		Total				28	32

SEMESTER I

Sl. No.	Course Code	Course Title	L	T	P	C	TCH
Theory							
1.	PSE201	Software Process and Project Management	4	0	0	4	4
2.	PSE202	Software Requirement and Estimation	4	0	0	4	4
3.	PSE203	Software Testing	4	0	0	4	4
4.	PSE204	Enterprise Resource Planning	4	0	0	4	4
5.	E-Code	Elective-I	3	0	0	3	3
6.	E-Code	Elective-II	3	0	0	3	3

Practical							
	PSE205	Software Testing Lab	0	0	4	2	4
	PSE206	Enterprise Resource Planning Lab	0	0	4	2	4
		Total				26	30

SEMESTER III

Sl. No.	Course Code	Course Title	L	T	P	C	TCH
Theory							
1.	E-Code	Elective-III	3	0	0	3	3
2.	E-Code	Elective-IV	3	0	0	3	3
3.	E-Code	Elective-V	3	0	0	3	3
Practical							
4	PSE301	Project Phase-I	0	0	12	6	12
		Total				15	21

SEMESTER IV

Sl. No.	Course Code	Course Title	L	T	P	C	TCH
Practical							
1.	PSE401	Project Phase-II	0	0	24	12	24
		Total				12	24

LIST OF ELECTIVES

Sl.No	Course Code	Course Title	L	T	P	C	TCH
1	PSE701	Multimedia Management	3	0	0	3	3
2	PSE702	Component Based Technology	3	0	0	3	3
3	PSE703	Human Interface System Design	3	0	0	3	3
4	PSE704	Bio Informatics	3	0	0	3	3
5	PSE705	Language Technologies	3	0	0	3	3
6	PSE706	Knowledge Management	3	0	0	3	3
7	PSE707	IT in Forensics	3	0	0	3	3
8	PSE708	Real Time Systems	3	0	0	3	3
9	PSE709	Software Agents	3	0	0	3	3
10	PSE710	Software Reliability and Metrics	3	0	0	3	3
11	PSE711	Integrated Software Project Management	3	0	0	3	3
12	PSE713	Adhoc Networks	3	0	0	3	3
13	PSE712	Software Quality Management	3	0	0	3	3
14	PCE713	Service Oriented Architecture	3	0	0	3	3
15	PIT716	Data Ware housing & Data Mining	3	0	0	3	3

*- Common to M.Tech. CSE, M.Tech. SE

\$\$- Common to M.Tech. CSE, M.Tech. SE, M.Tech. IT

\$\$\$- Common to M.Tech. CSE, M.Tech. SE, M.Tech. CCE, M.Tech. IT, M.Tech. CS

Total Credits : 81

**HINDUSTAN UNIVERSITY
HINDUSTAN INSTITUTE OF TECHNOLOGY AND SCIENCE
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
M.Tech. (Software Engineering)
CURRICULUM 2013-2014**

PMA105 APPLIED MATHEMATICS FOR COMPUTER SCIENCE

L	T	P	C
4	0	0	4

Goal

To create the awareness and comprehensive knowledge in probability functions random processes and queuing theory. Develop the Mathematical models using simulation techniques in practical problems, solve them and physically interpret the results.

Objectives

The course should enable the students to:

1. Learn the concept of random variable, moment generating function and their properties. Learns standard distributions in discrete and continuous cases and their applications.
2. Learn classification of random process and Markov chain processes. Understand wide sense stationary and ergodic and Poisson processes.
3. Learn the different Markovian models with finite and infinite capacity and to understand to classify them.
4. Learn the concept of simulation, its different types and their limitation to learn generation of random numbers.
5. Learn the representation of graphs and the different types of algorithm to find the shortest route, minimal spanning trees and search.

Outcome

The students should be able to:

1. Verify whether a given function is a probability mass or density function. Applies the discrete and continuous distributions for solving practical problems. Evaluates the moments of the distributions using moment generating function. Evaluates the probability using marginal and conditional distributions.
2. Verify whether a process is of first or second order or wide sense or strictly stationary. Classifies the properties of Markov processes and verifies the properties of Poisson process
3. Analyze and classify the models, $M/M/1$, $M/M/C$, finite and infinite capacity and be able solve practical problems related to the queuing models.
4. Apply simulation techniques to generate random numbers and solves queuing problems.

5. Use Kruskal and prim's algorithm to find the minimal spanning tree of a graph. Evaluates the shortest path of a network using Dijkstra's and Floyd algorithm. Using search algorithm finds the death and birth.

UNIT I PROBABILITY AND RANDOM VARIABLE 12

Discrete and Continuous random variables - Moments - Moment generating functions - Standard distributions - Binomial, Poisson, Geometric, Negative Binomial, Uniform, Normal, Exponential, Gamma and Weibull distributions - Two dimensional random variables - Joint, Marginal and Conditional distributions.

UNIT II RANDOM PROCESSES 12

Classification - Stationary Process - Markov process - Markov Chains - Auto correlation - Cross correlation - Wide Sense Stationary - Ergodic process - Transition Probabilities - Limiting distribution - Poisson process - Properties.

UNIT III QUEUING THEORY 12

Markovian models - Birth and death queuing models - Steady state - Single and Multiple servers - M/M/1 - Finite and infinite capacity - M/M/C - finite and infinite capacity.

UNIT IV SIMULATION AND APPLICATIONS 12

Introduction - Types of simulation - Limitations of simulation techniques - Phases of simulation study - Generation of random numbers - Monte Carlo simulation - Application to queuing problems.

UNIT V GRAPH ALGORITHMS 12

Computer Representation of graphs - Basic graph algorithms - Minimal spanning tree algorithm - Kruskal and Prim's algorithm - Shortest path algorithms - Dijkstra's and Floyd algorithms - DFS and BFS algorithms.

Total : 60

REFERENCE BOOKS

1. Taha, H.A., "Operations Research - An Introduction ", Prentice Hall of India Ltd., 6th Ed., 1997.
2. Dr.A.Singaravelu, Dr.S.Siva Subramanian and Dr.C.Ramachandran, "Probability and Queuing Theory", Meenakshi Agency, 20th edition, January 2013.
3. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science, PHI, Unit III - Chapter 11.
4. Kapur, J.N. and Saxena, H.C. "Mathematical Statistics ", S. Chand and Co. Ltd., 1997.
5. Bhat, U.N., " Elements of Applied Stochastic Processes ", John Wiley and Sons, 2nd, 1984.
6. Sharma, S.D., "Operations Research ", Kedar Nath, Ram Nath and Co., Meerut, 12th Ed., 1998.
7. T.Veerarajan, "Probability, Statistics and Random Processes", Tata McGraw-Hill, 2nd Ed., 2006.

PCE101 ADVANCED DATA STRUCTURES AND ALGORITHMS

L	T	P	C
4	0	0	4

Goal

To study the advanced representations in Data structures and algorithms

Objectives

The course should enable the student to learn:

1. About the time complexity of algorithms.
2. The representations used in heap data structures.
3. The different types of search structures.
4. Various algorithm design techniques.
5. The advanced algorithms.

Outcome

The student should be able to :

1. Calculate the time complexity of algorithms and express it using appropriate notations.
2. Compare and implement the different types of heap structures and search structures.
3. Understand the applications of heap and search structures in computer science.
4. Implement the real life problems using suitable algorithm design technique.
5. Implement advanced algorithms.

UNIT I INTRODUCTION

12

Abstract Data Types - Time and Space Analysis of Algorithms - Big Oh and Theta Notations - Average, best and worst case analysis - Simple recurrence relations - Mappings.

UNIT II HEAP STRUCTURES

12

Min-max heaps - Deaps - Leftist heaps - Binomial heaps - Fibonacci heaps - Skew heaps - Lazy-binomial heaps.

UNIT III SEARCH STRUCTURES

12

Binary search trees - AVL trees - 2-3 trees - 2-3-4 trees - Red-black trees - B-trees - splay trees - Tries.

UNIT IV ALGORITHM DESIGN TECHNIQUES

12

Divide and Conquer and Greedy : Quicksort - Strassen's matrix multiplication - Convex hull - Tree-vertex splitting - Job sequencing with deadlines - Optimal storage on tapes Dynamic Programming and Backtracking: Multistage graphs - 0/1 knapsack using dynamic programming - 8- queens problem - graph coloring.

UNIT V ADVANCED ALGORITHMS

12

Parallel Algorithms: Basic Techniques- Work & Efficiency - Distributed Computation - Heuristic & Approximation Approaches.

Total 60

REFERENCE BOOKS

1. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, University Press, 2009.
2. E. Horowitz, S. Sahni and S. Rajasekaran, Computer Algorithms/C++, 2nd Ed., Uni. Press, 2007.
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 3rd Edition, Pearson, 2007.
4. Jean-Paul Tremblay, Paul .G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw Hill, 2nd Ed. , 1991
5. Thomas H.Coremen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein , "Introduction to algorithms", 3rd Ed., MIT press.

