

ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS

**For
COMPUTER SCIENCE ENGINEERING
BRANCH**

SOFTWARE ENGINEERING



**JAWAHARLAL NEHRU TECHNOLOGY UNIVERSITY KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India**

ACADEMIC REGULATIONS R13 FOR M. Tech (REGULAR)
DEGREE COURSE

Applicable for the students of M. Tech (Regular) Course from the Academic Year 2013-14 onwards

The M. Tech Degree of Jawaharlal Nehru Technological University Kakinada shall be conferred on candidates who are admitted to the program and who 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 eligibility, qualification and specialization as prescribed by the University from time to time.

Admissions shall be made on the basis of merit/rank obtained by the candidates at the qualifying Entrance Test conducted by the University or on the basis of any other order of merit as approved by the University, subject to reservations as laid down by the Govt. from time to time.

2.0 AWARD OF M. Tech DEGREE

- 2.1 A student shall be declared eligible for the award of the M. Tech Degree, if he pursues a course of study in not less than two and not more than four academic years.
- 2.2 The student shall register for all 80 credits and secure all the 80 credits.
- 2.3 The minimum instruction days in each semester are 90.

3.0 A. COURSES OF STUDY

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

1. M.Tech- Structural Engineering
2. M.Tech- Transportation Engineering
3. M.Tech- Infrastructure Engineering & Management
4. ME- Soil Mechanics and Foundation Engineering
5. M.Tech- Environmental Engineering
6. M.Tech-Geo-Informatics
7. M.Tech-Spatial Information Technology

8. M.Tech- Civil Engineering
9. M.Tech -Geo-Technical Engineering
10. M.Tech- Remote Sensing
11. M.Tech- Power Electronics
12. M.Tech- Power & Industrial Drives
13. M.Tech- Power Electronics & Electrical Drives
14. M.Tech- Power System Control & Automation
15. M.Tech- Power Electronics & Drives
16. M.Tech- Power Systems
17. M.Tech- Power Systems Engineering
18. M.Tech- High Voltage Engineering
19. M.Tech- Power Electronics and Power Systems
20. M.Tech- Power System and Control
21. M.Tech- Power Electronics & Systems
22. M.Tech- Electrical Machines and Drives
23. M.Tech- Advanced Power Systems
24. M.Tech- Power Systems with Emphasis on High Voltage Engineering
25. M.Tech- Control Engineering
26. M.Tech- Control Systems
27. M.Tech- Electrical Power Engineering
28. M.Tech- Power Engineering & Energy System
29. M.Tech- Thermal Engineering
30. M.Tech- CAD/CAM
31. M.Tech- Machine Design
32. M.Tech- Computer Aided Design and Manufacture
33. M.Tech- Advanced Manufacturing Systems
34. M.Tech-Computer Aided Analysis & Design
35. M.Tech- Mechanical Engineering Design
36. M.Tech- Systems and Signal Processing
37. M.Tech- Digital Electronics and Communication Systems
38. M.Tech- Electronics & Communications Engineering
39. M.Tech- Communication Systems
40. M.Tech- Communication Engineering & Signal Processing
41. M.Tech- Microwave and Communication Engineering
42. M.Tech- Telematics

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43. M.Tech- Digital Systems & Computer Electronics
 44. M.Tech- Embedded System
 45. M.Tech- VLSI
 46. M.Tech- VLSI Design
 47. M.Tech- VLSI System Design
 48. M.Tech- Embedded System & VLSI Design
 49. M.Tech- VLSI & Embedded System
 50. M.Tech- VLSI Design & Embedded Systems
 51. M.Tech- Image Processing
 52. M.Tech- Digital Image Processing
 53. M.Tech- Computers & Communication
 54. M.Tech- Computers & Communication Engineering
 55. M.Tech- Instrumentation & Control Systems
 56. M.Tech – VLSI & Micro Electronics
 57. M.Tech – Digital Electronics & Communication Engineering
 58. M.Tech- Embedded System & VLSI
 59. M.Tech- Computer Science & Engineering
 60. M.Tech- Computer Science
 61. M.Tech- Computer Science & Technology
 62. M.Tech- Computer Networks
 63. M.Tech- Computer Networks & Information Security
 64. M.Tech- Information Technology
 65. M.Tech- Software Engineering
 66. M.Tech- Neural Networks
 67. M.Tech- Chemical Engineering
 68. M.Tech- Biotechnology
 69. M.Tech- Nano Technology
 70. M.Tech- Food Processing
 71. M.Tech- Avionics

and any other course as approved by AICTE/ University from time to time.

3.0 B. Departments offering M. Tech Programmes with specializations are noted below:

Civil Engg.	<ol style="list-style-type: none"> 1. M.Tech- Structural Engineering 2. M.Tech- Transportation Engineering 3. M.Tech- Infrastructure Engineering & Management 4. ME- Soil Mechanics and Foundation Engineering 5. M.Tech- Environmental Engineering 6. M.Tech-Geo-Informatics 7. M.Tech-Spatial Information Technology 8. M.Tech- Civil Engineering 9. M.Tech -Geo-Technical Engineering 10. M.Tech- Remote Sensing
EEE	<ol style="list-style-type: none"> 1. M.Tech- Power Electronics 2. M.Tech- Power & Industrial Drives 3. M.Tech- Power Electronics & Electrical Drives 4. M.Tech- Power System Control & Automation 5. M.Tech- Power Electronics & Drives 6. M.Tech- Power Systems 7. M.Tech- Power Systems Engineering 8. M.Tech- High Voltage Engineering 9. M.Tech- Power Electronics and Power Systems 10. M.Tech- Power System and Control 11. M.Tech- Power Electronics & Systems 12. M.Tech- Electrical Machines and Drives 13. M.Tech- Advanced Power Systems 14. M.Tech- Power Systems with Emphasis on High Voltage Engineering 15. M.Tech- Control Engineering 16. M.Tech- Control Systems 17. M.Tech- Electrical Power Engineering 18. M.Tech- Power Engineering & Energy System
ME	<ol style="list-style-type: none"> 1. M.Tech- Thermal Engineering 2. M.Tech- CAD/CAM 3. M.Tech- Machine Design 4. M.Tech- Computer Aided Design and Manufacture 5. M.Tech- Advanced Manufacturing Systems 6. M.Tech-Computer Aided Analysis & Design 7. M.Tech- Mechanical Engineering Design

