

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

**For
COMPUTER SCIENCE ENGINEERING
BRANCH**

COMPUTER SCIENCE



**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

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 Processing2. M.Tech- Digital Electronics and Communication Systems3. M.Tech- Electronics & Communications Engineering4. M.Tech- Communication Systems5. M.Tech- Communication Engineering & Signal Processing6. M.Tech- Microwave and Communication Engineering7. M.Tech- Telematics8. M.Tech- Digital Systems & Computer Electronics9. M.Tech- Embedded System10. M.Tech- VLSI11. M.Tech- VLSI Design12. M.Tech- VLSI System Design13. M.Tech- Embedded System & VLSI Design14. M.Tech- VLSI & Embedded System15. M.Tech- VLSI Design & Embedded Systems16. M.Tech- Image Processing17. M.Tech- Digital Image Processing18. M.Tech- Computers & Communication19. M.Tech- Computers & Communication Engineering20. M.Tech- Instrumentation & Control Systems21. M.Tech – VLSI & Micro Electronics22. M.Tech – Digital Electronics & Communication Engineering23. M.Tech- Embedded System & VLSI |
| CSE | <ol style="list-style-type: none">1. M.Tech- Computer Science & Engineering2. M.Tech- Computer Science3. M.Tech- Computer Science & Technology4. M.Tech- Computer Networks5. M.Tech- Computer Networks & Information Security6. M.Tech- Information Technology7. M.Tech- Software Engineering8. M.Tech- Neural Networks |
| Others | <ol style="list-style-type: none">1. M.Tech- Chemical Engineering2. M.Tech- Biotechnology3. M.Tech- Nano Technology4. M.Tech- Food Processing5. 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 |

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| | (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 |

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| | 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. |

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| | <p>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.</p> | |
| 7. | <p>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</p> | <p>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.</p> |
| 8. | <p>Possess any lethal weapon or firearm in the examination hall.</p> | <p>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</p> |

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| | | 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 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:
COMPUTER SCIENCE****I SEMESTER**

| S.NO | SUBJECT | L | P | C |
|-------------|--|-----------|----------|----------|
| 1 | DATA STRUCTURES | 4 | - | 3 |
| 2 | MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE | 4 | - | 3 |
| 3 | COMPUTER ORGANIZATION | 4 | - | 3 |
| 4 | DATABASE MANAGEMENT SYSTEMS | 4 | - | 3 |
| 5 | OPERATING SYSTEM | 4 | - | 3 |
| 6 | DATA COMMUNICATIONS AND COMPUTER NETWORKS | 4 | - | 3 |
| 7 | CS LAB-I (COVERING THE EXPERIMENTS OF DATA STRUCTURES & DATABASE MANAGEMENT SYSTEMS) | - | 3 | 2 |
| | TOTAL | 20 | | |

II SEMESTER

| S.No. | SUBJECT | L | P | C |
|--------------|--|----------|----------|----------|
| 1 | DATA WAREHOUSING AND DATA MINING | 4 | | 3 |
| 2 | DESIGN AND ANALYSIS OF ALGORITHMS | 4 | | 3 |
| 3 | SOFTWARE ENGINEERING | 4 | | 3 |
| 4 | ELECTIVE I AUTOMATA AND COMPILER DESIGN ADVANCED COMPUTER ARCHITECTURE SOFT COMPUTING | 4 | | 3 |
| 5 | ELECTIVE II SYSTEMS ENGINEERING BUSINESS INTELLIGENCE HUMAN COMPUTER INTERACTION | 4 | | 3 |

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|---|--|---|---|-----------|
| 6 | ELECTIVE III IMAGE PROCESSING INFORMATION SECURITY WEB TECHNOLOGIES | 4 | | 3 |
| 7 | CS LAB- II (COVERING THE EXPERIMENTS OF DAA, DWDM) | | 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 |
| DATA STRUCTURES | | | |

UNIT-I

Introduction to Data Structures, Singly Linked Lists, Doubly Linked Lists, Circular Lists-Algorithms. Stacks and Queues: Algorithm Implementation using Linked Lists.

UNIT-II

Searching-Linear and Binary Search Methods.

