AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
Gudur, Nellore Dist - 524101, A.P (India)

ACADEMIC REGULATIONS FOR THE AWARD OF FULL TIME
M.Tech DEGREE PROGRAMME
(WITH EFFECT FROM THE ACADEMIC YEAR 2013-14)

The **Audisankara College of Engineering and Technology**, Gudur, Nellore District, Andhra Pradesh shall confer M.Tech Post Graduate degree to candidates who are admitted to the Master of Technology Programs and fulfill all the requirements for the award of the degree.

1. ELIGIBILITY FOR ADMISSIONS:

Admission to the Master of Technology programme shall be made subject to the eligibility, qualifications and specialization criteria prescribed by the JNTUA, Anantapur for each programme, from time to time.

As per the norms of A.P. State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made to the first year of two years M.Tech P.G. Degree Programme as follows:-

- As per the norms of Government of Andhra Pradesh, Category-A (based on the rank obtained in GATE / PGECET score) seats will be filled by the Convener, PGECET.
- As per the norms of Government of Andhra Pradesh, Category-B seats will be filled by the management.

2. COURSE WORK:

- A Candidate after securing admission must pursue the M.Tech course of study for Four Semesters duration.
- Each semester shall be of 20 weeks duration including all examinations.
- A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

3.0 ATTENDANCE REGULATIONS AND CONDONATION:-

(i) A student shall be eligible to appear for end semester examinations, if he acquires a minimum of 75% attendance in aggregate of all the subjects.

(ii) Condonation of shortage of attendance in aggregate up to 10% on medical grounds (65% above and below 75%) in each semester may be granted on the recommendation of the College Academic Committee. However, granting condonation is purely at the discretion of Principal of the college.

(iii) A Student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester as applicable. They may seek re-admission for that semester as and when offered next.

(iv) Shortage of Attendance below 65% in aggregate shall in no case be condoned.

(v) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that particular semester and their registration for examination shall stand cancelled.

(vi) A stipulated fee shall be payable towards condonation of shortage of attendance if granted.

(vii) Attendance may also be condoned for those students who participate in prestigious sports and co and extracurricular activities provided their attendance is in the minimum prescribed range for the purpose and recommended by the concerned authority.

4.0. EVALUATION:-

The performance of the candidate in each semester shall be evaluated subject-wise for a maximum of 100 marks for Theory and 100 marks for practical subjects, on the basis of Internal Evaluation and End Semester Examination. For the theory & practical subjects 60% of the marks will be for the External End Examination, while 40% of the marks for Internal Evaluation.

4.1 INTERNAL EVALUATION FOR THEORY SUBJECTS:

Each course is evaluated for **40** marks **(a+b)**

a) Two Midterm Examinations each for **30 marks** with a duration of two hours each will be conducted for every theory course in a semester. First Midterm Examination is conducted in the middle of the Semester (I & II units) and second Midterm Examination immediately after the completion of instruction (III & IV units) as per academic schedule. The Midterm Examination marks shall be awarded giving a weightage of 80% in the Midterm Examination in which the student scores more marks and 20% in the remaining Midterm Examination.

Midterm Examination Pattern for 30 Marks:

- Each Midterm Examination Question Paper comprises of four questions covering the two units.
- Answering any three questions.
- Questions 1 & 2 from one unit and Questions 3 & 4 from another unit. Each question is allotted 10 marks.

b) 10 marks are allocated for **Assignment Tests.**

- There will be four Assignment Tests per subject.
- One Assignment Test is conducted from each unit.
- Five Assignment questions are given in advance from each unit out of which two questions given by the concerned teacher has to be answered during Assignment Test.
- Average of Assignment Tests marks is considered.

NOTE: A student who is absent for any Midterm Examination / Assignment Test, for any reason whatsoever, shall be deemed to have scored zero marks in that Midterm Examination/ Assignment Test and no make-up test shall be conducted.

4.2 INTERNAL EVALUATION FOR PRACTICAL SUBJECTS:

For Laboratory courses there shall be continuous evaluation during the semester for 40 internal marks. The break-up of internal marks to be awarded is as given below:

Table 1: Break-up of Internal Marks

S.No.	Criterion	Marks
1	Conduct of experiments, Observation & Results in regular class work(Day-to-Day Performance)	25
2	Viva – voce and Internal Examination	15

In any semester a minimum of 90% of the prescribed number of experiments/exercises specified in the syllabus for laboratory course shall be conducted. They shall complete these experiments/exercises in all respects and submit report and get it certified by the concerned internal lab teacher and the Head of the Department to become eligible to appear for the final end examination in the Laboratory Course.

4.3 INTERNAL EVALUATION FOR SEMINAR-I & SEMINAR-II:

There shall be two Seminars conducted in each discipline, Seminar-I in the M.Tech I Semester and the Seminar-II in M.Tech IV semester. The distribution of internal marks for seminar is given below:

Table 2: Distribution of Marks

S.No.	Criterion	Marks
1	Seminar Report & Subject content	20
2	Seminar presentation & Viva – Voce Exam	30

For the seminar, the student shall collect the information on a specialized relevant topic and prepare a report, showing his understanding over the topic, and submit the same to the department, which shall be evaluated by the Department Committee consisting of Head of the department, Seminar Supervisor and a Senior Faculty Member. Each Seminar shall be evaluated for 50 marks (10 marks for report, 10 marks for subject content, 20 marks for presentation and 10 marks for queries).

4.4 TERM PAPER:

The Term Paper is a precursor to the project work done in the 2nd year M.Tech Programme. The paper may be of 8-10 (A4 size) in length and follows the standard IEEE/Technical Journal Format.

The Term Paper helps to supplement the second year Project Work of the M.Techstudents. It helps to identify their Reserch area/topic and complete the groundwork andpreliminary research required for it comfortably. It trains the students to make use of Research Tools and Material available both in print and digital formats.
Based on the topic, a hypothesis is to be made by the student, under the supervision of the guide. The student is then required to collect literature and support information for his / her term paper from Standard Reference Books, Journals, and Magazines - both printed and online. Each student should refer to a minimum of 6 reference sources related to the topic. The student also presents his/her paper with the help of Power Point slides / OHP.
The Term Paper contains: The Aim and Objective of the study, The need for Rationale behind the study, Identify the work already done in the field, Hypothesis and Discussion, Conclusion Appendix with support data (Illustrations, Tables, Graphs, etc.).
Page Limit: minimum of eight pages.
Date of evaluation: During the Lab Internal Exam.
Method of Evaluation**:** Total 50 marks
1. Day to day work - 10 marks
2. Term Paper Report - 20 marks
3. Seminar - 20 marks

4.5 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

4.6 In case the candidate does not secure the minimum academic requirement in any subject(as specified in 4.4) he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the course when next offered or do any other specified subject as may be required.

5.0 SEMESTER END EXAMINATIONS:-

5.1 Theory Courses: 60 marks each

The Semester end examination in each theory subject shall be conducted for 3 hours duration at the end of the semester for 60 marks. The question paper for Semester pattern shall be designed as per the following:

Question paper contains

- A total of Eight questions.
- Answer one Question from each Unit
- The Eight questions are to be designed taking one question from each unit (Unit Wise Either or Type) of the four units.
- In each question, one, two or more bits can be set, totaling 15 Marks with appropriate distribution of marks.

A student has to secure not less than a minimum of 40% of marks (24 marks) exclusively at the end semester examinations in each of the theory subjects in which the candidate had appeared. However, the candidate shall have to secure a minimum of 50% of marks (50 marks) in both external and internal components put together to become eligible for passing in the subject.