ECE	<ol style="list-style-type: none"> 1. M.Tech- Systems and Signal Processing 2. M.Tech- Digital Electronics and Communication Systems 3. M.Tech- Electronics & Communications Engineering 4. M.Tech- Communication Systems 5. M.Tech- Communication Engineering & Signal Processing 6. M.Tech- Microwave and Communication Engineering 7. M.Tech- Telematics 8. M.Tech- Digital Systems & Computer Electronics 9. M.Tech- Embedded System 10. M.Tech- VLSI 11. M.Tech- VLSI Design 12. M.Tech- VLSI System Design 13. M.Tech- Embedded System & VLSI Design 14. M.Tech- VLSI & Embedded System 15. M.Tech- VLSI Design & Embedded Systems 16. M.Tech- Image Processing 17. M.Tech- Digital Image Processing 18. M.Tech- Computers & Communication 19. M.Tech- Computers & Communication Engineering 20. M.Tech- Instrumentation & Control Systems 21. M.Tech – VLSI & Micro Electronics 22. M.Tech – Digital Electronics & Communication Engineering 23. M.Tech- Embedded System & VLSI
CSE	<ol style="list-style-type: none"> 1. M.Tech- Computer Science & Engineering 2. M.Tech- Computer Science 3. M.Tech- Computer Science & Technology 4. M.Tech- Computer Networks 5. M.Tech- Computer Networks & Information Security 6. M.Tech- Information Technology 7. M.Tech- Software Engineering 8. M.Tech- Neural Networks
Others	<ol style="list-style-type: none"> 1. M.Tech- Chemical Engineering 2. M.Tech- Biotechnology 3. M.Tech- Nano Technology 4. M.Tech- Food Processing 5. M.Tech- Avionics

4.0 ATTENDANCE

- 4.1 A student shall be eligible to write University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
- 4.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester shall be granted by the College Academic Committee.
- 4.3 Shortage of Attendance below 65% in aggregate shall not be condoned.
- 4.4 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class.
- 4.5 A prescribed fee shall be payable towards condonation of shortage of attendance.
- 4.6 A student shall not be promoted to the next semester unless he satisfies the attendance requirement of the present semester, as applicable. They may seek readmission into that semester when offered next. If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

5.0 EVALUATION

The performance of the candidate in each semester shall be evaluated subject-wise, with a maximum of 100 marks for theory and 100 marks for practicals, on the basis of Internal Evaluation and End Semester Examination.

- 5.1 For the theory subjects 60 marks shall be awarded based on the performance in the End Semester Examination and 40 marks shall be awarded based on the Internal Evaluation. The internal evaluation shall be made based on the **average** of the marks secured in the two Mid Term-Examinations conducted-one in the middle of the Semester and the other immediately after the completion of instruction. Each mid term examination shall be conducted for a total duration of 120 minutes with 4 questions (without choice) each question for 10 marks. End semester examination is conducted for 60 marks for 5 questions to be answered out of 8 questions.

- 5.2 For practical subjects, 60 marks shall be awarded based on the performance in the End Semester Examinations and 40 marks shall be awarded based on the day-to-day performance as Internal Marks.
- 5.3 There shall be two seminar presentations during III semester and IV semester. For seminar, a student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Project Review Committee consisting of Head of the Department, Supervisor and two other senior faculty members of the department. For each Seminar there will be only internal evaluation of 50 marks. A candidate has to secure a minimum of 50% of marks to be declared successful.
- 5.4 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 semester Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.
- 5.5 In case the candidate does not secure the minimum academic requirement in any subject (as specified in 5.4) he has to reappear for the End semester Examination in that subject. A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and has failed in the end examination. In such a case, the candidate must re-register for the subject(s) and secure the required minimum attendance. The candidate's attendance in the re-registered subject(s) shall be calculated separately to decide upon his eligibility for writing the end examination in those subject(s). In the event of the student taking another chance, his internal marks and end examination marks obtained in the previous attempt stand cancelled. For re-registration the candidates have to apply to the University through the college by paying the requisite fees and get approval from the University before the start of the semester in which re-registration is required.

- 5.6 In case the candidate secures less than the required attendance in any re registered subject (s), he shall not be permitted to write the End Examination in that subject. He shall again re-register the subject when next offered.
- 5.7 Laboratory examination for M. Tech. courses must be conducted with two Examiners, one of them being the Laboratory Class Teacher or teacher of the respective college and the second examiner shall be appointed by the university from the panel of examiners submitted by the respective college.

6.0 EVALUATION OF PROJECT/DISSERTATION WORK

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

- 6.1 A Project Review Committee (PRC) shall be constituted with Head of the Department and two other senior faculty members.
- 6.2 Registration of Project Work: A candidate is permitted to register for the project work after satisfying the attendance requirement of all the subjects, both theory and practical.
- 6.3 After satisfying 6.2, a candidate has to submit, in consultation with his project supervisor, the title, objective and plan of action of his project work for approval. The student can initiate the Project work, only after obtaining the approval from the Project Review Committee (PRC).
- 6.4 If a candidate wishes to change his supervisor or topic of the project, he can do so with the approval of the Project Review Committee (PRC). However, the Project Review Committee (PRC) shall examine whether or not the change of topic/supervisor leads to a major change of his initial plans of project proposal. If yes, his date of registration for the project work starts from the date of change of Supervisor or topic as the case may be.
- 6.5 A candidate shall submit his status report in two stages at least with a gap of 3 months between them.
- 6.6 The work on the project shall be initiated at the beginning of the II year and the duration of the project is two semesters. A candidate is permitted to submit Project Thesis only after

successful completion of theory and practical course with the approval of PRC not earlier than 40 weeks from the date of registration of the project work. The candidate has to pass all the theory and practical subjects before submission of the Thesis.

- 6.7 Three copies of the Project Thesis certified by the supervisor shall be submitted to the College/School/Institute.
- 6.8 The thesis shall be adjudicated by one examiner selected by the University. For this, the Principal of the College shall submit a panel of 5 examiners, eminent in that field, with the help of the guide concerned and head of the department.
- 6.9 If the report of the examiner is not favourable, the candidate shall revise and resubmit the Thesis, in the time frame as decided by the PRC. If the report of the examiner is unfavorable again, the thesis shall be summarily rejected. The candidate has to re-register for the project and complete the project within the stipulated time after taking the approval from the University.
- 6.10 If the report of the examiner is favourable, Viva-Voce examination shall be conducted by a board consisting of the Supervisor, Head of the Department and the examiner who adjudicated the Thesis. The Board shall jointly report the candidate's work as one of the following:
 - A. Excellent
 - B. Good
 - C. Satisfactory
 - D. Unsatisfactory

The Head of the Department shall coordinate and make arrangements for the conduct of Viva-Voce examination.