Sorting-Bubble Sort, Selection Sort, Insertion Sort, Quick Sort, Merge Sort.

Trees-Binary trees, Properties, Representation and Traversals (DFT,BFT), Expression Trees (Infix, prefix, postfix).

Graphs-Basic Concepts , Storage Structures and Traversals.

UNIT-III

Dictionaries, ADT, The List ADT, Stack ADT, Queue ADT, Hash Table Representation, Hash Functions, Collision Resolution-Separate Chaining, Open Addressing-Linear Probing, Double Hashing.

UNIT-IV

Priority queues- Definition, ADT, Realising a Priority Queue Using Heaps, Definition, Insertion, Deletion .

Search Trees- Binary Search Trees, Definition, ADT, Implementation, Operations-Searching, Insertion, Deletion.

UNIT-V

Search Trees- AVL Trees, Definition, Height of AVL Tree, Operations, Insertion, Deletion and Searching.

Search Trees- Introduction to Red-Black and Splay Trees, B-Trees, , Height of B-Tree, Insertion, Deletion and Searching, Comparison of Search Trees.

TEXT BOOKS:

1. Data Structures: A Pseudo Code Approach, 2/e, Richard F.Gilberg,Behrouz A.Forouzon, Cengage.
2. Data Structures, Algorithms and Applications in java, 2/e, Sartaj Sahni, University Press.

REFERENCES BOOKS:

1. Data Structures And Algorithm Analysis, 2/e, Mark Allen Weiss, Pearson.
2. Data Structures And Algorithms, 3/e, Adam Drozdek, Cenage.
3. C and Data Structures: A Snap Shot Oriented Treatise Using Live Engineering Examples, N.B.Venkateswarulu, E.V.Prasad, S Chand & Co, 2009.
4. Data Structures, Algorithm and OOP,Heilman, TMH.
5. Inroductions to Algorithms, 2/e, Cormen, PHI,2001.
6. Fundamentals of Computer Algorithms, 2/e, Horowitz, Sahni, Rajasekaran, University Press.
7. Design and Analysis, Dave, Pearson, 2008.
8. Design and Analysis Algorithms, Panneerselvam, PHI,2007.
9. Data Structures, Seymour Lipschutz, Schaum's Outlines, TMH.

| I - I | L | P | Credits |
|---|---|---|---------|
| | 4 | - | 3 |
| MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE | | | |

UNIT-I

Mathematical Logic: Statements and notations, Connectives, Well formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Theory of inference for the statement calculus, Rules of inference, Consistency of premises and indirect method of proof, Automatic Theorem Proving

Predicate calculus: Predicates, statement functions, variables and quantifiers, predicate formulas, free & bound variables, universe of discourse, inference theory of predicate calculus

UNIT-II

Set theory & Relations: Introduction, Relations and ordering, Properties of binary Relations, Equivalence, Compatibility Relations, Partial ordering, Hasse diagram.

Functions: composition of functions, Inverse Function, Recursive Functions, Lattice and its Properties, Pigeon hole Principles and its application.

Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and monoids, groups, sub groups, Definitions, Examples, homomorphism, Isomorphism and related problems.

UNIT-III

Elementary Combinatorics: Basis of counting, Enumeration of Combinations & Permutations, Enumerating of Combinations & Permutations with repetitions and constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, principles of Inclusion – Exclusion.

UNIT-IV

Recurrence Relations: Generating Function of Sequences, Calculating Coefficient of generating functions, Recurrence relations, Solving recurrence relation by substitution and Generating functions, The method of Characteristic roots, Solution of Inhomogeneous Recurrence Relation.

