# RAJEEV GANDHI MEMORIAL

# COLLEGE OF ENGINEERING & TECHNOLOGY

**AUTONOMOUS**

Affiliated to JNTUA - Anantapuramu, Approved by AICTE - New Delhi,
Accredited by NBA - New Delhi, Accredited by NAAC of UGC with A-Grade
**NANDYAL-518 501, KURNOOL Dist., A.P.**

## DEPARTMENT OF
# INFORMATION TECHNOLOGY

# SOFTWARE ENGINEERING



---

# ACADEMIC REGULATIONS,
# COURSE STRUCTURE AND SYLLABI
## APPLICABLE FOR STUDENTS ADMITTED INTO
# M.TECH (REGULAR) FROM 2015-16

---

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
**AUTONOMOUS**
## INFORMATION TECHNOLOGY
**(Affiliated to J.N.T.U.A, Ananthapuramu)**
**ACADEMIC REGULATIONS, COURSE STRUCTURE AND DETAILED SYLLABI**
**M.Tech. (Regular) from 2015-16**

For pursuing Two year Master (post graduate) Degree of study in Engineering (M.Tech.), offered by Rajeev Gandhi Memorial College of Engineering and Technology, Nandyal - 518501 under Autonomous status and herein referred to as RGMCET (Autonomous).

All the rules specified herein approved by the Academic Council will be in force and applicable to students admitted from the Academic Year 2015-16 onwards. Any reference to "Institute" or "College" in these rules and regulations shall stand for Rajeev Gandhi Memorial College of Engineering and Technology (Autonomous).

All the rules and regulations, specified hereafter shall be read as a whole for the purpose of interpretation as and when a doubt arises, the interpretation of the Chairman, Academic Council is final. As per the requirements of statutory bodies, the Principal, Rajeev Gandhi Memorial College of Engineering and Technology shall be the Chairman, Academic Council.

**Academic Regulations 2015 for M.Tech. (Regular)**

**(Effective for the students admitted into first year from the Academic Year 2015-2016)**

The M.Tech. Degree of Jawaharlal Nehru Technological University Anantapur, Ananthapuramushall be conferred on candidates who are admitted to the M.Tech. program at RGMCET, Nandyal and they shall fulfil all the requirements for the award of the Degree.

**1.0    Eligibility for Admissions:**

Admission to the above program shall be made subject to the eligibility, qualifications and specialization prescribed by Andhra Pradesh State Council of Higher Education (APSCHE) from time to time.

Admissions shall be made on the basis of merit rank obtained in GATE examination or PGCET conducted by any University of Andhra Pradesh designated by Govt. of A. P., or on the basis of any other order of merit prescribed by APSCHE, subject to the reservations prescribed by the Government of A. P. from time to time.

**2.0    Award of M.Tech. Degree:**

**2.1**    The student shall be declared eligible for the award of the M.Tech. degree, if he/she pursues a course of study and completes it successfully for not less than prescribed course work duration and not more than double the prescribed course work duration.

**2.2**    The student, who fails to fulfil all the academic requirements for the award of the degree within double the course work duration from the year of his admission, shall forfeit his seat in M.Tech. course.

**2.3**    The minimum clear instruction days for each semester shall be 95.

**3.0    Courses of Study:**

The following specializations are offered at present for the M.Tech. course of study.

1. Computer Science (CSE)
2. Digital Systems and Computer Electronics (ECE)
3. Embedded Systems (ECE)
4. Machine Design (Mechanical Engineering)
5. Power Electronics (EEE)
6. Software Engineering (IT)
7. Structural Engineering (CE)

and any other course as approved by the appropriate authorities from time to time.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
**AUTONOMOUS**
## INFORMATION TECHNOLOGY

**4.0    Course pattern:**

**4.1**    The entire course of study is of four semesters. During the first and second semesters the student has to undergo course work and during the third and fourth semesters the student has to carry out project work.

**4.2**    The student shall be eligible to appear for the End Examination in a subject, but absent at it or has failed in the End Examination may appear for that subject at the supplementary examination.

**Table 1: Credits**

| Subject | Semester | | | |
|---|---|---|---|---|
| | Periods /Week | Credits | Internal marks | External marks |
| Theory | 04 | 04 | 40 (25 Internal Test+15 Assignment) | 60 |
| Practical | 03 | 02 | 50 | 50 |
| Seminar | | 02 | 100 | |
| Comprehensive  Viva – voce 1 | | 02 | | 50 |
| Comprehensive  Viva - voce 2 | | 02 | | 50 |
| Project | | 12 | | |

**Table2:  Course pattern**

| Semester | No.of Subjects | Number of Labs | Total credits | |
|---|---|---|---|---|
| First | 04-Subjects 01-Elective 01-MOOC/Elective | 02 - Labs Comprehensive Viva -1 | 04X4=16 01X4=04 01X4=04 02X2=04 01X2=02 | 30 |
| Second | 04-Subjects 01-Elective 01-MOOC/Elective | 02 - Labs Comprehensive Viva -2 | 04X4=16 01X4=04 01X4=04 02X2=04 01X2=02 | 30 |
| Third | Seminar (3$^{rd}$ semester) Intermediate Evaluation of Project work (3$^{rd}$ semester) | | 02 04 | |
| Fourth | Project Work | | 08 | |
| | | **Total credits** | **74** | |

**5.0    Attendance:**

**5.1**    The candidate shall be deemed to have eligibility to write end semester examinations, if he has secured a minimum of 75% of attendance in aggregate of all the subjects.

**5.2**    Condonation of shortage of attendance up to 10%, i. e. 65% and above and below 75% may be given by the College academic committee consisting of Principal, Head of the Department and a senior faculty member.

**5.3**    Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence.

**5.4    Shortage of attendance below 65% shall in no case be condoned.**

**5.5**    The candidate shall not be promoted to the next semester unless he fulfils the attendance requirements of the previous semester.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
**AUTONOMOUS**
## INFORMATION TECHNOLOGY

**5.6**      Attendance in each subject will be recorded in the marks memo.

**5.7**      **The attendance in each subject will be recorded in the Marks memo.**

**6.0**      **Evaluation:**

**6.1**      For theory subjects the distribution shall be 40 marks for Internal Evaluation (25 marks for Internal test and 15 marks for assignments/ field work) and 60 marks for the End-Examination.

**6.2**      Each Internal Test question paper shall contain 5 questions, of which the First question is compulsory and three questions are to be answered from the remaining four. Compulsory question carries 10 marks (It contains 5 short answer questions). The remaining 3 questions carry 5 marks each. Each question shall have a,b,c.... parts. The duration of internal test will be for 2 hours. First test to be conducted in 3 units in the middle of the semester and second test to be conducted in the remaining 3 units of each subject at end the semester. There shall be two assignments in each subject (problem based/ field work) for the award of 15 marks so that internal component (marks) will be 40 marks (25 marks for internal test+15 marks for assignments / field work). For awarding of 25 Internal marks the performance of the student in two internal examinations conducted will be considered by giving a weightage of 0.75 for the better score and 0.25 for the other score.

**6.3**      The End Examination question paper will have 7 questions and students have to answer 5 questions. However, the first question is compulsory and it consists of 6 short answer questions, each carrying 2 marks. The next 4 questions are to be answered from the remaining 6 questions and each carries 12 marks. Each 12 marks question shall have a, b, c ..parts.

**6.4**      Elective subjects will commence from $1^{st}$ semester. Out of the electives offered in $1^{st}$ / $2^{nd}$ semester, one elective will be MOOC / Electives offered by the department. Any student who is interested can opt for the MOOC/ Electives offered by the department and acquire the required credits. Even if the student opts MOOC, he has to write two internal tests besides the end examination conducted by the institute like other subjects. However, he has to obtain the certificate from the organization in which he has registered. Any MOOC selected by the student should be of more than 45 hours duration and also from the reputed organization. Attendance of the student who has opted for MOOC will be taken from the remaining subjects and labs only  in that semester while finalizing the attendance for fulfilling the minimum requirements of attendance for promotion to next semester. Attendance will not be recorded for MOOC. Where ever MOOC is opted by the student, the evaluation procedure will be similar to any subject offered by the department.

**6.5**      For practical subjects, 50 marks shall be for the End Semester Examinations and 50 marks will be for internal evaluation based on the day-to-day performance.Laboratory examination for M.Tech.. Course shall be conducted with two Examiners, one of them being Laboratory Class Teacher and second Examiner shall be outside from the institute (External examiner).

**6.6**      Student has to undergo a comprehensive viva pertaining to his specialization which carries 50 marks in each semester. He has to secure 50% marks to obtain required credits. Comprehensive viva will be conducted at the end of 1st and 2nd semester by the committee consisting of HOD, senior faculty member and external Examiner from outside the institute. For this, HOD of the Department shall submit a panel of 4 Examiners, who are eminent in that field. One from the panel will be selected by the principal of the institute as external Examiner for comprehensive viva.

**6.7**      For Seminar 100 marks shall be for internal evaluation. The candidate has to secure a minimum of 50 marks to be declared successful. The assessment will be made by a board consisting of HOD and two internal experts at the end of $3^{rd}$ semester.

**6.8**    The 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 Examination and Internal evaluation taken together.

**6.9**    In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.0), 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.