- 6.11 If the report of the Viva-Voce is unsatisfactory, the candidate shall retake the Viva-Voce examination only after three months. If he fails to get a satisfactory report at the second Viva-Voce examination, the candidate has to re-register for the project and complete the project within the stipulated time after taking the approval from the University.

7.0 AWARD OF DEGREE AND CLASS

After a 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 four classes:

Class Awarded	% of marks to be secured
First Class with Distinction	70% and above (Without any Supplementary Appearance)
First Class	Below 70% but not less than 60% 70% and above (With any Supplementary Appearance)
Second Class	Below 60% but not less than 50%

The marks in internal evaluation and end examination shall be shown separately in the memorandum of marks.

8.0 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the university or if any case of indiscipline is pending against him, the result of the student will be withheld. His degree will be withheld in such cases.

4.0 TRANSITORY REGULATIONS (for R09)

- 9.1 Discontinued or detained candidates are eligible for re-admission into same or equivalent subjects at a time as and when offered.
- 9.2 The candidate who fails in any subject will be given two chances to pass the same subject; otherwise, he has to identify an equivalent subject as per R13 academic regulations.

10. GENERAL

- 10.1 Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- 10.2 The academic regulation should be read as a whole for the purpose of any interpretation.
- 10.3 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- 10.4 The University 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 University.

MALPRACTICES RULES**DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN
EXAMINATIONS**

	Nature of Malpractices/ Improper conduct	Punishment
	<i>If the candidate:</i>	
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.	Has copied 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	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

	(theory or practical) in which the candidate is appearing.	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 is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits 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 is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or 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	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

	the examination.	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 University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	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.
6.	Refuses to obey the orders of the Chief Superintendent/ Assistant – 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 of any injury to his person or to any of his relations 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	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 debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.

	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.	
7.	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 University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess 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 is also debarred and forfeits the seat.
9.	If 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 clause 6 to 8.	Student of the colleges 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.	Comes in a 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.
11.	Copying detected 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.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
 - (i) A show cause notice shall be issued to the college.
 - (ii) Impose a suitable fine on the college.
 - (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA



KAKINADA-533003, Andhra Pradesh (India)






For Constituent Colleges and Affiliated Colleges of JNTUK

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

- ⇒ Ragging within or outside any educational institution is prohibited.
- ⇒ Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	 6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	 1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	 2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	 5 Years	+	Rs.10,000/-
Causing death or abetting suicide	 10 Months	+	Rs. 50,000/-

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE JNTUK A RAGGING FREE UNIVERSITY



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

**KAKINADA-533003, Andhra Pradesh (India)
For Constituent Colleges and Affiliated Colleges of JNTUK**

Ragging

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the College.
4. Outsiders are prohibited from entering the College and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Card and show them when demanded
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.



**Jawaharlal Nehru Technological University Kakinada
For Constituent Colleges and Affiliated Colleges of JNTUK**

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE JNTUK A RAGGING FREE UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING**Specialization: NEURAL NETWORKS****COURSE STRUCTURE****I SEMESTER**

S.NO	SUBJECT	L	P	C
1	SOFTWARE REQUIREMENTS AND ESTIMATION	4	-	3
2	SOFTWARE METRICS AND REUSE	4	-	3
3	SOFTWARE PROJECT AND PROCESS MANAGEMENT	4	-	3
4	WEB TECHNOLOGIES	4	-	3
5	MOBILE COMPUTING	4	-	3
6	MIDDLEWARE TECHNOLOGIES	4	-	3
7	MIDDLEWARE AND WEB TECHNOLOGIES LAB	-	3	2
	TOTAL			20

II SEMESTER

1	SOFTWARE ARCHITECTURE AND DESIGN PATTERNS	4	-	3
2	SOFTWARE QUALITY ASSURANCE AND TESTING	4	-	3
3	SERVICE ORIENTED ARCHITECTURES	4	-	3
4	Elective I SECURE SOFTWARE ENGINEERING SYSTEMS ENGINEERING ERP & SUPPLY CHAIN MANAGEMENT	4	-	3
5	Elective II USER INTERFACE DESIGN CLOUD COMPUTING SOCIAL NETWORKING AND SEMANTIC WEB	4	-	3
6	Elective III MULTIMEDIA AND APPLICATION DEVELOPMENT NATURAL LANGUAGE PROCESSING SOFT COMPUTING	4	-	3
7	SOFTWARE TESTING AND DESIGN PATTERNS LAB		3	2
	TOTAL			20

III SEMESTER

S.NO.	SUBJECT	L	P	C
1	COMPREHENSIVE VIVA	—	—	2
2	SEMINAR-I	—	—	2
3	PROJECT WORK PART - I	—	—	16
	TOTAL			20

IV SEMESTER

S.NO.	SUBJECT	L	P	C
1	Seminar-II	—	—	2
2	Project Work Part - II	—	—	18
	TOTAL			20

SYLLABUS

I – I	L	P	Credits
	4	-	3
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 Management : Requirements management Principles and practices, Requirements attributes, Change Management Process, Requirements Traceability Matrix, Links in requirements chain

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

UNIT III**Software Estimation**

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

Size Estimation

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

UNIT 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.

UNIT-V

Tools for Requirements Management and Estimation Requirements

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

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

TEXT BOOKS

1. Rajesh Naik and Swapna Kishore: Software Requirements and Estimation, 1st edition, Tata Mc Graw Hill, 2010
2. Karl E. Weigers: Software Requirements, 2nd edition Microsoft Press, 2008

REFERENCE BOOKS

1. Soren Lausen: Software Requirements Styles and Techniques, 1st edition, Addison-Wesley Professional, 2009
2. Karl E. Weigers: Software Requirements Practical Techniques for gathering and managing requirements through the product development life cycle, 2nd edition, Microsoft Press, 2008

I – I	L	P	Credits
	4	-	3
SOFTWARE METRICS AND REUSE			

UNIT-I

Introduction to software quality: Quality: Popular Views & Professional Views, Software Quality, Total quality management Fundamentals of Measurement Theory: Definition, Operational Definition and Measurement, Level of Measurement, Some Basic Measures, Reliability and Validity, Measurement Errors, Be Careful with Correlation, Criteria for Causality.