UNIT V

Graph Theory: Representation of Graph, Spanning Trees, BFS, DFS, Kruskals Algorithm, Binary trees, Planar Graphs, Graph Theory and Applications, Basic Concepts, Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to computer science J.P Tremblery, R.Manohar, TMH
2. Discrete Mathematical for computer Scientists & Mathematicians “ J.L. Molt, A.Kandel, T.P.Baker, PHI

REFERENCE TEXTBOOKS:

1. Elements of Discrete Mathematics, C L Liu, D P Mohanpatra, TMH
2. Discrete Mathematics, Schaum’s Outlines, Lipschutz, Lipson TMH.
3. Discrete Mathematical Structures, Kolman, Busby, Ross, 6th ed., PHI, 2009
4. Discrete Mathematics, Johnsonbaugh, 6th ed., Pearson, 2005
5. Discrete Mathematics, Malik, Sen, 6th ed., Cengage Learning, 2004
6. Discrete Mathematics for computer science, Bogart, Stein and Drysdale, Springer, 2005
7. Discrete Mathematics and Combinatorics, Sengadir, Pearson, 2009
8. Discrete and Combinatorial Mathematics, Grimaldi, Ramana, 5th ed., Pearson. 2006
9. Mathematical Foundations of Computer Science, Rajendra Prasad, Rama Rao et al., USP, 2009

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10. Discrete Mathematics, J K Sharma, 2nd ed., Macmillan, 2005
 11. Discrete Mathematics with Combinatorics and Graph Theory, Santha, Cengage Learning, 2009
 12. Applied Discrete Structures For Computer Science, Alan Doerr, Levassure, GP, 2005
 13. Discrete Mathematics with Applications, Koshy, Elsevier, 2006.
 14. Discrete Mathematics and its Applications, Rosen, 5th ed, T M Graw-Hill ed, 2006.
 15. Discrete Mathematics for Computer Science, Gary Haggard, John Schlipf, Sue Whitesides, Cengage., 2006.
 16. Discrete Mathematical, Kevin Ferland, Cengage, 2008.
 17. Discrete Mathematical Structures, Jayant Ganguly, Sanguine, 2007.

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| COMPUTER ORGANIZATION | | | |

UNIT-I**Number Systems And Computer Arithmetic**

Signed And Unsigned Numbers, Addition and Subtraction, Multiplication, Division, Floating Point Representation Logical Operation, Gray Code, BCD Code, Error Detecting Codes.

Boolean Algebra, Simplification of Boolean Expressions- Maps.

UNIT-II**Combinational and Sequential Circuits**

Decoders, Encoders, MultiPlexers, Half and Full Adders, Shift Registers, Flip-Flops, Binary Counters, Memory Unit.

UNIT-III**Memory Organization**

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory Concept.

UNIT- IV**ALU Design**

Addition and Subtraction, Sign and Unsigned Numbers, Multiplication and Division Algorithms, BCD Adders.

UNIT- V**Input –Output Organization**

Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, DMA, Input Output Processor, Serial Communication.

TEXT BOOKS:

1. Computer System Architecture, 3/e, Moris Mano, Pearson/PHI.
2. Micro Processor and Interfacing, 2/e, Douglas V.Hall, TMH.

REFERENCEBOOKS:

1. Digital Logic and Computer Organisation, Rajaraman, Radha Krishnan, PHI.
2. Micro Computer Systems : 8086/8088 family, 2/e, Liu, Gibson, PHI.
3. Computer Organisation and Architecture, 7/e, Stallings, Pearson.
4. Computer Organisation, 5/e, Hamacher, vranesic, TMH.
5. Computer Systems Organisation and Architecture, Carpinelli, Pearson.
6. Computer Organisation and Design, PalChowdary, PHI.
7. Computer Systems Organisation, jotwani, TMH.

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| DATABASE MANAGEMENT SYSTEMS | | | |

UNIT-I

Database System Applications, Purpose of Database Systems, View of Data – Data Abstraction, Instances and Schemas, Data Models – the ER Model, Relational Model, Other Models – Database Languages – DDL, DML, Database Access from Applications Programs, Transaction Management, Data Storage and Querying, Database Architecture, Database Users and Administrators, History of Database Systems. Introduction to Database design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises. Relational Model: Introduction to the Relational Model – Integrity Constraints Over Relations, Enforcing Integrity constraints, Querying relational data, Logical database Design, Introduction to Views – Destroying /altering Tables and Views.

UNIT- II

Relational Algebra and Calculus: Relational Algebra – Selection and Projection, Set operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus. Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators, Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT- III

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional

Dependencies - Reasoning about FDS, Normal Forms – FIRST, SECOND, THIRD Normal forms – BCNF – Properties of Decompositions- Loss less- join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

UNIT-IV

Overview of Transaction Management: The ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions – Lock Based Concurrency Control, Deadlocks – Performance of Locking – Transaction Support in SQL.