5.2 Lab Courses (Practical / Workshop): 60 marks

Out of 60 marks **40** marks are allocated for experiment (procedure for conducting the experiment carries 10 marks & readings, calculation and result-30 marks) and **15** marks for viva-voce examination with **5** marks for the record.

Each Semester External Lab Examination shall be evaluated by an Internal Examiner along with an External Examiner. External Examiner is appointed by the Principal.
A candidate shall be declared to have passed in individual lab course if he secures a minimum of 50% aggregate marks (50 marks) (Internal & Semester External Examination marks put together), subject to a minimum of 40% marks (24 marks) in the semester external examination.

5.3 EVALUATION OF PROJECT WORK:-

Every candidate shall be required to submit thesis or dissertation after taking up a topic approved by the college/ concerned department.

- **Registration of Project work**: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of I & II Semesters)
- An Internal Departmental Committee (I.D.C) consisting of HOD, Supervisor/ Guide and one Internal senior expert shall monitor the progress of the project work.
- The work on the project shall be initiated in the penultimate semester and continued in the final semester. The duration of the project is for two semesters. The candidate can submit Project thesis with the approval of I.D.C. after 36 weeks from the date of registration at the earliest and one calendar year from the date of registration for the project work. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institution.

- The student must submit status report at least in three different phases during the project work period. These reports must be approved by the I.D.C before submission of the Project Report.
- A candidate shall be allowed to submit the thesis / dissertation only after passing in all the prescribed subjects (both theory and practical) and then take viva-voce examination of the project. The viva-voce examination may be conducted once in two months for all the candidates submitted during that period.
- Three copies of the Thesis / Dissertation certified in the prescribed form by the supervisor and HOD shall be submitted to the HOD.
- The semester end examination for project work done during III & IV Semesters, shall be conducted by a Project Review Committee (PRC). The evaluation of project work shall be conducted at the end of the IV Semester.
- The PRC comprises of an External examiner appointed by the Principal, Head of the Department and Project Guide/Supervisor to adjudicate the thesis / dissertation. The PRC shall jointly evaluate candidates work and award grades as given below

S.No	Description	Grade
1	Very Good	Grade A
2	Good	Grade B
3	Satisfactory	Grade C
4	Not satisfactory	Grade D

If the report of the viva-voce is not satisfactory (Grade D) the candidate will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination he will not be eligible for the award of the degree unless the candidate is permitted to revise and resubmit the thesis.

6.0 RE-REGISTRATION FOR IMPROVEMENT OF INTERNAL EVALUATION MARKS:

Following are the conditions to avail the benefit of improvement of internal evaluation marks.

- The candidate should have completed the course work and obtained examinations results for I & II semesters.
- He should have passed all the subjects for which the internal evaluation marks secured are more than 50%.
- Out of the subjects the candidate has failed in the examination due to Internal evaluation marks secured being less than 50%, the candidate shall be given one more chance for each Theory subject and for a maximum of **three** Theory subjects for Improvement of Internal evaluation marks.
- The candidate has to re-register for the subjects so chosen and fulfill all the academic requirements.
- For each subject, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D. in favour of **'The Principal, Audisankara College of Engineering & Technology' payable at Gudur** along with the requisition through the Controller of the Examinations of the college.
- In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the End Examinations marks secured in the previous attempt(s) for the reregistered subjects stand cancelled.

7.0 SEMESTER – WISE DISTRIBUTION OF CREDITS:

Table 3: Semester –wise Credits distribution

SEMESTER	No. of Credits per semester Theory + Lab	Total credits
I Semester	24+06	30
II Semester	24+06	30
III & IV Semesters	0+18	18
TOTAL CREDITS	48+30	78

8.0 AWARD OF DEGREE AND CLASS:-

A candidate shall be eligible for the award of degree if he satisfies the minimum academic requirements in every subject, Seminar and secures 'satisfactory' or higher grade report on his thesis/dissertation and viva-voce. Based on overall percentage of marks obtained, the following class is awarded.

Table 4: Award of Division

Class Awarded	% of marks to be secured
First Class with Distinction	70% and above
First Class	Below 70% but not less than 60%
Second Class	Below 60% but not less than 50%

9.0 READMISSION CRITERIA:

A Candidate, who is detained in a semester due to lack of attendance, has to obtain written permission from the Principal for readmission into the same semester after duly fulfilling all the required norms stipulated by the college in addition to paying the required fee.

10. SUPPLEMENTARY EXAMINATIONS:

Apart from the regular End Examinations the institute may also schedule and conduct supplementary examinations for all subjects for the benefit of students with backlogs. Such students writing supplementary examinations as supplementary candidates may have to write more than one examination per day.

11.CONDUCT AND DISCIPLINE:-

(a) Students shall conduct themselves within and outside the premises of the Institute in a descent and dignified manner befitting the students of ACET.

(b) As per the order of the Honorable Supreme Court of India, ragging in any form is considered a criminal offence and is totally banned. Any form of ragging will be severely dealt with.

(c) The following acts of omission and / or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures with regard to ragging.
   (i) Lack of courtesy and decorum; indecent behavior anywhere within or outside the college campus.
   (ii) Damage of college property or distribution of alcoholic drinks or any kind of narcotics to fellow students / citizens.

(d) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.

(e) Mutilation or unauthorized possession of library books.

(f) Noisy and unruly behavior, disturbing studies of fellow students.
(g) Hacking in computer systems (such as entering into other person's areas without prior permission, manipulation and / or damage of computer hardware and software or any other cyber crime etc.
(h) Usage of camera /cell phones in the campus.
(i) Plagiarism of any nature.
(j) Any other act of gross indiscipline as decided by the college academic council from time to time.
(k) Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute/ hostel, debarring from examination, disallowing the use of certain facilities of the Institute, rustication for a specified period or even outright expulsion from the Institute, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.
(l) For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief Warden, the concern Head of the Department and the Principal respectively, shall have the authority to reprimand or impose fine.
(m) Cases of adoption of unfair means and/ or any malpractice in an examination shall be reported to the principal for taking appropriate corrective action.
(n) All cases of serious offence, possibly requiring punishment other than reprimand, shall be reported to the Academic council of the college.
(o) The Institute Level Standing Disciplinary Action Committee constituted by the academic council shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.
(p) The Principal shall deal with any problem, which is not covered under these rules and regulations.
(q) **"Grievance and Redressal Committee" (General)** constituted by the Principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters.
(r) All the students must abide by the code and conduct rules prescribed by the college from time to time.

12.0 WITH – HOLDING OF RESULTS:

If the candidate has not paid dues to the university/college or if any case of in-discipline is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted to the next higher semester. The issuing of degree is liable to be withheld in such cases.

13.0 TRANSITORY REGULATIONS:

Candidates who have discontinued or have been detained for want of attendance or who have failed after having undergone the course in earlier regulations and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when such subjects are offered, subject to the conditions of 4.5 and 2.3 sections.

14.0MINIMUM INSTRUCTION DAYS:

The minimum instruction days for each semester shall be 90 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

15.0AMENDMENTS OF REGULATIONS-

The college may, from time to time, revise, amend or change the regulations, scheme of examinations and syllabi. However the academic regulations of any student will be same throughout the course of study in which the student has been admitted.

16.0 GENERAL:

- The academic regulations should be read as a whole for the purpose of any interpretation.
- Disciplinary action for Malpractice/improper conduct in examinations is appended.
- Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institute is final.

