ACADEMIC REGULATIONS
PROGRAM STRUCTURE
and
DETAILED SYLLABUS

Master of Technology

(Computer Science and Engineering)

(Two Year Regular Programme)

(Applicable for Batches admitted from 2017)

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Autonomous)

ACADEMIC REGULATIONS

GOKARAJU RANGARAJU
INSTITUTE OF ENGINEERING AND TECHNOLOGY

For all Postgraduate Programmes (M.Tech)
GR17 REGULATIONS

Gokaraju Rangaraju Institute of Engineering and Technology-2017 Regulations (GR 17 Regulations) are given hereunder. These regulations govern all the Post Graduate programmes offered by various departments of Engineering with effect from the students admitted to the programmes from 2017-18 academic year.

1. **Programme Offered:** The Post Graduate programme offered by the department is M.Tech, a two-year regular programme in that discipline.

2. **Medium of Instruction:** The medium of instruction (including examinations and reports) is English.

3. **Admissions:** Admission into the M.Tech Programme in any discipline shall be made subject to the eligibility and qualifications prescribed by the University from time to time. Admissions shall be made either on the basis of the merit rank obtained by the student in PGCET conducted by the APSCHE for M. Tech Programmes or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the Government from time to time.

4. **Programme Pattern:**
   a) A student is introduced to "Choice Based Credit System (CBCS)" for which he/she has to register for the courses at the beginning of each semesters as per the procedure.
   b) Each Academic year of study is divided into two semesters.
   c) Minimum number of instruction days in each semester is 90.
   d) The total credits for the Programme is 88.
   e) Grade points, based on percentage of marks awarded for each course will form the basis for calculation of SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
   f) A student has a choice of registering for credits from the courses offered in the programme.
   g) All the registered credits will be considered for the calculation of final CGPA.

5. **Award of M.Tech Degree:** A student will be declared eligible for the award of the M. Tech Degree if he/she fulfills the following academic requirements:
   a) A student shall be declared eligible for the award of M.Tech degree, if he/she pursues the course of study and completes it successfully in not less than two academic years and not more than four academic years.

b) A Student, who fails to fulfill all the academic requirements for the award of the degree within four academic years from the date of admission, shall forfeit his/her seat in M.Tech courses.

c) The Degree of M.Tech shall be conferred by Jawaharlal Nehru Technological University Hyderabad (JNTUH), Hyderabad, on the students who are admitted to the programme and fulfill all the requirements for the award of the degree.

6. Attendance Requirements

a) A student shall be eligible to appear for the semester end examinations if he/she puts in a minimum of 75% of attendance in aggregate in all the courses concerned in the semester.

b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in a semester may be granted. A committee headed by Dean (Academic Affairs) shall be the deciding authority for granting the condonation.

c) Students who have been granted condonation shall pay a fee as decided by the Academic Council.

d) Students whose shortage of attendance is not condoned in any semester are detained and are not eligible to take their end examinations of that semester. They may seek re-registration for that semester when offered next with the academic regulations of the batch into which he/she gets re-registered.

7. Paper Setting, Evaluation of Answer Scripts, Marks and Assessment

a) Paper setting and Evaluation of the Answer Scripts shall be done as per the procedures laid down by the Academic Council of the College from time to time.

b) The following is the division of marks between internal and external evaluations.

S.no	Particulars	Internal	External	Total
1	Theory	30	70	100
2	Practical	30	70	100
3	Comprehensive Viva	-	100	100
4	Seminar	30	70	100
5	Project work	30	70	100

c) The marks for internal evaluation per semester per theory course are divided as follows:

i. **Mid written examinations: 20 Marks**
ii. **Tutorial/Assignment: 5 Marks**
iii. **Continuous Assessment: 5 Marks**
iv. **Total: 30Marks**

d) Mid-Term Written Examination: There shall be two mid-term written examinations during a semester. The first mid-term written examination shall be conducted from the first

50 per cent of the syllabus and the second mid-term written examination shall be conducted from the remaining 50 per cent of the syllabus. The mid-term written examinations shall be evaluated for **20 marks** and average of the marks scored in the two mid-term written examinations shall be taken as the marks scored by each student in the mid-term written examination for that semester.

e) Assignment: Assignments are to be given to the students and marks not exceeding 5 (5%) per semester per paper are to be awarded by the teacher concerned.

f) For Internal Evaluation in Practical/Lab Subjects: The marks for internal evaluation are 30. Internal Evaluation is done by the teacher concerned with the help of the other staff member nominated by Head of the Department. Marks Distribution is as follows:

i.	**Writing the program/Procedure:**	**10 Marks**
ii.	**Executing the program/Procedure:**	**10 Marks**
iii.	**Viva:**	**05 Marks**
iv.	**Continuous Assessment:**	**05 Marks**
v.	**Total:**	**30Marks**

g) For External Evaluation in Practical/Lab Subjects: The Semester end examination shall be conducted by an external examiner and a staff member of the Department nominated by Head of the Department. Marks distribution is as follows:

i.	**Writing the program/Procedure:**	**20 Marks**
ii.	**Executing the program/Procedure:**	**20 Marks**
iii.	**Viva:**	**15 Marks**
iv.	**Lab Record:**	**15 Marks**
v.	**Total:**	**70 Marks**

h) Comprehensive Viva: There shall be a Comprehensive Viva-Voce in II year I semester. The Comprehensive Viva-Voce will be conducted by the committee consisting of Head of the Department and two senior faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects he/she studies during the M.Tech course of study. The Comprehensive Viva-Voce is valued for 100 marks by the committee. There are no internal marks for the Comprehensive Viva-voce.

i) Seminar: There shall be two Seminar Presentations by the student, one each in I and II semesters. For the seminar, the student shall collect the information on a specialized topic other than his/her project and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, seminar Supervisor and a senior faculty member. **The seminar shall be evaluated for 100 marks. Internal evaluation is for 30 marks and external for 70 marks.**

j) **Evaluation of Main Project Work:** A Project Review Committee (PRC) is to be constituted by the Principal/Director with Head of the Department as the Chairman and two other senior faculty members of the department.

i. **Registration for Project work:** A candidate is permitted to register for the project work after satisfying the attendance requirements of all the courses (theory and practical courses) up to III Semester.

ii. After satisfying the registration requirements, a candidate is permitted to register for the project work after satisfying, the title, objectives and plan of action of his project work to the Project Review Committee for its approval. Only after obtaining the approval of Project Review Committee of the Department, the student can initiate the project work. Any changes thereafter in the project are to be approved by PRC. The student has to work under the guidance of both internal guide (one faculty member of the department) and external guide (from Industry not below the rank of an officer). Internal guide is allotted by the Head of the Department or Coordinator of the Project Work whereas external guide is allotted by the industrial organization in which the project is undertaken.

iii. The candidate shall submit status of the report in two stages at least with a gap of 20 days between them.

iv. The work on the project shall be initiated in the beginning of the fourth semester and the duration is one semester. A candidate is permitted to submit project report only after successful completion of theory and practical courses with the approval of PRC and not earlier than 40 days from the date of registration of the project work. For the approval of PRC the candidate shall submit the draft copy of the thesis to the Head/Coordinator (through internal research guide) and shall make an oral presentation before the PRC.

v. After approval from the PRC, the final thesis is to be submitted along with ANTI-PLAGIARISM report from the approved agency with a similarity index not more than 30%.

vi. Two hardcopies and one soft copy of the project work (dissertation) certified by the research supervisors shall be submitted to the College/Institute.

vii. The thesis shall be adjudicated by one external examiner selected by the Institute out of 5-member panel, submitted by the department.

viii. **The marks allotted for project work review are 100, out of which30 are for internal and 70 for external.** Internal evaluation marks are awarded by the PRC on the basis of the student's performance in the three pre-submission reviews and the external evaluation is done by the external examiner.

ix. **The marks allotted for project work and dissertation are 100, out of which 30 are for internal and 70 for external.** Internal evaluation marks are awarded by the PRC on the basis of the student's performance in the three pre-submission reviews and the external evaluation is done by the external examiner. In both internal and external evaluations the student shall score at least 40% marks and an aggregate of 50% marks to pass in the project work.