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions, Dealing with Dead Locks, Specialized Locking Techniques – Concurrency Control without Locking.

Crash recovery: Introduction to Crash recovery, Introduction to ARIES, the Log, Other Recovery related Structures, the Write-Ahead Log Protocol, Check pointing, recovering from a System Crash, Media recovery

UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations.

Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A Dynamic Index Structure, Search, Insert, Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendable vs. Linear Hashing.

TEXT BOOKS:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition,2003.
2. Data base System Concepts, A.Silberschatz,H.F. Korth, S.Sudarshan, McGraw hill, VI edition,2006.
3. Fundamentals of Database Systems 5th edition., Ramez Elmasri, Shamkant B.Navathe,Pearson Education,2008.

REFERENCE BOOKS:

1. Database Management System Oracle SQL and PL/SQL,P.K.Das Gupta,PHI.
2. Database System Concepts,Peter Rob & Carlos Coronel,Cengage Learning,2008.
3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database-Principles, Programming, and Performance, P.O'Neil, E.O'Neil, 2nd ed., ELSEVIER
5. Fundamentals of Relational Database Management Systems,S.Sumathi,S.Esakkirajan, Springer.
6. Introduction to Database Management,M.L.Gillenson and others,Wiley Student Edition.
7. Database Development and Management, Lee Chao,Auerbach publications,Taylor & Francis Group.
8. Introduction to Database Systems,C.J.Date,Pearson Education.

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| OPERATING SYSTEMS | | | |

UNIT-I**Overview of Operating System**

Introduction, Computer System Organization, Computer System Architecture, Operating Systems Services, Systems Calls and Types, Evolution of Operating Systems.

UNIT-II**Process Management**

Process, Process States , Process Control Block ,Process Scheduling, Operations On Processes, Threads Concepts, Process Scheduling Concepts, CPU Scheduling Algorithms, Multiple Processor Scheduling.

UNIT-III**Synchronization**

Importance of Synchronization, The Critical-Section Problem, Semaphores, Classic Problems of Synchronization, Monitors, Synchronization Examples

Principles Of Deadlock – Deadlock System Model, Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Detection And Avoidance, Recovery Form Deadlock.

UNIT-IV**Memory Management Strategies & Virtual Memory Management**

Concepts, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory, Demand Paging, Page-Replacement Algorithms, Thrashing.

Secondary-Storage Structures & I/O Systems

Overview of Mass-Storage Structure, Disk Structure, Disk Scheduling, Disk Management, RAID Structure, I/O Hardware, Application Interface, Kernel I/O Subsystem.

UNIT-V**File System Interface And Implementation**

The Concept of a File, Access Methods, Directory Structure, File System Structure, File System Implementation, File Sharing, Protection, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency And Performance.

Protection And Security: Principles of Protection, Security Problem, System and Network Threats, Denial Lock Service, Importance of Cryptography.

TEXT BOOKS:

1. Operating System Principles, 7/E, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, WILEY INDIA publications.
2. Operating Systems, 6/e, William Stallings, PHI/Pearson.

REFERENCE BOOKS:

1. Operating Systems, 2/e, Dhamdhre.

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| DATA COMMUNICATIONS AND COMPUTER NETWORKS | | | |

UNIT-I

Network Hardware reference model: Transmission media, Narrowband ISDN, Broad band ISDN, ATM.

The data Link layer : Design Issues, Error detection and correction, Elementary Data Link Protocols, Sliding window protocols : Data link layer in HDLC, Internet and ATM.

UNIT-II

Channel allocation methods: TDM, FDM, ALOHA, Carrier sense Multiple access protocols, Collision Free protocols – IEEE standard BO2 for LANS – Ethernet, Token Bus, Token ring, Bridges.

Network layer Routing Algorithms: Shortest path, Flooding, Flow based Distance vector, Link state, Hierarchical, Broadcast routing, Congestion Control algorithms-General principles of congestion control, Congestion prevention polices, Choke packets and Load shedding.