PCE103 ADVANCED DATABASE MANAGEMENT SYSTEMS

L	T	P	C
4	0	0	4

Goal

To provide a comprehensive study of Relational, Distributed and Advanced Database technologies.

Objectives

The course should enable the students to:

1. Learn ER model and transaction processing system.
2. Understand various storage structures for Database.
3. Learn the distributed and Parallel database processing.
4. Learn Object Oriented database concepts and models.
5. Understand various advancements in database technology.

Outcome

The student should be able to

1. Construct ER models and explain transaction processing in relational models.
2. Implement database storage models and query optimization techniques.
3. Design a distributed database.
4. Implement the distributed query processing systems.
5. Understood emerging database systems.

UNIT I RELATIONAL MODEL ISSUES	12
ER Model - Normalization - Query Processing - Query Optimization - Transaction Processing - Concurrency Control - Recovery - Database Tuning.	
UNIT II DATABASE STORAGE AND SYSTEM DESIGN	12
Storage Structures, Indexing and multi dimensional indexes, Query Processing Algorithms, External Sorting, Query Optimization- Heuristic based optimization- cost based optimization, Buffer Management, Concurrency Control, Recovery.	
UNIT III DISTRIBUTED DATABASES	12
Parallel Databases - Inter and Intra Query Parallelism - Distributed Database Features - Distributed Database Architecture - Fragmentation - Distributed Query Processing - Distributed Transactions Processing - Concurrency Control - Recovery - Commit Protocols.	
UNIT IV OBJECT ORIENTED DATABASES	12
Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence - Query Languages - Transaction - Concurrency - Multi Version Locks - Recovery - POSTGRES - JASMINE -GEMSTONE - ODMG Model.	
UNIT V EMERGING SYSTEMS	12
Enhanced Data Models - Client/Server Model - Web Databases - Mobile Databases- XML and Web Databases. Current issues- Rules - Knowledge Bases - Active and Deductive Databases - Multimedia Databases- Multimedia Query languages - Spatial Databases.	

Total : 60

REFERENCE BOOKS

1. Thomas Connolly and CarolynBegg, "Database Systems, A Practical Approach to Design, Implementation and Management", 4th Edition, Pearson Education 2000.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Edu., 2006.
3. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6th Ed., Tata McGraw Hill, 2006.
4. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Ed., Pearson Education, 2006.

PIT101 ADVANCED DATA COMMUNICATIONS

L	T	P	C
4	0	0	4

Goal

To provide wide knowledge in the design and implementation of communication systems.

Objectives

The course should enable the students to:

1. Understand the concepts of TCP/IP, UDP and OSI architecture.
2. Understand ATM Services and Connection details.
3. Learn congestion control algorithms.
4. Learn graph methods to find the shortest path among different routing protocols.
5. Learn the key concepts of integrated service architecture and label switching.

Outcome

The student should be able to

1. Compare and understand the different network architectures
2. Implement ATM protocol architecture and services.
3. Design techniques to control the congestion in the network.
4. Apply the different routing protocols to find the shortest path.
5. Design the ISA with the associated protocols.

UNIT I NETWORK ARCHITECTURES

2

The need for speed and quality of service, Advanced TCP/IP and ATM Networks, The need for a protocol architecture, The TCP/IP protocol architecture, The OSI model, Internetworking, TCP, UDP, Ipv6.

UNIT II ATM NETWORKS

12

Packet-switching networks, Frame relay networks, ATM protocol architecture, ATM logical connections, ATM cells, ATM service categories, ATM Adaptation Layer (AAL), The emergence of high-speed LANs, Ethernet, Fibre channel, Wireless LANs.

UNIT III TRAFFIC MANAGEMENT

12

Congestion control in data networks and internets, Effects of congestion, Congestion and control, Traffic management, Congestion control in Packet-Switching networks, Frame relay congestion control, The need for flow and error control, Link control mechanisms, ARQ performance, TCP flow control, TCP congestion control performance of TCP over ATM.

UNIT IV ROUTING PROTOCOLS

12

Overview of graph theory and least-cost paths, Elementary concepts of graph theory, Shortest path

length determination, Internet routing principles, Distance-Vector protocol, RIP, Link-State protocol, OSPF, Path-Vector protocols, BGP and IDRP, Multicasting.

UNIT V ADVANCED NETWORKING CONCEPTS

12

Integrated Services Architecture (ISA), Queuing discipline, Random early detection, Differentiated services, Real-Time traffic, Resource Reservation : RSVP, Multiprotocol label switching, Real-Time Transport Protocol (RTP).

Total : 60

REFERENCE BOOKS

1. Willam Stallings, "High Speed Networks and Internets - Performance and Quality of Service", 2nd Ed., Pearson Education.
2. Andrew S. Tanenbaum, " Computer Networks", 4th Ed., Pearson Education.
3. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach featuring the Internet", 5th Ed., Addison Wesley, 2009 .
4. William Stallings, "Data and Computer Communications", 9th Ed., Pearson Education.

PSE101 SOFTWARE ARCHITECTURE AND DESIGN

L	T	P	C
4	0	0	4

Goal

To provide a sound technical exposure to the concepts, principles, methods, and best practices in software architecture and software design.

Objectives

The course should enable the student to learn

1. The challenges of advanced software design and the issues associated with large-scale software architectures, frameworks, patterns and components.
2. The tools and techniques that may be used for the automatic analysis and evaluation of software.
3. To design and make architectural documentation.
4. To analyse architecture.
5. To software production

Outcome

The student should be able to

1. Conceptualize and coordinate designs, addressing technological aspects of architecture.
2. Produce "software architects" with sound knowledge and superior.
3. Build robust, scalable, and reliable software intensive systems in an extremely.

4. Recognize and analyze the Architecture.
5. Apply and integrate computer technology in design processes and products.

UNIT I ARCHITECTURE BUSINESS CYCLE 12

Architecture Business Cycle - Origin of an Architecture , Software Processes and Architectural Business Cycle, A good architecture, Software Architecture, What is & what it is not the software Architecture is, Other points of view, Architectural Pattern, Reference Models and Reference Architectures, The Importance of Software Architecture, Architectural structures & views, Case study in utilizing Architectural Structures.

UNIT II CREATING AN ARCHITECTURE 12

Understanding the quality Attributes - Functionality and Architecture, Architecture and Quality Attributes, System Quality Attributes, Quality Attributes Scenarios in practice, Other System Quality Attributes, Business Qualities, Architecture Qualities. Achieving Qualities - Introducing Tactics - Availability, Modifiability, Performance, Security, Testability, Usability, Relationships of Tactics to Architectural Patterns, Architectural Patterns and Style.

UNIT III DESIGN AND DOCUMENTATION 12

Designing the Architecture - Architecture in the life cycle, Designing the Architecture, Forming the Team Structure, Creating the Skeletal System. Documenting Software Architectures, Uses of Architectural Documentation, Views, Choosing the relevant views, Documenting a view, Documentation across views.

UNIT IV ANALYZING ARCHITECTURE 12

ATAM (Architecture Tradeoff Analysis Method) - A comprehensive method for architecture evaluation, participants, outputs, phases of the ATAM, The Nightingale system - A case study in applying the ATAM. CBAM (Cost Benefit Analysis Method) - A quantitative approach to architecture design decision making: Decision making context, basis for CBAM, Implementing CBAM, A Case Study - The NASA ECS project. The World Wide Web - A case study in interoperability Relationship to the Architecture Business Cycle, Requirements & Quality, Architectural Solution, The evolution of web based e-commerce architectures, Achieving quality goals, Architecture Business Cycle today.

UNIT V SOFTWARE PRODUCT LINES 12

Reusing Architectural Assets - Overview - Successful working, Scope, Architectures and Difficulties in software product lines. Celsius Tech - A Case study in product Line development, Relationship to the Architecture Business Cycle, Requirements & Quality, Architectural Solution. Building systems from off-the-shelf components - Impact of components on Architecture, Architectural mismatch, Component-based design as search, ASEILM example.

Total : 60

REFERENCE BOOKS

1. Len Bass, Paul Clements, Rick Kazman, Software Architecture in Practice, Pearson Education Asia , 3rd Edition, 2012.

2. Jeff Garland, Richard Anthony, Large-Scale Software Architecture - A Practical Guide Using UML, Wiley -dreamtech India Pvt., Ltd., 2000.
3. Pressman S Roger, Software Engineering, Mc Graw Hill, Editions, 4th Ed., 1997.
4. Sommerville, Ian, Software Engineering, Addison Wesley, 5th Ed., 2000.
5. Rumbaugh, James, Object Oriented Modeling and design, Pearson Education, 2005.