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RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	**Punishment**
	If the candidate	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Is found copying in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate will be cancelled.
3.	Comes in alcohol drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
4.	Smuggles the Answer book or a part there of additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of

		seat.
5.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
6.	Possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate will also be debarred and forfeit the seat.
7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate will also be debarred and forfeit the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate will also be debarred for two consecutive semesters from class work and all end examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case registered against him.
8.	Refuses to obey the orders of the Chief Superintendent/Asst.Superintendent/ any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall causing any injury to him or to any of his relations	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are

	whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case registered against them.
9.	Is a student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clauses 6 to 8.	In case of students of the college expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
11.	Is detected copying on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	Indulging in any malpractice which is not covered in the above clauses 1 to 11 if detected shall be reported to the College Authorities for further action to award suitable punishment.	Appropriate action will be taken as recommended by the College Authorities.

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.

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Course Structure for M.Tech (SE) Regular Programme
Applicable for students admitted from Academic Year 2013-14

M.Tech I Year (I Semester) – Software Engineering

Sl.No	Course Code	Subject	Scheme of instruction (Periods / week)		Scheme of Examination			No. of Credits
			Theory	Lab	IM	EM	Total Marks	
1	13SE101	Advanced Data Structures and Algorithms	4	-	40	60	100	4
2	13SE102	Advanced Software Engineering	4	-	40	60	100	4
3	13SE103	Software Requirements and Estimation	4	-	40	60	100	4
4	13SE104	Software Metrics	4	-	40	60	100	4
5	13SE105	Object Oriented Modeling	4	-	40	60	100	4
6	13SE106 13SE107 13SE108	**Elective-I** 1.Middleware Technologies 2.Software Project Management 3.Software Process Management	4		40	60	100	4
7	13SE109	Advanced Data Structures and Algorithms Lab	-	3	40	60	100	2
8	13SE110	Object Oriented Modeling Lab	-	3	40	60	100	2
9	13SE111	Seminar-I	-	-	50	-	50	2
Contact Periods / Week			**24**	**6**	**370**	**480**	**850**	
			Total Periods/ Week		**30**	**Total Credits**		**30**

M.Tech I Year (II Semester) – Software Engineering

Sl.No	Course Code	Subject	Scheme of instruction (Periods / week)		Scheme of Examination			No. of Credits
			Theory	Lab	IM	EM	Total Marks	
1	13SE201	Software Architecture and Design Patterns	4	-	40	60	100	4
2	13SE202	Software Quality Assurance and Testing	4	-	40	60	100	4
3	13SE203	Service Oriented Architecture	4	-	40	60	100	4
4	13SE204	Software Reliability	4	-	40	60	100	4
5	13SE205	Software Requirements Engineering	4	-	40	60	100	4
6	13SE206 13SE207 13SE208	**Elective-II** 1.Secure Software Engineering 2.Soft Computing 3.Model Driven Software Development	4		40	60	100	4
7	13SE209	Design Patterns Lab	-	3	40	60	100	2
8	13SE210	Software Testing Lab	-	3	40	60	100	2
9	13SE211	Term Paper	-	-	50	-	-	2
Contact Periods / Week			**24**	**3**	**370**	**480**	**850**	
			Total Periods/ Week		**27**	**Total Credits**		**30**

M.Tech II Year (III & IV Semesters) – Software Engineering

Sl.No	Course Code	Subject	Scheme of Examination			No. of Credits
			IM	EM	Total Marks	
1	13SE401	Seminar-II	50	-	50	2
2	13SE402	Project Work	-	A/B/C/D		16
Contact Periods / Week						
					Total Credits	**18**

AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY: GUDUR (AUTONOMOUS)

Detailed Syllabus

M.Tech I Semester (SE)	L	T	P	[C]
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(13SE101) ADVANCED DATA STRUCTURES AND ALGORITHMS

UNIT- I:

Overview of Data Structures: Review of Arrays, Stacks, Queues, linked lists , Linked stacks and Linked queues, Applications.

Algorithm Analysis: Efficiency of algorithms, Apriori Analysis, Asymptotic Notations, Time complexity of an algorithm using O notation, Polynomial Vs Exponential Algorithms, Average, Best, and Worst Case Complexities, Analyzing Recursive Programs.

UNIT- II:

Trees and Graphs: Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees and Binary trees, Binary tree Traversals, Threaded binary trees, Graphs-basic concepts, representation and traversals.

Binary Search Trees, AVL Trees and B Trees: Introduction, Binary Search Trees: Definition, Operations and applications. AVL Trees: Definition, Operations and applications. B Trees: Definition, Operations and applications.

UNIT III:

Red – Black Trees, Splay Trees and Hash Tables: Red – Black Trees, Splay Trees and its applications. Hash Tables: Introduction, Hash Tables, Hash Functions and its applications.

Divide – and – Conquer & Greedy Method: General Method, Binary Search, Finding Maximum and Minimum, Quick Sort, Merge sort, Strassen's Matrix Multiplication, Greedy Method- General Method, Minimum Cost Spanning Trees, Single Source Shortest Path

UNIT IV:

Dynamic Programming: General Method, All Pairs Shortest Path, Single Source Shortest Path, 0 / 1 Knapsack problem, Reliability Design, Traveling Sales Person's Problem.

Back Tracking and Branch – and – Bound: General Method, 8 – Queen's Problem, Graph Coloring. Branch – and – Bound: The Method, LC Search, Control Abstraction, Bounding, 0 / 1 Knapsack Problem.

Text Books:

1. G.A.V. Pai ,Data Structures and Algorithms, TMH, 2009.
2. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2nd edition, University Press.

Reference Books:

1. D. Samanta, Classic Data Structures ,PHI, 2005.
2. Aho, Hopcraft, Ullman ,Design and Analysis of Computer Algorithms, PEA, 1998.
3. Goodman, Hedetniemi, Introduction to the Design and Analysis of Algorithms TMG.
4. E. Horowitz, S. Sahani, Design and Analysis of Algorithms 3rd Edition, Galgotia.
5. Drozdek ,Data Structures and Algorithms in C++ 2nd Edition, Thomson.

AUDISANKARA COLLEGE OF ENGINEERING & TECHNOLOGY: GUDUR
(AUTONOMOUS)

M.Tech I Semester (SE)

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4	0	0	[4]

(13SE102) ADVANCED SOFTWARE ENGINEERING

UNIT-I:

Software and Software Engineering: The Nature of Software, Software characteristics, The Unique Nature of WebApps, Software Engineering, The Software Process, Software Engineering Practice, Software Myths.

Software Paradigms: Perspective Process Models, Specialized Process Models.

Unified Process Model: The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development: What is Agility? Agility and the Cost of Change, What is an Agile Process? Extreme Programming (XP), Other Agile Process Models, A Tool set for the Agile Process.

UNIT-II:

Critical Systems: A simple safety-critical system, System dependability, Availability and reliability, Safety, Security. **Critical systems specification:** Risk-driven specification, Safety specification, Security specification Software reliability specification.

Formal Specification: Formal specification in the software process, Sub-system interface specification, Behavioural specification.

Software Reuse: The reuse landscape, Design patterns, Generator-based reuse, Application frameworks, Application system reuse.

Component-based Software Engineering: Components and component models, The CBSE process, Component composition.

UNIT-III:

Software Testing: System testing, Component testing, Test case design, Test automation.

Software Evolution: Program evolution dynamics, Software maintenance, Evolution Processes, Legacy system evolution.

Aspect oriented software engineering: The separation of concerns, Aspects, Join points and pointcuts, Software engineering with aspect, Using AOSD to streamline complex systems development without sacrificing flexibility or scalability.

Service oriented software engineering: Service-based concepts, modeling and documentation, Service discovery and composition, Service-oriented architecture, Services as reusable components, Software development with services.

UNIT-IV

Quality Management: Process and product quality, Quality assurance and standards, Quality Planning, Quality control, Software Measurement and metrics.

Process Improvement: Process and product quality, process classification, Process measurement, Process analysis and modeling, Process change, The CMMI process improvement framework.