UNIT-III

Internet Working : Tunneling, internetworking, Fragmentation, network layer in the internet – IP protocols, IP address, Subnets, Internet control protocols, DSPF, BOP, Internet multicasting, Mobile IP. Network layer in the ATM Networks – cell formats, connection setup, routing and switching, service categories, and quality of service, ATM LANs.

UNIT-IV

The Transport Layer: Elements of transport protocols – addressing, establishing a connection, releasing connection, flow control and buffering and crash recovery, end to end protocols : UDP, reliable Byte Stream (TCP) end to end format, segment format, connection establishment and termination, sliding window revisited, adaptive retransmission, TCP extension, Remote Procedure Call – BLAST, CHAN, SELECT, DCE.

UNIT-V

Application Layer: Network Security, Cryptographic Algorithms: DES, RSA. Security Mechanisms : Authentication Protocols, Firewalls. Name service (DNS) Domains Hierarchy, Name servers. Traditional Applications : SMTP, MIME, World Wide Web : HTTP, Network Management : SNMP.

TEXT BOOKS :

1. Computer Networks and rew, Tanenbaum, 4/e, Pearson
2. Data and computer communications, stallings, 8/e, PHI

REFERENCEBOOKS

1. Data communications and networking Forouzan, 4/e, TMH
2. Computer Networks – A System Approach , Peterson ,Bruce Davie,2/e,Harcourt Asia
3. Compute communications and networking technologies, Gallo, Hancock,Cengage
4. An Engineering approach to compute networking, Kesha ,Pearson
5. Communication networks, 2/e , Leon-Garcia, TMH
6. Computer networks , Anuranjan Misra, ACME Learning
7. Computer networks, C R Sarma, Jaico,
8. Understanding data communications, Held, 7/e , Pearson

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| CS LAB 1 | | | |

DBMS Lab

1. Execute a single line and group functions for a table.
2. Execute DCL and TCL Commands.
3. Create and manipulate various DB objects for a table.
4. Create views, partitions and locks for a particular DB.
5. Write PL/SQL procedure for an application using exception handling.
6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
11. Create table for various relation
12. Implement the query in sql for a) insertion b) retrieval c) updation d) deletion
13. Creating Views
14. Writing Assertion
15. Writing Triggers
16. Implementing operation on relation using PL/SQL
17. Creating Forms
18. Generating Reports

DATASTRUCTURESLAB**Exercise 1:**

- a) Write C program to perform Linear search for a Key value in a given list.
- b) Write C program to perform Binary search for a Key value in a given list.

Exercise 2:

- a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order
- b) Write C program that implement Quick sort, to sort a given list of integers in ascending order
- c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order

Exercise 3:

- a) Write C program that implement stack (its operations) using arrays
- b) Write C program that implement stack (its operations) using Linked list

Exercise 4:

- a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
- b) Write C program that implement Queue (its operations) using arrays.
- c) Write C program that implement Queue (its operations) using linked lists

Exercise 5:

- a) Write a C program that uses functions to create and perform various operations on a singly linked list
- b) Write a C program that uses functions to create and perform various operations on a doubly linked list
- c) Write a C program that uses functions to create and perform various operations on a circular linked list

Exercise 10:

- a) Write a C program to Create a Binary Tree of integers
- b) Write a recursive C program for Traversing a binary tree in preorder, in order and post order.

Exercise 11:

- a) Write a C program to Create and perform various operations on a BST

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| DATAWAREHOUSING AND DATA MINING | | | |

UNIT-I

Introduction to Data mining, types of Data, Data Quality, Data Processing, Measures of Similarity and Dissimilarity, Exploring Data: Data Set, Summary Statistics, Visualization, OLAP and multi dimensional data analysis.

UNIT-II

Classification: Basic Concepts, Decision Trees and model evaluation: General approach for solving a classification problem, Decision Tree induction, Model over fitting: due to presence of noise, due to lack of representation samples, Evaluating the performance of classifier. Nearest Neighborhood classifier, Bayesian Classifier, Support vector Machines: Linear SVM, Separable and Non Separable case.