PSE102 ADVANCED SOFTWARE ENGINEERING

L	T	P	C
4	0	0	4

Goal

To focus on the object oriented software engineering principles and methodologies for effective software development.

Objectives

The course should enable the student to learn

1. Object Oriented Software Engineering concepts and principles.
2. Various cost estimation methods and scheduling process.
3. Various Software models.
4. Implementation.
5. Maintenance issues.

Outcome

The student should be able to

1. Understand the software life cycle models.
2. Understand the importance of modelling and modelling languages.
3. Design and develop correct and robust software products.
4. Understand business requirements pertaining to software development.
5. Understand testing and maintenance.

UNIT I INTRODUCTION

12

Software Engineering Paradigms - Software Development process models - Project and Process - Project management - Process and Project metrics - Object Oriented concepts and Principles.

UNIT II PLANNING AND SCHEDULING

12

Software prototyping - Software project planning - Scope - Resources - Software Estimation - Empirical Estimation Models-Planning-Risk Management - Software Project Scheduling - Object Oriented Estimation and Scheduling.

UNIT III ANALYSIS AND DESIGN**12**

Analysis Modeling - Data Modeling - Functional Modeling & Information Flow- Behavioural Modeling- Structured Analysis - Object Oriented Analysis - Domain Analysis-Object oriented Analysis process - Object Relationship Model - Object Behaviour Model. Design Concepts and Principles - Design Process - Design Concepts - Modular Design - Design Effective Modularity - Introduction to Software Architecture - Data Design - Transform Mapping - Transaction Mapping - OOD - Design System design process- Object design process -Design Patterns.

UNIT IV IMPLEMENTATION AND TESTING**12**

Top-Down , Bottom-Up , object oriented product Implementation and Integration. Software Testing methods-White Box, Basis Path-Control Structure -Black Box-Unit Testing- Integration testing- Validation and System testing. Testing OOA and OOD models - Object oriented testing strategies.

UNIT V SOFTWARE MAINTENANCE**12**

Maintenance process-System documentation-program evolution dynamics-Maintenance costs-Maintainability measurement - Case Studies.

Total : 60**REFERENCE BOOKS**

1. Roger S. Pressman, "Software Engineering-A Practitioner's Approach", 6th Ed., TMH, 2005.
2. Grady Booch, James Rumbaugh, Ivar Jacobson -"The Unified Modeling Language User Guide", Addison Wesley, 1999.
3. Ian Sommerville, "Software Engineering", V Edition Addison- Wesley 1996
4. Carlo Ghezzi Mehdi Jazayer, Dino Mandrioli "Fundamentals of Software Engineering", Prentice Hall, 2002.
5. Richard Fairley, "Software Engineering Concepts", Mc.Graw Hill 1985

PCE104 DATA STRUCTURES AND ALGORITHMS LAB

L	T	P	C
0	0	4	2

Goal

To implement advanced Data structures and applications using algorithms in C++

Objectives

The course should enable the student to:

1. Implement advanced data structures
2. Calculate the time complexity of algorithms and express it using appropriate notations
3. Implement different algorithm design techniques.
4. Implement advanced algorithm concepts.

Outcome

The student should be able to

1. Use the appropriate data structures for applications in computer science.
2. Understand the applications of heap and search structures in computer science.
3. Calculate the time complexity of algorithms.

LIST OF EXPERIMENTS

1. Implement and calculate the time complexity of merge sort
2. Implement and calculate the average case, worst case and best case comparison of Insertion sort.
3. Implement min heap and max heap and calculate the efficiency of the heap.
4. Implement versions of the BST search, insertion, and deletion algorithms using an array. What happens to the space efficiency of the array representation when the tree is ill balanced
5. Implement amortized analysis of splay trees.
6. Implement 0/1 knapsack problem using the following:
 - a) Greedy algorithm.
 - b) Backtracking algorithm.
7. Implement traveling sales persons problem using the following:
 - a) Dynamic programming algorithm.
 - b) The back tracking algorithm.
8. Implement tower of Hanoi using heuristic approach
9. Implement vertex cover problem using approximate algorithms.

PSE103 SOFTWARE ENGINEERING LAB

L	T	P	C
0	0	4	2

Goal

To implement Software engineering concepts.

Objective

The course should enable the student to:

Understand Software engineering concepts.

Outcome

The student should be able to

Implement a project using Software engineering process.

LIST OF EXPERIMENTS

1. Identifying the Requirements from Problem Statements Requirements.
2. Estimation of Project Metrics Project Estimation Techniques.
3. Modeling UML Use Case Diagrams and Capturing Use Case Scenarios.
4. E-R Modeling.
5. Identifying Domain Classes from the Problem Statements Domain Class.
6. State chart and Activity Modeling State chart Diagrams.
7. Modeling UML Class Diagrams and Sequence diagrams.
8. Modeling Data Flow Diagrams.
9. Estimation of Test Coverage Metrics and Structural Complexity.
10. Designing Test Suites Software Testing.

SEMESTER - II
PSE201 SOFTWARE PROCESS AND PROJECT MANAGEMENT

L T P C
4 0 0 4

Goal

To study advanced methods in software process and project tracking

Objectives

The students should be able to learn

1. Software Process Maturity Framework.
2. Project Management Framework
3. Project Planning Software Life Cycle Models.
4. Concepts of Project Tracking
5. Techniques for Project Closure.

Outcome

The student should be able to

1. Optimize the process.
2. Improve Software Economics.
3. Calculate Cost estimation
4. Maintain status report
5. Perform closure analysis

UNIT I SOFTWARE PROCESS

12

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, IDEAL, Process Definition Techniques.

UNIT II SOFTWARE PROJECT MANAGEMENT

12

Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, The old way and the new way. Managing Software Projects Project Management and the CMM, Project Management and CMMI, Project Management Process Framework.

UNIT III PROJECT PLAN AND QUALITY

12

Project Planning Software Life Cycle Models, Project Organizations and Responsibilities, Artifacts of the Project Management Process, Cost and scheduling estimation, Establishing Project Environment, Risk Management, Quality Assurance and Configuration Management.

UNIT IV PROJECT DEFECT TRACKING AND PREVENTION

12

Project Tracking and Control Defect Tracking, Issue Tracking, Status Reports, Milestone Analysis, Defect Analysis and Prevention Methods, Process monitoring and audit, Reviews, Inspections and Walkthroughs, Seven Core Metrics, Management indicators, Quality Indicators.

UNIT V PROJECT CLOSURE

12

Project Closure :Project Closure Analysis, Role of Closure Analysis in a project, Performing Closure Analysis.

Total : 60

REFERENCE BOOKS

1. Watts S. Humphrey, "Managing the Software Process", Pearson Education, 1989.
2. Walker Royce, Software Project Management, Pearson Education,
3. Münch, J., Armbrust, O., Kowalczyk, M., Soto, M, "Software Process Definition and Management", Springer, 2012.
4. Robert B Grady, Practical Software Metrics for Project Management and Process Improvement, Prentice Hall, 1992.
5. Sami Zahran, Software Process Improvement, Addison-Wesley, 1998.

PSE202 SOFTWARE REQUIREMENT AND ESTIMATION

L	T	P	C
4	0	0	4

Goal

To study advanced methods of software requirement engineering and different estimation methods.

Objectives

The course should enable the students to

1. Learn about software requirement.
2. Learn about software requirement elicitation.
3. Learn about software requirement principles.
4. Study about software requirement models.
5. Learn about software estimation.

Outcome

The student should be able to

1. Improve Software requirement process.
2. Identify Software quality attribute.
3. Identify matrix and links in requirement chain.
4. Draw UML diagrams
5. Perform software size estimation.

UNIT I SOFTWARE REQUIREMENTS

12

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

UNIT II SOFTWARE REQUIREMENT ANALYSIS	12
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 REQUIREMENT MANAGEMENT	12
Software Requirements Management, Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain.	
UNIT IV SOFTWARE REQUIREMENT MODELLING	12
Software Requirements Modeling Use Case Modeling, Analysis Models, Dataflow diagram, state transition diagram, class diagrams, Object analysis, Problem Frames.	
UNIT V SOFTWARE ESTIMATION	12
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.	

Total : 60

REFERENCE BOOKS

1. Rajesh Naik and Swapna Kishore, "Software Requirements and Estimation" Tata McGraw Hill, 2001.
2. Karl Wieggers, "Practical Project Initiation: A Handbook with Tools", Microsoft Press, 2007.
3. Karl Wieggers, "More About Software Requirements: Thorny Issues and Practical Advice", Microsoft Press, 2006.
4. Karl Wieggers, "Software Requirements", 2nd Ed., Microsoft Press, 2006.
5. Dean Leffingwell, Don Widrig, "Managing Software Requirements: A Use Case Approach", 2nd Ed., Addison-Wesley, 2003.
6. Richard H. Thayer, Merlin Dorfman, "Software Requirements Engineering", 2nd Willey, 1997.