**7.0**    **Re-registration for improvement of Internal marks:**

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

**7.1**    The candidate should have completed the course work and obtained examinations results for $1^{st}$ & $2^{nd}$ semesters.

**7.2**    He should have passed all the subjects for which the internal marks secured are more than 50%.

**7.3**    Out of the subjects the candidate has failed in the examination due to Internal marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of <u>three</u> Theory subjects for Improvement of Internal marks.

**7.4**    The candidate has to re-register for the chosen subjects and fulfil the academic requirements as and when they are offered.

**7.5**    For each subject, the candidate has to pay a fee equivalent to one tenth of the semester tuition fee and the amount is to be remitted in the form of D. D. in favour of the Principal, RGMCET payable at RGMCET, Nandyal branch along with the requisition through the HOD of the respective Department.

**7.6**    In case of availing the Improvement of Internal marks, the internal marks as well as the End Examinations marks secured in the previous attempt (s) for the re-registered subjects stand cancelled.

**8.0**    **Evaluation of Project / Dissertation work :**

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

**8.1**    Registration of Project work: The candidate is permitted to register for the project work after satisfying the attendance requirement of all the courses (theory and practical courses of $1^{st}$ & $2^{nd}$ Sem)

**8.2**    An Internal Department Committee (I.D.C.) consisting of HOD, Supervisor and One Internal senior expert shall monitor the progress of the project work.

**8.3**    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. Extension of time within the total permissible limit for completing the programme is to be obtained from the Head of the Institution.

**8.4**    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.

**8.5**    The 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.

**8.6** Three copies of the Thesis/Dissertation certified in the prescribed form by the supervisor & HOD shall be submitted to the institute.

**8.7** The Department shall submit a panel of 4 experts for a maximum of 4 students at a time. However, the thesis/dissertation will be adjudicated by the board consists of HOD, concerned supervisor and one external Examiner from other institute nominated by the principal from a panel of Examiners submitted by the Department HOD to the Controller of Examinations.

**8.8** If the report of the board is favourable in viva voce examination, the board shall jointly report candidates work as:

1. Good
2. Satisfactory
3. Not satisfactory

If the report of the viva voce is not satisfactory 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.

**9.0** **Award of Degree and Class:**

After the student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of M. Tech. Degree he shall be placed in one of the following classes:

**Table 3: Award of division**

| Class Awarded | % of marks to be secured | Division/ Class | CGPA | |
|---|---|---|---|---|
| First Class with Distinction | 70% and above | First Class With Distinction | $\geq 7.5$ | From the aggregate marks secured from the 74 Credits. |
| First Class | Below 70% but not less than 60% | First Class | $6.5 \ and \ < 7.5$ | |
| Second Class | Below 60% but not less than 50% | Second Class | $\geq 5.5 \ and \ < 6.5$ | |

(The marks in internal evaluation and End Examination shall be shown separately in the marks memorandum)

**10.0** *Grading:*

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student falls.

**Table 4: Conversion into Grades and Grade points assigned**

| Range in which the % of marks in the subject fall | Grade | Grade point Assigned | Performance |
|---|---|---|---|
| 90 to 100 | O | 10 | Outstanding |
| 80 to 89.9 | $A^+$ | 09 | Excellent |
| 70 to 79.9 | A | 08 | Very good |
| 60 to 69.9 | $B^+$ | 07 | good |
| 50 to 59.9 | B | 06 | Pass |
| <50 | F | 00 | Fail |
| Ab | AB | 00 | Fail |

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**10.1** Requirement for clearing any subject: The students have to obtain a minimum of 40% in End Examination and they have to score minimum of 50% marks from Internal and external exam marks put together to clear the subject. Otherwise they will be awarded fail grade.

**10.2** F is considered as a fail grade indicating that the student has to reappear for the end supplementary examination in that subject and obtain a non fail grade for clearing that subject.

**10.3** To become eligible for the award of degree the student must obtain a minimum CGPA of 6.0.

**11.0 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. The student is not permitted to improve his performance in any subject in which he has obtained pass grade.

**12.0 *Grade Point Average (GPA) and Cumulative Grade Point Average(CGPA)***

The Grade Point Average (GPA) for each semester and Cumulative Grade Point Average (CGPA) up to any semester are calculated as follows:

**i)** Semester Grade Point Average will be computed as follows:

$$GPA = \frac{\sum_1^n C_i \times GP_i}{\sum_1^n C_i}$$

Where, n is the number of subjects in that semester. $C_i$ is Credits for the subjects. $GP_i$ is the grade point obtained for the subject and the summation is over all the subjects in that semester.

**ii)** A Cumulative Grade Point Average (CGPA) will be computed for

every student at the end of each semester. The CGPA would give the cumulative performance of The student from the first semester up to the end of the semester to which it refers and is calculated as follows

$$CGPA = \frac{\sum_1^m GPA_j \times TC_i}{\sum_1^m TC_j}$$

Where 'm' is the number of semester under consideration. $TC_j$ the total number of credits for a $j^{th}$ semester and $GPA_j$ is the Grade Point Average of the $j^{th}$ semester. Both GPA and CGPA will be rounded off to the second digit after decimal and recorded as such.

While computing the GPA / CGPA the subjects in which the student is awarded zero grade points will also be included.

**13.0 Grade Sheet:**

A grade sheet (Memorandum) will be issued to each student indicating his performance in all subjects of that semester in the form of grades and also indicating the GPA and CGPA.

**14.0 Transcripts:**

After successful completion of prerequisite credits for the award of degree a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee and also as per norms in vogue.

**15.0 Minimum Instruction Days:**

The minimum instruction days for each semester shall be 95 clear instruction days excluding the days allotted for tests/examinations and preparation holidays declared if any.

**16.0 Amendment of Regulations:**

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

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.

**17.0    Transfers**

There shall be no branch transfers after the completion of admission process.

**18.0    Withholding of results:**

If the candidate has not paid any dues to the institute or if any case of in-discipline is pending against him, the result of the candidate will be withheld and he will not be allowed for the next semester.  The issue of the degree is liable to be withheld in such cases.

**19.0    Transitory Regulations:**

Candidates who have discontinued or have been detained for want of attendance are eligible for admission to the same or equivalent subjects as and when subjects are offered, subject to 2.0 and 5.0.

**20.0    Rules of Discipline:**

**20.1**    Any attempt by any student to influence the teachers, Examiners, faculty and staff of Examination section for undue favours in the exams, and bribing them either for marks or attendance will be treated as malpractice cases and the student can be debarred from the college.

**20.2**    When the student absents himself, he is treated as to have appeared and obtained zero marks in that subject (s) and grading is done accordingly.

**20.3**    When the performance of the student in any subject (s) is cancelled as a punishment for indiscipline, he is awarded zero marks in that subject (s).

**20.4**    When the student's answer book is confiscated for any kind of attempted or suspected malpractice, the decision of the Chief Superintendent is final.

**21.0    General:**

**21.1**    The Academic Regulations should be read as a whole for the purpose of any interpretation.

**21.2**    In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Council is final.

**21.3**    The Institute may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the Institute.

**21.4**    *Where the w*ords "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

**AUTONOMOUS**

## INFORMATION TECHNOLOGY

### COURSE STRUCTURE

### I M.TECH, I-SEMESTER (Software Engineering)

| Code | Subject | Theory | Practical | Credits | Internal Marks | External Marks | Total Marks |
|------|---------|--------|-----------|---------|----------------|----------------|-------------|
| | | | | | **Scheme of Examination** | | |
| D2501121 | Design and Analysis of Algorithms | 4 | - | 4 | 40 | 60 | 100 |
| D2502121 | Advances in Software Engineering | 4 | - | 4 | 40 | 60 | 100 |
| D2503121 | Object oriented design and patterns | 4 | - | 4 | 40 | 60 | 100 |
| D2504121 | Software quality assurance and testing | 4 | - | 4 | 40 | 60 | 100 |
| | **Elective-I** | | | | | | |
| D2505121 | Human Computer Interaction | 4 | - | 4 | 40 | 60 | 100 |
| D2506121 | Date Mining and Information Retrieval | 4 | - | 4 | 40 | 60 | 100 |
| D2507121 | Cloud Computing | 4 | - | 4 | 40 | 60 | 100 |
| | **Elective-II** | | | | | | |
| D2508121 | Embedded Systems | 4 | - | 4 | 40 | 60 | 100 |
| D2509121 | Mobile Computing | 4 | - | 4 | 40 | 60 | 100 |
| D2510121 | Software requirements and estimations | 4 | - | 4 | 40 | 60 | 100 |
| | **Laboratory** | | | | | | |
| D2591121 | Software Lab-1: Data Structures & Algorithms Lab | | 3 | 2 | 50 | 50 | 100 |
| D2592121 | Software Lab-2: Quality Assurance & Testing Lab | | 3 | 2 | 50 | 50 | 100 |
| D2506121 | Comprehensive Viva-I | | | 2 | | 50 | 50 |
| **Total** | | **24** | **6** | **30** | **340** | **510** | **850** |