If the report of the examiner is favorable, Viva-voce examination shall be conducted by a Board consisting of the Supervisor, Head and the External Examiner who adjudicated the project work. The Board shall jointly evaluate the student's performance in the project work.

x. In case the student doesn't pass through the project work, he has to reappear for the viva-voce examination, as per the recommendations of the Board. If he fails succeed at the second Viva-voce examination also, he will not be eligible for the award of the degree, unless he is asked to revise and resubmit the Project by the Board. Head of the Department and Project coordinator shall coordinate and make arrangements for the conduct of viva-¬voce examination. When one does get the required minimum marks both in internal and external evaluations the candidate has to revise and resubmit the dissertation in the time frame prescribed by the PRC. If the report of the examiner is unfavorable again, the project shall be summarily rejected.

xi. If the report of the viva-voce is not satisfactory, the candidate will retake the viva-voce examination after three months. If he fails to get a satisfactory report at the second viva-voce examination, he will not be eligible for the award of the degree, unless the candidate is asked to revise and resubmit.

8. **Recounting of Marks in the End Examination Answer Books:** A student can request for re-counting of his/her answer book on payment of a prescribed fee.
9. **Re-evaluation of the End Examination Answer Books:** A student can request for re-evaluation of his/her answer book on payment of a prescribed fee.
10. **Supplementary Examinations:** A student who has failed in an end semester examination can appear for a supplementary examination, as per the schedule announced by the College/Institute.
11. **Malpractices in Examinations:** Disciplinary action shall be taken in case of malpractices during Mid/ End-examinations as per the rules framed by the Academic Council.

12. **Academic Requirements**

a) A student shall be deemed to have secured the minimum academic requirement in a subject if he / she secures a minimum of 40% of marks in the Semester-end Examination and a minimum aggregate of 50% of the total marks in the Semester-end examination and Internal Evaluation taken together.

b) A student shall be promoted to the next semester only when he/she satisfies the requirements of all the previous semesters.

c) In order to qualify for the award of M.Tech Degree, the student shall complete the academic requirements of passing in all the Courses as per the course structure including Seminars and Project if any.

d) In case a Student does not secure the minimum academic requirement in any course, he/she has to reappear for the Semester-end Examination in the course, or re-register for the same course when next offered or re-register for any other specified course, as may be required.

However, one more additional chance may be provided for each student, for improving the internal marks provided the internal marks secured by a student are less than 50% and he/she failed finally in the course concerned. In the event of taking another chance for re-registration, the internal marks obtained in the previous attempt are nullified. In case of re-registration, the student has to pay the re-registration fee for each course, as specified by the College.

e) Grade Points: A 10- point grading system with corresponding letter grades and percentage of marks, as given below, is followed

	Grade Point	
O (Outstanding)	10	Marks>=90
A+ (Excellent)	9	Marks>=80 and Marks < 90
A (Very Good)	8	Marks>=70 and Marks < 80
B+ (Good)	7	Marks>=60 and Marks < 70
B (Above Average)	6	Marks>=50 and Marks < 60
F (Fail)	0	Marks < 50
Ab (Absent)	0	

Earning of Credit:

A student shall be considered to have completed a course successfully and earned the credits if he/she secures an acceptable letter grade in the range O-B. Letter grade 'F' in any Course implies failure of the student in that course and no credits earned.

Computation of SGPA and CGPA:

The UGC recommends the following procedure to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i) S_k the SGPA of kth semester(1 to 4) is the ratio of sum of the product of the number of credits and grade points to the total creditsof all courses registered by a student,

$$\text{SGPA } (S_k) = \sum_{i=1}^{n} (Ci * Gi) / \sum_{i=1}^{n} Ci$$

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course and n is the number of courses registered in that semester.

ii) The CGPA is calculated in the same manner taking into account all the courses m, registered by a student over all the semesters of a programme, i.e., upto and inclusive of Sk, where k ≥ 2.

iii) The SGPA and CGPA shall be rounded off to 2 decimal points.

$$\text{CGPA} = \sum_{i=1}^{m} (Ci * Gi) / \sum_{i=1}^{m} Ci$$

13. **Award of Class:** After a student satisfies all the requirements prescribed for the completion of the Degree and becomes eligible for the award of M. Tech Degree by JNTUH, he/she shall be placed in one of the following four classes:

	Class Awarded	
3.1	First class with distinction	CGPA > 7.75
3.2	First Class	CGPA > 6.75 and CGPA < 7.75
3.3	Second Class	CGPA > 6.00 and CGPA < 6.75

14. **Withholding of Results:** If the student has not paid dues to the Institute/ University, or if any case of indiscipline is pending against him, the result of the student (for that Semester) may be withheld and he will not be allowed to go into the next Semester. The award or issue of the Degree may also be withheld in such cases.

15. **Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities:** Transfer of students from the Constituent Colleges of JNTUH or from other Colleges/ Universities shall be considered only on case-to-case basis by the Academic Council of the Institute.

16. **Transitory Regulations:** Students who have discontinued or have been detained for want of attendance, or who have failed after having undergone the Degree Programme, may be considered eligible for readmission to the same or equivalent subjects as and when they are offered.

17. **General Rules**
    a) The academic regulations should be read as a whole for the purpose of any interpretation.
    b) In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Academic Council is final.
    c) In case of any error in the above rules and regulations, the decision of the Academic Council is final.
    d) The college 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 college.

M.Tech (CSE) **M.Tech (CSE) PROGRAMME STRUCTURE** **I Year- I Semester**

Sub-Code	Group	Subject	L	T	P	C	Int	Ext	Total
GR17D5012	PC	Distributed Computing	3	1	0	4	30	70	100
GR17D5002	PC	Object Oriented Modeling	3	1	0	4	30	70	100
GR17D5003	PC	Advanced Unix Programming	3	1	0	4	30	70	100
	OE-I	**Open Elective – I**	3	1	0	4	30	70	100
	Elective I		3	1	0	4	30	70	100
GR17D5005	PE	Multi-core Computers: Architecture and Programming							
GR17D5006	PE	Mobile Application Services							
GR17D5007	PE	Software Architecture & Design Patterns							
	Elective II		3	1	0	4	30	70	100
GR17D5008	PE	Image Processing & Pattern Recognition							
GR17D5009	PE	Soft Computing							
GR17D5010	PE	Computer System Design							
GR17D5011	Lab	Advanced Unix Programming Lab	0	0	2	2	30	70	100
GR17D5173	SPW	Seminar – I	0	0	2	2	30	70	100
		Total	**18**	**6**	**4**	**28**	**240**	**560**	**800**

M.Tech (CSE) **M.Tech (CSE) PROGRAMME STRUCTURE** **I Year-II Semester**

Sub-Code	Group	Subject	L	T	P	C	Int	Ext	Total
GR17D5001	PC	Advanced Problem Solving	3	1	0	4	30	70	100
GR17D5013	PC	Advanced datamining	3	1	0	4	30	70	100
GR17D5014	PC	Cryptography and Network Security	3	1	0	4	30	70	100
	OE-I	**Open Elective – I**	3	1	0	4	30	70	100
	Elective III		3	1	0	4	30	70	100
GR17D5021	PE	Service Oriented Architecture							
GR17D5017	PE	Information Storage and Retrieval							
GR17D5018	PE	Cloud Computing and Applications							
	Elective IV		3	1	0	4	30	70	100
GR17D5019	PE	High Performance Computing							
GR17D5020	PE	Natural Language Processing							
GR17D5015	PE	Advanced Computer Networks							
GR17D5022	Lab	Datawarehousing & Datamining / IS Lab	0	0	2	2	30	70	100
GR17D5174	SPW	Seminar – II	0	0	2	2	30	70	100
		Total	18	6	4	28	240	560	800

II Year-I Semester

	Group	Subject	L	T	P	C	Int	Ext	Total
GR17D5175	SPW	Comprehensive Viva-voce	-	-	-	4	0	100	100
GR17D5176	SPW	Project work Review	-	-	-	12	30	70	100
Total			-	-	-	16	30	170	200

II Year II Semester

Sub-Code	Group	Subject	L	T	P	C	Int	Ext	Total
GR17D5177	SPW	Project work and Dissertation	-	-	-	16	30	70	100
Total			-	-	-	16	30	70	100

A student has a choice to select one Open Elective Pool I in I Semester and one Open Elective Pool II in II Semester.