Software Quality Metrics Overview: Product Quality Metrics, In-Process Quality Metrics, Metrics for Software Maintenance, Examples of Metrics Programs, Collecting Software Engineering Data.

UNIT-II

Applying the Seven Basic Quality Tools in Software Development: Ishikawa's Seven Basic Tools, Checklist, Pareto Diagram, Histogram, Run Charts, Scatter Diagram, Control Chart, Cause-and-Effect Diagram, Relations Diagram.

Defect Removal Effectiveness: A closer look at Defect Removal Effectiveness, Defect Removal Effectiveness and Quality Planning, Cost Effectiveness of Phase Defect Removal

UNIT-III

In-Process Metrics for Software Testing: In-Process metrics for Software Testing, In-Process metrics and Quality Management, Possible Metrics for Acceptance Testing to evaluate Vendor Developed Software, How do you know Your Product is Good Enough to Ship?

Complexity Metrics and Models: Lines of Code, Halstead's Software Science, Cyclomatic Complexity, Syntactic Constructs, Structure Metrics, An Example of Module Design Metrics in Practice

UNIT-IV

Metrics and Lessons learned for Object-oriented projects: Object-oriented Concepts and Constructs, Design and Complexity metrics,

productivity metrics, Quality and quality management metrics, Lessons learned for OO projects.

Using Function Point Metrics to Measure Software Process Improvement: Software Process Improvement Sequences, Process Improvement Economics, Measuring Process Improvements at Activity Levels.

UNIT V: Reuse

Introduction, benefits of reuse, reuse landscape, design patterns, generator based reuse, application frame work for reuse, applications of system reuse, COTS product reuse

TEXT BOOKS

1. Metrics and Models in Software Quality Engineering, Stephen H. Kan, Second Edition , Pearson Education Asia, 2003
2. Software Engineering, Sommerville, 7ed, Pearson

REFERENCES

1. Software Engineering Measurement, John C. Munson Auerbach Publication, 2003
2. Estimating Software– intensive systems: projects, products and processes, Rechar D. Stutzke, Addison – Wesley 2005
3. Software Metrics: A guide to planning, analysis and application, C. Ravindranath Pandian, Auerbach Publication, 2003
4. Practical Implementation of Software Metrics, Paul Goodman, Mc.Graw Hill, 1993

I – I	L	P	Credits
	4	-	3
SOFTWARE PROJECT AND PROCESS MANAGEMENT			

UNIT-I

Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The

Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process.

UNIT-II

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

Managing Software Projects : Project Management and the CMM, Project Management and CMMi, Project Management Process Framework

UNIT-III

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

UNIT-IV

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

UNIT-V

Project Tracking and Control: Defect Tracking, Issue Tracking, Status Reports, Milestone Analysis, Defect Analysis and Prevention Methods, Process monitoring and audit, Reviews, Inspections and Walkthroughs,

Seven Core Metrics, Management indicators, Quality Indicators

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

TEXT BOOKS

1. Watts S. Humphrey: Managing the Software Process, 1st edition, Pearson Education, 2009
2. Walker Royce: Software Project Management, 1st edition, Pearson Education, 2009

REFERENCE BOOKS

1. Watts S. Humphrey: An Introduction to the Team Software Process, 1st edition, Pearson Education, 2009.
2. Watts S. Humphrey: A Discipline to Software Engineering, 1st edition, Pearson Education, 2009.
3. Pankaj Jalote: Software Project Management in Practice, 1st edition, Pearson Education, 2009

I - I	L	P	Credits
	4	-	3
WEB TECHNOLOGIES			

UNIT-I

Review of HTML4 : Common tags ,HTML Tables and formatting internal linking, Complex HTML forms.

Introduction to Scripting Languages: Java Scripts, Control structures, functions, arrays & objects, DHTML, CSS, event model, filters & transitions.

UNIT-II

Review of Applets, Class, Event Handling, AWT Programming:

Introduction to Swing: Japplet, Handling Swing Controls like Icons, Buttons, Text Boxes, Combo Boxes, Tabbed Pains, Scroll Pains, Trees, Tables, Differences between AWT Controls & Swing Controls, Developing a Home page using Applets & Swing.

UNIT-III

Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDk, Introspection, Using Bound properties, Bean Info Interface, Constrained properties, Persistence, Customizers, Java Beans API.

Introduction to Servelets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization Parameters, The javax.servlet.HTTP package, Handling, Http Request & responses, Using Cookies, Session Tracking, Security Issues.

UNIT-IV

Introduction to JSP: The Problem with Servelets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC.

Setting Up the JSP Environment: Installing the Java Software Development Kit, Tomcat Server & Testing Tomcat.

JSP Application Development: Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing – Displaying Values, Using an Expression to Set an Attribute, Declaring

Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Passing Control and Data Between Pages – Sharing Session and Application Data Memory Usage Considerations.

UNIT-V

Database Access: Database Programming using JDBC, Studying Javax.sql.* package. Accessing a Database from a JSP Page, Application – Specific Database Actions Deploying JAVA Beans in a JSP Page.

TEXT BOOKS:

1. Internet and World Wide Web: How to program, 6/e, Dietel, Dietel , Pearson.
2. The Complete Reference Java2, 8/e, Patrick Naughton, Herbert Schildt, TMH.
3. Java Server Faces, Hans Bergstan, O'reilly.

REFERENCE BOOKS:

1. Web Programming, building internet applications, 2/e, Chris Bates, Wiley Dreamtech
2. Programming world wide web, Sebesta, PEA
3. Web Tehnologies, 2/e, Godbole, kahate, TMH
4. An Introduction to web Design , Programming ,Wang,Thomson

I – I	L	P	Credits
	4	-	3
MOBILE COMPUTING			

UNIT-I

Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks.

Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, Handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices

UNIT-II

GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture.

Wireless medium access control, CDMA, 3G, and 4G communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-2000 3G wireless communication standards, WCDMA 3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks.