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
**AUTONOMOUS**
## INFORMATION TECHNOLOGY
### I M.TECH, II-SEMESTER (Software Engineering)

| Code | Subject | Theory | Practical | Credits | Scheme of Examination | | |
|------|---------|--------|-----------|---------|------------------|----------------|-------------|
| | | | | | Internal Marks | External Marks | Total Marks |
| D2511122 | Middleware Technologies and Service Oriented Architecture | 4 | - | 4 | 40 | 60 | 100 |
| D2512122 | Software Architecture & Design Patterns | 4 | - | 4 | 40 | 60 | 100 |
| D0515122 | Software Project Management | 4 | - | 4 | 40 | 60 | 100 |
| D2513122 | Software Maintenance Reengineering | 4 | - | 4 | 40 | 60 | 100 |
| **Elective-III** | | | | | | | |
| D2514122 | Secure Software Engineering | 4 | - | 4 | 40 | 60 | 100 |
| D0517122 | Soft computing | 4 | - | 4 | 40 | 60 | 100 |
| D2515122 | Model-Driven Software development | 4 | - | 4 | 40 | 60 | 100 |
| **Elective-IV** | | | | | | | |
| D2516122 | Machine Learning | 4 | - | 4 | 40 | 60 | 100 |
| D0516122 | Image Processing | 4 | - | 4 | 40 | 60 | 100 |
| D2517122 | High Performance Computing | 4 | - | 4 | 40 | 60 | 100 |
| **Laboratory** | | | | | | | |
| D2594122 | Middleware Technologies Lab | - | 3 | 2 | 50 | 50 | 100 |
| D2595122 | Software Project Management and Reengineering Lab | - | 3 | 2 | 50 | 50 | 100 |
| D2596122 | Comprehensive Viva-II | | | 2 | | 50 | 50 |
| **Total** | | **24** | **6** | **30** | **340** | **510** | **850** |

### II M.TECH, III-SEMESTER & IV-SEMESTER (Software Engineering)

| Code | Subject | Credits | Internal Marks | External Marks | Total |
|------|---------|---------|----------------|----------------|-------|
| | Seminar | 2 | 100 | - | 100 |
| | Project work | 12 | - | - | - |

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**　　　　　　　　　　　　　　　　　　　　　**T**　　**C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**4**　　**4**

## (D2501121)DESIGN AND ANLASYS OF ALGORITHMS

**UNIT I**

**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. Introductionto Computability, correctness, and complexity.

**UNIT II**

**Trees and Graphs:** Introduction, Definition and Basic terminologies of trees and binary trees, Representation of trees and Binary trees, Binary tree Traversals, Binary Search Trees, AVL Trees, . Red – Black Trees, Splay Trees. Graphs-basic concepts, representation and traversals. Hash Tables: Introduction, Hash Tables, Hash Functions and its applications.

**UNIT III**

**Divide – and – Conquer & Greedy Method:** Divide-and-conquer 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, Back Tracking and Branch and Bound:** General Method, All Pairs Shortest Path, Single Source Shortest Path, 0/1 Knapsack problem, Reliability Design, Traveling Sales Person's Problem.
General Method, 8 – Queen's Problem, Graph Coloring. Branch – and – Bound: The Method, LC Search, Control Abstraction, Bounding, 0/1 Knapsack Problem.

**UNIT V**

**Parallel Algorithms:** Introduction to parallelism- computer system categories, parallel architectures, principles of parallel analysis; PRAM model; simple parallel operations; parallel searching; parallel sorting; paralle numerical algorithms; parallel graph algorithms.

**UNIT VI**

**Nondeterministic and Probabilistic algorithms:** What is NP?, typical NP problems; is P = NP?; testing possible solutions – job scheduling, graph coloring. Numerical probabilistic algorithms:-Buffon's Needle, Monte Carlo integration, probabilistic counting; Monte Carlo algorithms- majority element, prim testing, Las Vegas algorithm, Sherwood algorithm, comparison of probabilistic algorithms.

**TEXT BOOKS:**
1. Data Structures and Algorithms by G.A.V. Pai, 2009, TMH.
2. Analysis of Algorithms- An active learning approach by Jeffrey J. Connell,2002, Narosa.
3. Fundamentals of Computer Algorithms by Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, 2$^{nd}$ edition, University Press.

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

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

## AUTONOMOUS

## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**      **T**    **C**

                                                      **4**    **4**

## (D2502121) ADVANCES IN SOFTWARE ENGINEERING

### UNIT – I      INTRODUCTION

Software Processes: Software Process Models, Process Iteration, Process Activities, The Rational Unified Process, Computer-Aided Software Engineering

Project Management: Management Activities, Project Planning, Project Scheduling, Risk Management

### UNIT – II      REQUIREMENTS AND DESIGN

Software Requirements: Functional and Non-Functional Requirements, User Requirements, System Requirements, Interface Specification, The Software Requirements Document

Requirements Engineering Processes: Feasibility Studies, Requirements Elicitation And Analysis, Requirements Validation, Requirements Management

Architectural Design: Architectural Design Decisions, System Organization, Modular Decomposition Styles, Control Styles, Reference Architectures

Object-Oriented Design: Objects And Object Classes, An Object-Oriented Design Process, Design Evolution

### UNIT – III      DEVELOPMENT

Rapid Software Development: Agile Methods, Extreme Programming, Rapid Application Development, Software Prototyping

Software Reuse: The Reuse Landscape, Design Patterns, Generator-Based Reuse, Application Frameworks, Application System Reuse,

An Overview of Component-Based Software Engineering and its use.

### UNIT – IV      VERIFICATION AND VALIDATION

Verification And Validation: Planning Verification And Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods

Software Testing: System Testing, Component Testing, Test Case Design, Test Automation An Overview of Critical Systems Specification and Critical Systems Validation.

### UNIT – V      MANAGEMENT

Managing People: Selecting Staff, Motivating People, Managing Groups, The People Capability Maturity Model.

Software Cost Estimation: Software Productivity, Estimation Techniques, Algorithmic Cost Modeling, Project Duration and Staffing.

Quality ManagementProcess and Product Quality, Quality Assurance and Standards, Quality Planning, Quality Control, Software Measurement and Metrics.

Configuration Management: Configuration Management Planning, Change Management, Version and Release Management, System Building, CASE Tools For Configuration Management.

### UNIT – VI      EMERGING TECHNOLOGIES

Security Engineering: Security Concepts, Security Risk Management, Design for Security, System Survivability.

Service-Oriented Software Engineering: Services As Reusable Components, Service Engineering, Software Development With Services.

**TEXT BOOKS:**

1. Software Engineering, by Ian Somerville, Addison-Wesley, 8th Edition, 2006.

**REFERENCES:**

1. Software Engineering, A Practitioner's Approach, by Roger S. Pressman, 7th Edition, 2009.
2. The Future of Software Engineering, edited by Anthony Finkelstein, ACM Press, 2000.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**
      T     C
      4     4

## (D2503121) OBJECT-ORIENTED DESIGN AND PATTERNS

**UNIT I**
**INTRODUCTION TO OOD:** The principles of object oriented Design - Encapsulation andconnascence, Encapsulation structure, Levels of encapsulation, Design criteria governing interacting levels of encapsulation. Connascence - varieties of connascence, contra nascence, connascenceand encapsulation, boundaries, connascenceand maintainability, connascence abuse in object –oriented system.
Class Diagrams. The Generalization construct, Single inheritance, Multiple Inheritances, Subclass Partitioning.

**UNIT II**
The Association Construct - The basic UM notation for Association, Associations depicted as classes, Higher-order Associations, Navigability of Associations, the Whole/ Part Associations, Composition, Aggregation.
Object Interaction Diagrams.
The Collaboration Diagram, Depicting a message, Polymorphism in the collaboration Diagram, Iterated messages, Use of self in messages.
The sequence Diagram - Asynchronous messages and concurrent execution, The call back mechanism, Asynchronous message with Priority, Depicting a broadcast.

**UNIT III**
**STATE DIAGRAM:** Basic State Diagram, Nested States, Concurrent States and Synchronization, Transient States from Message Result Arguments, Continuously Variable Attribute.

**UNIT IV**
**INCEPTION:** Artifacts that may start in inception, Understanding Requirements, Types of Requirements.
Use Case Model - Use cases and Functional Requirements, Goals and scope of a Use cases, Finding Primary Actors ,Goals , and Use cases.

**UNIT V**
**ELABORATION ITERATION1:** Use-Case Model: Drawing System Sequence Diagram, Design Model: Use-Case Realization with GRASP patterns, Design Model: Determining Visibility, Implementation Model: Mapping Designs to codeIteration 2 and its requirements, Designing Use-Case Realization with GoF Design PatternsIteration 3 and its requirements, Relating Use Cases

**UNIT VI**
**DESIGNING A SOFTWARE COMPONENT:** What is a Component, Similarities & Differences between Components, Internal Design of a Component, Lightweight and Heavy Weight Component, Advantages and Disadvantages of using Component.

**TEXT BOOKS:**
1. Fundamentals of Object-Oriented Design in UML, Meilir Page-Jones, 6th Impression 2009, Pearson Education.
2. Appling UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process, Craig Larman, 2nd edition, Pearson Education.