UNIT-III

Association Analysis: Problem Definition, Frequent Item-set generation, rule generation, compact representation of frequent item sets, FP-Growth Algorithms. Handling Categorical , Continuous attributes, Concept hierarchy, Sequential , Sub graph patterns

UNIT-IV

Clustering: Over view, K-means, Agglomerative Hierarchical clustering, DBSCAN, Cluster evaluation: overview, Unsupervised Cluster Evaluation using cohesion and separation, using proximity matrix, Scalable Clustering algorithm

UNIT-V

Web data mining: Introduction, Web terminology and characteristics, Web content mining, Web usage mining, web structure mining, Search Engines :Characteristics, Functionality, Architecture, Ranking of WebPages, Enterprise search

TEXT BOOKS:

1. Introduction to Data Mining: Pang-Ning tan, Michael Steinbach, Vipin kumar, Addison- Wesley.
2. Introduction to Data Mining with Case Studies: GK Gupta; Prentice Hall.

REFERENCE BOOKS:

1. Data Mining: Introductory and Advanced Topics, Margaret H Dunham, Pearson, 2008.
2. Fundamentals of data warehouses, 2/e , Jarke, Lenzerini, Vassiliou, Vassiliadis, Springer.
3. Data Mining Theory and Practice, Soman, Diwakar, Ajay, PHI, 2006.
4. Data Mining , Concepts and Techniques, 2/e, Jiawei Han, Micheline Kamber, Elsevier, 2006.

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| DESIGN AND ANALYSIS OF ALGORITHMS | | | |

UNIT-I

Introduction: Algorithm, Psuedo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.

Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi-connected components.

UNIT-II

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT-III

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT-IV

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. The Algorithm Design Manual, 2nd edition, Steven S. Skiena, Springer.
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd.

REFERENCE BOOKS:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
2. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu BALachandra Dave, Pearson Education.
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc Graw Hill.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.

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| SOFTWARE ENGINEERING | | | |

UNIT – I**Introduction to Software Engineering:**

The evolving role of software, Changing Nature of Software, Software myths. (Text Book 3)

The software problem: Cost, schedule and quality, Scale and change.

UNIT – II**Software Process:**

Process and project, component software process, Software development process models : Waterfall model, prototyping, iterative development, relational unified process, time boxing model, Extreme programming and agile process, using process models in a project. Project management process.

UNIT - III

Software requirement analysis and specification: Value of good SRS, requirement process, requirement specification, functional specifications with use-cases, other approaches for analysis, validation.

Planning a software project: Effort estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan, detailed scheduling.

UNIT – IV

Software Architecture: Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

Design: Design concepts, function-oriented design, object oriented design, detailed design, verification, metrics

UNIT V

Coding and Unit testing: Programming principles and guidelines, incrementally developing code, managing evolving code, unit testing, code inspection, metrics.

Testing: Testing concepts, testing process, black-box testing, white-box testing, metrics.

TEXT BOOKS:

1. A Concise introduction to software engineering (undergraduate topics in computer science), Pankaj Jalote, Springer International Edition.
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
3. Software Engineering, 3/e ,& 7e Roger S.Pressman , TMH

REFERENCE BOOKS:

1. Software Engineering, 8/e, Sommerville, Pearson.
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH

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| AUTOMATA THEORY AND COMPILER DESIGN | | | |

UNIT-I

Formal Language and Regular Expressions:

Languages, operations on languages, regular expressions (re), languages associated with (re), operations on (re), Identity rules for (re), Finite Automata: DFA, NFA, Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to lexical analysis, lex tools.

UNIT-II

Context Free grammars and parsing:

Context free Grammars, Leftmost Derivations, Rightmost Derivations, Parse Trees, Ambiguity Grammars,

Top-Down Parsing, Recursive Descent Parsers: LL(K) Parsers and LL(1) Parsers.

Bottom up parsing:

Rightmost Parsers: Shift Reduce Parser, Handles, Handle pruning, Creating LR (0) Parser, SLR (1) Parser, LR (1) & LALR (1) Parsers, Parser Hierarchy, Ambiguous Grammars, Yacc Programming Specifications.

UNIT-III

Syntax Directed Translation:

Definitions, construction of Syntax Trees, S-attributed and L-attributed grammars, Intermediate code generation, abstract syntax tree, translation of simple statements and control flow statements.