Model Driven Software Development (MDSD) : Goals of MDSD, The MDSD approach, An overview of MDA concepts, Common MDSD concepts and terminology, Model driven architecture, Domain specific modeling, What is meta modeling?, MOF and UML, Software architecture in the context of MDSD.

Text Books:

1. Ian Sommerville, Addison Software Engineering-Wesley, 8th Edition, 2006.
2. Roger S. Pressman, Software Engineering, A Practitioner's Approach, 7th Edition, 2009.
3. Thomas Stahl , Markus Voelter , Krzysztof Czarnecki , Model-Driven Software Development: Technology, Engineering, Management , 1st edition , Wiley; 2006

Reference Books:

1. Perdita Stevens, Rob Pooley, Using UML: Software Engineering with Objects and Components, Addison-Wesley, 2nd edition, 2006.
2. Frederick P., Jr.Brooks, Frederick P. Brooks Jr,The Mythical Man-Month : Essays on Software Engineering, Addison-Wesley, 1995.
3. Anthony Finkelstein, The Future of Software Engineering, ACM Press,2000.
4. Robert E. Filman, Tzilla Elrad, SiobhÃ¡n Clarke, Mehmet Aksit, Aspect-Oriented Software Development, Addison-Wesley, 1st edition, 2004.
5. Zoran Stojanovic, Ajantha Dahanayake, Service-Oriented Software System Engineering : Challenges and Practices,IGI Global, 2005.
6. I. Jacobson, M. Griss, and P. Jonsson, Software Reuse, ACM Press, 1997

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(13SE103) SOFTWARE REQUIREMENTS AND ESTIMATION

UNIT I:

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

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-II:

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

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

UNIT-III:

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

Software Estimation: 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 and Conversion between size measures.

Unit IV:

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

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

Text Books:

1. Swapna Kishore & Rajesh Naik, Software Requirements and Estimation, Tata Mc Graw Hill, 2001

Reference Books:

1. Dean Leffingwell & Don Widrig, Managing Software Requirements, Pearson Education,2003.
2. Suzanne Robertson & James Robertson, Mastering the requirements process, second edition, Pearson Education, 2006.
3. Capers Jones, Estimating Software Costs, Second edition, Tata McGraw-Hill, 2007.
4. M.A. Parthasarathy, Practical Software Estimation, Pearson Education, 2007.

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(13SE104) SOFTWARE METRICS

UNIT I:

Measurement: Measurement in Everyday Life, Measurement in Software Engineering, Scope of Software Metrics.

Basics of Measurement: Representational Theory of Measurement, Measurement and Models, Measurement Scales and Scale Types.

UNIT-II:

Frame Work for Software Measurement: Classifying Software Measures, Applying Frame Work, Software Measurement Validation.

Software Methods in Data Collection: Good Data, Definition of Data, Collecting, Storing and Extracting Data.

UNIT-III:

Measuring Internal Product Attributes: Measuring Size and Structure.

Measuring External Product Attributes: Modeling Software Quality, Measuring Aspects of Quality.

UNIT-IV:

Measurement and Management: Planning a Measurement Program, Measurement in Practice.

Customer Satisfaction: Empirical Research in Software Engineering, Measuring and Analyzing Customer Satisfaction: Customer Satisfaction Surveys, Analyzing Satisfaction Data, Satisfaction with Company.

Text Books:

1. Fenton, Pfleeger," Software Metrics: A Rigorous and Practical Approach", Thomson.
2. Stephen H. Kan: "Metrics & Models in Software Quality Engineering", PEA.

Reference Books:

1. Sheppard, "Software Engineering Metrics", MCG , 1992.
2. Pertis et al, "Software Metrics: An Analysis and Evaluation", MIT Press, 1981.

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(13SE105) OBJECT ORIENTED MODELING

UNIT- I:

Introduction to UML: The meaning of Object Orientation, object identity, Encapsulation, information hiding, polymorphism, generosity, importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture.

Basic Structural Modeling: Classes, Relationships, common Mechanisms, and diagrams.

Class & Object Diagrams: Terms, concepts, modeling techniques for Class & Object Diagrams.

UNIT- II:

Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.

Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, callback mechanism, broadcast messages.

Basic Behavioral Modeling: Use cases, Use case Diagrams, Activity Diagrams.

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT- III:

The Unified process: use case driven, architecture centric, iterative, and incremental.

The Four Ps: people, project, product, and process.

Use case driven process: why use case, capturing use cases, analysis, design, and implementation to realize the use cases, testing the use cases.

Architecture-centric process: architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

Iterative incremental process: iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.

The Generic Iteration workflow: phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed, assess the iteration and phases.

UNIT- IV:

Inception phase: early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, requirements to test.

Elaboration Phase: elaboration phase in brief, early in the elaboration phase, the architectural elaboration iteration workflow, execute the core workflows-Requirements to test.

Construction phase: early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.

Transition phase: early in the transition phase, activities in transition phase.

Case Studies: Automation of a Library, Software Simulator application (2-floor elevator simulator)

Text Books:

1 Grady Booch, James Rumbaugh, Ivar Jacobson The Unified Modeling Language User Guide 2nd Edition, Pearson Education.

2. Ivar Jacobson, Grady Booch, James Rumbaugh, The Unified Software Development Process ,Pearson Education

Reference Books:

1. Meilir Page-Jones, Fundamentals of Object Oriented Design in UML Pearson Education
2. Atul Kahate, Object Oriented Analysis & Design, The McGraw-Hill.
3. Mark Priestley, Practical Object-Oriented Design with UML ,TATA McGrawHill
4. Brett D McLaughlin, Gary Pollice and David West, Object Oriented Analysis & Design ,O'REILY .
5. Simon Bennet, Steve McRobb and Ray Farmer, Object-Oriented Analysis and Design using UML : 2nd Edition, TATA McGrawHill.
6. John W. Satzinger, Robert B Jackson and Stephen D Burd,Object-Oriented Analysis and Design with the Unified Process THOMSON Course Technology.
7. Hans-Erik Eriksson, Magnus Penker, Brian Lyons,UML 2 Toolkit David Fado WILEY-Dreamtech India Pvt. Ltd.

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(13SE106) MIDDLEWARE TECHNOLOGIES
(ELECTIVE-I)

UNIT-I:

Client/Server Computing: Building blocks-types of servers-types of Clients-types of middleware-aspects of client/server systems-sizing-scalability-tiered architecture-client/server models-requirements of client/server systems-Distributed objects-benefits-drawbacks-from distributed objects to components.

Component Technology: Components- definitions-properties-benefits-components and interfaces-direct and indirect interfaces- versions-interfaces as contracts- callbacks- forms of design levels reuse- connection oriented programming – connectable objects.

UNIT-II:

Component Architecture: Component architecture- component frameworks- composition- data driven, contextual, aspect oriented programming, subject oriented programming, XML components-component development- assembly.

The Microsoft Way: Component object model- from COM, COM+, DCOM to .NET framework-evolution- web services technologies- XML, WSDL, UDDI, SOAP.

UNIT-III :

Common Language Infrastructure: Common language infrastructure- common language Runtime -.NET framework class library- ADO.NET, ASP.NET- enterprise services.

The Sun Way: Component variety- applets, servlets, java beans, enterprise beans- EJB architecture-types of beans- characteristics- Building and deploying distributed applications using EJB-java and web services-JXTA and jinni.

UNIT-IV:

The Omg Way: System object model- CORBA timeline- CORBA architecture- ORB- services- facilities-business objects-IIop- transport mechanisms- IDL- Drawbacks of CORBA.

Corba Component Model: CORBA Component model- POA- CCM components- CCM containers-Meta Object Facility. Comparison of CORBA, .NET and EJB.