Open Elective Pool-I

	Group	Subject	L	T	P	C	Int.	Ext.	Total
GR17D5178	OE-I	E- Commerce and Applications (CSE)	3	1	0	4	30	70	100
GR17D5179		Enterprise Resource Planning (IT)	3	1	0	4	30	70	100
GR17D5180		Modern Control Theory (EEE)	3	1	0	4	30	70	100
GR17D5181		Computer Oriented Numerical Methods in Engineering (CE)	3	1	0	4	30	70	100
GR17D5182		Advanced Computer Architecture (ECE)	3	1	0	4	30	70	100
GR17D5183		Operations Research (ME)	3	1	0	4	30	70	100

Open Elective Pool-II

Sub-Code	Group	Subject	L	T	P	C	Int	Ext	Total
GR17D5184	OE-II	Human Computer Interaction (CSE)	3	1	0	4	30	70	100
GR17D5185		Big Data and Analytics (IT)	3	1	0	4	30	70	100
GR17D5186		Neural and Fuzzy Systems (EEE)	3	1	0	4	30	70	100
GR17D5187		Project Management (CE)	3	1	0	4	30	70	100
GR17D5188		Hardware Software Co-Design(ECE)	3	1	0	4	30	70	100
GR17D5189		Non-Conventional Energy Resources(ME)	3	1	0	4	30	70	100

I- SEMESTER

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DISTRIBUTED COMPUTING

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5012 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Analyze the differences among: concurrent, networked, distributed, and mobile.
- Understand Resource allocation and deadlock detection and avoidance techniques.
- Design Remote procedure calls
- Discuss IPC mechanisms in distributed systems.
- Understand Grid computing and cloud computing in distributed systems

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Develop, test and debug RPC based client-server programs in Unix.
- Design and build application programs on distributed systems.
- Improve the performance and reliability of distributed programs.
- Design and build newer distributed file systems for any OS.
- Design Cobra architecture in distributed computing.
- Develop and test the Quality of service.
- Develop coordination models and multimedia.

UNIT-I

Introduction: The different forms of computing – Monolithic, Distributed, parallel and cooperative computing, the meaning of Distributed computing, Examples of Distributed systems, the strengths and weaknesses of Distributed computing, operating system concepts relevant to distributed computing, the architecture of distributed applications.

UNIT-II

Distributed computing Paradigms: Paradigms for Distributed Applications – Message passing Paradigm, The Client-Server Paradigm (JAVA Socket API), The peer-to-peer paradigm, Message System (or MOM) Paradigm – the Point-to-point message model and the publish/subscribe message model, RPC model, The Distributed Objects Paradigms-RMI,ORB, the object space Paradigm, The Mobile Agent Paradigm, the Network Services Paradigm, The Mobile Agent Paradigm, the Network Services Paradigm, The collaborative application (Groupware Paradigm), choosing a Paradigm for an application.

UNIT-III

Distributed Objects Paradigm (RMI): Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, Java RMI API, A sample RMI Application, steps for building an RMI application,

testing and debugging, comparison of RMI and socket API

Distributed Object Paradigm (CORBA): The basic Architecture, The CORBA object interface, Inter-ORB Protocols, object servers and object clients, CORBA Object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, Object Adapters, Java IDL, An example CORBA application.

UNIT-IV

Distributed Document-based Systems: WWW, Lotus Notes, comparison of WWW and Lotus Notes, Distributed Coordination-based systems- Introduction to coordination models, TIB, JINI, comparison of TIB and JINI Software Agents, Agent Technology, Mobile Agents.
Distributed Multimedia Systems – characteristics of multimedia data, QOS of service management, Resource Management, Stream Adaption.

UNIT- V

Grid Computing: Definition of grid, grid types – computational grid, data grid, grid benefits and applications, drawback of grid computing, grid components, grid architecture and its relation to various Distributed Technologies.
Cluster Computing Parallel computing overview, cluster computing – Introduction, Cluster Architecture, parallel programming models and Paradigms, Applications of Clusters.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS

1. Distributed, Computing, Principles and applications, M.L.Liu, Pearson Education
2. Distributed Systems, Principles and paradigms, A.S. Tannenbaum and M.V. Steen, Pearson Education
3. Client-Server Programming with Java and CORBA 2nd edition, R. Orfali& Dan Harkey, John Wiley &Sons
4. Grid Computing, J. Joseph & C. Fellenstein, Pearson Education
5. High Performance cluster computing, RajKumarBuyya, Pearson Education

REFERENCE BOOKS

1. A Networking Approach to grid computing, D.Mimoli, Wiley & Sons
2. Grid Computing: a practical guide to technology and applications, A. Abaus, Firewall media
3. Java Network Programming, E.R. Harold, 2nd Edition, O. Reilly, SPD.
4. Distributed systems, concepts and Design, 3rd edition, G. Coulouris, J. Dollimore, and Tim Kindbirg, Pearson Education
5. Java programming with CORBA, 3rd Edition, Brose, Vogel, Duddy, Wiley Dreamtech.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

OBJECT ORIENTED MODELING

M .Tech (CSE) | I Year - I Semester
Course Code: GR17D5002 | L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Create a requirements model using UML class notations and use-cases based on statements of user requirements, and to analyze requirements models given to them for correctness and quality
- Create the OO design of a system from the requirements model in terms of a high-level architecture description, and low-level models of structural organization and dynamic behaviour using UML class, object, and sequence diagrams.
- Comprehend enough Java to see how to create software the implements the OO designs modeled using UML.
- Comprehend the nature of design patterns by understanding a small number of examples from different pattern categories, and to be able to apply these patterns in creating an OO design.
- Given OO design heuristics, patterns or published guidance, evaluate a design for applicability, reasonableness, and relation to other design criteria.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Master the fundamental principles of OO programming-U1.
- Master key principles in OO analysis, design, and development-U1.
- Be familiar with the application of the Unified Modeling Language (UML) towards analysis and design-U1,U2.
- Master common patterns in OO design and implement them-U1,U2.
- Be familiar with Unified Process-U3.
- To familiarize with workflows-U4.
- Be exposed to the phases in unified process-U5 .

UNIT-I

Introduction to UML: The meaning of Object Orientation, object identity, Encapsulation, information hiding, polymorphism, generosity, importance of modelling, principles of modelling, object oriented modelling, conceptual model of the UML, Architecture.
Basic Structural Modelling: Classes, Relationships, common Mechanisms, and diagrams. Class & Object Diagrams: Terms, concepts, modelling techniques for Class & Object Diagrams.
Collaboration Diagrams: Terms, Concepts, depicting a message, polymorphism in collaboration diagrams, iterated messages, use of self in messages.
Sequence Diagrams: Terms, concepts, depicting asynchronous messages with/without priority, call back mechanism, broadcast messages.

UNIT-II

Basic Behavioural Modelling: Use cases, Use case Diagrams, Activity Diagrams. Advanced **Behavioural Modelling:** Events and signals, state machines, processes and Threads, time and space, state chart diagrams.
Architectural Modelling: Component, Deployment, Component diagrams and Deployment diagrams.

UNIT-III

The Unified process: use case driven, architecture centric, iterative, and
incremental **The Four Ps:** people, project, product, and process
Use case driven process: why use case, capturing use cases, analysis, design, and implementation to realize the use cases, testing the use cases
Architecture-centric process: architecture in brief, why we need architecture, use cases and architecture, the steps to architecture, an architecture description.

UNIT-IV

Iterative incremental process: Iterative incremental in brief, why iterative incremental development? The iterative approach is risk driven, the generic iteration.
The Generic Iteration workflow: phases are the first division workflow, planning proceeds doing, risks affect project planning, use case prioritization, resource needed, assess the iteration and phases
Inception phase: early in the inception phase, the archetypal inception iteration workflow, execute the core workflows, requirements to test.

UNIT-V

Elaboration Phase: elaboration phase in brief, early in the elaboration phase, the architectural elaboration iteration workflow, execute the core workflows-Requirements to test.
Construction phase: early in the construction phase, the archetypal construction iteration workflow, execute the core workflow.
Transition phase: early in the transition phase, activities in transition phase
Case Studies: Automation of a Library, Software Simulator application (2-floor elevator simulator).