**REFERENCE BOOKS:**
1. The Unified Modeling Language User Guide, Grady Booch, James Rumbaugh, IvarJacobson , Pearson Education.
2. UML 2 Toolkit, Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY-Dreamtech India Pvt. Ltd.
3. Modeling Software Systems Using UML2, Pascal Roques, WILEY-Dreamtech India Pvt. Ltd.
4. Object Oriented Analysis & Design, AtulKahate, The McGraw-Hill Companies.
5. Practical Object-Oriented Design with UML, Mark Priestley,TATAMcGrawHill

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**                  **T**      **C**
                                              **4**      **4**

## (D2504121) 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, MalcomBalridge, 3 Sigma, 6 Sigma

**UNIT: II**

Software Quality Assurance Metrics and Measurement Software Quality Metrics: Product Quality metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples ofMetric Programs.
Software Quality Metrics Methodology: Establish quality requirements, Identify Software quality metrics, implement the software quality metrics, analyze software metrics results, and validate the softwarequality metrics – Software quality indicators – Fundamentals in Measurement theory.

**UNIT: III**

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

**UNIT:IV**

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 Walkthroughs, Thread Testing, Performance Testing, White-Box Testing.

**UNIT: V**

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.

**UNIT: VI**

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

**REFERENCE BOOKS:**
1. Software Testing Tools, K.V.K.K. Prasad, Dream tech press, 2008.
2. Software Testing Techniques, by BoriesBeizer, Second Edition, Dreamtech Press
3. Handbook of Software Quality Assurance, by G. Gordon Schulmeyer, James I.McManus, Second Edition, International Thomson Computer Press
4. Metrics and Models for Software Quality Engineering, by Stephen H. Kan, by Pearson Education Publication.
5. Software Testing, SrinivasanDesikan&Gopalaswamy Ramesh, Pearson Education,2006.
6. Software testing techniques, Scott Loveland & Geoffrey Miller, Shroff Publishers, 2005

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

## AUTONOMOUS

## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**                                          T      C
                                                                4      4

## (D2505121) HUMAN COMPUTER INTERACTION

(Elective – I)

**UNIT I**
**INTRODUCTION:** Importance of user Interface, definition, importance of good design.Benefits of good design. A brief history of Screen design,

**UNIT II**
**THE GRAPHICAL USER INTERFACE:** Popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

**UNIT III**
**DESIGN PROCESS AND SCREEN DESIGNING:** Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.
Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

**UNIT IV**
**WINDOWS:** New and Navigation schemes selection of window, selection of devices based and screen based controls.

**UNIT V**
**COMPONENTS:** Ttext and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

**UNIT VI**
**SOFTWARE TOOLS AND INTERACTION DEVICES:** Specification methods, interface – Building Tools. Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

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

**REFERENCE BOOKS**
1. Human – Computer Interaction. Alan Dix, Janet Fincay, GreGoryd, Abowd, Russell Bealg, Pearson Education
2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech, 3. User Interface Design, SorenLauesen, Pearson Education.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
**AUTONOMOUS**
## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**                    **T    C**
                                           **4    4**

## (D2506121) DATA MINING AND INFORMATION RETRIEVAL
(Elective – I)

**UNIT- I**

Introduction to data mining, knowledge discovery from database, kind of data, data mining functionalities, classification of data mining systems

Data warehouse, Multidimensional data models: data cubes, stars, snowflakes and fact constellations, defining schemas, concept hierarchies, OLAP, Three-tier data warehouse architecture, Types of OLAP servers, data warehouse implementation.

Data preprocessing and its need, data cleaning, data integration, data transformation, data reduction, discretization and concept hierarchy generation

**UNIT- II**

Data Mining Primitives, Languages and its system architectures: Task relevant data, Kind of knowledge to be mined, data mining query languages and its syntaxes, designing GUI, architectures of DM systems.

Class description, data generalization and summarization-based characterization, Attribute relevance analysis, association rule mining and its road map, finding frequent item sets using APRIORI algorithm and FP growth algorithm, mining multi- level association rules from relational databases, Correlational analysis

**UNIT- III**

Introduction to classification and prediction, classification model, classification using decision trees, classification by Bayesian concepts Back propagation, K-nearest neighbor classifiers , case based reasoning, genetic algorithms, Linear and Non-linear regression, Bagging and Boosting, DM tools such as OLEDB/DBMiner/WEKA/ORACLE DM

**UNIT-IV**

Clustering, types of data, partitioning methods: k-means and PAM, hierarchical clustering methods: BIRCH, CURE, CHAMELEON Clustering, Density Based Clustering: DBSCAN, OPTICS, DENCLUE, Grid based clustering: STING, CLIQUE, Model based clustering methods, Outlier analysis

**UNIT-V**

Information Retrieval Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Information Retrieval System Capabilities: Search, Browse, Miscellaneous

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction, Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure, Document and Term Clustering

**UNIT- VI**

User Search Techniques, Information Visualization, Text Search Algorithms: Introduction, Software text search algorithms, Hardware text searching systems, Information system Evaluation

**TEXT BOOKS**
1. J. Han, M. Kamber, Data Mining Concepts and Techniques, Second Edition, ELSEVIER
2. Information storage and retrieval systems : Theory and Implementation by Kowalski, Gerald, Mark T Maybury Kluwer Academic Press, 2000
3. Introduction to Information Retrieval ,Christopher D.Manning, Prabhakar Raghavan, Henrich Schutze,2008

**REFERENCE BOOKS**
1. Data Mining Techniques – Arun K Pujari, University Press.
2. Data Warehousing in the Real World – Sam Aanhory& Dennis Murr Pearson Edn Asia.
3. Data Warehousing Fundamentals – PaulrajPonnaiah Wiley student Edition
4. The Data Warehouse Life cycle Tool kit – Ralph Kimball Wiley student edition

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

**AUTONOMOUS**

**INFORMATION TECHNOLOGY**

**M.Tech, I-Sem (CSE)**                                     **T      C**

                                                           **4      4**

## (D2507121) CLOUD COMPUTING
(Elective – I)

**UNIT-1**

Defining Cloud Computing: Defining Cloud Computing, Cloud Types, Characteristics of Cloud Computing, Paradigm shift, Benefits of cloud computing, Disadvantages of cloud computing, Assessing the role of open standards.

Assessing the value proposition: Measuring the Cloud's value, Avoiding Capital Expenditures,Computing the Total Cost of ownership, Specifying service Level Agreements, Defining Licensing Models

**UNIT -2**

Cloud Architecture: Exploring the Cloud Computing Stack, Connecting to the Cloud.

Services and Applications by Type: Defining- Infrastructure as a Service (laas), Platform as a Service (PaaS), Software as a Service (SaaS), Identity as a Service (IDaaS), Compliance as a service (CaaS)

**UNIT-3**

Abstraction and Virtualization: Virtualization Technologies, Load Balancing and Virtualization, Hypervisors, Machine Imaging, Porting Applications.

Capacity Planning: Capacity Planning, Baseline and Metrics, Network Capacity, Scaling. Exploring Platform as a Service: Defining services, PaaS Application Frameworks,

**UNIT-4**

Examples of vendor Specific Cloud Services- An overview: Google web services, Amazon web services, Microsoft Cloud services.

Cloud Infrastructures: Managing the Cloud- Administrating the Clouds, Cloud management Products, Emerging Cloud Management Standards.

Cloud security: Securing the Cloud, Securing Data,Establishing Identity and Presence.

**UNIT -5**

Services and Applications - Service Oriented Architecture: Introducing SOA, Defining SOA Communications, Managing and Monitoring SOA, Relating SOA and Cloud Computing. Moving Applications to the CloudWorking with Cloud-Based Storages: Provisioning Cloud Storage, Exploring Cloud Backup solutions, Cloud storage Interoperability.

Working with Productivity Software: Using Productivity Applications, Online office systems.

**UNIT-6**

Webmail Services: Cloud Mail Services, Syndication services.

Communicating with the Cloud: Exploring Instant Messaging, Exploring Collaboration Technologies, Using social Networks.

Using Media and Streaming: Understanding the Streaming Process, Audio streaming, Video Streaming.

**BOOKS:**

1.  Cloud Computing Bible, Barrie Sosinsky, Wiley India edition, 2012

**REFERENCE BOOKS:**

1.  Cloud Security, Ronald L. Krutz, Russell Dean Vines, Wiley India Edition, 2012.
2.  Cloud Computing – A Practical Approach, Anthony T. Velte, Toby J. Velte and Robert Elsenpeter, Tata McGraw-Hill edn. 2011.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**

| T | C |
|---|---|
| 4 | 4 |

## (D2508121) EMBEDDED SYSTEMS
### (Elective – II)

**UNIT-I: Embedded Computing**

Embedding Computers, Characteristics of Embedded Computing, Applications, Challenges in Embedded Computing System Design, Performance in Embedded Computing, The Embedded System Design Process, Formalisms for System Design, case study: Model Train Controller.

Instruction Sets

Computer Architecture Taxonomy, Assembly Language, ARM Processor, TI C55x DSP Or SHARC family of DSPs

**UNIT– II: CPUs**

Programming Input and Output, Supervisor Mode, Exceptions, and Traps, Co-Processors;Memory System Mechanisms- Caches, Memory Management Units and Address Translation; CPU Performance- Pipelining, CachingCPU Power Consumption;Design Example: Data Compressor.