PSE203 SOFTWARE TESTING

L	T	P	C
4	0	0	4

Goal

This course will enable the designers and users of the software to implement and test the software

Objectives

The course should enable the students to learn

1. Testing strategies and methodologies
2. Techniques to test of object Oriented software
3. Test management strategies and testing tools

4. Automated tools for testing.
5. Testing standards.

Outcome

The student should be able to

1. Understand the software testing fundamentals
2. Understand the testing methods used for object oriented software.
3. Demonstrate the use of automated tools

UNIT I PRINCIPLES OF TESTING 12

Need for Testing-Psychology of testing-Testing economics-white box testing, Black box testing, Grey box Testing-Retesting regression Testing-Verification and Validation Testing Strategies-Levels of Testing-Unit, Integration, System Testing, Acceptance Testing .

UNIT II WHITE BOX TESTING 12

Test case Design-Statement Coverage-Branch Coverage-Condition Coverage-Decision / Condition Coverage-Multiple Condition Coverage-Data Flow Coverage-Mutation Testing.

UNIT III BLACK BOX TESTING 12

Test Case Designs. Boundary Value analysis-Equivalence Partitioning-Cause Effect Graphing, Error Guessing, Logic Based Testing.Special Topics: Syntax testing-Finite State Testing Logic Based Testing Domain Testing

UNIT IV TEST MANAGEMENT 12

Test Planning-Test Plan Documentation-Test Estimation-Test Schedule -Test monitoring and Control-standards for Testing.

UNIT V MISCELLANEOUS TOPICS 12

Introduction of Object Oriented Testing-Automated Tools for Testing-Tool Selection and Implementation-Test case generators-GUI Testing-Testing Web enabled Application

Total : 60

REFERENCE BOOKS

1. Glenford J.Myers," The Art of Software Testing" John Willey & Sons 1979.
2. Boris Beizer, "Software Testing Technologies" 1st edition Dreamtech 2000.
3. Edward Kit, "Software Testing in the Real World - Improving the Process", Pearson Edu., 2004.
4. Roger S.Pressman, " Software Engineering" 5th edition, Mc Graw Hill
5. William E.Lewis," Software Testing and continuous quality improvement "Auerbach
6. William Perry, "Effective Methods for Software Testing", 2nd, John Willey & Sons, 2000

PSE204 ENTERPRISE RESOURCE PLANNING

L	T	P	C
4	0	0	4

Goal

To learn the concepts of ERP, Architectures and implementation.

Objectives

The course should enable the student to learn

1. Principles of business engineering.
2. The guidelines for ERP implementation.
3. Business modeling and ERP implementation.
4. ERP models and its advantage
5. SAP architectures and its uses

Outcome

The student should be able to

1. Understand how business engineering goes with information technology
2. Apply ERP implementation technology
3. Select the ERP models for the application.
4. Understand the features of SAP package.
5. Develop small applications using SAP.

UNIT I INTRODUCTION TO ERP

12

Integrated Management Information Seamless Integration - Supply Chain Management - Integrated Data Model - Benefits of ERP - Business Engineering and ERP - Definition of Business Engineering - Principle of Business Engineering - Business Engineering with Information Technology.

UNIT II BUSINESS MODELLING FOR ERP

12

Building the Business Model - ERP Implementation - An Overview - Role of Consultant, Vendors and Users, Customization - Precautions - ERP Post Implementation Options-ERP Implementation Technology -Guidelines for ERP implementation.

UNIT III ERP AND THE COMPETITIVE ADVANTAGE

12

ERP domain MPGPRO - IFS/Avalon - Industrial and Financial Systems - Baan IV SAP-Market Dynamics and Dynamic Strategy.

UNIT IV COMMERCIAL ERP

12

Description - Multi-Client Server Solution - Open Technology - User Interface- Application Integration.

UNIT V SAP ARCHITECTURE

12

Basic Architectural Concepts - The System Control Interfaces - Services - Presentation Interface - Database Interface.

Total : 60

REFERENCE BOOKS

1. Vinod Kumar Garg and N.K.Venkita Krishnan, "Enterprise Resource Planning - Concepts and Practice", PHI, 1998.
2. Jose Antonio Fernandz, The SAP R/3 Handbook, TMH, 1998.
3. Bret Wagner, Ellen Monk, "Enterprise Resource Planning", 3rd Ed., Course Technology, 2008.
4. Alexis Leon, "Enterprise Resource Planning", 2nd Ed., Tata McGraw Hill, 2007.
5. Mahadeo Jaiswal, Ganesh Vanapalli, "Textbook of Enterprise Resource Planning", Macmillan Publishers India, 2005.

PSE205 SOFTWARE TESTING LAB

L	T	P	C
0	0	4	2

Goal

To implement the concepts of software testing process.

Objective

This course should enable the students to learn Software Testing concepts.

Outcome

The students should be able to implement the concepts in Software Testing.

LIST OF EXPERIMENTS

1. Do the following testing for a chosen software implementation using any commercial or freeware tools:
 - a. Path-testing
 - b. Transaction-flow testing.
 - c. Data-flow testing.
2. Do the following measurements on a chosen software implementation:
 - a. Halstead's metrics
 - b. McCabe's metrics
3. **Simulate a test driver**
 - a. Develop a simple software testing tool implementing any testing technique of your choice.

PSE206 ENTERPRISE RESOURCE PLANNING LAB

L	T	P	C
0	0	4	2

Goal

To implement the concepts of ERP, Architectures and implementation.

Objective

This course should enable the students to learn ERP concepts.

Outcome

The students should be able to implement the concepts in ERP.

LIST OF EXPERIMENTS

1. ERP- Financial accounting - Financial accounting delivers tools and reports that enable you to manage all financial processes.
2. ERP- Bank Transactions - Bank transactions help you handle all your financial processing with tools.
3. ERP - Sales and Distribution - From price quotes to invoicing and payment, sales and distribution helps you complete your entire sales cycle with tools.
4. ERP - Sales Opportunity Management - Sales opportunity management records every sales opportunity from the first phone call to the successful close of a transaction. User can enter various details concerning the opportunity, including the source, potential, closing date, competitors, and activities. As soon as the first relevant quotation is created, user can link it with the opportunity to simplify later tracking and analysis.
5. ERP - Service Management - Service management optimizes the potential of your service department, providing support for service operations, service contract management, service planning, tracking of customer interaction activities and customer support. ERP - Purchasing - Purchasing enables you to manage and maintain every aspect of your vendor relationships.
6. ERP - Warehouse management - Warehouse management gives you the tools and processes you need to handle stock merchandise.
7. ERP - Material Requirements Planning - Materials requirements planning (MRP) manages MRP through a wizard-based process. This process enable users to define a planning scenario in five easy steps and predict demand based on forecasts.
8. ERP- Business Partners - Business partner management allows you to track and manage vital information about your clients and vendors.
9. ERP - Outlook Integration - Outlook integration gives you seamless integration and synchronized communications between SAP Business One and outlook, Microsoft's Personal information manager and communications program. outlook provides an integrated solution for managing and organizing e-mail messages schedules, tasks notes, contacts and other information.
10. ERP - Reporting - Reporting can open an entirely new world of data and information.

PSE701 MULTIMEDIA MANAGEMENT

L T P C
3 0 0 3

Goal

To study the concepts of multimedia systems and management.

Objectives

The students should be able to learn

1. The nature of interactive multimedia,
2. The techniques to create and communicate using multimedia
3. How it can benefit business.
4. The design principles for multimedia
5. The multimedia production process.

Outcome

The student should be able to

1. Understand the Multimedia server architecture and components.
2. Analyze the various scheduling techniques.
3. Identify and overcome the issues involved in Multimedia storage system.
4. Understand the Cache management techniques.
5. Evaluate the load balancing and various caching policies.

UNIT I MULTIMEDIA SERVER APPLICATIONS AND ENVIRONMENTS 9

Introduction - Multimedia Server Environment - Multimedia Server Architecture and Components.

UNIT II SCHEDULING 9

Client session scheduling - Client request scheduling - Scheduling in system components.

UNIT III THE STORAGE SUBSYSTEM 9

Storage Management Overview - Single Disk Issue - Multiple Disk Organization - Storage Hierarchy.

UNIT IV CACHE MANAGEMENT 9

Caching overview - Memory cache - Disk cache.

UNIT V RELEATED ISSUES 9

Performance evaluation - Affinity Routing - Load Balancing - Caching among disks - Distributed disk caching - Disk caching policies.