Semantic Analysis:

Semantic Errors, Chomsky hierarchy of languages and recognizers, Type checking, type conversions, equivalence of type expressions, Polymorphic functions, overloading of functions and operators.

UNIT-IV**Storage Organization:**

Storage language Issues, Storage Allocation, Storage Allocation Strategies, Scope, Access to Nonlocal Names, Parameter Passing, Dynamics Storage Allocation Techniques.

UNIT-V**Code Optimization:**

Issues in the design of code optimization, Principal sources of optimization, optimization of basic blocks, Loop optimization, peephole optimization, flow graphs, Data flow analysis of flow graphs.

Code Generation:

Issues in the design of code Generation, Machine Dependent Code Generation, object code forms, generic code generation algorithm, Register allocation and assignment, DAG representation of basic Blocks, Generating code from DAGs.

TEXT BOOKS:

1. Introduction to Automata Theory Languages & Computation, 3/e, Hopcroft, Ullman, PEA
2. Compilers Principles, Techniques and Tools, Aho, Ullman, Ravi Sethi, PEA

REFERENCE BOOKS:

1. Principles of Compiler Design, A.V. Aho. J.D.Ullman; PEA
2. Theory of Computer Science, Automata languages and computation , 2/e, Mishra, Chandra Shekaran, PHI
3. Elements of Compiler Design, A.Meduna, Auerbach Publications, Taylor and Francis Group.

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| ADVANCED COMPUTER ARCHITECTURE | | | |

UNIT-I

Evolution of Computer Architecture, System Attributes to performance; Shared Memory Multiprocessors, Distributed Memory Multiprocessors, A Taxonomy of MIMD Computers; architecture of Vector Super computers, operational model of SIMD computer, PRAM models and PRAM variants

Conditions of Parallelism- data and resource dependencies, hardware and software parallelism, Program partitioning and Scheduling- grain sizes and latency, grain packing and scheduling, static multi processor scheduling, Program flow mechanisms- control flow vs data flow, demand driven mechanisms, comparison of flow mechanisms, System interconnect architectures- network properties and routing, static and dynamic connection networks.

UNIT-II

Principles of scalable performances- performance metrics and measures- parallelism profile in programs, mean performance, efficiency, utilization and quality, benchmarks and performance measures, characteristics of parallel processing applications, Speed up performance laws- Amdahl's law, Gustafson's law, memory bounded speed up model, Scalability metrics and goals,

Bus systems- back plane bus specification, Addressing and Timing protocols, Arbitration, transaction and interrupt, IEEE future bus standard requirement set, Shared memory organizations- Interleaved memory organization, band width and fault tolerance, memory allocation schemes, Atomicity and event ordering

UNIT-III

Linear Pipeline Processors- asynchronous and synchronous models, clocking and timing control, speedup, efficiency, and throughput, Non linear pipeline processors- reservation and latency analysis, collision free scheduling, pipeline schedule optimization, Instruction pipe line

design- instruction execution phases, mechanisms for instruction pipelining, dynamic instruction scheduling, branch handling techniques, static arithmetic pipelines.

Hierarchical bus system, cross bar switch and multiport memory, multistage and combining networks, multistage and combining networks, The cache coherence problem, message passing mechanism- message routing schemes, deadlock virtual channels, flow control strategies, multicast routing algorithms

UNIT-IV

Vector processing principles- vector instruction types, vector access memory schemes, early super computers, Multi vector multiprocessors- performance directed design rules, architecture of Cray and MPP, Compound vector operations, vector loops and chaining, SIMD computer organizations

UNIT-V

Latency-hiding techniques- shared virtual memory, prefetching techniques, distributed coherent caches, scalable coherence interface, relaxed memory consistency, principles of multithreading and context switching policies,

MPD architecture, The Tera multiprocessor system, Data flow computer architecture

TEXT BOOKS:

1. KAI HWANG & NARESH JOTWANI, “Advanced Computer Architecture- Parallelism, Scalability, Programmability” Second Edition, Mc Graw Hill Publishing.