TEACHING METHODOLOGIES

1. Board
2. Markers
3. Duster
4. LCD Projector
5. OHP Projector

TEXT BOOKS

1. The Unified Modeling Language User Guide By Grady Booch, James Rumbaugh, Ivar Jacobson 2nd Edition, Pearson Education.
2. UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado WILEY-Dreamtech India Pvt. Ltd.
3. The Unified Software Development Process by Ivar Jacobson, Grady Booch, James Rumbaugh, Pearson Education

REFERENCE BOOKS

1. Fundamentals of Object Oriented Design in UML By Meilir Page-Jones, Pearson Education
2. Object Oriented Analysis & Design By AtulKahate, The McGraw-Hill.
3. Practical Object-Oriented Design with UML By Mark Priestley, TATA Mc Graw Hill
4. Object Oriented Analysis & Design By Brett D McLaughlin, Gary Pollice and David West, O'REILY.
5. Object-Oriented Analysis and Design using UML by Simon Bennet, Steve Mc Robb and Ray Farmer, 2nd Edition, TATA Mc Graw Hill.
6. Object-Oriented Analysis and Design with the Unified Process By John W. Satzinger, Robert B Jackson and Stephen D Burd, THOMSON Course Technology.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED UNIX PROGRAMMING

M. Tech (CSE) — I Year - I Semester
Course Code: GR17D5003 — L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Learn basic file related system calls and directory related and security system calls.
- Practice shell scripts in UNIX environment.
- Discuss the issues of inter-process communication and process synchronization.
- Develop C Programs in UNIX environment for various applications.
- Analyze file system management, accessing methods and access rights inUNIX environment.
- Design client server communication in UNIX environment

COURSE OUTCOMES: At the end of the course, the student will be able to

- Identify the UNIX system calls for files, directory and security management.
- Use shell programs in the UNIX environment while exploring OS features.
- Validate semaphores, shared memory, message queues for synchronization of inter-process communications.
- Translate Unix Commands to develop C programs in the UNIX environment.
- Construct client server communication in UNIX environment.
- Design Socket Programming in UNIX Environment
- Implement Inter process Communication methods in Client Server Process

UNIT-I

Unix Utilities-Introduction to Unix file system, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, text processing utilities and backup utilities, vi editor.

Working with the Bourne shell: what is a shell, shell responsibilities, pipes and input Redirection, output redirection, here documents, shell meta characters, shell variables, shell commands, the environment, control structures, shell script examples.

UNIT-II

Unix Files: Unix file structure, directories, files and devices, System calls, library functions, low level file access, usage of open, create, read, write, close, lseek, stat, fstat, umask, dup, dup2.,The standard I/O- fopen, fclose, fflush, fseek, fgetc, getc, fputc, putc, fgets, gets Formatted I/O - streams and file descriptors, File and directory maintenance-chmod, chown, unlink, link, symlink, mkdir, rmdir, chdir, getcwd, Directory handling system calls -opendir, readdir, closedir, rewinddir, seekdir, telldir.

UNIT-III

Unix Process and Signals: What is process, process structure, starting new process, waiting for a process, zombie process, process control, process identifiers, system call interface for process management-fork, vfork, exit, wait, waitpid, exec, system, Signals- Signal functions, unreliable signals, interrupted system calls, kill and raise functions, alarm, pause functions, abort, sleep functions.

UNIT-IV

Interprocess Communication Overview: Introduction to IPC,IPC between processes on a single computer system, IPC between processes on different systems, file and record locking, other Unix locking techniques, pipes, FIFOs, streams and messages, namespaces, introduction to three types of IPC(system-V)-message queues, semaphores and shared memory. Message Queues-Unix system-V messages, Unix kernel support for messages, Unix APIs for messages, client/server example.

UNIT-V

Semaphores-Unix system-V semaphores, Unix kernel support for semaphores, Unix APIs for semaphores, file locking with semaphores. Shared Memory-Unix system-V shared memory, Unix kernel support for shared memory, Unix APIs for shared memory, semaphore and shared memory example. Sockets- Berkeleysockets, socket system calls for connection oriented protocol and connectionless protocol, example client- server programs.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS

1. Unix the ultimate guide, Sumitabha Das, TMH
2. Unix Network Programming, W. R. Stevens, Pearson/PHI
3. Unix System Programming using C++,T. Cahn, PHI

REFERENCE BOOKS

1. Advanced Programming in the Unix environment, W. R. Stevens, Pearson education.
2. Unix system programming using C++, T. Chan, PHI
3. Unix for programmers and users, third edition, Graham Glass, King Ables, Pearson education.
4. Unix Programming, Kumar Saurabh, 1st Edition, Wiley India Pvt Ltd.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

MULTI-CORE COMPUTERS: ARCHITECTURE AND PROGRAMMING
ELECTIVE - I

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5005 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Give knowledge and insights of modern computers, in particular processor design including parallel computation and advance memory hierarchies.
- Expose mutli-threading and hyper threading in multi-core machines
- Give the significance of synchronization in mutli-core computation.
- Expose the algorithm structure design aspects of parallel programming
- Provide programming skills using GPUs
- Expose parallel programming skills.

COURSE OUTCOMES: After undergoing the course, Students will be able to

- Use the concepts of simultaneous multi-threading
- Use synchrnonizing primitives such as semaphores, message queues
- Analyze deadlocks and able to take proper measures for dealing with them
- Develop parallel programs with shared memory system using OMP libraries
- Develop parallel programs with distributed memory using MPI libraries
- Write muti-threded programs in GPGPU environments.
- Develop solutions by exploring GPUs using CUDA environment.

UNIT-I

Introduction to Multi-core Architecture: Motivation, Parallel Computing Platforms, Differentiation between Hyper threading and Multi-Core architectures, Multi Threading on Single-Core and Multi-Core Platforms, Understanding the Performance.

System Overview on Threading: Definition, Application Programming Models and Threading, Virtual Environment.

UNIT -II

Programming Paradigms: Fundamental Concepts of Programming: Task Decomposition, Data Decomposition and Data Flow decomposition, Parallel Programming Patterns.

Threading and Parallel Programming Constructs: Synchronization, Critical sections, Deadlock, Synchronization Primitives, Flow-Control based Concepts

UNIT-III

Open MP: Challenges in Threading a Loop, Data- race conditions, Performance Oriented Programming, Open MP Environment Variables, Compiling, Debugging.

Basics of MPI: Getting Started, Basic Point-to-Point Message Passing, Collective Operations and Single –Core Processor Fundamentals.

UNIT-IV

The Age of Parallel Processing, The Rise of GPU Computing, Applications of CUDA Development Environment Introduction to CUDA C, Querying Devices Using Device Properties Parallel Programming in CUDA C.

UNIT-V

Thread Co-operation in GPU: Splitting parallel blocks, Shared memory and synchronization, Constant memory, Measuring performance with events, texture memory overview.

TEXT BOOKS

1. Multi-Core Programming-: Increasing Performance through Software,by ShameemAkther and J. Roberts, Intel Press, 2006 Intel Corporation. (Unit I to Unit III)
2. Patterns for Parallel Programming, Timothy G. Mattson, Beverly A. Sanders, Berna L. Massingil, pearson education, 2004 (Unit –IV)
3. Parallel Programming: Techniques And Applications Using Networked Workstations And Parallel Computers, 2/E, Pearson Education India, 01-Sep-2006 (Unit IV,Unit V)

REFERENCE BOOKS

1. Introduction to High Performance Computing for Scientists and Engineers,Chapman & Hall/CRC Computational Science, July 02, 2010 by CRC Press.
2. Computer Organization and Design, David A.Patterson, John L.Hennessy, Morgan Kaufmann Publishers, 1998.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

MOBILE APPLICATION SERVICES
ELECTIVE-I

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5006 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this cours-e are expected to

- Describe the limitations and challenges of working in a mobile and wireless environment as well as the commercial and research opportunities presented by these technologies.
- Describe and apply the different types of application models/architectures used to develop mobile software applications.
- Describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT)) and learn how and when to apply the different components to develop a working system.
- Describe and apply software patterns for the development of the application models described above.
- Describe and work within the capabilities and limitations of a range of mobile computing devices
- Design, implement and deploy mobile applications using an appropriate software development environment.

COURSE OUTCOMES: After undergoing the course, Students will be able to

- Have a firm grasp of event-based computing models.
- Be able to demonstrate an understanding of and the ability to use different types of components used in mobile platforms.
- Be able to use threading efficiently and correctly in mobile apps.
- Be able to appropriately use different types of data management for mobile devices.
- Be able to appropriately use different types of networking options for mobile devices.
- Have a clear understanding of the creation and use of simple user interfaces.
- Be able to use tools to create apps for a mobile platform.
- Be able to create simple graphics for mobile devices.
- Have an understanding of the importance, role and use of security on mobile devices.

UNIT- I

J2ME Overview: Java 2 Micro Edition and the World of Java, Inside J2ME, J2ME and Wireless Devices. Small Computing Technology: Wireless Technology, Radio Data Networks, Microwave Technology, Mobile Radio Networks, Messaging, Personal Digital Assistants.

J2ME Architecture and Development Environment:J2ME Architecture, Small Computing Device Requirements, Run-Time Environment, MIDlet Programming, Java Language for J2ME, J2ME Software Development Kits, Hello World J2ME Style, Multiple MIDlets in a MIDlet Suite, J2ME Wireless Toolkit.