Text Books:

1. Clemens szyperski, Dominik Gruntz and Stephan Murer, “Component Software Beyond object oriented Programming” third edition, Pearson education, 2004.
2. Robert Orfali, Dan Harkey, Jeri Edwards, “Client/Server Survival Guide” third edition, John Wiley Inc, 2003.

Reference Books:

1. David Chappell, “Understanding .NET”, Pearson education Inc, 2002.
2. Bill Burke, Richard Monson-Haefel, “Enterprise JavaBeans”, Fifth Edition, O’Reily, 2001.
3. Dan harkey, Roberrt Orfali, “ Client/Server programming with JAVA and CORBA”, second edition, wiley& sons Inc, 1999.

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(13SE107) SOFTWARE PROJECT MANAGEMENT
(ELECTIVE-I)

UNIT-I:

Conventional Software Management: The Waterfall Model, Conventional software Management Performance. Evolution of Software Economics: Software Economics, Pragmatic Software Cost Estimation.

Improving Software Economics: Reducing Software Product Size, Improving software Processes, Improving Team Effectiveness, Improving Automation, Achieving Required Quality, Peer Inspections.

UNIT-II:

Conventional and Modern Software Management: Principles of Conventional Software Engineering, Principles of Modern Software Management, Transitioning to an Iterative Process. Life Cycle Phases: Engineering and Production Stages, Inception. Elaboration, Construction, Transition Phases.

Artifacts of the Process: The Artifact Sets. Management Artifacts, Engineering Artifacts, Programmatic Artifacts. Model Based Software Architectures: A Management Perspective and Technical Perspective.

UNIT-III:

Flows of The Process: Software Process Workflows. Inter Trans Workflows. Checkpoints of the Process : Major Mile Stones, Minor Milestones, Periodic Status Assessments. Interactive Process Planning: Work Breakdown Structures, Planning Guidelines, Cost and Schedule Estimating. Interaction Planning Process. Pragmatic Planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, and Evolution of Organizations. Process Automation: Automation Building Blocks, The Project Environment.

UNIT-IV:

Project Control and Process Instrumentation: Server Care Metrics, Management Indicators, Quality Indicators, Life Cycle Expectations Pragmatic Software Metrics, Metrics Automation. Tailoring the process: Process Discriminates, Example.

Future Software Project Management: Modern Project Profiles Next Generation Software economics, Modern Process Transitions. Case Study: The Command Center Processing and Display System –Replacement (CCPDS-R)

Text Books:

1. Walker Rayce, “Software Project Management”, PEA,1998.
2. Henrey, “Software Project Management”’ Pearson.

Reference Books:

1. Richard H. Thayer: “Software Engineering Project Management”, IEEE Computer Society, 1997.
2. Shere K. D. : “” Software Engineering and Management”, PHI,1998.
3. S. A. Kelkar, “ Software Project Management: A Concise Study”, PHI.
4. Hughes Cotterell, “ Software Project Management”, 2e, TMH.

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(13SE108) SOFTWARE PROCESS MANAGEMENT
(ELECTIVE-I)

UNIT-I:

Software Process Maturity: Framework: Software Process Improvement, Need for Process Optimization. Software Process Change: Perceptive, Principles, Misconceptions, Change Implementation. Software Process Assessment: Overview, Phases, Principles, Process and Conduct.

Repeatable Process: Managing Software Organizations: Discipline, Management System, and Establishment.

Project Plan: Principles, Concepts, Size Measure, Estimation, Productivity Factors, Scheduling, Project Tracking, Development Plan, Planning Models, Final Considerations.

UNIT-II:

Configurations Management & Quality Assurance: SCM: Introduction, Software Product Nomenclature, Functions, Baselines, Configurations, Responsibilities, Need for Automated Tools.

SQA: Quality Management, The Role of SQA, Launching the SQA Program, The SQA Plan, SQA People, Independent Verification and Validation.

Standards and Inspections: Standards: Definitions, necessity, benefits, Major Standards, Standards Vs Guidelines.

Software Inspections: Types of Reviews, Objectives, Principles, Conduct of Inspections, Training, Reports and Tracking, Other Considerations, Initiating an Inspection Program.

UNIT-III:

Software Testing And SCM Design: Software Testing: Principles, Software Tests, Planning, Development, Execution, Reporting, Tools and Methods, Real-Time Testing.

SCM Design Phase: Plan, Questions, Support Functions, Requirement Phase, Design Control, Implementation Phase, Operational data, Test Phases, Tools, Accounting, Audit.

Software Process: Software Process: Standards, Definitions, Levels of models & Uses, Architecture, Critical Software Process issues, Process Architecture, Process Models and Views, Establishing and Using a Process Definition, Basic process Guidelines.

Software Engineering Process Group: Changing Software Process, Role, Standards, Process Database, Technology Insertion Focal Point, Education and Training Process Consultation, Process Consultation, Process Status and Assessment, Establishing the SEPG.

UNIT-IV:

Managed Process: Data Gathering and Analysis: Principles, Process, Software Measure, Data Analysis.

Managing Software Quality: Paradigm, Quality Motivation, measurement Criteria, A Software Quality Program, Estimation, Goals, Plans, Tracking and Controlling Software Quality.

Optimizing Process: Defect Prevention Principles, Process Changes, Considerations and Management's Role.

Automating The Software Process: Need, Importance, Dev. Environments, Organizational Plan, Tech. Transition, Special Considerations, Productivity, Justification Considerations.

Text Books:

1. Watt S. Humphrey, ”Managing the Software Process”, PEA, 2003.

Reference Books:

1. Watts S. Humphrey, “A Descipline for Software Engineering”, PEA, 2002.
2. Roger S. Pressman, “ Software Engineering, A Practioners Approach”, 5e, TMH,2003.
3. W. S. Humphrey, “ Introduction to the Personal Software Process”, PEA, 1997.
4. W. S. Humphrey, “ Introduction to the Team Software Process”, PEA, 2002.

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(13SE109) ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

1) Implement the applications of Arrays:
   a) Ordered List.(Different operations)
   b) Sparse Matrix to Efficient Matrix.
   c) Checking an expression whether it is Completely fully parenthesis or not.
2) Implement the applications of Stacks:
   a) Infix To Postfix Expression.
   b) Infix To Prefix Expression.
   c) Prefix To Postfix Expression.
   d) Evaluation Postfix Expression.
3) Implement Queues Using Array.
4) Implement Circular Queue Using Array:
   a) Ascending Priority Queue.
   b) .Descending Priority Queue.
   c) Input & Output De-queue.
5) Implement applications of linked lists.
   a) Stack Using Linked List.
   b) Queue Using Linked List.
   c) Circular Queue Using Linked List.
   d) Single Linked List.
   e) Double Linked List.
6) Arrange words in dictionary order using Binary Search Tree In order Traversal.
7) Implement search traversals for graphs.
   a) DFS
   b) BFS
8) Find minimum cost spanning tree using Kruskal's and Prism's Algorithms.
9) Using Floyd's Algorithm find out" All Pair Shortest Path".
10) Implement N-Queens Problem.

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(13SE110) OBJECT ORIENTED MODELING LAB

1) Study of Computer-aided software engineering tools.

2) Create a system to perform Bank ATM transaction.

3) Create a system to reserve a ticket in railways.

4) Create a system to analyze the students marks stored in the database.

5) Create a computer system to process employee's payroll.

6) Create a system through which students can register to the courses desired by them.

7) Create a system to perform airline ticket reservation system.

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(13SE111) SEMINAR-I

Objectives: To get involved with the latest advancements and developments to enhance communication and presentation skills, exchange of ideas, greater connectivity to develop a research bent of mind.