Total : 45

REFERENCE BOOKS

1. Dinker Sitaram, Asit Dan, "Multimedia Servers - Applications, Environments and Design", Morgan Kaufmann Publishers, 2000.
2. S. Ghandeharizadeh, S Kim, C Shahabi and R. Zimnorman, "Multimedia Information Storage Management", Kluwer Academic Press, 1996.
3. C. K. Wong, "Algorithmic Studies in Mass Storage Systems, Computer Science Press, 1983.

PSE702 COMPONENT BASED TECHNOLOGY

L	T	P	C
3	0	0	3

Goal

To provide a detailed study on different software components and their applications.

Objectives

The course should enable the students to learn

1. Advanced concepts in JAVA, Corba and .Net Components
2. Fundamental properties of components, technology and architecture and middleware.
3. Component Frameworks and Development.

Outcome

The student should be able to

1. Understand fundamentals of CBT
2. Write efficient programs using Java and CORBA technologies
3. Design and use component based tools

UNIT I INTRODUCTION 9

Software Components - objects - fundamental properties of Component technology - modules - interfaces - callbacks - directory services - component architecture - components and middleware.

UNIT II JAVA COMPONENT TECHNOLOGIES 9

Threads - Java Beans - Events and connections - properties - introspection - JAR files - reflection - object serialization - Enterprise Java Beans - Distributed object models - RMI and RMI-IIOP.

UNIT III CORBA TECHNOLOGIES 9

Java and CORBA - Interface Definition language - Object Request Broker - system object model - portable object adapter - CORBA services - CORBA component model - containers - Application server - model driven architecture.

UNIT IV COM AND .NET TECHNOLOGIES 9

COM - Distributed COM - object reuse - interfaces and versioning - dispatch interfaces - connectable objects - OLE containers and servers - Active X controls - .NET components - assemblies - appdomains - contexts - reflection - remoting.

UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT 9

Connectors - contexts - EJB containers - CLR contexts and channels - Black Box component framework - directory objects - cross-development environment - component-oriented programming - Component design and implementation tools - testing tools - assembly tools.

Total : 45

REFERENCE BOOKS

1. Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Addison Wesley, 2nd Ed., 2002.
2. Ed Roman, "Enterprise Java Beans", 3rd Edition, Wiley, 2004.
3. Andreas Vogel, Keith Duddy, "Java Programming with CORBA", John Wiley & Sons 1998.
4. Corry, Mayfield, Cadman, "COM/DCOM Primer Plus", Tec media, 1st Edition, 1999.

PSE703 HUMAN INTERFACE SYSTEM DESIGN

L	T	P	C
3	0	0	3

Goal

To understand the concepts of Human Computer Interface Design.

Objectives

The course should enable the students to learn

1. Theoretical foundations of human computer interaction;
2. Appreciation for human factors in software systems
3. What makes an interface good
4. User-centered interfaces design techniques.

Outcome

The student should be able to

1. Understand fundamentals of human computer interaction.
2. Apply human factors for the development of interactive software
3. Design an efficient user interface
4. Do a case study on usability of websites

UNIT I HUMAN FACTORS 9

Human Factors of Interactive Software - Interaction Devices.

UNIT II MODELS 9

Theories - Principles and Design Guidelines for User Interface Design - Object - Action Interface Model -Principles for Design - Data display and entry guidelines.

UNIT III DESIGN PROCESS 9

User Interface Design Process - Usability Testing - Usability Requirements and Specification procedures and techniques.

UNIT IV INFORMATION RELATED 9

Information Search - Visualization and the WWW.

UNIT V USABILITY 9

Usability of Web Sites and Case Study of e-commerce sites.

Total : 45

REFERENCE BOOKS

1. Ben Schneiderman, " Designing the User Interface ", Addison Wesley, 2000.
2. Jacob Nielsen, " Usability Engineering ", Academic Press, 1993.
3. Alan Dix et al, " Human - Computer Interaction ", Prentice Hall, 1993.
4. Alan Cooper, " The Essentials of User Interface Design ", IDG Books, 1995.

PSE704 BIOINFORMATICS

L	T	P	C
3	0	0	3

Objectives

The course should enable the students to learn

1. Various concepts of Biological patterns.
2. The Biological pattern matching process
3. Features of search engines and data visualization.
4. Approaches to statistics and data mining.
5. The issues in proteins and drug discovery.

Outcome

The student should be able to

1. Understand representation of biological patterns.
2. Design a distributed database for bioinformatics
3. Understand search engine mechanisms.
4. Understand data mining concepts applicable to Bioinformatics.
5. Apply pattern matching concepts in bioinformatics

UNIT I INTRODUCTION

9

The Central Dogma - Killer Application - Parallel Universes - Watson's Definition - Top Down Vs Bottom Up Approach - Information Flow - Conversance - Communications.

UNIT II DATABASE AND NETWORKS

9

Definition - Data Management - Data Life Cycle - Database Technology - Interfaces - Implementation - Networks: Communication Models - Transmission Technology - Protocols - Bandwidth - Topology - Contents - Security - Ownership - Implementation.

UNIT III SEARCH ENGINES AND DATA VISUALIZATION

9

Search Process - Technologies - Searching And Information Theory - Computational Methods - Knowledge Management - Sequence Visualizations - Structure Visualizations - User Interfaces - Animation Vs Simulation.

UNIT IV STATISTICS, DATA MINING AND PATTERN MATCHING

9

Statistical Concepts - Micro Arrays - Imperfect Data - Basics - Quantifying - Randomness - Data Analysis - Tools Selection - Alignment - Clustering - Classification - Data Mining Methods - Technology

- Infrastructure Pattern Recognition - Discovery - Machine Learning - Text Mining - Pattern Matching Fundamentals - Dot Matrix Analysis - Substitution Matrix - Dynamic Programming - Word Method - Bayesian Method - Multiple Sequence Alignment Tools.

UNIT V MODELING SIMULATION AND COLLABORATION 9

Drug Discovery Fundamentals - Protein Structure - System Biology Tools - Collaboration And Communication - Standards - Issues - Case Study.

Total : 45

REFERENCE BOOKS

1. Bryan Bergeron, "Bio Informatics Computing", Prentice Hall, 2003.
2. T.K. Affward, D.J. Parry Smith, "Introduction to Bio Informatics", Pearson Education, 2001.
3. Pierre Baldi, Soren Brunak, "Bio Informatics - The Machine Learning Approach", 2nd Edition, First East West Press, 2003

PSE705 LANGUAGE TECHNOLOGIES

L	T	P	C
3	0	0	3

Goal

To study the concepts language processing and technologies.

Objectives

The course should enable the students to learn

1. Fundamentals of Natural Language Processing..
2. Basis of information retrieval.
3. Text mining algorithms.
4. Issues in multilingual information retrieval.
5. Machine translation.

Outcome

The student should be able to

1. Understand the fundamentals of Natural Language Processing.
2. Understand information retrieval models.
3. Explain text mining algorithms.
4. Understand issues in multilingual information retrieval.
5. Demonstrate machine translation schemes.

UNIT I INTRODUCTION 9

Natural Language Processing - Linguistic Background- Spoken language input and output Technologies - Written language Input - Mathematical Methods - Statistical Modeling and Classification Finite State methods Grammar for Natural Language Processing - Parsing - Semantic and Logic Form - Ambiguity Resolution - Semantic Interpretation.

UNIT II INFORMATION RETRIEVAL

9

Design features - evaluation measures - vector space model - term Distribution Model - Latent Semantic Indexing - Discourse Segmentation - Search Engine - Features Performance Measure - NLP Based information Retrieval - Information Extraction

UNIT III TEXT MINING

9

Clustering- Hierarchical Clustering- Non Hierarchical Clustering - Text Categorization Decision Tree - Maximum Entropy Model - Perception - K -Nearest Neighbor classification - Use of Categories and Clusters for Organizing Retrieval Result.

UNIT IV GENERIC ISSUES

9

Multilinguality - Multilingual Information Retrieval and Speech processing - Multimodality - Text and Images - Modality Integration - Transmission and Storage - Speech coding- Evaluation of systems - Human Factors and user Acceptability.

UNIT V APPLICATIONS

9

Machine Translation - Transfer Metaphor - Interlingua and Statistical Approaches - Discourse Processing - Dialog and Conversational Agents - Natural Language Generation -Surface Realization and Discourse Planning.

Total : 45

REFERENCE BOOKS

1. Daniel Jurafsky and James H. martin, " Speech and Language Processing" , 2000.
2. Christopher D.Manning and Hinrich Schutze, " Foundations of Statistical Natural Language Processing ", MIT Press, 1999.
3. James Allen " Natural Language Understanding ", Benjamin/ Cummings Publishing Co. 1995.
4. Gerald J. Kowalski and Mark.T. Maybury, "Information Storage and Retrieval systems", Kluwer Academic Publishers, 2000.
5. Tomek Strzalkowski " Natural Language Information Retrieval ", Kluwer Academic Pub., 1999.
6. Ron Cole, J.Mariani, et.al "Survey of the State of the Art in Human Language Technology", Cambridge University Press, 1997.
7. Michael W. Berry " Survey of Text Mining: Clustering, Classification and Retrieval", Springer Verlag, 2003.