UNIT-II

J2ME Best Practices and Patterns: The Reality of Working in a J2ME World, Best Practices Commands, Items, and Event Processing: J2ME User Interfaces, Display Class, The Palm OS Emulator, Command Class, Item Class, Exception Handling.

UNIT-III

High-Level Display: Screens: Screen Class, Alert Class, Form Class, Item Class, List Class, Text Box Class, Ticker Class.
Low-Level Display: Canvas: The Canvas, User Interactions, Graphics, Clipping Regions, Animation.
Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.

UNIT-IV

Mobile Services: Evolution of Mobile Services, Types of Mobile Services, Personal Services, CommModuley Services, Introduction to Consumer Services, Various Consumer Services, SMS, MMS, Games, Proprietary vs. Standardize Interface, Various Developer Services, SMS Web Service, MMS Web Service

UNIT-V

Mobile platform and NW environment: Mobile App Testing Environment, OTA App Provisioning. **Mobile Applications:** What is Web App?, Context of Mobile Applications, Pros and Cons of Mobile Web App, SIM based Mobile App Development, What is SIM?, SIM as a Platform, SIM as Service Differentiator, Introduction to UI, Principles for UI development Module -IV: Mobile Services 8 hrs Evolution of Mobile Services, Types of Mobile Services, Personal Services, CommModuley Services,

TEXT BOOKS

1. J2ME: The Complete Reference, James Keogh, Tata McGrawHill.
2. Professional Mobile Application Development by Jeff McWherter, Scott Gowell, 2012

REFERENCES BOOKS

1. Enterprise J2ME: Developing Mobile Java Applications, Michael Juntao Yuan, Pearson Education, 2004.
2. Beginning Java ME Platform, Ray Rischpater, Apress, 2009.
3. Beginning J2ME: From Novice to Professional, Third Edition, Sing Li, Jonathan B. Knudsen, Apress, 2005.
4. Kicking Butt with MIDP and MSA: Creating Great Mobile Applications, First Edition, J.Knudsen, Pearson.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
ELECTIVE-I

M.Tech (CSE) | I Year - I Semester
Course Code: GR17D5007 | L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Software architecture and quality requirements of a software system
- Fundamental principles and guidelines for software architecture design, architectural styles, patterns, and frameworks.
- Methods, techniques, and tools for describing software architecture and documenting design rationale.
- Software architecture design and evaluation processes.
- Future challenges and emerging trends in software architecture discipline.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Argue the importance and role of software architecture in large scale software systems
- Design patterns and motivate software architecture for large scale software systems
- Recognise major software architectural styles, design patterns, and frameworks
- Describe a software architecture using various documentation approaches and architectural description languages
- Generate architectural alternatives for a problem and select among them
- Discuss and evaluate the current trends and technologies such as model-driven, service-oriented, and aspect-oriented architectures
- Evaluate the coming attractions in software architecture research and practice

UNIT -I

Envisioning Architecture The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views. Creating an Architecture Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT-II

Analysing Architectures Architecture Evaluation, Architecture design decision making, ATAM, CBAM.

UNIT-III

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

UNIT-IV

Patterns Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage. Creational and Structural patterns Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, flyweight, Proxy.

UNIT -V

Behavioural patterns Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor. Case Studies A-7E – A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control – a case study in designing for high availability, Celsius Tech – a case study in product line development

TEACHING METHODOLOGIES

1. Board
2. Markers
3. Duster
4. LCD Projector
5. OHP Projector

TEXT BOOKS

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

REFERENCE BOOKS

1. Beyond Software architecture, Luke Hohmann, Addison Wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR,2001
3. Pattern Oriented Software Architecture, F. Buschmann& others, John Wiley & Sons.
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker& William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi& Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.
8. Software Design, David Budgen, second edition, Pearson education,2003

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

IMAGE PROCESSING AND PATTERN RECOGNITION
ELECTIVE-II

M. Tech (CSE) I Year - I Semester
Course Code: GR17D5008 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Understand image processing on digital image
- Understand image representation and compression
- Understand the character/signal representation
- Know the wavelets for higher level image processing
- Use gradient and LMSE algorithms
- Use clustering techniques for real world data
- Use higher level image representations

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Describe 2D,3D image representations
- Apply image transformations for smoothing and enhancements
- Apply neighborhood operators on images
- Apply Discrete Wavelet Transforms for image compression
- Apply mathematical transformations machines such as scaling rotation etc..
- Apply image transformation techniques using MAT LAB.
- Designing of small projects on object recognition

UNIT-I

Fundamental steps of image processing, components of an image processing of system.The image model and image acquisition, sampling and quantization, relationship between pixels, distance functions, scanner.

UNIT-II

Statistical and spatial operations, Intensity functions transformations, histogram processing, smoothing & sharpening – spatial filters Frequency domain filters, homomorphic filtering, image filtering & restoration. Inverse and weiner filtering, FIR weiner filter, Filtering using image transforms, smoothing splines and interpolation.
Morphological and other area operations, basic morphological operations, opening and closing operations, dilation erosion, Hit or Miss transform, morphological algorithms, extension to grey scale images.

UNIT-III

Segmentation and Edge detection region operations, basic edge detection, second order detection, crack edge detection, gradient operators, compass and Laplace operators, edge linking

and boundary detection, thresholding, region based segmentation, segmentation by morphological watersheds.

Image compression: Types and requirements, statistical compression, spatial compression, contour coding, quantizing compression, image data compression-predictive technique, pixel coding, transfer coding theory, lossy and lossless predictive type coding, Digital Image Water marking.

UNIT-IV

Representation and Description: Chain codes, Polygonal approximation, Signature Boundary Segments, Skeltons, Boundary Descriptors, Regional Descriptors, Relational Descriptors, Principal components for Description, Relational Descriptors

UNIT -V

Pattern Recognition Fundamentals: Basic Concepts of pattern recognition, Fundamental problems in pattern recognition system, design concepts and methodologies, example of automatic pattern recognition systems, a simple automatic pattern recognition model

Pattern classification: Pattern classification by distance function: Measures of similarity, Clustering criteria, K-means algorithm, and Pattern classification by likelihood function: Pattern classification as a Statistical decision problem, Bayes classifier for normal patterns.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS

1. Digital Image Processing Third edition, Pearson Education, Rafael C. Gonzalez, Richard E. Woods
2. Pattern recognition Principles: Julus T. Tou, and Rafel C. Gonzalez, Addision-Wesly Publishing Company

REFERENCE BOOKS

1. Image Processing, Analysis and Machine Vision, Second Edition, Milan Sonka, Vaclav Hlavac and Roger Boyle. Thomson learning.
2. Digital Image Processing – Williamk. Pratl –John wiley edition
3. Fundamentals of digital image processing – by A.K. Jain. PH
4. Pattern classification, Richard Duda, Hart and David strok John Weily publishers.
5. Digital Image Processing, S. Jayaraman, S. Esakkirajan, T. Veerakumar, TMH.
6. Pattern Recognition, R. Shinghal, Oxford University Press.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOFT COMPUTING
ELECTIVE-II

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5009 L/T/P/C : 3/1/0/4

Prerequisites: Fundamentals of Predicate Logic and Analysis, Sound knowledge in mathematics, Programming skills are desired.

COURSE OBJECTIVES: Students undergoing this course are expected to

- Familiarize the training aspects of neural networks.
- Use supervised, unsupervised learning aspects of artificial neural networks.
- Expose mutation, crossover concepts of genetic algorithm.
- Understand fuzzy relations and membership functions.
- Introduce data clustering techniques.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Learn the unified and exact mathematical basis as well as the general principles of various soft computing techniques
- Identify and described soft computing techniques and their roles in building intelligent machines.
- Recognize the feasibility of applying a soft computing methodology for a particular problem.
- Apply genetic algorithm to combinatorial optimization problems.
- Apply the neural network to pattern classification and regression problems.
- Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem.

UNIT-I

INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS: Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence - Machine Learning Basics

UNIT-II

GENETIC ALGORITHMS: Introduction to Genetic Algorithms (GA) – Applications of GA in Machine Learning - Machine Learning Approach to Knowledge Acquisition.

UNIT-III

NEURAL NETWORKS: Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks -

Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

UNIT-IV

FUZZY LOGIC: Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions- Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

UNIT-V

NEURO-FUZZY MODELLING: Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rule base Structure Identification – Neuro-Fuzzy Control – Case studies.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, EijiMizutani, "Neuro-Fuzzy and Soft Computing", Prentice-Hall of India, 2003.
2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.