UNIT-III

Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP

Introduction to Mobile Adhoc network: fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

UNIT-IV

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependant specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server

UNIT-V

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11 protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

TEXT BOOK:

1. RAJ KAMAL, "Mobile Computing," second edition, Oxford.
2. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, "Mobile Computing, Technology Applications and Service Creation" Second Edition, Mc Graw Hill.
3. UWE Hansmann, Lothar Merk, Martin S. Nocklous, Thomas Stober, "Principles of Mobile Computing," Second Edition, Springer

I - I	L	P	Credits
	4	-	3
MIDDLE WARE TECHNOLOGIES			

UNIT-I**Introduction to Object Oriented Systems :**

Preview of Object-orientation, Concept of distributed object systems, Reasons to distribute for centralized Objects. Client-server system architecture, Multi tier system architectures. File Server, Database Server, Group Server, Object Server, Web Server.

UNIT-II**Introduction to Middleware Technologies:**

General Middleware, Service Specific Middleware, Client/Server Building blocks, RPC - messaging, Peer-to-Peer, Java RMI.

Introduction to Distributed Objects :

Computing standards, OMG, Overview of CORBA, Overview of COM/DCOM, and Overview of EJB.

UNIT-III**EJB Architecture :**

Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

UNITIV**CORBA**

Introduction and concepts, distributed objects in CORBA, CORBA components, architectural features, method invocations, static and dynamic: IDL (Interface Definition Language) models and interfaces. Structure of CORBA IDL, CORBA's self-describing data; CORBA interface repository. Building an application using CORBA.

CORBA Services and CORBA Component Model :

Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

UNIT V**COMandNET:**

Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces, COM Threading Models, Marshalling, Custom and standard marshalling, Comparison COM and CORBA, Introduction to .NET, Overview of .NET architecture, Remoting.

Service Oriented architecture (SOA) Fundamentals:

Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, Basic SOA, Enterprise Service Bus (ESB), SOA enterprise Software Models.

TEXT BOOKS:

1. Distributed Component Architecture, G. Sudha Sadasivam , Wiley
2. Service Oriented Architecture: Concepts , Technology & Design, Thomas Erl, PHI
3. Java programming with CORBA, 3/e, G. Brose, A Vogel, K. Duddy, Wiley-dreamtech
4. Distributed Systems, 2/e, Tanenbaum, Van Steen, PEA

REFERENCE BOOKS:

1. Client/server Programming with Java & Corba W/cd, Robert Orfali, Dan Harkey, Wiley
2. Component Software: Beyond Object-Oriented Programming, Clemens Szyperski, PEA.
3. Inside CORBA, Mowbray, PEA
4. COM and CORBA side by side, Jason Pritchard, PEA
5. Enterprise JavaBeans 3.0, 5/e, Bill Burke, O'Reilly .
6. Component Based technology, Sudha Sadasivam, Wiley

I - I	L	P	Credits
	-	3	2
MIDDLEWARE AND WEB TECHNOLOGIES LAB			

- Develop static pages (using only HTML) of an online Book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
 - Home page - Registration and user Login
 - User Profile Page - Books catalog
 - Shopping cart - Payment by credit card
 - Order Confirmation
- Validate the Registration, user login, user profile and payment by credit card pages using Java Script.
- Create and save an XML document at the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
- Bean Assignments
 - Create JavaBean which gives the exchange value of INR (Indian Rupees) into equivalent American / Canadian /Australian Dollar value.
 - Create a simple Bean with a label – which is the count of number of clicks. Than create a BeanInfo class such that only the “count” property is visible in the Property Window.
 - Create two Beans-a)KeyPad. b)DisplayPad. After that integrate the two Beans to make it work as a Calculator.
 - Create two Beans Traffic Light (Implemented as a Label with only three background colours-Red,Green,Yellow) and Automobile (Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.

Light Transition Automobile State

Red → Yellow Ready

Yellow →

Green

Move

Green → Red Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments in experiment 2 into dynamic web pages using servlets and cookies.

Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.
7. Implement the “Hello World” program using JSP struts framework.

I – II	L	P	Credits
	4	-	3
SOFTWARE ARCHITECTURE AND DESIGN PATTERNS			

UNIT-I

Envisioning Architecture: The Architecture Business Cycle, What is Software Architecture? Designing the Architecture, Documenting the architecture, Reconstructing Software Architecture

UNIT-II

Creating an Architecture: Quality Attributes, Moving from quality to architecture, Architectural styles and patterns, UNIT Operations, Achieving qualities, designing the Architecture, Documenting the architecture, Reconstructing Software Architecture, shared information systems

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

UNIT-III

Moving from Architecture to Systems: Software Product Lines, Building systems from off the shelf components, Reuse of Architectural assets within an organization.

UNIT-V

Patterns: What is pattern? Pattern categories, Pattern Description, Patterns and Software Architecture, Pattern Systems, Classification, Selection

Design Patterns Catalog: Creational Pattern, Structural Pattern, Behavioral Patterns, Pattern Community, Designing a document editor

UNIT-V

Case Studies : Key word in Context, The World Wide Web - a case study in interoperability, Instrumentation software, cruise control, three vignettes in mixed styles,

TEXT BOOKS:

- 1 Software Architecture in Practice, 2nd Edition by Len Bass, Paul Clements, Rick Kazman, published by Pearson Education
- 2 Design Patterns, by Erich Gamma, Pearson Education

I – II	L	P	Credits
	4	-	3

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.

Standards: ISO9000, CMM, CMMI, PCMM, Malcom Balridge, 3 Sigma, 6 Sigma

UNIT II

Software Quality Assurance Metrics and Measurement Software Quality Assurance Metrics: Product Quality metrics, In- Process Quality metrics, Metrics for Software Maintenance. Examples of Metric Programs, Software quality indicators Fundamentals in Measurement Theory

UNIT-III

Building Software Testing Environment : Writing Policy for software testing, Economics of testing, Building a structured approach to software testing .