**UNIT – III: Bus-Based Computer System**

The CPU Bus, Bus Protocols, DMA, System Bus Configurations, AMBA Bus; Memory Devices- Memory Device Organization Random-Access Memories, Read-Only Memories; I/O devices, Timers and Counters A/D and D/A Converters, Keyboards, LEDs Displays, Touch screens; Component Interfacing- Memory Interfacing, Designing with Microprocessors, System Architecture, Hardware Design, The PC as a Platform;Development and Debugging Development Environments, Debugging Techniques, Debugging Challenges,System-Level Performance Analysis, System-Level Performance Analysis, Parallelism; Design Example: Alarm Clock.

**UNIT –IV: Program Design and Analysis**

Components for Embedded Programs;Models of Programs; Assembly, Linking, and Loading; Basic Compilation Techniques;Program Optimization; Program-Level Performance Analysis; Software Performance Optimization; Program-Level Energy and Power Analysis and Optimization; Analysis and Optimization of Program Size; Program Validation and Testing Design example: Software Modem.

**UNIT – V: Processes and Operating Systems**

Multiple Tasks and Multiple Processes; Preemptive Real-Time Operating Systems; Priority-Based Scheduling; Interprocess Communication Mechanisms; Power Management and Optimization for Processes; Design Example: Telephone Answering Machine.

**UNIT – VI: Multiprocessors And Networks**

CPUs and Accelerators; Multiprocessor Performance Analysis; Consumer Electronics Architecture; Some Design Examples.Distributed Embedded Architectures;Networks for Embedded Systems;Network-Based Design;Internet-Enabled Systems;Vehicles as Networks; Design Example: Elevator Controller.

System Design Techniques

Design Methodologies; Requirements Analysis;Specifications;System Analysis and Architecture Design; Quality Assurance.

**Text Book**

1. Computers as Components - Principles of Embedded Computing System Design, by Wayne Wolf, Second Edition, Morgan Kaufmann Publishers, 2008.

**Reference Books**

1. Embedding system building blocks, Labrosse, via CMP publishers.
2. Embedded Systems, Raj Kamal, TMH.
3. Embedded System Design, Frank Vahid, Tony Givargis, John Wiley.
4. An Embedded Software Primer, David E. Simon, Pearson Education.

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

**AUTONOMOUS**

**INFORMATION TECHNOLOGY**

**M.Tech, I-Sem (CSE)**                                    T        C
                                                          4        4

# (D2509121) MOBILE COMPUTING
(Elective – II)

**UNIT I**

**INTRODUCTION TO NETWORK TECHNOLOGIES AND CELLULAR COMMUNICATIONS:**
HIPERLAN: Protocol architecture, physical layer, Channel access control sub layer, MAC sub layer, Information bases and networking WLAN: Infrared vs. radio transmission, Infrastructure and ad hoc networks, IEEE 802.11. GSM: Mobile services, System architecture, Radio interface, Protocols, Localization and calling, Handover, Security, and New data services. Mobile Computing (MC): Introduction to MC, novel applications, limitations, and architecture.

**UNIT II**

**(WIRELESS) MEDIUM ACCESS CONTROL:**Motivation for a specialized MAC (Hidden and exposed terminals, Near and farterminals), SDMA, FDMA, TDMA, CDMA.
Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations), Dynamic Host Configuration Protocol (DHCP).

**UNIT III**

**MOBILE TRANSPORT LAYER:**Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time out freezing, Selective retransmission, Transaction oriented TCP.
Mobile Ad hoc Networks (MANETs):Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

**UNIT IV**

**DATABASE ISSUES:**Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power aware and context aware computing, transactional models, query processing, recovery, and quality of service issues.

**UNIT V**

**DATA DISSEMINATION:**Communications asymmetry, classification of new data delivery mechanisms, push based mechanisms, pull based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

**UNIT VI**

**PROTOCOLS AND TOOLS:**Wireless Application Protocol WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

**TEXT BOOKS:**
1. Mobile Communications, Jochen Schiller, Pearson Education, Second edition, 2004.
2. Handbook of Wireless Networks and Mobile Computing, Stojmenovic and Cacute,Wiley, 2002,

**REFERENCE BOOK:**
1. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press, October 2004

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**                                    **T      C**
                                                          **4      4**

## (D2510121) SOFTWARE REQUIREMENTS AND ESTIMATION
(Elective – II)

**UNIT I: SOFTWARE REQUIREMENTS AND ENGINEERING:**

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

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 MANAGEMENT:**

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

**UNIT III: SOFTWARE REQUIREMENTS MODELING USE CASE MODELING, ANALYSIS MODELS, DATAFLOW DIAGRAM, STATE** transition diagram, class diagrams, Object analysis, Problem Frames.

**UNIT IV: SOFTWARE ESTIMATION COMPONENTS:**

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

**UNIT V: SIZE, EFFORT, SCHEDULE AND COST ESTIMATION:**

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

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

**UNIT VI: TOOLS FOR REQUIREMENTS:**

Management and Estimation Requirements Management Tools: Benefits of using a requirements management tool, commercial requirements management tool, Rational Requisite pro, Caliber RM, implementing requirements management automation, Software Estimation Tools: Desirable features in software estimation tools, IFPUG, COCOMO II, SLIM (Software Life Cycle Management) Tools.

**TEXT BOOKS:**
1. Software Requirements and Estimation by Rajesh Naik and Swapna Kishore, published by Tata McGraw Hill WEB TECHNOLOGIES.

**REFERENCES:**
1. Software Requirements by Karl E. Weigers

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

**AUTONOMOUS**

## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**          **P**     **C**

                                                 **3**     **2**

## (D2591121) DATA STRUCTURES & ALGORITHMS LAB

**OBJECTIVE:**

- To implement all the key algorithms described in the syllabus in C++ or Java.
- To implement the following using an array
  Stack  ADT
  Queue ADT
- To implement the following using a singly linked list
  Stack  ADT
  Queue ADT
- To implement the deque(double ended queue) ADT using a doubly linked list

1. To perform the following operations
2. Insert an element into a binary search tree.
3. Delete an element from a binary search tree.
4. Search for a key element in a binary search tree.
5. To implement circular queue ADT using an array.
6. To implement all the functions of dictionary ADT using hashing.
7. To perform the following operations on B- Trees and AVL Trees
8. Insertion
9. Deletion
10. To implement BFS for a given graph.
11. To implement  the following to generate a minimum cost spanning tree:
12. Prim's algorithm
13. Kruskal's algorithm
14. To solve the single source shortest path problem ( UsingDijkstra's algorithm).
15. Use non-recursive functions to traverse a binary tree in:
16. Pre-order.
17. In-order.
18. Post-order.
19. To sorting a given list of elements in ascending order using the following sorting methods:
20. Quick Sort
21. Merge Sort

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

**AUTONOMOUS**

## INFORMATION TECHNOLOGY

**M.Tech, I-Sem (CSE)**                                                    **P     C**
                                                                          **3     2**

### (D2592121) QUALITY ASSURANCE & TESTING LAB

1. The experiments form 1-8 should be done on flight reservation system application which is coming with QTP software

2. Write a script for flight booking in flight reservation application?

3. Create a script to verify selected item in flyfromlistbox with expected value as paris for order number 5th record?

4. Create a script to verify update order button, it should be disabled before and after opening a record?

5. Create a standard check point to verify delete order button enabled property with the following expected values?

   i) TRUE           ii)FALSE          iii)TRUE          iv)FALSE

6. Create a script to verify 5th order number customer name 'Rajesh' in the name edit box?

7. Compare image in MsPaint window before and after modification using bitmap check point?

8. Verify update order button functionality?

9. Create a standard button output value to read item count property count for flyfromlistbox?

10. Perform manual testing on gmail application(write testcases)

11. Create a script to verify multiply function in a calculator?

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, II-Sem (CSE)**                                    T        C
                                                           4        4

## (D2511122) MIDDLEWARE TECHNOLOGIES& SERVICE ORIENTED ARCHITECTURE

**UNIT 1**

**Introduction to Middleware**:What is Middleware? Types of Middleware, client Server computing, Benefits and pitfalls of client server programming. Multi-tiered architecture, distributed computing models, RPC Middleware, java RMI.

**Web Service Technologies:**
Introduction. Where does WS fit into Middleware? WS Standards - XML/XSL, SOAP, WSDL, BPEL.

**UNIT 2**

Enterprise Architecture Integration (EAI): What is Integration? Intro to EAI - definition of concepts involved - EDI, B2B Integration, Legacy integration, EAI Infrastructure, ESB, EAI Solution utilities - TIBCO

**UNIT 3**

**EJB Architecture**:Overview of EJB Architecture, View of EJB Conversation, Building and deploying EJBs, Role in EJB.

**EJB Applications:**EJB Session beans, EJB Entity beans, Lifecycle of beans, EJB Clients, Steps in developing an application with EJB, EJB deployment.

**UNIT 4**

Introducing C# and .Net Framework:Introducing C# and the .NET Platform; Understanding .NET Assemblies; Object –Oriented Programming with C#, Delegates, and Events
.Net Application development, Type Reflection, Late Binding, and Attribute Based Programming; Object Serialization and the .NET Remoting Layer, Data Access with ADO.NET; XML Web Services.