REFERENCE BOOKS

1. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
2. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to FuzzyLogic using MATLAB", Springer, 2007.
4. S. N. Sivanandam • S. N. Deepa, "Introduction to Genetic Algorithms", Springer, 2007.
5. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER SYSTEM DESIGN
ELECTIVE-II

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5010 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to:

- Understand the components of the computer and its working and also basic concepts of number system.
- Understand the concepts of Input¬Output interface and its organization.
- Understand the concepts of memory management, i.e cache, associative and virtual, auxiliary memory's and its organization.
- Understand different approaches to memory management.
- Learn and understand the security aspects of a UNIX

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Learn IA-32 Pentium processor architecture.
- Compare hardwired control and micro programmed control in Processing unit.
- Learn the management of different type of memories in the computer system
- Determine the reasons of deadlocks, and their remedial measures in an operating system
- Understand the different types of IPC mechanisms.
- Compare and analyze different file systems being used in different operating systems
- Understand the various types of Hazards that occur in pipeline processing

UNIT-I

Computer structure: Hardware, software, system software, Von-Neumann architecture – case study. IA -32 Pentium: registers and addressing, instructions, assembly language, program flow control, logic and shift/rotate instructions, multiply, divide MMX, SIMD instructions, I/O operations, subroutines. Input/output organization, interrupts, DMA, Buses, Interface circuits, I/O interfaces, device drivers in windows, interrupt handlers.

UNIT-II

Processing Unit: Execution of a complete instruction, multiple bus organization, hardwired control, micro programmed control.

Pipelining: data hazards, instruction hazards, influence on instruction sets, data path & control consideration, and RISC architecture introduction.

UNIT-III

Memory: types and hierarchy, model level organization, cache memory, performance considerations, mapping, virtual memory, swapping, paging, segmentation, replacement policies.

UNIT-IV

Processes and Threads: processes, threads, inter process communication, classical IPC problems, Deadlocks.

UNIT-V

File system: Files, directories, Implementation, UNIX file system
Security: Threats, intruders, accident data loss, basics of cryptography, user authentication.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS

1. Computer Organization – Car Hamacher, ZvonksVranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI

REFERENCE BOOKS

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Morris Mano -Computer System Architecture –3rd Edition-Pearson Education.
3. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED UNIX PROGRAMMING LAB

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5011 L/T/P/C : 0/0/4/2

Course Objectives: Students undergoing this course are expected to

- Develop shell programs using its basic syntax, shell variables and its control structure.
- Discuss file system management, file related and directory related system calls in Unix environment.
- Learn about the communication between child and parent process and handling signals in UNIX OS.
- Demonstrate various methods for inter process communication between processes and users.
- Design client server architecture in UNIX environment while dealing with projects.

COURSE OUTCOMES: On successful completion of this course, students should be able to

- Implement shell programs in the Unix environment while exploring OS features.
- Use system calls for manipulating files and directories in UNIX OS.
- Design C programs in Unix environment for communication between child and parent processes.
- Design C Programs for signal handling mechanism.
- Develop inter-process communication mechanisms using PIPES and FIFO's in UNIX.
- Design client server programs for Semaphores, shared memory and message queues.
- Implement UNIX Domain and Internet Domain Sockets.

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.
3. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
4. Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.
5. Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files
6. Write a shell script to list all of the directory files in a directory.
7. Write a shell script to find factorial of a given integer.
8. Write an awk script to count the number of lines in a file that do not contain vowels.

9. Write an awk script to find the number of characters, words and lines in a file.
10. Write a c program that makes a copy of a file using standard I/O and system calls
11. Implement in C the following UNIX commands using System calls
    A. cat B. ls C. mv

12. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.
    A. File type. B. Number of links.
    C. Time of last access. D. Read, Write and Execute permissions.
13. Write a C program to emulate the UNIX ls –l command.
14. Write a C program to list for every file in a directory, its inode number and file name.
15. Write a C program that demonstrates redirection of standard output to a file.Ex: ls> f1.
16. Write a C program to create a child process and allow the parent to display "parent" and the child to display "child" on the screen.
17. Write a C program to create a Zombie process.
18. Write a C program that illustrates how an orphan is created.
19. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:ls –l |sort
20. Write C programs that illustrate communication between two unrelated processes using named pipe
21. Write a C program to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
22. Write a C program that receives the messages (from the above message queue as specified in (21)) and displays them.
23. Write a C program to allow cooperating processes to lock a resource for exclusive use, using a) Semaphores b) flock or lockf system calls.
24. Write a C program that illustrates suspending and resuming processes using signals.
25. Write a C program that implements a producer-consumer system with two processes.(Using Semaphores).
26. Write client and server programs (using c) for interaction between server and client processes using Unix Domain sockets.
27. Write client and server programs (using c) for interaction between server and client processes using Internet Domain sockets.
28. Write a C program that illustrates two processes communicating using shared memory
29. Write a C Program for TCP client Server Communication
30. Write a C Program for UDP client server Communications

TEXT BOOKS

1. Unix the ultimate guide, Sumitabha Das, TMH
2. Unix Network Programming, W. R. Stevens, Pearson/PHI
3. Unix System Programming using C++,T. Cahn.PHI

REFERENCE BOOKS

1. Advanced Programming in the Unix environment, W. R. Stevens, Pearson education.
2. Unix system programming using C++, T. Chan, PHI
3. Unix for programmers and users, third edition, Graham Glass, King Ables, Pearson education.
4. Unix Programming, Kumar Saurabh, 1st Edition, Wiley India Pvt Ltd

OPEN ELECTIVE - I

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

E - COMMERCE AND APPLICATIONS
(Open Elective I)

M.Tech (CSE) I Year - I Semester

Course Code: GR17D5178 L/T/P/C : 3/1/0/4

Course Objectives

- To understand the interest and opportunity of e-commerce
- To know and understand the critical success factors in implementing an ecommerce
- System
- To know how to plan and how to manage e-commerce solutions
- To have hands on, real-life experience with electronic commerce applications
- To analyze and understand the human, technological and business environment
- Associated with e-commerce

Course Outcomes: At the end of the course, the student will be able to

- Understand the trends in e-Commerce and the use of the Internet.(Level 2)
- Analyze, Understand and Comparethe principles of E-commerce and basics of World Wide Web.(Level 2&4)
- Analyze, Understandthe concept of electronic data interchange and its legal, social and technical aspects.(Level 2&4)
- Understandand Evaluate the security issues ssssover the web, the available solutions and future aspects of e-commerce security .(Level 2&5)
- Understanding and Validating the concept of E-banking, electronic payment system.(Level 2&5)
- Understand, Analyze and Comparethe capabilities and limitation of agents, Web based marketing and various security Issues. (Level 2&4)
- Understandingand Evaluation of online advertisements, website design issues and Creating a business transaction using an e commerce site.(Level 2,5 &6)

UNIT-I

INTRODUCTION Traditional commerce and E commerce – Internet and WWW – role of WWW – value chains – strategic business and Industry value chains – role of E commerce, advantages of E commerce, anatomy of e commerce applications.

UNIT-II

INFRASTRUCTURE FOR E COMMERCE Packet switched networks – TCP/IP protocol script – Internet utility programmes – SGML, HTML and XML – web client and servers – Web client/server architecture – intranet and extranets.

UNIT-III

WEB BASED TOOLS FOR E COMMERCE Web server – performance evaluation - web server software feature sets – web server software and tools – web protocol – search engines – intelligent agents –EC software – web hosting – cost analysis

UNIT- IV

SECURITY Computer security classification – copy right and Intellectual property – electronic commerce threats – protecting client computers – electronic payment systems and risks involved in it –electronic cash __ micro payment system– strategies for marketing – sales and promotion – cryptography –authentication.

UNIT-V

INTELLIGENT AGENTS Definition and capabilities – limitation of agents – security – web based marketing – search engines and Directory registration – online advertisements – Portables and info mechanics – website design issues.

TEXT BOOKS

1. Ravi Kalakota, " Electronic Commerce", Pearson Education,
2. Gary P Schneider "Electronic commerce", Thomson learning & James T Peny Cambridge USA, 2001.

REFERENCES BOOK

1. EfraimTurvanJ.Lee, David kug and chung, "Electronic commerce" Pearson Education Asia 2001.
2. Brenda Kienew E commerce Business Prentice Hall, 2001.
3. Manlyn Greenstein and Miklos "Electronic commerce" McGraw-Hill, 2002.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENTERPRISE RESOURCE PLANNING
(Open Elective-I)

M.Tech (IT) I Year - I Semester

Course Code: GR17D5179 L/T/P/C : 3/1/0/4

PREREQUISITES

- Fundamentals of enterprise resource planning (ERP) systems concepts
- Importance of integrated information systems in an organization.