PSE706 KNOWLEDGE MANAGEMENT

L	T	P	C
3	0	0	3

Goal

To learn the concepts of knowledge models and management.

Objectives

The course should enable the student to learn

1. Basics of knowledge engineering, management and Ontology.

2. The components of knowledge model and its various types.
3. Basic idea about the various techniques of knowledge management.
4. How to design knowledge system.
5. The concept of knowledge modeling.

Outcome

The students should be able to

1. Understand the knowledge engineering basics.
2. Construct various types of knowledge models.
3. Understand the KM and organizational learning.
4. Implement knowledge system.
5. Understand the business models of KM

UNIT I INTRODUCTION 9

The value of Knowledge - Knowledge Engineering Basics - Knowledge Economy - The task and Organizational content - Knowledge Management - Knowledge Management Ontology.

UNIT II KNOWLEDGE MODELS 9

Knowledge Model Components - Template Knowledge Models -Reflective Knowledge Models- Knowledge Model Construction - types of Knowledge Models.

UNIT III TECHNIQUES OF KNOWLEDGE MANAGEMENT 9

Knowledge Elicitation techniques - Modeling communication aspects - Knowledge Management and Organizational learning.

UNIT IV KNOWLEDGE SYSTEM IMPLEMENTATION 9

Case Studies - Designing Knowledge Systems - Knowledge Codification - Testing and Deployment - Knowledge Transfer and Knowledge Sharing - Knowledge system implementation.

UNIT V ADVANCED KNOWLEDGE MANAGEMENT 9

Advanced Knowledge Modelling - Value Networks - Business models for knowledge economy - UML Notations - Project Management.

Total : 45

REFERENCE BOOKS

1. C.W. Holsapple, "Handbooks on Knowledge Management", Vol 1 and 2, 2003.
2. Tiwana, "Knowledge Management Toolkit", Second Edition, Pearson Education, 2003.
3. Guus Schreiber, Hans Akkermans, Anjo Anjewierden, Robert de Hoog, Nigel Shadbolt, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", Uni. Press, 2001.
4. Elias M.Awad & Hassan M. Ghaziri, "Knowledge Management", Pearson Education, 2003.
5. <http://www.epistemics.co.uk>
6. http://depts.washington.edu/pettt/papers/WIN_poster_text.pdf.

PSE707 IT IN FORENSICS

L T P C
3 0 0 3

Goal

To study the role of IT in Forensics.

Objectives

The course should enable the student to learn

1. The use of biometrics in Forensics
2. The principles of steganography and steganographic techniques
3. Importance of intellectual property rights
4. Basis of computer forensics

Outcome

The students should be able to

1. Understand biometric authentication for cyber security
2. Implement steganographic techniques
3. Implement water marking for copyright protection
4. Understand computer/digital forensics

UNIT I BIOMETRICS

9

Overview of Biometrics, Biometric Identification, Biometric Verification, Biometric Enrollment, Biometric System Security. Authentication and Biometrics: Secure Authentication Protocols, Access Control Security Services, Matching Biometric Samples, Verification by humans. Common Biometrics: Finger Print Recognition, Face Recognition, Speaker Recognition, Iris Recognition, Hand Geometry, Signature Verification

UNIT II INTRODUCTION TO STEGANOGRAPHY

9

Introduction to Information Hiding: Technical Steganography, Linguistic Steganography, Copy Right Enforcement, Wisdom from Cryptography. Principles of Steganography: Framework for Secret Communication, Security of Steganography System, Information Hiding in Noisy Data , Adaptive versus non-Adaptive Algorithms, Active and Malicious Attackers, Information hiding in Written Text.

UNIT III STEGANOGRAPHIC TECHNIQUES

9

A Survey of Steganographic Techniques: Substitution systems and Bit Plane Tools, Transform Domain Techniques: - Spread Spectrum and Information hiding, Statistical Steganography, Distortion Techniques, Cover Generation Techniques. Steganalysis: Looking for Signatures: - Extracting hidden Information, Disabling Hidden Information.

UNIT IV IPR

9

Watermarking and Copyright Protection: Basic Watermarking, Watermarking Applications, Requirements and Algorithmic Design Issues, Evaluation and Benchmarking of Watermarking system.

Transform Methods: Fourier Transformation, Fast Fourier Transformation, Discrete Cosine Transformation, Mellin-Fourier Transformation, Wavelets, Split Images in Perceptual Bands. Applications of Transformation in Steganography.

UNIT V COMPUTER FORENSICS

9

Computer Forensics, Rules of evidence, Evidence dynamics, Evidence collection, Data recovery, Preservation of digital evidence, surveillance tools for future warfare.

Total : 45

REFERENCE BOOKS

1. Peter Wayner, "Disappearing Cryptography: Information Hiding, Steganography and Watermarking" 2nd Ed., Morgan Kaufmann, 2008.
2. Katzendbisser, Petitcolas, " Information Hiding Techniques for Steganography and Digital Watermarking", Artech House, 1999.
3. Bolle, Connell et. al., "Guide to Biometrics", Springer, 2004.
4. John Vecca, "Computer Forensics: Crime scene Investigation", Firewall Media, 2002.
5. Christopher L.T. Brown, "Computer Evidence: Collection and Preservation", Firewall Media

PSE708 REAL TIME SYSTEMS

L	T	P	C
3	0	0	3

Goal

To know the concept of Real Time Systems.

Objective

The course should enable the student to learn

1. The basics of Real Time system and its types.
2. The approaches involves in Real Time Scheduling and various algorithm.
3. The importance of Resource sharing and related protocols.
4. The different types of real time communication.
5. The features of real time operating system and database.

Outcome

The students should be able to

1. Understand the fundamental concept of Real Time system.
2. Analyze various approaches and algorithms of Real time scheduling.
3. Understand the various resource sharing protocols.
4. Understand the model of real time communication and networks.
5. Design real time operating system and database.

UNIT I INTRODUCTION

9

Definition, Typical Real Time Applications: Digital Control, High Level Controls, Signal Processing etc., Release Times, Deadlines, and Timing Constraints, Hard Real Time Systems and Soft Real Time Systems, Reference Models for Real Time Systems: Processors and Resources, Temporal Parameters of Real Time Workload, Periodic Task Model, Precedence Constraints and Data Dependency.

UNIT II REAL TIME SCHEDULING**9**

Common Approaches to Real Time Scheduling: Clock Driven Approach, Weighted Round Robin Approach, Priority Driven Approach, Dynamic Versus Static Systems, Optimality of Effective-Deadline-First (EDF) and Least-Slack-Time-First (LST) Algorithms, Rate Monotonic Algorithm, Offline Versus Online Scheduling, Scheduling Aperiodic and Sporadic jobs in Priority Driven and Clock Driven Systems.

UNIT III RESOURCE SHARING**9**

Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority- Ceiling Protocol, Use of Priority-Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in Multiple-Unit Resources, Controlling Concurrent Accesses to Data Objects.

UNIT IV REAL TIME COMMUNICATION**9**

Basic Concepts in Real time Communication, Soft and Hard RT Communication systems, Model of Real Time Communication, Priority-Based Service and Weighted Round-Robin Service Disciplines for Switched Networks, Medium Access Control Protocols for Broadcast Networks, Internet and Resource Reservation Protocols.

UNIT V REAL TIME OPERATING SYSTEMS AND DATABASES**9**

Features of RTOS, Time Services, UNIX as RTOS, POSIX Issues, Characteristic of Temporal data, Temporal Consistency, Concurrency Control, Overview of Commercial Real Time databases.

Total : 45**REFERENCE BOOKS**

1. Jane W. S. Liu, "Real Time Systems", Pearson Education, 2000.
2. Mall Rajib, "Real Time Systems: Theory and Practice", Pearson Education, 2007.
3. Albert M. K. Cheng , "Real-Time Systems: Scheduling, Analysis, and Verification", Wiley, 2002.

PSE709 SOFTWARE AGENTS

L	T	P	C
3	0	0	3

Goal

To have the sufficient in depth knowledge in Software agents

Objectives

The course should enable the student to learn

1. The purpose of software agents.
2. The process of creating software agents.
3. The process to design multi agents.
4. The design of intelligent software agents.

Outcome

The student should be able to

1. Understand the purpose of software agents.
2. Understand the process of creating software agents.
3. Design multi agents for special applications.
4. Design intelligent software agents.