For the seminar, the student shall collect the information on a specialized relevant topic and prepare a report, showing his understanding over the topic, and submit the same to the department, which shall be evaluated by the Department Committee consisting of Head of the department, Seminar Supervisor and a Senior Faculty Member. Each Seminar shall be evaluated for 50 marks (10 marks for report, 10 marks for subject content, 20 marks for presentation and 10 marks for queries).

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(13SE201) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

UNIT- I:

Envisioning Architecture : The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture: Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT- II:

Analyzing Architectures : Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

Moving from one system to many : Software Product Lines, Building systems from off the shelf components, Software architecture in future.

UNIT III

Patterns : Pattern Description, Organizing catalogs, role in solving design problems ,Selection and usage.

Creational and Structural patterns : Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight, Proxy.

UNIT- IV:

Behavioral Patterns: Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

Case Studies : A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development

Text Books:

1. Len Bass,Paul Clements & Rick Kazman, Software Architecture in Practice, second edition, Pearson Education,2003.
2. Erich Gamma, Design Patterns, Pearson Education,1995.

Reference books:

1. Luke Hohmann, Beyond Software architecture, Addison wesley, 2003.
2. David M. Dikel, David Kane and James R. Wilson, Software architecture, Prentice Hall PTR,2001
3. F.Buschmann, Pattern Oriented Software Architecture, John Wiley & Sons.
4. Eric Freeman & Elisabeth Freeman, Head First Design patterns, O'REILLY, 2007.
5. Steven John Metsker & William C. Wake, Design Patterns in Java, Pearson education, 2006
6. Deepak Alur, John Crupi & Dan Malks, J2EE Patterns, Pearson education, 2003.

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(13SE202) SOFTWARE QUALITY ASSURANCE AND TESTING

UNIT- I:

Software Quality Assurance Framework and Standards SQA Framework: What is Quality? Software Quality Assurance, Components of Software Quality Assurance

Software Quality Assurance Plan: Steps to develop and implement a Software Quality Assurance Plan.

Quality Standards: ISO 9000 and Companion ISO Standards, CMM, CMMI, PCMM, Malcom Baldrige, 3 Sigma, 6 Sigma.

Software Quality Assurance Metrics and Measurement Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metric Programs

UNIT- II:

Software Quality metrics methodology: Establish quality requirements, Identify Software quality metrics, Implement the software quality metrics, analyze software metrics results, validate the software quality metrics.

Software quality indicators – Fundamentals in Measurement theory

Software Testing Strategy and Environment: Establishing testing policy, structured approach to testing, test factors, Economics of System Development Life Cycle (SDLC) Testing.

UNIT- III:

Software Testing Methodology: Defects hard to find, verification and validation, functional and structural testing, workbench concept, eight considerations in developing testing methodologies, testing tactics checklist.

Software Testing Techniques: Black-Box, Boundary value, Bottom-up, Branch coverage, Cause-Effect graphing, CRUD, Database, Exception, Gray-Box, Histograms, Inspections, JADs, Pareto Analysis, Prototyping, Random Testing, Risk-based Testing, Regression Testing, Structured Walk throughs, Thread Testing, Performance Testing, White-Box Testing .

UNIT- IV:

Software Testing Tools:

Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win runner and Rational Testing Tools, Silk test, Java Testing Tools, JMetra, JUNIT and Cactus.

Eleven Step Testing Process: Assess Project Management Development Estimate and Status, Develop Test Plan, Requirements Phase Testing, Design Phase Testing, Program Phase Testing, Execute Test and Record Results, Acceptance Test, Report test results, testing software installation, Test software changes, Evaluate Test Effectiveness.

Testing Specialized Systems and Applications

Testing Client/Server – Web applications, Testing off the Shelf Components, Testing Security, Testing a Data Warehouse

Text Books:

1. William E. Perry , Effective Methods for Software Testing, 2nd Edition, Wiley India, 2006.
2. Mordechai Ben-Menachem/Garry S. Marliss, Software Quality, Thomson Learning publication,1997.

Reference Books:

1. Gao, Tsao and Wu,Testing and Quality Assurance for Component-based Software, Artech House Publishers
2. Bories Beizer,Software Testing Techniques, Second Edition, Dreamtech Press
3. Rex Black, Managing the Testing Process, Wiley
4. G. Gordon Schulmeyer, James I.McManus, Handbook of Software Quality Assurance, Second Edition, International Thomson Computer Press
5. William E.Lewis, Gunasekaran Veerapillai, Software Testing and continuous Quality Improvement, Second Edition, Auerbach Publications
6. Stephen H. Kan, Metrics and Models for Software Quality Engineering, by Pearson Education Publication.

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(13SE203) SERVICE ORIENTED ARCHITECTURE

UNIT- I:

SOA and Web Services Fundamentals: Introducing SOA- Fundamental SOA, Common Characteristics of Contemporary SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA. The Evolution of SOA – An SOA timeline, The continuing evolution of SOA, The roots of SOA. Web Services and primitive SOA-The Web Services frame work, Services, Service descriptions, Messaging.

Web Services and Contemporary SOA (Part I-Activity management and Composition) Message exchange patterns, Service Activity Coordination, Atomic transactions, Business Activities, Orchestration, Choreography.

UNIT- II:

Web Services and Contemporary SOA: (Part-II-Advanced Messaging, Metadata , and Security) Addressing , Reliable messaging, Correlation, Policies, Metadata exchange, Security, Notification and eventing.

Principles of Service-Orientation: Service – Orientation and the enterprise, Anatomy of SOA, Common Principles of Service – Orientation, interrelation between Principles of Service-Orientation, Service Orientation and Object Orientation, Native Web Services support for Principles of Service-Orientation.

UNIT- III:

Service Layers: Service-Orientation and Contemporary SOA, Service Layer abstraction, Application Service Layer , Business Service Layer, Orchestration Service Layer, Agnostic Services, Service Layer Configuration Scenarios.

Building SOA (Planning and Analysis): SOA Delivery Strategies-SOA delivery lifecycle phases, the top-down strategy, the bottom-up strategy, the agile strategy. Service Oriented Analysis (Part I-Introduction)-Introduction to Service Oriented Analysis, Benefits of a Business Centric SOA, Deriving Business Services. Service Oriented Analysis (Part-II-Service Modeling)-Service Modeling, Service Modeling guidelines, Classifying Service model logic, Contrasting Service modeling approaches.

UNIT- IV:

Building SOA (Technology and Design): Service Oriented Design (Part I-Introduction)-Introduction to Service-Oriented design, WSDL related XML Schema language basics, WSDL language basics, Service interface design tools. Service Oriented Design (Part II-SOA Composition Guidelines)-SOA Composing steps, Considerations for choosing service layers, Considerations for positioning core SOA standards, Considerations for choosing SOA extensions.

Service Oriented Design (Part III- Service Design): Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines. Service Oriented Design (Part IV-Business Process Design)-WS-BPEL language basics, WS-Coordination overview, Service Oriented Business process Design. Fundamental WS-* Extensions-WS-Addressing language basics, WS-Reliable Messaging language basics, WS-Policy language basics, WS-Metadata Exchange language basics, WS-Security language basics. SOA Platforms-SOA platform basics, SOA support in J2EE and .NET, integration considerations.

Text Books:

1. Thomas Erl, Service-Oriented Architecture-Concepts, Technology, and Design, Pearson Education.
2. Eric Newcomer, Greg Lomow, Understanding SOA with Web Services, Pearson Education.