**UNIT 5**

Service Oriented Architecture-1: Review of basic tiered architecture-EA and the basic points of benefit of SOA including better integration, business agility, asset re-use, increase ROI.
Web Services and SOA - XML over the Http protocol. Representational State Transfer(REST).

**UNIT 6**

Service Oriented Architecture-2: Data and Services –review of JDO(Java Data Objects) as an alternative to JDBC along with sample code and examples. Service Data Objects(SDO). Apache Tuscany DSO. Service Component Architecture(SCA) with a Tuscany SCA java example. Benefits of MOM and ESB.

**TEXT BOOKS:**
1.  Middileware and Enterprise Integration techniques, by SudhaSadasivam G. and RadhaShankarmani, 2009, WIND.
2.  Programming With Middleware Technologies, S Anitha and M Gomathi, Ane Books Pvt. Ltd (2011).
3.  Service Oriented Architecture with Java" by Binildas CA, MalharBarai, and Vicenzo.

**REFERENCES:**
1.  Distributed Computing, Principles and applications, M.L.Liu, Pearson
2.  Client/ServerComputing-D.T.Dewire,TMH.
3.  Programming C#, JesseLiberty,SPD-O'Reilly

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, II-Sem (CSE)**                                        T       C
                                                               4       4

### (D2512122) SOFTWARE ARCHITECTURE& DESIGN PATTERNS

Unit I: Envision Architecture:

Architecture business cycle. What is software architecture? Case study in utilizing architectures.

Unit II: Creating an Architecture: Part-1

Understanding Quality Attributes: Functionality of architecture, architecture and quality of attributes, system quality attributes and their scenarios in practice, other system quality attributes, business and architecture qualities.

Achieving Qualities: Tactics; availability, modifiability, performance, security, testability and utility of tactics; Relationship of tactics to architectural patterns; Architectural patterns and styles;

Unit III: Software Architectural styles

Architectural Styles, Pipes and Filters, Data Abstraction and Object Oriented Organization, Event Based Implicit Invocation, Layered systems, Repositories, Iterpretors.

Unit IV: Creating an Architecture: Part-2

Designing the Architecture: Architecture in the life cycle; Designing the architecture; Forming the team structure; Creating the skeletal system.

Documenting Software Architecture: Uses of architectural documentations; Views; Choosing relevant views; Documenting a view; Documentation across views.

Unit V: Creating an Architecture: Part-3

Reconstructing Software Architecture: Information extraction; Database construction; View fusion; Reconstruction; Example.

Analyzing Architectures:

ATAM: Architectural Tradeoff Analysis Method. CBAM: Cost Benefit Analysis Method.

Unit VI:

Case Studies I

WWW a case study; J2EE/EJB, A case study of an industry standard computing Infrastructure.

Case Studies II

The Luther Architecture – A case study in mobile applications using J2ME.

Building systems from off-the-shelf components.

**TEXT BOOKS**

1. Software Architecture in Practice. Len Bass, Paul Clements, and Rick Kazman. 2e, Person. 2003. [

**REFERENCE BOOKS**

1. Pattern-Oriented Software Architecture, Vol-1. Frank Buschmann, RegineMeunier, et. Al., Wiley India Edn.2010.
2. Software Architecture: Organizational Principles and Patterns, David M. Dikel, David Kane, James R. Wilson, Pearson Education.
3. Software Engineering Software Architecture: A Case Based Approach Software Architecture: A Case Based Approach, VasudevaVarma, Pearson Education.
4. Software architecture, Shaw, Mary Garlan, David, Prentice Hall of India, 2000

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

**M.Tech, II-Sem (CSE)**                                    T        C
                                                           4        4

## (D0515122) SOFTWARE PROJECT MANAGEMENT

**Unit: I.**

Introduction to software project management: Software project Vs other projects, Contract Management & Technical Project Management, Activities Covered by software Project Management, Stakeholders, Management,

Project Evaluation & Programme Management: Business Case, Project portfolio Management, Evaluation of Projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme Management, Strategic Programme Management.

**Unit: II.**

An overview of project Planning: Introduction to step wise project planning, Select project, Identify project scope Objectives, Project Infrastructure, Analyze Project Characteristics, Estimate Effort, Allocate Resources.

Selection of an appropriate Project Approach: Methodologies & Technologies, Process Models, Structure Vs Speed of Delivery, Waterfall Model, Spiral Model, Software Prototyping, Incremental Delivery, Agile Methods, Extreme Programming, Iterative Process.

**Unit: III.**

Software effort estimation: Problems with over & under Estimation, Basis for software Estimating, Software Effort Estimation Techniques, Top-Down & Bottom-up Strategy, Parametric Models, Expert Judgment, FPA, FPM-II, COSMIC FP, COCOMO.

Activity planning: Objectives of planning, Project Schedules, Projects & activities, Network Planning Models, Forward & Backward Pass, Critical Path, Activity Float, Time dimension, shortening project duration.

**Unit:IV.**

Risk management: Risk, Categories of risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks, PERT technique, Monte Carlo Simulation, Critical Chain Concepts. Resource allocation: Nature of resources, Identifying resource requirements, Scheduling Resources, Critical Paths, Cost Schedules.

**Unit: V.**

Monitoring and control: Framework, Visualizing Progress, Cost Monitoring, EVA, Change Control, Prioritizing Monitoring.

Managing contracts: Types of contract, Stages in contract placement, Contract Management, Acceptance.

**Unit: VI**

Managing people in software environments: Behavior, Best Methods, Motivation, Stress, Oldham-Hack man job characteristics, Health & Safety, Ethics & Professional Concerns.

Working in teams: Decision Making, Organizational Structure, Coordination Dependencies, Dispersed & Virtual Terms, Communication Genres, Communication Plans, Leadership.

Software quality: Quality in Project planning, Importance of quality, Define software quality, ISO9216, Product Vs Process quality, PCM, Testing, Quality Plans.

**TEXT BOOK:**
1. Software Project Management, by Bob Hughes and Mike Cotterell. 5 ed. TMH. (Chapters 1 to 13).

**REFERENCES:**
1. Software Project Management in Practice, by PankajJalota. Person edn. 2010.
2. Managing the Software Process by Watts S. Humphrey, published by Pearson Education
3. Software Project Management, by Walker Royce, published by Pearson Education
4. Software Project Management Readings and Cases by Chris Kemer

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

AUTONOMOUS

**INFORMATION TECHNOLOGY**

**M.Tech, II-Sem (CSE)**　　　　　　　　　　　　　　　　　　T　　C
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　4　　4

## (D2513122) SOFTWARE MAINTENANCE AND REENGINEERING

**UNIT I: SOFTWARE MAINTENANCE AND REENGINEERING**

Introduction, Lehman's Laws of Evolution, Categories of Software Maintenance (Corrective, Adaptive, Preventive, Perfective)

Introduction, Role of Software Reengineering in improving Maintainability, Process of Reengineering (Program Comprehension, Reverse engineering, Program Restructuring/Refactoring)

**UNIT II: SOFTWARE REVERSE ENGINEERING**

Introduction, Importance of Reverse Engineering for Maintenance and Reengineering, Objectives of Reverse Engineering, Levels of Reverse Engineering, Supporting Techniques, Benefits of Reverse Engineering, Maintenance Tools for Reverse Engineering

**UNIT III: REFACTORING**

What is Refactoring; Role of Refactoring in Reengineering as well as Perfective Maintenance, Origin of Refactoring as a practice; Principles of Refactoring: Problems with Refactoring, Refactoring and Design, Refactoring and Performance.

**UNIT IV: EXPOSING BAD CODING PRACTICES AND COMPOSING METHOD (REFACTORING I)**

Bad Practices in Code; Composite Method: Extract Method, Inline Method, Inline Temp, Replace Temp with Query, Introduce Explaining Variable, Split Temporary Variable, Remove Assignments to parameters, Replace Method with Method Object, Substitute Algorithm

Moving Features between Objects & Organizing Data (Refactoring II)

Moving Features between Objects: Move Method, Move Field, Extract Class, Inline Class, Hide Delegate, Remove Middle Man, Introduce Foreign Method, Introduce Local Extension; Organizing Data: Self Encapsulate Method, Replace Data Value With Object, Change Value to Reference, Change Reference to Value, Encapsulate Field, Encapsulate Collection, Replace Sub Classes with Fields;

**UNIT V: SIMPLIFYING CONDITIONAL EXPRESSIONS AND SIMPLIFYING METHODS (REFACTORING III)**

Simplifying Conditional Expressions: Decomposing Conditionals, Consolidate Conditional expression, Remove Control Flag, Replace Conditional with Polymorphism, Replace Nested Conditions with Guard Classes, Introduce Null Object, Introduce Assertion; Making Method Calls Simpler, Rename Method, Separate Query From modifier, Introduce parameter Object, Replace Constructor with factory method, Replace Error Code with Exception, Replace parameter with explicit Object, Hide Method.

**UNIT VI: GENERALIZATION & REFACTORING: REUSE AND REALITY**

Dealing With Generalization: Dealing Data Generalization related refactoring s like Extract Sub Class, Extract Super Class, Extract Interface, Collapse Hierarchy, Replace Inheritance with Delegation, Pull up and Push Down Methods and Fields; Big Refactoring; Refactoring, Reuse and Reality.