Software Testing process: Defects Hard to find, Functional and structured testing, Workbench concept, Customising the software testing process, testing tactics check list

UNIT-IV

Software Testing Techniques : Black-Box testing, Boundary value analysis, Bottom-up, Branch Coverage, Cause- Effect graphing, CRUD, Database, exception, Gray_box, Histogram, Inspections, JADs, Pareto Analysis, prototyping, random Testing, Risk based Testing, Regression Testing, Structured Walkthrough, Thread testing, Performance Testing, White Box Testing

Software Testing Tools: Taxonomy of Testing tools, Methodology to evaluate automated testing tools, Load Runner, Win Runner and Rational Testing Tools, Java testing Tools, JMetra, JUNIT and Cactus

UNIT-V

Testing Process : Advantages of following a process, Cost of computer testing, Seven step software Testing Process, Define the scope of testing, Developing the test plan, Verification Testing. Validation Testing, Analysing and reporting test results, Acceptance and operational Testing, Post Implementation Analysis

Testing Specialised Systems and Applications : Testing Client/Server System, Testing COTS and Contracted Software, Testing security, Testing Data Warehouse .

TEXT BOOKS:

1. William E.Perry:Effective Methods for Software Testing, 3rd Edition,Wiley Publication,2009.
2. Mordechai Ben-Menachem,Garry S. Marliss:Software Quality,1st Edition, Thomson Learning Publication, 2008

I – II	L	P	Credits
	4	-	3
SERVICE ORIENTED ARCHITECTURES			

UNIT-I

SOA Fundamentals: Defining SOA, Business Value of SOA, Evolution of SOA, SOA characteristics, concept of a service in SOA, misperceptions about SOA, Basic SOA architecture, infrastructure services, Enterprise Service Bus (ESB),

SOA Enterprise Software models, IBM On Demand operating environment

UNIT-II

SOA Planning and Analysis : Stages of the SOA lifecycle, SOA Delivery Strategies, service-oriented analysis, Capture and assess business and IT issues and drivers, determining non-functional requirements (e.g., technical onstraints, business constraints, runtime qualities, non-runtime qualities), business centric SOA and its benefits, Service modeling, Basic modeling building blocks, service models for legacy application integration and enterprise integration, Enterprise solution assets(ESA)

UNIT-III

SOA Design and implementation: Service-oriented design process, design activities, determine services and tasks based on business process model, choosing appropriate standards, articulate architecture,

UNIT-IV

mapping business processes to technology, designing service integration environment (e.g., ESB, registry), Tools available for appropriate designing, implementing SOA, security implementation, implementation of integration patterns, services enablement, quality assurance

UNIT-V

Managing SOA Environment : Distributing service management and monitoring concepts, operational management challenges, Service-level

agreement considerations, SOA governance (SLA, roles and responsibilities, policies, critical success factors, and metrics), QoS compliance in SOA governance, role of ESB in SOA governance, impact of changes to services in the SOA lifecycle

TEXT BOOKS

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Prentice Hall Publication, 2005.
2. Norbert Bieberstein, Sanjay Bose, Marc Fiammante, Keith Jones, Rawn Shah, "Service-Oriented Architecture Compass: Business Value, Planning, and Enterprise Roadmap", IBM Press Publication, 2005.

REFERENCES

1. Thomas Erl, "Service-Oriented Architecture: A Field Guide to Integrating XML and Web Services", Prentice Hall Publication, 2004
2. Dave Chappell, "Enterprise Service Bus", O'Reilly Publications, 2004
3. Sanjiva Weerawarana, Francisco Curbera, Frank Leymann, Tony Storey, Donald F. Ferguson, "Web Services Platform Architecture: SOAP, WSDL, WS-Policy, WSAddressing, WS-BPEL, WS-Reliable Messaging, and More", Prentice Hall Publication, 2005

I – II	L	P	Credits
	4	-	3
SECURE SOFTWARE ENGINEERING			

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?

Introduction, 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:**

Introduction, Misuse and Abuse Cases, The SQUARE Process Model, 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

Considerations for Secure Coding and Testing:

Introduction, Code Analysis, Coding Practices, Software Security Testing, Security Testing Considerations Throughout the SDLC

UNIT-IV**Security and Complexity: System Assembly Challenges:**

Introduction, Security Failures, Functional and Attacker Perspectives

for Security Analysis: Two Examples, System Complexity Drivers and Security, Deep Technical Problem Complexity

UNIT-V

Governance, and Managing for More Secure Software:

Introduction, Governance and Security, Adopting an Enterprise Software Security Framework, How Much Security Is Enough?, Security and Project Management, Maturity of Practice

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Howard , M and Lipner,S : The Security Development Lifecycle , Microsoft Press, 2006
2. Swiderski, F and Snyder W. :, Threat Modeling, Microsoft Press, 2004.
3. Viega, J and McGraw G. , : Building Secure Software: How to avoid Security Problems in the Right Way, Addison-Wesley,2001
4. The Open Web Application Security Project: A Guide to Building Secure Web Applications and Web Services”, 2.0 Black Hat Edition, 2005

I – II	L	P	Credits
	4	-	3
SYSTEMS ENGINEERING			

UNIT-I

Management Information Systems: A Framework: Importance of MIS, MIS: A Definition Nature and Scope of MIS , **Structure and Classification of MIS :** Structure of MIS, MIS Classification

Information and System Concepts: Information: A Definition, Types of Information, Dimensions of Information, System: A Definition, Kinds of Systems, System Related Concepts, Elements of a System, Human as an Information Processing System

Information Systems for Competitive Advantage: Introduction, Changing concepts of Information System, Competitive Advantage, Information systems Strategies for Dealing with competitive Force, Porter's Value Chain Model, Strategic Information Systems (SIS)

UNIT-II**BUSINESS APPLICATIONS OF IS**

e – Commerce : Introduction, e – Commerce

ERP Systems : Introduction, Enterprise Information Systems

Decision – Support Systems: Decision – Making: A Concept, Simon's Model of Decision - Making Types of Decisions, Methods for Choosing Among Alternatives, Decision – Making and MIS, Decision Support Systems – Why?, Decision Support Systems: A framework, Characteristics and Capabilities of DSS

Business Intelligence and knowledge Management System : Business Intelligence, Knowledge Management System

UNIT-III

Information System Planning : Information System Planning: WHY?, Planning Terminology

Information System Planning, The Nolan Stage Model, The Four – Stage Model of is planning

Selecting A Methodology, Information Resources Management (IRM), Organisation Structure and Location of MIS

System Acquisition : Acquisition of Information Systems , Acquisition of Hardware and Software

UNIT – IV

System Implementation: IMPLEMENTATION PROCESS, Organisational Change

Evaluation & Maintenance of IS : Evaluation of MIS , System Maintenance

IS Security and Control: IS Security Threats, Protecting Information System, IS Security Technology The Disaster Recovery Plan

UNIT – V :

BUILDING OF IS

System Development Approaches: System Development Stages, System Development Approaches

System Analysis and Design: SYSTEM ANALYSIS - Introduction, Requirement Determination, Strategies for Requirement Determination, Structured Analysis Tools

SYSTEMS DESIGN: Design Objectives , Conceptual Design , Design Methods, Detailed System Design.