UNIT I AGENTS OVERVIEW 9

Agent Definition - Agent Programming Paradigms - Agent Vs Object - Aglet - Mobile Agents - Agent Frameworks - Agent Reasoning.

UNIT II JAVA AGENTS 9

Processes - Threads- FIPA - ACL - DIA GAL- Daemons - Components - Java Beans - ActiveX - Sockets - RPCs - Distributed Computing - Aglets Programming - Jini Architecture - Actors and Agents - Typed and proactive messages.

UNIT III MULTIAGENT SYSTEMS 9

Reasoning about Multi agent Interaction between agents - Reactive English Agents Dutch - Combinational Spectrum - Cognitive Agents - Interaction protocols - Agent coordination - Agent negotiation -Agent Cooperation -Agent Organization - Self-Interested agents in Electronic Commerce Applications - Probabilistic Agents - Temporal Agents.

UNIT IV INTELLIGENT SOFTWARE AGENTS 9

Interface Agents - Agent Communication Languages - Agent Knowledge Representation - Agent Adaptability - Belief Desire Intension - Mobile Agent Applications- Argumentic and Knowledge Sharing Agent.

UNIT V AGENTS AND SECURITY 9

Agent Security Issues - Mobile Agents Security - Protecting Agents against Malicious Hosts - Untrusted Agent - Black Box Security - Authentication for agents - Security issues for Aglets.

Total : 45

REFERENCE BOOKS

1. Bigus & Bigus, "Constructing Intelligent agents with Java ", Wiley, 1997.
2. Bradshaw, "Software Agents", MIT Press, 2000.
3. Russel, Norvig, "Artificial Intelligence: A Modern Approach", 2nd Ed., Pearson, 2003.
4. Richard Murch, Tony Johnson, "Intelligent Software Agents", Prentice Hall, 2000.
5. Gerhard Weiss, "Multi Agent Systems - A Modern Approach to Distributed Artificial Intelligence", MIT Press, 2000.

PSE710 SOFTWARE RELIABILITY AND METRICS

L	T	P	C
3	0	0	3

Goal

To study the concepts of software reliability and metrics

Objectives

The course should enable the students to learn

1. The need for software reliability
2. The different software reliability models.
3. Reliability models under different conditions
4. Mechanisms to measure the reliability models.
5. Techniques to measure the quality of products.

Outcome

The student should be able to

1. The need for software reliability
2. Explain various software reliability models.
3. Demonstrate reliability models under different conditions
4. Understand mechanisms to measure the reliability models.
5. Demonstrate the techniques to measure the quality of products.

UNIT I INTRODUCTION TO SOFTWARE RELIABILITY 9

Basic Concepts - Failure and Faults - Environment - Availability -Modeling - uses.

UNIT II SOFTWARE RELIABILITY MODELING 9

Concepts - General Model Characteristic - Historical Development of models - Model Classification scheme - Markovian models - General concepts - General Poisson-Type Models - Binomial - Type Models - Poisson-Type models - Fault reduction factor for Poisson-Type models.

UNIT III COMPARISON OF SOFTWARE RELIABILITY MODELS 9

Criteria - Failure Data - Comparison of Predictive Validity of Model Groups - Recommended Models - Comparison of Time Domains - Calendar Time Modelling - Limiting Resource Concept - Resource Usage model - Resource Utilization - Calendar Time Estimation and confidence Intervals.

UNIT IV MEASUREMENTS THEORY 9

Fundamentals - comparison of software reliability models - Comparison of Measurement - Measurements in Software Engineering - Scope of Software metrics - Measurements theory - Goal based Framework - Software Measurement Validation.

UNIT V PRODUCTS AND MANAGEMENT METRICS

9

Measurement of Internet Product Attributes - Size and Structure - External Product Attributes - Measurement of Quality - Quality Management Models - Rayleigh Model - Problem Tracking Report (PTR) Model - Reliability Growth Model - Model Evaluation - Orthogonal Classification.

Total : 45

REFERENCE BOOKS

1. John D. Musa, Anthony Iannino, Kazuhira Okumoto, "Software Reliability - Measurement, Prediction, Application, Series in Software Engineering and Technology", McGraw Hill, 1987.
2. John D. Musa, "Software Reliability Engineering", Tata McGraw Hill, 1999.
3. Norman E - Fentan, Share Lawrence Pflieger, "Software metrics", 2nd Ed., Thomson, 2002.

PSE711 INTEGRATED SOFTWARE PROJECT MANAGEMENT

L	T	P	C
3	0	0	3

Goal

To introduce an integrated approach to software development incorporating quality management methodologies

Objectives

The course should enable the students to learn

1. Software Process Maturity Framework.
2. Project Management Framework.
3. Project Planning Software Life Cycle Models.
4. Project Tracking methods.
5. Team management and CRM.

Outcome

The student should be able to

1. Understand Software Process Maturity Framework.
2. Explain Project Management Framework.
3. Explain Project Planning Software Life Cycle Models.
4. Understand Project Tracking methods.
5. Understand Team management and CRM.

UNIT I PROJECT MANAGEMENT CONCEPTS

9

Evolution of Software Economics - Software Management Process Framework (Phases, Artefacts, Workflows, Checkpoints) - Software Management Disciplines (Planning / Project Organization and Responsibilities / Automation / Project Control) - Modern Project Profiles.

UNIT II SOFTWARE ESTIMATION AND COSTING

9

Problems in Software Estimation - Algorithmic Cost Estimation Process, Function Points, SLIM (Software Life cycle Management), COCOMO II (COConstructive COSt MOdel) - Estimating Web Application Development - Concepts of Finance - Activity Based Costing and Economic Value Added (EVA) - Balanced Score Card.

UNIT III RISK MANAGEMENT

9

Risk Definition - Risk Categories - Risk Assessment (Identification / Analysis / Prioritization) - Risk Control (Planning / Resolution / Monitoring) - Failure Mode and Effects Analysis (FMEA).

UNIT IV METRICS

9

Need for Software Metrics - Classification of Software Metrics: Product Metrics (Size Metrics, Complexity Metrics, Halstead's Product Metrics, Quality Metrics), and Process metrics (Empirical Models, Statistical Models, Theory-based Models, Composite Models, and Reliability Models).

UNIT V PEOPLE MANAGEMENT

9

Team Management - Client Relationship Management.

Total : 45

REFERENCE BOOKS

1. McConnell, S. "Software Project: Survival Guide", Microsoft Press, 1998.
2. Royce, W. "Software Project management: A Unified Framework", Addison-Wesley, 1998.
3. Cooper, R, "The Rise of Activity-Based Costing- Part One: What is an Activity-Based Cost System", Journal of Cost Management, Vol.2, No.2 (Summer 1988), pp.45 - 54.
4. Grant, J.L. "Foundations of Economic Value Added", John Wiley and Sons, 1997.

PSE713 ADHOC NETWORKS

L	T	P	C
3	0	0	3

Goal

To introduce the student to recent advancement in the architecture for the communication networks

Objectives

The students should able to learn

1. The concepts of adhoc wireless networks.
2. The concepts of link state routing protocols.
3. The concepts of TCP protocols.
4. The concepts multicasting in wired networks.
5. The concepts of multi hop adhoc networks.

Outcome

The students should be able to

1. Understand the basics of adhoc wireless networks.
2. Understand the concepts of link state routing protocols.
3. Understand the concepts TCP protocols.
4. Understand the concepts multicasting in wired networks.
5. Explain the concepts multi hop adhoc networks.

UNIT I ADHOC WIRELESS NETWORKS 9

Introduction -Heterogeneity in mobile devices wireless sensor networks-traffic profiles-types of Adhoc mobile communications-types of mobile host movements-challenges facing Adhoc mobile networks-Synchronous MAC protocols- Asynchronous MAC protocols-problems in Adhoc channel access.

UNIT II LINK STATE ROUTING 9

Motivation- Ad Hoc Wireless Networks-Power Issues- Smart Batteries and Battery Characteristics-Effects of Beaconing on Battery Life- Associativity based Routing- ABR protocol Description-ABR route discovery phase-ABR route deletion phase-Updating routes in wireless networks .

UNIT III COMMUNICATION PERFORMANCE OF ADHOC NETWORKS 9

Performance parameters of interest-route discovery time-end to end delay performance-communication throughput performance-packet loss performance-route reconfiguration repair time-TCP Reno-TCP Tahoe-TCP Vegas-TCP SACK-Problems facing TCP in wireless last hop Problems facing TCP in Wireless Ad Hoc.

UNIT IV MULTICASTING IN ADHOC WIRELESS NETWORKS 9

Multicasting in wired networks-DVMRP-Multicast mesh-CAMP-Group Based-ODMRP-location based-LBMABAM-Comparisons of multicast routing protocols.