REFERENCE BOOKS:

1. HENNESSY PATTERSON, “Computer Architecture- A Quantitative Approach” Fifth Edition, Elsevier
2. KAI HWANG, “Advanced Computer Architecture- Parallelism, Scalability, Programmability”, TMH.
3. Computer Architecture, Concepts and Evolutions, Garrit A Blaauw, PEA

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| 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, 200UNIT 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

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| | 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), Organization 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

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| I – II | L | P | Credits |
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| BUSINESS INTELLIGENCE | | | |

UNIT-I

Introduction - Understanding the field of business intelligence in a global world, Understanding the BI process and choosing, Place and tasks of the study of private and public intelligence, The practice of private and public intelligence: the choice of means- Strategies of information gathering, Information asymmetry and competitive advantage.

UNIT-II

The tripod: intelligence, security and Counterintelligence, The organizational and academic placement of the intelligence function, the intelligence working process, Intelligence strategies and demands on information gathering

UNIT-III

Efficient intelligence systems leading to shorter product life cycles, The relationship of the industry analysis to the company analysis, Developing the intelligence model and conducting the analysis, The submarine: a general intelligence model

UNIT-IV

Required qualifications at different stages of the intelligence cycle, Scope and logic of the language for analysis, Business intelligence software and business intelligence on the web, Ethical and legal limits in private organizations, Industrial espionage: the fine line of hiring Competitor's employees.

UNIT-V

BI Software and its business opportunities- Technical equipment of intelligence and Counter intelligence available to nation states and private organizations, Technical equipment of intelligence and counter intelligence available to nation states and private organizations, Learning, personal development and information technology.

REFERENCES:

Business Intelligence: A Managerial Approach (2011) Turban, Sharda, Delen, King, Publisher: Prentice Hall, Edition: 2nd, ISBN: 13-978-0-136-10066-9.

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| | 4 | - | 3 |
| HUMAN COMPUTER INTERACTION | | | |

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.

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| | 4 | - | 3 |
| IMAGE PROCESSING | | | |

UNIT-I

Introduction: What is Digital Image Processing, Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels.

UNIT-II

Image Enhancement In The Spatial Domain: Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters.

UNIT-III

Image Restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise—only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function.

Color Image Processing: Color fundamentals, color models.

UNIT-IV

Image Compression: Fundamentals, image compression models, Lossless Compression: Huffman coding, Run length coding contour coding, A brief discussion on Lossy Compression Image compression standards.

Morphological Image Processing: Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms.

UNIT-V

Image Segmentation: Detection of discontinuous, edge linking and boundary detection, threshold, region-based segmentation.

TEXTBOOK:

1. Digital Image Processing, Rafeal C. Gonzalez, Richard E. Woods, Second Edition, Pearson Education/PHI.

REFERENCES:

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S. Publications
4. Digital Image Processing using Matlab, Rafeal C.Gonzalez, Richard E.Woods, Steven L. Eddins, Pearson Education.

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| | 4 | - | 3 |
| INFORMATION SECURITY | | | |

UNIT-I

Introduction: Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.

UNIT-II**Conventional Encryption:**

Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC,

UNIT-III

Public key: Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service

UNIT-IV

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

Email Privacy: Pretty Good Privacy (PGP) and S/MIME.

UNIT-V

SNMP: Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3, Intruders, Viruses and related threats

Fire walls: Firewall Design principles, Trusted Systems, Intrusion Detection Systems

TEXT BOOKS:

1. Network Security Essentials: Applications and Standards, William Stallings, PEA.
2. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech

REFERENCE BOOKS:

1. Network Security & Cryptography, Bernard Menezes, Cengage, 2010
2. Fundamentals of Network Security, Eric Maiwald, Dream Tech
3. Network Security: Private Communication in a Public World, Kaufman, Perlman, PEA/PHI.
4. Principles of Information Security, Whitman, Thomson.
5. Cryptography and Network Security, 3/e, Stallings, PHI/PEA
6. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
7. Introduction to Cryptography, Buchmann, Springer

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| 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 Technologies, 2/e, Godbole, kahate, TMH
4. An Introduction to web Design , Programming ,Wang,Thomson

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| CS LAB II | | | |

Covering experiments from DAA, DWDM