COURSE OBJECTIVES: The objective of the course is to provide the student

- Understanding of the basic concepts of ERP systems for manufacturing or service companies, and the differences among MRP, MRP II, and ERP systems
- Thinking in ERP systems: the principles of ERP systems, their major components, and the relationships among these components
- Capability to adapt in-depth knowledge of major ERP components, including material requirements planning, master production scheduling, and capacity requirements planning
- Understanding knowledge of typical ERP systems, and the advantages and limitations of implementing such systems
- Understanding the business process of an enterprise
- Grasp the activities of ERP project management cycle
- Understanding the emerging trends in ERP developments

COURSE OUTCOMES: At the end of the course the student will be able to

- Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components
- Understand production planning in an ERP system, and systematicallydevelop plans for an enterprise
- Use methods to determine the correct purchasing quantity and right time to buy an item, and apply these methods to material management
- Understand the difficulties of a manufacturing execution system, select a suitable performance measure for different objectives, and apply priority rules to shop floor control
- Knowledge of ERP implementation cycle
- Awareness of core and extended modules of ERP
- Apply emerging trends in ERP

UNIT-I

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

UNIT-II

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

UNIT- III

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

UNIT- IV

ERP MARKET: ERP Market Place – SAP AG – PeopleSoft – Baan Company – JD Edwards World Solutions Company – Oracle Corporation – QAD – System Software Associates.

UNIT- V

ERP-Present and future : Turbo Charge the ERP System – EIA – ERP and E–Commerce – ERP and Internet – Future Directions in ERP.

TEXT BOOKS

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, 1999.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, “Concepts in Enterprise Resource Planning” , Thomson Learning, 2001.
3. Vinod Kumar Garg and N.K .Venkata Krishnan, “Enterprise Resource Planning – concepts and Planning”, Prentice Hall, 1998.
4. Jose Antonio Fernandz, “ The SAP R /3 Hand book”, Tata McGraw Hill

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

MODERN CONTROL THEORY
(Open Elective-I)

M.Tech (EEE) I Year - I Semester

Course Code: GR17D5180 L/T/P/C : 3/1/0/4

PREREQUISITE: Control Systems, Mathematics.

COURSE OBJECTIVES

- To familiarize students with the modelling of systems
- To familiarize the students with the state space analysis of dynamic systems and observe their controllability and Observability.
- To make students understand the concepts of describing function analysis of nonlinear systems and analyze the stability of the systems.
- To analyze the stability of the nonlinear systems.

COURSE OUTCOMES

- Ability to obtain the mathematical model of any system.
- Ability to obtain the state model for dynamic systems.
- Ability to analyze the controllability and Observability for various types of control systems.
- Ability to understand the various types of nonlinearity.
- Ability to analyze the stability of the nonlinear systems.
- Ability to synthesize the nonlinear systems.

UNIT-I

MATHEMATICAL PRELIMINARIES: Fields, Vectors, Vector Spaces — Linear combinations and Bases — Linear Transformations and Matrices — Scalar Product and Norms ,Eigenvalues, Eigen Vectors and a Canonical form representation of linear operators, The concept of state — State Equations for Dynamic systems, Time invariance and Linearity Non uniqueness of state model — State diagrams for Continuous-Time State models.

UNIT-II

STATE VARIABLE ANALYSIS: linear Continuous time models for Physical systems-- Existence and Uniqueness of Solutions to Continuous- time State Equations — Solutions of Linear Time Invariant Continuous-Time State Equations—State transition matrix and it's properties.

CONTROLLABILITY AND OBSERVABILITY-General concept of controllability— General concept of Observability—Controllability tests for Continuous-Time Invariant Systems ---
Observability tests for Continuous-Time Invariant Systems— Controllability and Observability of State Model in Jordan Canonical form— Controllability and Observability Canonical forms of State model.

UNIT- III

NON LINEAR SYSTEMS -I

Introduction to Non Linear Systems - Types of Non-Linearities-Saturation-Dead-Zone - Backlash Jump Phenomenon etc;— Singular Points-Introduction to Linearization of nonlinear systems, Properties of Non Linear systems-Describing function-describing function analysis of nonlinear systems-Stability analysis of Non-Linear systems through describing functions.

UNIT-IV

NON LINEAR SYSTEMS-II

Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase- plane analysis of nonlinear control systems.

UNIT-V

STABILITY ANALYSIS

Stability in the sense of Lyapunov, Lyapunovs stability and Lyapunov's instability theorems - StabilityAnalysis of the Linear continuous time invariant systems by Lyapunov second method — Generation of Lyapunov functions Variable gradient method — Krasooviski's method.

TEACHING METHODOLOGIES

1. White board
2. PPTs
3. Seminars

EXT BOOKS

1. Modern Control System Theory by M.Gopal — New Age International -1999
2. Modern Control Fngineering by Ogata:K — Prentice Hall – 1997

REFERENCE BOOK

1. Control Systems Engineering, N. S. Nise: 4th Ed., Wiley, 2004.Engineering, 4th Ed., Wiley, 2004.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTER–ORIENTED NUMERICAL METHODS IN ENGINEERING
(Open Elective-I)

M.Tech (Civil) I Year - I Semester

Course Code: GR17D5181 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES

- To develop the skill of solving linear algebraic systems by direct and iteration methods.
- To illustrate advanced matrix techniques in the determination of Eigen values and Eigen vectors of square matrix.
- To analyze the performance of various interpolation technique and perform error analysis.
- To compare various numerical differentiation and integration techniques. •
- To explain the various techniques to study Initial and Boundary value problems in ODE.
- To solve a range of problems on applicable software.

COURSE OUT COMES: At the end of the course the student will be able to

- Solve linear algebraic system by direct and iteration methods.
- Apply the knowledge of Eigen values and Eigen vectors to some contents in engineering.
- Develop the skill of working with symmetric matrices in the study of Engineering problems.
- Apply the knowledge of interpolation and extrapolation of uniform and non uniform data to certain contents of Civil Engineering.
- Apply the knowledge of numerical differentiation and integration to some contents of Civil Engineering
- Learn grid based methods to solve Initial and Boundary value problems that arise in engineering problems.
- Develop the skill of solving computational problems using software.

UNIT-I

Solutions of linear equations: Direct method – Cramer's rule, Guass – Elimination method-Gauss Jordan elimination – Triangulation (LU Decomposition) method – Iterative methods Jacobi – Iteration method – Gauss – Siedel iteration, Successive over –relaxation method.

Eigen values and eigen vectors: Jacobi method for symmetric matrices- Given's method for symmetric matrices-Householder's method for symmetric matrices-Rutishauser method of arbitrary matrices –Power method.*Demonstration of solutions using open source software in Numerical Methods.

UNIT-II

Interpolation: Linear Interpolation - Higher order Interpolation - Lagrange Interpolation – Interpolating polynomials using finites differences- Hermite Interpolation -piece-wise and spline Interpolation.*Demonstration of solutions using open source software in Numerical methods.

UNIT - III

Finite Difference and their Applications: Introduction- Differentiation formulas by Interpolating parabolas – Backward and forward and central differences- Derivation of Differentiation formulae using Taylor series- Boundary conditions- Beam deflection – Solution of characteristic value problems- Richardson's extrapolation- Use of unevenly spaced pivotal points- Integration formulae by interpolating parabolas- Numerical solution to spatial differential equations. *Demonstration of solutions using open source software in Numerical Methods.

UNIT-IV

Numerical Differentiation: Difference methods based on undetermined coefficients- optimum choice of step length– Partial differentiation. Numerical Integration: Method based on interpolation-method based on undetermined coefficient – Gauss – Lagrange interpolation method- Radaua integration method- composite integration method – Double integration using Trapezoidal and Simpson's method.*Demonstration of solutions using open source software in Numerical Methods.

UNIT-V

Ordinary Differential Equation: Euler's method – Backward Euler method – Mid point method – single step method, Taylor's series method- Boundary value problems-case studies. *Demonstration of solutions using open source software in Numerical Methods.

***NOTE:** Demonstration of solutions using open source software in Numerical Methods only for the knowledge of students to apply in their Project Works. Not for examination.

TEXT BOOKS

1. M.K.Jain-S.R.K.Iyengar, R.K.Jain Numerical methods for scientific and engineering computations, Willey Eastern Limited, 1987
2. S.S.Shastry, Numerical methods.
3. Curtis I.Gerala, Applied numerical analysis, Addisson Wasley published campus.