Reference Books:

1. Jeff Davies & others, The Definitive guide to SOA, Apress, Dreamtech.
2. E.Hewitt, Java SOA Cook book, SPD.
3. N.M.Josuttis, SOA in **Practice**, SPD.
4. M.Rosen and others, Applied SOA, Wiley India pvt. Ltd.
5. J.Mc Govern, and others, Java Web Services Architecture, Morgan Kaufmann Publishers, Elsevier.
6. Shankar.K, SOA for Enterprise Applications, Wiley India Edition.
7. W.Roshen, SOA-Based Enterprise Integration, TMH.

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(13SE204) SOFTWARE RELIABILITY

UNIT- I:

Introduction: The Need for Reliable Software, Software Reliability Engineering Concepts, Basic definitions, Software practitioner's biggest problem, software reliability engineering approach, software reliability engineering process, defining the product.

The Operational Profile: Reliability concepts, software reliability and hardware reliability, developing operational profiles, applying operational profiles, learning operations and run concepts.

UNIT- II:

Software Reliability Concepts: Defining failure for the product, common measure for all associated systems, setting system failure intensity objectives, determining develop software failure intensity objectives, software reliability strategies, failures, faults and errors, availability, system and component reliabilities and failure intensities, predicting basic failure intensity.

Software Reliability Modelling Survey: Introduction, Historical Perspective and Implementation, Exponential Failure Time Class of Models, Weibull and Gamma Failure Time Class of Models, Infinite Failure Category Models, Bayesian Models, Model Relationship, Software Reliability Prediction in Early Phases of the Life Cycle.

UNIT- III:

Software Metrics for Reliability Assessment: Introduction, Static Program Complexity, Dynamic Program Complexity, Software Complexity and Software Quality, Software Reliability Modeling. **Software Testing and Reliability:** Introduction, Overview of Software Testing, Operational profiles, Time/Structure Based Software Reliability Estimation.

UNIT IV:

Best Practice of SRE: Benefits and approaches of SRE, SRE during requirements phase, SRE during implementation phase, SRE during Maintenance phase.

Neural Networks for Software Reliability: Introduction, Neural Networks, Neural Networks for software reliability, software reliability growth modeling.

Text Books

1. Michael R. Lyu, published Handbook of Software Reliability Engineering Edited by IEEE Computer Society Press and McGraw-Hill Book Company.
2. D. Musa,Software Reliability Engineering John second edition Tata McGraw-Hill.

Reference Books

1. Patric D. T. O connor ,Practical Reliability Engineering, 4th Edition, John Wesley & Sons, 2003.
2. Anderson and PA Lee, Fault tolerance principles and Practice, PHI, 1981.
3. Pradhan D K Fault tolerant computing-Theory and Techniques, (Ed.): Vol 1 and Vol 2, Prentice hall, 1986.
4. E. Balagurusamy, Reliability Engineering Tata McGrawHill, 1994.

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(13SE205) SOFTWARE REQUIREMENTS ENGINEERING

UNIT- I:

Introduction: Introduction - Requirements Problem – Requirements management – Requirements and software life cycle-software team.

UNIT- II:

Analysing The Problem: The five steps in problem analysis– business modelling – Systems engineering of software intensive systems – Understanding user and stakeholders needs – Features of a product or system –Interviewing – Requirements workshops- Brain storming and Idea reduction-storyboarding

UNIT- III:

Defining the System: Use case primer-Organizing requirement Information-Vision Document-Product Management-Managing scope-Establishing Project scope-Managing customer

Refining the System Definition: Software requirement-Refining the use cases-developing the supplementary specification- Ambiguity and specificity -Technical methods for specifying requirements

UNIT- IV:

Building the Right System: From use cases to Implementation-From use Cases to Test cases-Tracing requirements-Managing Change-Assessing Requirements Quality in Iterative Development-Agile Requirement methods.

Text Books:

1. D.Leffingwell, D.Widrig, "Managing Software Requirements A Use case approach",Second Edition, Pearson Education, 2000

Reference Books:

1. Swapna Kishore, Rajesh Naik, "Software Requirements and Estimation", Tata McGraw Hill, 2001
2. K.Weigers, Software Requirements, Microsoft Press, 1999.
3. Ian Sommerville and P Sawyer, "Requirements engineering a good practice Guide", Wiley India, 1997

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(13SE206) SECURE SOFTWARE ENGINEERING
(ELECTIVE-II)

UNIT- I:

Why Is Security a Software Issue? : Introduction, The problem, Software assurance and software security, Threats to software security, Sources of software insecurity, the benefits of detecting software security defects early and managing secure software development.

What Makes Software Secure? : Defining properties of secure software, How to influence the security properties of software, How to assert and specify desired security properties.

UNIT- II:

Requirements Engineering for Secure Software: The SQUARE process model: Identifying security requirements using the security quality requirements engineering (SQUARE) method, SQUARE sample outputs, Requirements elicitation and Requirements prioritization.

Secure Software Architecture and Design: Introduction, Software security practices for architecture and design: Architectural risk analysis. Software security knowledge for architecture and design: Security principles, Security guidelines, and Attack patterns.

UNIT- III:

Considerations for Secure Coding and Testing: Introduction, Code analysis, Coding practices, Software security testing, Security testing considerations throughout the SDLC.

Security and Complexity: System Assembly Challenges: Introduction, Security failures, Functional and attacker perspectives for security analysis, System complexity drivers and security, Deep technical problem complexity.

UNIT- IV:

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

Security metrics: Defining security metrics, Diagnosing problems and measuring technical security, Analysis techniques, Organize, aggregate, and analyze data to bring out key insights.

Text Books:

1. Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Software Security Engineering: A Guide for Project Managers, Addison-Wesley, 1st edition, 2008.

2. Andrew Jaquith, Security Metrics: Replacing Fear, Uncertainty, and Doubt, Addison-Wesley, 1st edition, 2007.

Reference Books:

1. Haralambos Mouratidis, Paolo Giorgini, Integrating Security and Software Engineering: Advances and Future Vision, IGI Global, 2006.

2. Gary McGraw , Software Security: Building Security In, Addison-Wesley, 2006

3. M. Howard, D. LeBlanc, Writing Secure Code, Microsoft Press, 2nd Edition, 2003.

4. G. Hoglund, G. McGraw, Exploiting Software: How to break code, Addison Wesley, 2004.

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(13SE207) SOFT COMPUTING
(ELECTIVE-II)

UNIT- I:

Introduction to intelligent systems and soft computing: Introduction, Intelligent systems, Knowledge-based systems, Knowledge representation and Processing, soft computing. **Fundamentals of Fuzzy Logic Systems:** Introduction, Background, Fuzzy sets, Fuzzy logic operations, Generalized fuzzy operations, Implication (if-then), Some definitions, Fuzziness and Fuzzy resolution, Fuzzy relations, Composition and Inference, considerations of fuzzy decision-making.

UNIT-II:

Fuzzy Logic Control: Introduction, Background, Basic of Fuzzy control, Defuzzification, Fuzzification, Fuzzy Control Surface, Extensions of Mamdani fuzzy control.

Fuzzy Control Architectures: Fuzzy control architectures, Properties of fuzzy control, Robustness and Stability.

UNIT-III:

Fundamentals of Artificial Neural Networks: Introduction, Learning and acquisition of knowledge, Features of artificial Neural Networks, Fundamentals of Connectionist Modeling.

Major Classes of Neural Networks: Introduction, The Multilayer Perceptron.

Neuro-Fuzzy Systems: Introduction, Background, Architectures of neuron-fuzzy systems, Construction of neuron-fuzzy systems.

UNIT-IV:

Evolutionary Computing: Introduction, Overview of evolutionary computing, Genetic algorithms and optimization, The schema theorem: the fundamental theorem of genetic algorithms, Genetic algorithm operators, Integration of genetic algorithms with neural networks, Integration of genetic algorithms with fuzzy logic, Known issues in GAs, Population-based incremental learning, Evolutionary strategies, ES applications.