**BOOKS:**
1. Software Maintenance: concepts and practice by Penny Grubb, Armstrong A. Takang
2. Refactoring: Improving the Design of Existing Code by Martin Fowler et al.

**REFERENCES:**
1. Software Engineering by Ian Sommerville, 8th Edition.

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

**AUTONOMOUS**

**INFORMATION TECHNOLOGY**

**M.Tech, II-Sem (CSE)**　　　　　　　　　　　　　　**T　　C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　**4　　4**

# (D2514122) SECURE SOFTWARE ENGINEERING
(ELECTIVE-III)

**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, 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, Requirements prioritization.

**UNIT III: SECURE SOFTWARE ARCHITECTURE AND DESIGN**
Introduction, Software security practices for architecture and design: Architectural risk analysis. Software security knowledge for architecture and design: Security principles, Security guidelines, and Attack patterns.

**UNIT IV: CONSIDERATIONS FOR SECURE CODING AND TESTING**
Introduction, Code analysis, Coding practices, Software security testing, Security testing considerations throughout the SDLC.

**UNIT V: SECURITY AND COMPLEXITY: SYSTEM ASSEMBLY CHALLENGES**
Introduction, Security failures, Functional and attacker perspectives for security analysis, System complexity drivers and security, Deep technical problem complexity.

**UNIT VI: GOVERNANCE, AND MANAGING FOR MORE SECURE SOFTWARE**
Governance and security, Adopting an enterprise software security framework,
How much security is enough?, Security and project management, maturity of practice.
**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. Software Security Engineering: A Guide for Project Managers, by Julia H. Allen, Sean Barnum, Robert J. Ellison, Gary McGraw, Nancy R. Mead, Addison-Wesley , 1st edition, 2008.
2. Security Metrics: Replacing Fear, Uncertainty, and Doubt , by Andrew Jaquith,Addison-Wesley , 1st edition , 2007.

**REFERENCES:**
1. Integrating Security and Software Engineering: Advances and Future Vision, by HaralambosMouratidis, Paolo Giorgini, IGI Global, 2006.
2. Software Security: Building Security In ,by Gary McGraw , Addison-Wesley, 2006
3. The Art of Software Security Assessment: Identifying and Preventing Software Vulnerabilities, by Mark Dowd, John McDonald, Justin Schuh, Addison-Wesley, 1st edition, 2006
4. Building Secure Software: How to Avoid Security Problems the Right Way by John Viega, Gary McGraw, Addison-Wesley, 2001.
5. Writing Secure Code, by M. Howard, D. LeBlanc,  Microsoft Press, 2nd Edition, 2003.
6. Exploiting Software: How to break code, by G. Hoglund, G. McGraw, Addison Wesley, 2004

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

AUTONOMOUS

**INFORMATION TECHNOLOGY**

**M.Tech, II-Sem (CSE)**
              T  C
              4  4

## (D0517122) SOFT COMPUTING
(Elective – III)

### UNIT-I : Introduction to Intelligent Systems and Soft Computing

Hard computing Vs Soft computing. Intelligent systems. Knowledge-based systems. Knowledge representation and processing. Over view of soft computing.

Optimization and some traditional Method: Introduction to Optimization. Traditional Methods of Optimization: Exhaustive search, Random Walk, and Steepest Decent Methods Drawbacks.

### UNIT-II: Genetic Algorithms

Working Cycle of a Genetic Algorithm. Binary – Coded GA. GA-parameters Setting. Constraints Handling in GA. Advantages and disadvantages of GA.
Specialized Genetic Algorithms:
Real-Coded GA. Micro-GA. Visualized Interactive GA. Scheduling GA.

### UNIT III: Introduction to Fuzzy Sets

Crisp Sets, Properties of Crisp Sets. Fuzzy Sets: Representation, Difference between Crisp Set and Fuzzy Set. Some standard operations in Fuzzy Sets, Properties of Fuzzy Sets.

### UNIT IV: Fuzzy Reasoning and Clustering

Fuzzy Logic Controller: Two Major forms of Fuzzy Logic Controller. Hierarchical Fuzzy Logic Controller. Sensitivity Analysis. Advantages and Disadvantages. Fuzzy Clustering. Fuzzy C-Means Clustering Entropy-based Fuzzy Clustering.

### UNIT V: Fundamentals of Neural Networks

Biological Neuron. Artificial Neuron. Single and multiple Layer of Neurons. Static Vs Dynamic Neural Networks. Training of Neural networks: Supervised and Unsupervised Learning. Incremental Training, and Batch Training.
Examples of Neural Networks
Multi-layer feed-forward Neural Network (MLFFNN). Radial Basis Function Network(RBFN). Self-Organizing Map(SOM). Recurrent Neural Networks(RNNs.

### UNIT VI: Combined Systems.

Fuzzy-Genetic Algorithm and Genetic –Fuzzy System. Working Principle of a Genetic-Neural System Forward. Neuro-Fuzzy System based on Mamdani Approach and Takagi and Sugeno's Approach.

### TEXT BOOK:

1. Soft Computing, by D. K. Prathikar, Narosa Publishing House, 2009. [all chapters.

### REFERENCE BOOKS:

1. Soft Computing and Intelligent Systems Design: Theory, Tools and Applications. By Fakhreddine O. Karray and Clarence De Silva.(2009). Pearson Education. [ unit one is covered by chapter-1 of this book]
2. Neuro-Fuzzy and Soft Computing: A computational Approach to Learning and Machine Intelligence, by Jang, J.R., Sun, C.T., and Mizutani, E., (1997), Prentice Hall.

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

**AUTONOMOUS**

**INFORMATION TECHNOLOGY**

**M.Tech, II-Sem (CSE)**                                    **T        C**

                                                           **4        4**

## (D2515122) MODEL-DRIVEN SOFTWARE DEVELOPMENT

(Elective – III)

**UNIT-1**

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.

**UNIT- 2**

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.

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

**UNIT- 3**

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- 4**

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.

**UNIT- 5**

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-6**

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

**REFERENCE BOOKS:**
1. Model-Driven Software Development by Sami BeydedaMatthias Book, Volker Gruhn, Springer.
2. Model Driven Systems Development with Rational Products By Brian Nolan, Barclay Brown, Dr. Laurent Balmelli, Et Al Tim Bohn, 2008,IBM.
3. Model Driven Development with Executable UML by DraganMilicev, 2009, Wilei India pvt Ltd.
4. Model Driven Software Development by Kevin Lano, Apr 2009, Ci Business Press

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

**AUTONOMOUS**

**INFORMATION TECHNOLOGY**

**M.Tech, II-Sem (CSE)**                                                     **T          C**
                                                                               **4          4**

## (D2516122) MACHINE LEARNING
(Elective – IV)

**UNIT 1**
**INTRODUCTION:** What is Machine Learning, Machine Learning Algorithm types (Supervised Learning, Unsupervised Learning, Semisupervised Learning, Reinforcement Learning..)Approaches and Applications of Machine Learning Algorithms.
Probability and Distributions.
Probability densities, Expectations and covariances, Bayesian probabilities, Model Selection, The Curse of Dimensionality, Decision Theory, Information Theory .
Binary Variables, Multinomial Variables, The Gaussian Distribution, Kernel density estimators.

**UNIT 2**
**LINEAR MODELS FOR REGRESSION AND CLASSIFICATION:** Linear Basis Function Models, Bias-Variance Decomposition, Bayesian Linear Regression, Discriminant Functions, Probabilistic Generative Models, Probabilistic Discriminative Models.

**UNIT 3**
**NEURAL NETWORKS:** Feed-forward Network Functions, Network Training, Error Back propagation, Overview of Regularization in Neural Networks.

**UNIT 4**
**KERNEL METHODS AND SPARSE KERNEL MACHINES:** Dual Representations, Constructing Kernels, Maximum Margin Classifiers, Relevance Vector Machines. Mixture Models and EM-K-means Clustering, Mixtures of Gaussians.

**UNIT 5**
**PCA AND HMM:**Principal Component Analysis, Markov Models, Discrete Hidden Markov Models, Continuous Hidden Markov Models.

**UNIT 6**
**Combining Models:**Boosting, Tree Models, Conditional Mixture Models.
Case Studies
OCR data, Intrusion Detection Data Set.

**TEXT BOOKS:**
1. Pattern Recognition and Machine Learning.  Christopher M. Bishop, Springer (2006).

**REFERENCE BOOKS:**
1. Pattern classifications, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, 2nd Edition.
2. Pattern Recognition and Image Analysis – Earl Gose, Richard John baugh, Steve Jost PHI 2004
3. Fundamentals of speech Recognition, LawerenceRabiner, Biing – Hwang Juang Pearson education

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

**AUTONOMOUS**

## INFORMATION TECHNOLOGY

**M.Tech, II-Sem (CSE)**

| T | C |
|---|---|
| 4 | 4 |

## (D0516122) IMAGE PROCESSING

(Elective – V)

**UNIT I**

**The digitized image and its properties:**Applications of image processing, image function, image representation, sampling, quantization, color images, metrics and topological properties of digital images, histograms, image quality, noise image.