UNIT V MOBILE MULTI HOP AD HOC NETWORKS 9

Real world evaluation of mobile Adhoc networksMobile MAN design- integration and experimentation of mobile multi hop ad hoc networks.

Total : 45

REFERENCE BOOKS

1. Charles .E. Perkins, "AdHoc Networking",Pearson Education,2008.
2. C.K.Toh, "Ad Hoc Mobile Wireless Networks-Protocols and Systems", Pearson Edu., 2007.
3. Marco Conti,, Jon Crowcroft, Andrea Passarella,"Multihop AdHoc Networks from Theory to Reality" ,Nova Science Publishers,Inc,NewYork,2007.
4. Siva Ram Murthy. C and Manoj. B.S, "AdHoc Wireless Networks: Architectures and protocols", Prentice Hall, 2004.

PSE712 SOFTWARE QUALITY MANAGEMENT

L	T	P	C
3	0	0	3

Goal

To introduce an integrated approach to software development incorporating quality management methodologies

Objectives

The course should enable the students to learn

1. Software quality models.
2. Quality measurement and metrics.
3. Quality control and reliability of quality process.
4. Quality management system models, Complexity metrics and Customer Satisfaction.
5. International quality standards - ISO, CMM.

Outcome

The student should be able to

1. Understand software quality models.
2. Explain quality measurement and metrics.
3. Understand various software reliability models.
4. Understand quality management models.
5. Explain various quality standards.

UNIT I INTRODUCTION TO SOFTWARE QUALITY 9

Software Quality - Hierarchical models of Boehm and McCall - Quality measurement - Metrics measurement and analysis - Gilb's approach -GQM Model.

UNIT II SOFTWARE QUALITY ASSURANCE 9

Quality tasks - SQA plan - Teams - Characteristics - Implementation - Documentation - Reviews and Audits.

UNIT III QUALITY CONTROL AND RELIABILITY 9

Tools for Quality - Ishikawa's basic tools - CASE tools - Defect prevention and removal - Reliability models - Rayleigh model - Reliability growth models for quality assessment.

UNIT IV QUALITY MANAGEMENT SYSTEM 9

Elements of QMS - Rayleigh model framework - Reliability Growth models for QMS - Complexity metrics and models - Customer satisfaction analysis.

UNIT V QUALITY STANDARDS 9

Need for standards - ISO 9000 Series - ISO 9000-3 for software development - CMM and CMMI - Six Sigma concepts.

Total: 45

REFERENCE BOOKS

1. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003.
2. Stephen H. Kan, "Metrics and Models in Software Quality Engineering", Pearson, 2002.
3. Norman E. Fenton and Shari Lawrence Pfleeger, "Software Metrics" Thomson, 2003.
4. Mordechai Ben - Menachem and Garry S.Marliss, "Software Quality", Thomson, 2003.
5. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, "CMMI", Pearson 2003.
6. ISO 9000-3 "Notes for the application of the ISO 9001 Standard to software development".

PCE713 SERVICE ORIENTED ARCHITECTURE

L	T	P	C
3	0	0	3

Goal

To provide an insight into the impact of Service Oriented Architecture (SOA) on software quality, efficiency, security, performance and flexibility

Objectives

The course should enable the student to learn

1. The fundamentals of SOA and Web Services.
2. Basics of Web services policy and framework.
3. SOA life cycle model.
4. Service oriented design principles.
5. Web service security.

Outcome

The student should be able to

1. Understand basis of SOA
2. Understand and explain the importance of web services.
3. Explain the model of SOA management.
4. Understand the principles of software oriented design principles.
5. Develop and deploy web services.

UNIT I SOA AND WEB SERVICES FUNDAMENTALS

9

Fundamentals of SOA - Characteristics - Common misperception - Benefits - Pitfalls of adopting SOA - Transition from XML to web service to SOA - Reshaping of XML and web service through SOA - Standards for SOA - Comparison of SOA vs Past architecture - Web services frame work - Service description - Messaging with SOA.

UNIT II SECOND GENERATION WEB SERVICES

9

Activity management and comparison - Message exchange patterns - Service activity - Coordination - Atomic transactions - Business activities - Business protocols - Process definitions - Process services - Orchestration and coordination - Collaboration. Addressing - Reliable messaging - WS policy framework - Policy assertions and alleviates policies relationship to activity management - Metadata exchange security - WS notification and eventing.

UNIT III SERVICE ORIENTATION

9

Service oriented architecture - Components - Common principles of service - Orientation - Interrelationship among principles - Service orientation versus object orientation - Service layers - Different services layers - Configuration scenarios of service layers. SOA delivery life cycle phases - Agile strategy - SOA analysis - Service modeling - guidelines - Classifications of service models.

UNIT IV TECHNOLOGIES AND DESIGN FOR SOA

9

Service oriented design - Web service description language (WSDL) - Related XML schema - WSDL language basis - SOAP language basis - Service interface design tools - SOA comparison guide lines - Industry standards - XML AWSOA - WSDL and SOA - SOAPAWAOA - SOA extension.

UNIT V SERVICE DESIGN AND SECURITY

9

Service design - Guidelines - Business process design - WS - BPEL language basics - WS - BPEL elements - WS co ordination - Service oriented process design - WS addressing language and messaging basis - WS - Meta data exchange - Security language basis - WSOA platform - SOA support in J2EE and .NET.

Total : 45

REFERENCE BOOKS

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology & Design", Pearson Education, 2005.
2. Thomas Erl, "Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services", The Prentice Hall, Service-Oriented Computing Series, 2004.
3. Thomas Erl, "SOA Principles of Service Design", Prentice Hall Service-Oriented Computing Series, 2007.
4. Shankar Kambhampaty, "Service Oriented Architecture for Enterprise Applications", 1st edition, Wiley India Private Limited, 2008.
5. Mike Rosen, Boris Lublinsky, Kevin T. Smith and Marc J. Balcer, "Applied SOA Service Oriented Architecture And Design Strategies", Wiley India, 2008.
6. Eric Newcomer Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2nd edition, 2008.
7. Paul. C. Brown, "Implementing SOA Total Architecture in Practice", Pearson Edu, 2009.
8. Nicolai M. Josuttis, "SOA in Practice: The Art of Distributed System Design", 2nd Ed., 2008.

PIT716 DATA WAREHOUSING AND DATA MINING

L	T	P	C
3	0	0	3

Goal

Understand the fundamentals of data mining functionalities and its application in various business and social domains.

Objectives

The course should enable the student to learn

1. Data warehousing components and data models for big data.
2. The fundamentals of data mining and its functionalities
3. Issues regarding classification and prediction.
4. Concepts of cluster and cluster analysis.
5. Application of data mining in different domains.

Outcome

The student should be able to

1. Understand data warehousing and big data models.
2. Understand principles of data mining the techniques.
3. Understand classification and prediction techniques.
4. Explain various cluster analysis method.
5. Demonstrate data mining in different domains.

UNIT I DATA WAREHOUSING AND BUSINESS ANALYSIS

9

Data warehousing Components -Building a Data warehouse - Mapping the Data Warehouse to a Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Cleanup, and Transformation Tools -Metadata - reporting - Query tools and Applications - Online Analytical Processing (OLAP) - OLAP and Multidimensional Data Analysis. Big data : A new paradigm for Big Data -Data model for Big Data.

UNIT II DATA MINING

9

Data Mining Functionalities - Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation. Association Rule Mining: - Efficient and Scalable Frequent Item set Mining Methods - Mining Various Kinds of Association Rules - Association Mining to Correlation Analysis - Constraint-Based Association Mining.

UNIT III CLASSIFICATION AND PREDICTION

9

Issues Regarding Classification and Prediction - Classification by Decision Tree Introduction - Bayesian Classification - Rule Based Classification - Classification by Back propagation - Support Vector Machines - Associative Classification - Lazy Learners - Other Classification Methods - Prediction -

Accuracy and Error Measures - Evaluating the Accuracy of a Classifier or Predictor - Ensemble Methods - Model Section.

UNIT IV CLUSTER ANALYSIS

9

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

UNIT V MINING OBJECT, SPATIAL, MULTIMEDIA, TEXT AND WEB DATA

9

Multidimensional Analysis and Descriptive Mining of Complex Data Objects - Spatial Data Mining - Multimedia Data Mining - Text Mining - Mining the World Wide Web.

Total : 45

REFERENCE BOOKS

1. Jiawei Han and Micheline Kamber "Data Mining Concepts and Techniques" Second Edition, Elsevier, Reprinted 2008.
2. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw Hill Edition, Tenth Reprint 2007.
3. K.P. Soman, Shyam Diwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
4. G. K. Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
5. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2006.
6. Nathan Marz, Samuel E. Ritchie "Big Data Principles and best practices of scalable real time data systems", Manning Publications Company, 2013.