Applications: Pattern Recognition, Image Processing, Information Retrieval Systems, Share Market Analysis, Soft Computing for Color Recipe Prediction.

Text Books:

1. Fakhreddine.O. Karray and Clarence De Silva, “Soft Computing and Intelligent Systems Design”, Pearson Education.
2. J.S.R. Jang, C.T. Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, Pearson Education 2004.

Reference Books:

1. Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
2. A.Konar, “Computational Intelligence Principles, Techniques and Applications”, Springer, 2005.
3. M.Friedman and Abraham Kandal, “Introduction to Pattern Recognition- Statistical, Structural, Neural and Fuzzy Logic Approaches”, World Scientific, 2005.

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(13SE208) MODEL DRIVEN SOFTWARE DEVELOPMENT
(ELECTIVE-II)

UNIT-I:

MDSD Basic Terminology: Goals of MDSD, MDSD Approach, Overview of MDA concepts, Architecture-Centric MDSD, Common MDSD concepts and terminology, Model-Driven Architecture, Generative Programming, Software factories, Model-Integrated computing, Language-Oriented Programming, Domain specific modeling.

Metamodeling: What is Metamodeling?, Metalevels vs. Level of Abstraction, MOF and UML, Extending UML, UML profiles, Metamodeling & OCL, Examples, Tool-supported Model validation, Metamodeling & Behavior, Pitfalls in Metamodeling, MDSD classification.

UNIT- II:

Model Transformation with QVT: History, M2M language requirements, Overall Architecture, An Example Transformation, The OMG standardization Process and Tool Availability, Assessment.

MDSD Tools: Roles, Architecture, Selection Criteria, and Pointers: Role of Tools in the Development Process, Tool Architecture and selection criteria, pointers. **The MDA Standard:** Goals, Core concepts

UNIT- III:

MDSD Process Building Blocks and Best Practices: Introduction, Separation between Application and domain Architecture Development, Two track Iterative Development, Target Architecture Development Process, Product-line Engineering.

Testing: Test Types, Tests in Model-driven Application Development, Testing the Domain Architecture.

Versioning: What is Versioned? Projects and Dependencies, The structure of Application Projects, The structure of Application Projects, Version management and Build Process for mixed files, Modeling in a team and versioning of partial models

UNIT- IV:

Case study: Embedded Component Infrastructures Overview, Product-Line Engineering, Modeling, Implementation of Components, Generator Adaptation, Code Generation.

Quality: Quality in Model Driven Engineering

Text Books:

1. Thomos Stahl, Markus Volter,Model-Drievn Software Development-Technology, Engineering, Management , John Wiley & Sons ,jul 2006.
2. Jorg Rech,hristian Bunse,Model-Driven Software Development: Integrating Quality Assurance 2008, Information Science Publishing.(UNIT-8)

Reference Books:

1. Sami Beydeda Matthias Book , Volker Gruhn, Model-Driven Software Development Springer.
2. Brian Nolan, Barclay Brown, Dr. Laurent Balmelli, Model Driven Systems Development with Rational Products Et Al Tim Bohn, 2008,IBM.
3. Dragan Milicev, Model Driven Development with Executable UML,Wilei India , 2009.

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(13SE209) DESIGN PATTERNS LAB

1. Define an abstract Shape class that declares an interface for creating each basic kind of shape by implementing Abstract Factory design pattern.
2. Implement an appropriate design pattern that converts the interface of a class into another interface clients expect.
3. Write a program that implements Command Design pattern encapsulating a request as an object, thereby letting to parameterize clients with different requests, queue or log requests, and support undoable operations.
4. Compose objects into tree structures to represent part-whole hierarchies implementing Composite Design Pattern.
5. Write a program that demonstrates Mediator Design pattern where mediator objects are used to encapsulate and centralize the interactions between classes.
6. Write a program that executes methods of proxy class which are transferred to Real Subject's methods.
7. Ensure a class has only one instance and provide a global point of access to it by Singleton design pattern
8. Write a program that demonstrates state pattern that allows an object to completely change its behavior depending upon its current internal state.
9. Implement Visitor Design Pattern that lets you define a new operation to be performed without changing the classes of the elements on which it operates.
10. Implement Facade design pattern

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0	0	3	[2]

(13SE210) SOFTWARE TESTING LAB

1) Study of various testing tools (e.g . junit, win runner, selenium, bugzilla, bugbit, test director and test link).
2) Take a mini project (eg. ATM, Railway Reservation, Library) and perform the following techniques:
3) Write a program (unit test) to measure the following things:
   i) the lines of code ii) comments iii) statement iv) expressions
4) By using McCabe's Cyclomatic Complexity, Write a program to calculate the number of possible alternative paths.
5) Write a program to do method level calculation for the following constraints using Halstead metrics:
   i) Number of operators (method names, arithmetical operators)
   ii) the number of operands (variables, numeric and string constants).
6) Use Nesting Depth technique for any application.
7) Take a mini project (eg. ATM, Railway Reservation, Library)
8) Measure, how well the related types in a package or assembly using Relational Cohesion.
9) Find out Weighted Methods for Class(WMC) and Coupling between Objects (CBO)
10) Find Response For Class (RFC), depth of Inheritance Tree (DIT), Number of Children (NOC)

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	0	0	0	[2]

(13SE211) TERM PAPER

The Term Paper is a precursor to the project work done in the 2nd year M.Tech Programme. The paper may be of 8-10 (A4 size) in length and follows the standard IEEE/Technical Journal Format.

The Term Paper helps to supplement the second year Project Work of the M.Tech students. It helps to identify their Research area/topic and complete the groundwork and preliminary research required for it comfortably. It trains the students to make use of Research Tools and Material available both in print and digital formats.

Based on the topic, a hypothesis is to be made by the student, under the supervision of the guide. The student is then required to collect literature and support information for his / her term paper from Standard Reference Books, Journals, and Magazines - both printed and online. Each student should refer to a minimum of 6 reference sources related to the topic. The student also presents his/her paper with the help of Power Point slides / OHP.

The Term Paper contains: The Aim and Objective of the study, The need for Rationale behind the study, Identify the work already done in the field, Hypothesis and Discussion, Conclusion Appendix with support data (Illustrations, Tables, Graphs, etc.).

Page Limit: minimum of eight pages.

Date of evaluation: During the Lab Internal Exam.

Method of Evaluation**:** Total 50 marks

1. Day to day work - 10 marks
2. Term Paper Report - 20 marks
3. Seminar - 20 marks

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M.Tech III & IV Semesters (SE)	L	T	P	[C]
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(13SE401) SEMINAR-II

Objectives: To get involved with the latest advancements and developments to enhance communication and presentation skills, exchange of ideas, greater connectivity to develop a research bent of mind.

For the seminar, the student shall collect the information on a specialized relevant topic and prepare a report, showing his understanding over the topic, and submit the same to the department, which shall be evaluated by the Department Committee consisting of Head of the department, Seminar Supervisor and a Senior Faculty Member. Each Seminar shall be evaluated for 50 marks (10 marks for report, 10 marks for subject content, 20 marks for presentation and 10 marks for queries).

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M.Tech III & IV Semesters (SE)	L	T	P	[C]
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(13SE402) PROJECT WORK

Students are required to take up a project work, in which the student can choose any specific problem of Industry or Industry based project work. Alternatively it can be secondary source based or Field based project work. Before the commencement of the project work each student is required to submit a synopsis indicating the objectives, Methodology, Framework for analysis, Action plan with milestones in order to have clarity for the subsequent work. The project should have an internal faculty as guide. The student can initiate the project work in the penultimate semester of the course.