**UNIT II**

**Image preprocessing:**Pixel brightness transformation, position dependent brightness correction, gray scale transformation; geometric transformation, local preprocessing- image smoothening, edge detectors, zero-crossing, scale in image processing, canny edge detection, parametric edge models, edges in multi spectral images, local preprocessing and adaptive neighborhood preprocessing; image restoration;

**UNIT III**

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

**UNIT IV**

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

**UNIT V**

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

**UNIT VI**

**Application to pattern recognition**:Basic concepts of pattern recognition, fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model
Implementation
Implementation of some of the above algorithms using MATLAB and Image Processor tool of MATLAB.

**TEXT BOOKS**

1. Image Processing Analysis and Machine Vision: Millansonka, Vaclav Hiavac, roger Boyle, vikas publishing House, Brooks/Cole.
2. Digital Image Processing: Pearson Education- Rafel C. Gonzalez Richard E. Woods. second edition
3. Pattern Recognition principles: Julus T. Tou and Rafel C. Gonzalez, Addision –Wesley publishing company.
4. Pattern Recognition and Image Analysis: Earl Gose, Richard Johnsonbaugh, prentice Hall of India private limited, 1999.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY

## AUTONOMOUS

## INFORMATION TECHNOLOGY

**M.Tech, II-Sem (CSE)**                                                   **T          C**
                                                                          **4          4**

## (D2517122) HIGH PERFORMANCE COMPUTING
(Elective – IV)

### UNIT I: INTRODUCTION
Modern processors: Stored –program computer architecture; General-purpose cache – based microprocessor architecture; Memory hierarchies; Multicore and Multithreaded processors; Vector processors.
Optimization Techniques
Scalar profiling, commonsense optimizations, Simple measures-Elimination of common sub expressions, avoiding branches ,using SIMD instruction sets; The role of compilers; Bandwidth-based performance modeling, the STREAM benchmarks; storage order, Algorithm classification and access optimizations, Case studies.

### UNIT II: PARALLEL COMPUTERS & PARALLELIZATION
Parallel computers: Taxonomy; shared – memory computers; Distributed- memory computers; Hierarchical systems; Networks.
Basics of parallelization: Why parallelize? Parallelism;  Parallel scalability.

### UNIT III: OPEN MP
Shared- memory parallel programming with Open MP:
Introduction to Open MP; Open MP Case Study: – parallel Jacobi algorithm. Efficient open MP Programming: Profiling open MP programs; Performance pitfalls; Case study: Parallel sparse matrix-vector multiply

### UNIT IV: CCNUMA ARCHITECTURES
Locality optimizations on cc NUMA architectures
Locality of access on cc NUMA; cc NUMA optimization of sparse MVM(Case study); Placement pitfalls; cc NUMA issues with C++.

### UNIT V: DISTRIBUTED-MEMORY PARALLEL PROGRAMMING WITH MPI
Message passing; Introduction to MPI; MPI Parallelization of a Jacobi solver. Efficient MPI Programming:
MPI Performance tools; Communication Parameters; Synchronization, serialization, contention; Reducing communication overhead; Internodes point-to-point communication. Basic MPI/0pen MP programming models.

### UNIT VI: MPI PROGRAMMING.
MPI performance tools, Communication parameters, Synchronization, Serialization, Contention, Reducing communication overhead, internode point-to-point communication.
Hybrid Parallelization with MPI and Open MP
Basic MPI/OpenMP programming models, MPI taxonomy, Hybrid decomposition and mapping, Potential benefits and drawbacks of hybrid programming.

### TEXT BOOKS:
1. Introduction to high performance computing for scientists and engineers, Georg Hager and Gerhard Wellein, CRC Press ( Special Indian Edition) 2012.

### REFERENCE BOOKS:
1. Parallel Programming in C with MPI and OpenMP, By Michale J Quinn, Tata McGraw Hill 2004.
2. Introduction to Parallel Computing Anantha Grama, Anshul Gupta, George Karypis, VipinKumar,Pearson education LPE, Second edition, 2004.

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
## AUTONOMOUS
## INFORMATION TECHNOLOGY

M.Tech, II-Sem (CSE)                                     P       C
                                                         3       2

## (D2594122) MIDDLEWARE TECHNOLOGIES LAB

**Objectives:** Implementation of some of the key concepts of middleware using Java, C## and orDOTNet.

| Middleware Technologies – Lab Programs List | |
|---|---|
| **Submission – 1** | |
| Week - 1 | 1) **Communication:** Create a server that accepts the requests from client and client displays the server system information |
| Week – 2 | 2) **File transfer:** Create a server that asks for a password, then opens a file and sends the file over the network connection. Create a client that connects to this server, gives the appropriate password, then captures and saves the file |
| Week – 3 | 3) **Calculator:** Create a remote server that implements a calculator with basic functionalities like addition, subtraction, division, multiplication and client, which uses the remote calculator.<br><br>4) **Stock market:**Create a remote stock server that accepts the company name and gives the share value. Stock client that retrieves the company share value and displays by giving the company name. |
| Week - 4 | 5) **Phone book server:**Create a remote phone book server that maintains names and phone numbers. Phone book client should provide a user interface that allows the user to scroll through entries, add a new entry, modify an existing entry and delete an existing entry. The client and the server should provide proper error handling |
| **Submission – 2** | |
| Week - 5 | Introduction to C# |
| Week – 6 | 6) **Working with callbacks and delegates in C# :**Demonstrates the use of delegates, callbacks, and synchronous and asynchronous method invocation, including how Microsoft .NET Framework classes provide explicit asynchronous support using the BeginXXXX and EndXXXX naming conventions and how you can make use of this support in your own code |
| Week – 7 | 7) **Code access security with C# :**Demonstrates the use of .NET Framework Code Access Security, in which code can have permissions independent of the person executing the code |
| **Submission – 3** | |
| Week – 8 | 8) **Creating a COM+ component with C# :**Demonstrates how to create a COM+ component, that takes advantage of Transaction management service within COM+, then assign a strong name to the assembly, register the assembly in the Global Assembly Cache, and register the component with COM+. |
| Week – 9 | 9) **Creating a Windows Service with C# :** Demonstrates how to create a Microsoft Windows Service that uses a File System Watcher object to monitor a specific directory for changes in files. |
| Week – 10 | 10) **Read and Write Images to a SQL Server Database with C#:**Demonstrates how to upload images into SQL Server by using standard HTML upload methods and then insert each image as a byte array into SQL Server. |
| **Submission-4** | |
| Week – 11 | 11) **Interacting with a Windows Service with C# :**Develop a sample application that launches a Windows Form to allow the user to interact and manipulate the IIS Admin service on the local machine. The application should work by placing an icon in the System Tray. |
| Week – 12 | 12) **Partitioning an Application into Multiple Assemblies with C# :** Understand why it can be beneficial to create separate modules for an application download, and then demonstrates how to do so with C#. |

# RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
**AUTONOMOUS**
## INFORMATION TECHNOLOGY

| | |
|---|---|
| | 13) **Using System Printing in C# Applications :** Develop a sample application that shows how to print a formatted report from sample data stored in an XML file using the Print Document class in the System. Drawing. Printing namespace. Also illustrates the user selection of a destination printer and multiple print fonts.<br>14) **Using Reflection in C#:** Demonstrate how to gather information on various types included in any assembly by using the System.Reflection namespace and some main.NET base classes. |
| Week – 13 | 15) **Sending Mail with SmtpMail and C#:**Uses a simple Web form to demonstrate how to use the SmtpMail class in the .NET Framework.<br>16) **Perform String Manipulation with the String Builder and String Classes and C# :** Demonstrates some basic string manipulation using both the String Builder and String classes. |
| Week – 14 | 17) **Application Configuration Using Configuration Files and the Registry Using C#:** A sample application that demonstrates methods of storing application settingsby making use of both the system registry and application configuration files Implements a custom configuration section to show how you can tailor these files to the specific needs of a particular application.<br>18) **Using the System.Net.WebClient to Retrieve or Upload Data with C#:** Demonstrate how to create a Windows Form that can use HTTP to download and save a resource from a specified URI, upload a resource to a specified URI, or read and write data through a stream object. |
| Week - 15 | 19) **Web Services Security with C# :**Examines how to use IIS to perform user authentication so that no changes to the Web Service are required in order to provide superior security.<br>20) **Reading and Writing XML Documents with the XmlTextReader and XmlTextWriter Class and C# :**Demonstrate how to retrieve information from an existing XML document and how to create a new XML document of memory management |

**RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY**

**AUTONOMOUS**

**INFORMATION TECHNOLOGY**

**M.Tech, II-Sem (CSE)**           P       C
                                                     3       2

**(D2594122) SOFTWARE PROJECT MANAGEMENT AND REENGINEERING Lab**

**Objectives:**
- For implementing the concepts in project management and reengineering using case tools and other related components.

1. Implement the System for The Project Control Cycle

2. Telephone Directory

3. Payroll Processing System

4. E-solutions

5. Change Control Procedures

6. Income Tax System

7. The system for Recruitment Process

8. Project Planning Framework

9. Quality Management System

10. Invitation to tender activity network