TEXT BOOKS:

1. Management Information System, Managerial Perspectives, D P Goyal, 3 ed, McMillan Publications.

I – II	L	P	Credits
	4	-	3
ERP & SUPPLY CHAIN MANAGEMENT			

UNIT-I

Introduction to ERP: Overview – Benefits of ERP, ERP and Related Technologies, Business Process Reengineering, Data Warehousing, Data Mining – On-line Analytical Processing, Supply Chain Management.

ERP Implementation: Implementation Life Cycle, Implementation Methodology, Hidden Costs, Organizing Implementation, Vendors, Consultants and Users, Contracts, Project Management and Monitoring.

UNIT-II

Business Modules: Business Modules in an ERP Package , Finance, Manufacturing, Human Resource, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

Fundamentals of Supply Chain Management:

Supply chain networks, Integrated supply chain planning, Decision phases in a supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT-III

SCM Strategies, Performance:

Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

UNIT-IV

Planning and Managing Inventories:

Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

Distribution Management:

Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

UNIT-V

Strategic Cost Management in Supply Chain:

The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

TEXT BOOKS:

1. ERP Demystified, 2/e, Alexis Leon, TMH, 2007.
2. Supply Chain Management: Strategy, Planning, Operation, Sunil Chopra, Peter Meindel, PEA, 2002

I – II	L	P	Credits
	4	-	3
USER INTERFACE DESIGN			

UNIT-I

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

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-II

Design process: Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT-III

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

UNIT-IV

Windows: Windows new and Navigation schemes selection of window, selection of devices based and screen based controls.

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

UNIT-V

Software tools : Specification methods, interface, Building Tools.

Interaction Devices: Keyboard and function keys, pointing devices, speech recognition digitization and generation, image and video displays, drivers.

TEXT BOOKS :

1. Human Computer Interaction. 3/e, Alan Dix, Janet Finlay, Goryd, Abowd, Russell Beal, PEA, 2004.
2. The Essential guide to user interface design, 2/e, Wilbert O Galitz, Wiley DreamaTech.

REFERENCE BOOKS :

1. Designing the user interface. 4/e, Ben Shneidermann , PEA.
2. User Interface Design, Soren Lauesen , PEA.
3. Interaction Design PRECE, ROGERS, SHARPS, Wiley .
4. Human Computer, Interaction Dan R.Olsan, Cengage , 2010.

I – II	L	P	Credits
	4	-	3
CLOUD COMPUTING			

UNIT-I

Introduction to virtualization and virtual machine, Virtualization in Cluster/grid context Virtual network, Information model & data model for virtual machine, Software as a Service (SaaS), SOA, On Demand Computing.

UNIT-II

Cloud computing: Introduction, What it is and What it isn't, from Collaborations to Cloud, Cloud application architectures, Value of cloud computing, Cloud Infrastructure models, Scaling a Cloud Infrastructure, Capacity Planning, Cloud Scale.

UNIT-III:

Data Center to Cloud: Move into the Cloud, Know Your Software Licenses, The Shift to a Cloud Cost Model, Service Levels for Cloud Applications

UNIT-IV

Defining Clouds for the Enterprise- Storage-as-a-Service, Database-as-a-Service, Information-as-a-Service, Process-as-a-Service, Application-as-a-Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service Infrastructure-as-a-Service

UNIT-V

Security: Disaster Recovery, Web Application Design, Machine Image Design, Privacy Design, Database Management, Data Security, Network Security, Host Security, Compromise Response

Disaster Recovery, Disaster Recovery, Planning, Cloud Disaster Management

Case study: Types of Clouds, Cloudcentres in detail, Comparing approaches, Xen OpenNEbula, Eucalyptus, Amazon, Nimbus

TEXT BOOKS:

1. Cloud Computing – Web Based Applications That Change the way you Work and Collaborate Online – **Michael Miller**, Pearson Education.
2. Cloud Application Architectures, 1st Edition by **George Reese** O'Reilly Media.

REFERENCE BOOK:

1. Cloud Computing and SOA Convergence in Your Enterprise: A Step-by-Step Guide **David S. Linthicum** Addison-Wesley Professional

I – II	L	P	Credits
	4	-	3
SOCIAL NETWORKING AND SEMANTIC WEB			

UNIT-I**Web Intelligence**

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines. Software Agents, Berners-Lee www.Semantic Road Map, Logic on the semantic Web.

UNIT-II**Knowledge Representation for the Semantic Web**

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

UNIT-III**Ontology Engineering**

Ontology Engineering. Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharm;1: and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

UNIT-IV**Semantic Web Applications, Services and Technology**

Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowku!<>;- Base .XML Based Web Services. Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods,

UNIT-V**Social Network Analysis and semantic web**

What is social Networks analysis, development of the social networks analysis, Electronic Sources for Net work Analysis - Electronic

Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

TEXT BOOKS:

1. Thinking on the Web - Berners Lee, Gödel and Turing, Wiley interscience, 2008.
2. Social Networks and the Semantic Web ,Peter Mika, Springer, 2007.

REFERENCE BOOKS:

1. Semantic Web Technologies /Trends and Research in Ontology Based Systems, J.Davies, Rudi Sluder, J'aul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Ilall/CRC Publishers, (Taylor & Francis Group)
3. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications.
4. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reilly, SPD

I – II	L	P	Credits
	4	-	3
MULTIMEDIA AND APPLICATION DEVELOPMENT			

UNIT -I**Fundamental concepts in Text and Image:**

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

UNIT -II**Fundamental Concepts in Video and Digital Audio:**

Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT -III

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

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

Application Development:

An OOP Application Framework, Using Components with Action Script Movie Clip Subclasses.

UNIT -IV**Multimedia Data Compression:**

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

Basic Video Compression Techniques:

Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT – V

Multimedia Networks:

Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG- 4, Media-on-Demand (MOD).

TEXT BOOKS:

1. Fundamentals of Multimedia , Ze-Nian Li , Mark S. Drew, PHI/PEA.
2. Multimedia Systems, Parag Havaladar, Gerard Medioni, cengage, 2009.
3. Essentials Action Script 3.0, Colin Moock, SPD O, Reilly,2007.

REFERENCE BOOKS:

1. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
2. Digital Multimedia, Nigel Chapman, Jenny Chapman, Wiley-Dreamtech.
3. Multimedia & Communications Technology, Steve Heath, Elsevier .
4. Multimedia Technology & Applications, David Hilman , Galgotia.
5. Multimedia Technologies, Banerji, Mohan Ghosh, MGH.

I – II	L	P	Credits
	4	-	3
NATURAL LANGUAGE PROCESSING			

UNIT-I

Introduction: NLP tasks in syntax, semantics, and pragmatics. Applications such as information extraction, question answering, and machine translation. The problem of ambiguity. The role of machine learning. Brief history of the field.

UNIT-II

N-gram Language Models: The role of language models, Simple N-gram models.

Estimating parameters and smoothing. Evaluating language models.

Part of Speech Tagging and Sequence Labeling : Lexical syntax. Hidden Markov Models. Maximum Entropy Models. Conditional Random Fields

UNIT-III

Syntactic parsing: Grammar formalisms and tree banks. Efficient parsing for context-free grammars (CFGs). Statistical parsing and probabilistic CFGs (PCFGs). Lexicalized PCFGs.

UNIT-IV

Semantic Analysis: Lexical semantics and word-sense disambiguation. Compositional semantics. Semantic Role Labeling and Semantic Parsing.

UNIT-V

Information Extraction (IE) and Machine Translation (MT): Named entity recognition and relation extraction. IE using sequence labeling. Basic issues in MT. Statistical translation, word alignment, phrase-based translation, and synchronous grammars. Dialogues: Turns and utterances, grounding, dialogue acts and structures Natural Language Generation: Introduction to language generation, architecture, discourse planning (text schemata, rhetorical relations).

TEXTBOOK

1. D. Jurafsky & J. H. Martin – “Speech and Language Processing – An introduction to Language processing, Computational Linguistics, and Speech Recognition”, Pearson Education

REFERENCES

1. Allen, James. 1995. – “Natural Language Understanding”. Benjamin/Cummings, 2ed.
2. Bharathi, A., Vineet Chaitanya and Rajeev Sangal. 1995. Natural Language Processing- “A Pananian Perspective”. Prentice Hall India, Eastern Economy Edition.
3. Eugene Cherniak: “Statistical Language Learning”, MIT Press, 1993.
4. Manning, Christopher and Heinrich Schutze. 1999. “Foundations of Statistical Natural Language Processing”. MIT Press.

I – II	L	P	Credits
	4	-	3
SOFT COMPUTING			

UNIT-I

FUZZY SET THEORY: Introduction to Neuro – Fuzzy and Soft Computing, Fuzzy Sets, Basic Definition and Terminology, Set-theoretic Operations, Member Function Formulation and Parameterization, Fuzzy Rules and Fuzzy Reasoning, Extension Principle and Fuzzy Relations, Fuzzy If-Then Rules, Fuzzy Reasoning, Fuzzy Inference Systems, Mamdani Fuzzy Models, Sugeno Fuzzy Models, Tsukamoto Fuzzy Models, Input Space Partitioning and Fuzzy Modeling.

UNIT-II

OPTIMIZATION: Derivative based Optimization, Descent Methods, The Method of Steepest Descent, Classical Newton's Method, Step Size Determination, Derivative-free Optimization, Genetic Algorithms, Simulated Annealing, Random Search – Downhill Simplex Search.

UNIT-III

ARTIFICIAL INTELLIGENCE : Introduction, Knowledge Representation, Reasoning, Issues and Acquisition: Propositional and Predicate Calculus Rule Based knowledge Representation Symbolic Reasoning Under Uncertainty Basic knowledge Representation Issues Knowledge acquisition, Heuristic Search: Techniques for Heuristic search Heuristic Classification

State Space Search: Strategies Implementation of Graph Search Search based on Recursion Patent-directed Search Production System and Learning.

UNIT-IV

NEURO FUZZY MODELING: Adaptive Neuro-Fuzzy Inference Systems, Architecture – Hybrid Learning Algorithm, Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling, Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.

UNIT-V

APPLICATIONS OF COMPUTATIONAL INTELLIGENCE : Printed Character Recognition, Inverse Kinematics Problems, Automobile Fuel Efficiency Prediction, Soft Computing for Color Recipe Prediction.

TEXT BOOKS:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
2. N.P.Padhy, “Artificial Intelligence and Intelligent Systems”, Oxford University Press, 2006.

REFERENCES:

1. Elaine Rich & Kevin Knight, Artificial Intelligence, Second Edition, Tata Mcgraw Hill Publishing Comp., 2006, New Delhi.
2. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
3. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
4. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2000UNIT III
5. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston, 1996.
6. Amit Konar, “Artificial Intelligence and Soft Computing Behaviour and Cognitive model of the human brain”, CRC Press, 2008

I – II	L	P	Credits
	-	3	3
SOFTWARE TESTING AND DESIGN PATTERNS LAB			

SOFTWARE TESTING LAB

1. Study of various tools Study various tools such as WinRunner, LoadRunner, TestDirector, Rational Rose Suite etc.
2. Perform experiments to do the following:
 - a. Requirements Testing
 - b. Use – case Scenario Testing
 - c. Unit Testing
 - d. Regression Testing
 - e. Integration Testing
 - f. Validation Testing
 - g. Acceptance Testing
 - h. System Testing
3. Prepare test plan and develop test case hierarchy
4. Generate Test cases and Test Documentation in the following case studies
 - a. Library System
 - b. Course Registration System
 - c. Implement a Quiz System
 - d. Student Marks Analyzing System
 - e. Online Ticket Reservation System

DESIGN PATTERNS LAB:

1. Using UML design Abstract factory design pattern
2. Using UML design Builder Design pattern
3. Using UML design Facade Design pattern
4. Using UML design Bridge Design pattern
5. Using UML design Decorator Design pattern
6. User gives a print command from a word document. Design to represent this chain of responsibility design pattern.