REFERENCES BOOKS

1. C.Chopra, Raymond P.Canal, Numerical methods for Engineers Stevan, Mc. Graw Hill book Company, 4th edition, 2002.
2. C.Xavier, C Language and Numerical methods, New age international publisher, 2003.
3. Dr. M.Shanta Kumar, Computer based numerical analysis, Khanna Book publishers, New Delhi.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED COMPUTER ARCHITECTURE
(Open Elective-I)

M.Tech (ECE) I Year - I Semester

Course Code: GR17D5182 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES

- To learn how to build the best processor/computing system understanding the underlying tradeoffs and ramifications.
- To identify and analyze the attributes of computer architecture design with recent trend technology.
- To identify the techniques to improve the speed and performance of computers – Parallelism in Instruction level – Hardware approaches - pipelining,dynamic scheduling, superscalar processors, and multiple issue of instructions.
- To implement the design aspects and categorize various issues , causes and hazards due to parallelisms.
- To examine and compare the performance with benchmark standards.
- To understand the framework for evaluating design decisions in terms of application requirements and performance measurements.
- To learn the design and analysis of complex and high performance multiprocessors and supporting subsystems from the quantitative aspect.

COURSE OUTCOMES: After going through this course the student will be able to

- An ability to discuss the organisation of computer-based systems and how a range of design choices are influenced by applications.
- An ability to understand the components and operation of a memory hierarchy and the range of performance issues influencing its design.
- An ability to interpret the organisation and operation of current generation parallel computer systems, including multiprocessor and multicore systems.
- An ability to understand the various techniques to enhance a processors ability to exploit instruction-level parallelism (ILP), and its challenges.
- An ability to know the classes of computers, and new trends and developments in computer architecture.
- An ability to develop the applications for high performance computing systems.
- An ability to undertake performance comparisions of modern and high performance computers.

UNIT -I

Fundamentals of Computer Design: Fundamentals of Computer design, Changing faces of computing and task of computer designer, Technology trends, Cost price and their trends, measuring and reporting performance, Quantitative principles of computer design, Amdahl's law.

Instruction set principles and examples- Introduction, classifying instruction set- memory addressing type and size of operands, Operations in the instruction set.

UNIT-II

Pipelines: Introduction, basic RISC instruction set, Simple implementation of RISC instruction set, Classic five stage pipe lined RISC processor, Basic performance issues in pipelining, Pipeline hazards, Reducing pipeline branch penalties.

Memory Hierarchy Design: Introduction, review of ABC of cache, Cache performance, Reducing cache miss penalty, Virtual memory.

UNIT-III

Instruction Level Parallelism (ILP) - The Hardware Approach: Instruction-Level parallelism, Dynamic scheduling, Dynamic scheduling using Tomasulo's approach, Branch prediction, High performance instruction delivery- Hardware based speculation.

ILP Software Approach:

Basic compiler level techniques, Static branch prediction, VLIW approach, Exploiting ILP, Parallelism at compile time, Cross cutting issues - Hardware verses Software.

UNIT-IV

Multi Processors and Thread Level Parallelism: Multi Processors and Thread level Parallelism-Introduction, Characteristics of application domain, Systematic shared memory architecture, Distributed shared – Memory architecture, Synchronization.

UNIT-V

Inter Connection and Networks: Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster, Designing of clusters.
Intel Architecture: Intel IA-64 ILP in embedded and mobile markets Fallacies and pit falls.

TEXT BOOKS

1. John L. Hennessy, David A. Patterson - Computer Architecture: A Quantitative Approach, 3rd Edition, an Imprint of Elsevier.

REFERENCE BOOKS

1. John P. Shen and Miikko H. Lipasti -, Modern Processor Design : Fundamentals of Super Scalar Processors
2. Computer Architecture and Parallel Processing - Kai Hwang, Faye A.Brigs., MC Graw Hill.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

IOPERATIONS RESEARCH
(Open Elective-I)

Mtech(ME) I Year - I Semester

Course Code: GR17D5183 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: The Objective of this course is to provide

- Analysis of quantitative methods and techniques for effective Decision–making.
- Constructing models that are used in solving business decision problems.
- Introduce the students to the use of basic methodology for the solution of linear programs and integer programs.
- Introduce the students to methods for solving large-scale transportation and assignment problems.
- Illustrate how sequencing is carried out in assigning jobs to machines
- Understand the concept of Inventory and apply different models in optimizing the same.
- Apply PERT/CPM: [Project scheduling and allocation of resources] to schedule and control construction of dams, bridges, roads etc. in an optimal way.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Apply various linear programming techniques for optimal allocation of limited resources such as machine, materials and money
- Solve transportation problems to minimize cost and understand the principles of assignment of jobs and recruitment polices.
- Solve game theory problems.
- Solve problems of inventory and develop proper inventory policies.
- Apply PERT/CPM: [Project scheduling and allocation of resources] to schedule and control construction of dams, bridges, roads etc in a optimal way.
- Solve sequencing problems.
- Develop optimum replacement policy

UNIT-I

Introduction: Definition and scope of operations research(OR),ORmodel, solving the O**R** model, art of modeling, phases of OR study.

Linear Programming:

Two variable Linear Programming model and Graphical method of solution, Simplex method, Dual Simplex method, special cases of Linear Programming, duality, sensitivity analysis.

UNIT-II

Transportation Problems: Types of transportation problems, mathematical models, transportation algorithms

Assignment: Allocation and assignment problems and models, processing of job through machines.

UNIT-III

Network Techniques: Shortest path model, minimum spanning Tree Problem, Max-Flow problem and Min-cost problem.
Project Management: Phases of project management, guidelines for network construction, CPM and PERT.

UNIT-IV

Theory of Games: Rectangular games, Min-max theorem, graphical solution of 2xnormx2 games, game with mixed strategies, reduction to linear programming model.
Quality Systems: Elements of Queuing model, generalized Poisson queuing model.

UNIT-V

Inventory Control: Models of inventory, operation of inventory system, quantity discount.
Replacement models: Equipments that deteriorate with time, equipments that fail with time.

Text/ Reference Books:

1. Wayne L. Winston,"OperationsResearch", Thomson Learning, 2003.
2. Hamdy H. Taha, "Operations Research - An Introduction", Pearson Education, 2003.
3. R. Panneer Seevam, "Operations Research", PHI Learning, 2008.
4. V. K. Khanna, "Total Quality Management", New Age International, 2008.

Teaching Methodology:

- Lecture is delivered on blackboard, preparing OHP sheets and by preparing Power point presentations.
- Seminars are conducted on new technologies related to subject.
- Assignments are given.
- Group discussions are conducted on familiar topics related to subject.
- Industrial visits for practical exposure to understand and explore things.

II- SEMESTER

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED PROBLEM SOLVING

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5001 L/T/P/C : 3/1/0/4

Course Objectives: Students undergoing this course are expected to

- Describe the concepts and features of object oriented programming.
- Analyze the performance of the algorithms.
- Demonstrate Linear and Nonlinear data structure operations and applications.
- Explain the various Searching and Sorting techniques.
- Illustrate Pattern matching algorithms and Tries for Text processing.

Course Outcomes: At the end of the course, the student will be able to:

- Apply object oriented programming features and concepts for solving a given problem.
- Evaluate Space and Time complexity of algorithms.
- Experiment the operations and applications of linear and nonlinear data structures using Java.
- Compare and contrast Linear and Nonlinear data structures.
- Write Java programs for Sorting and Searching techniques.
- Examine text processing techniques.
- Use different data structures for real world applications.

UNIT-I

OOP Using Java - Class and Objects, Variables, Operators, Expressions, Methods, Decision statements, Loops, Arrays, OOP concepts- Encapsulation, Inheritance, Polymorphism, Abstraction, Modularity, Exception handling, Input and Output, Java and Pointers, Interfaces, Packages, Abstract classes, Casting in Inheritance hierarchy, Casting with Interfaces, Vectors in java.util,Data Structures And OOP, Writing a java program-Design, coding, testing and debugging. Basic concepts (Review)- Abstract Data Types, Data structures, Algorithms-Characteristics of Algorithms, Performance analysis- Time complexity and Space complexity, Asymptotic Analysis-Big O, Omega and Theta notations.

UNIT-II

Linear data structures- The List ADT, Array and Linked Implementations, Singly Linked Lists-Operations - Insertion, Deletion, Traversals, Doubly Linked Lists – Operations - Insertion, Deletion, Skip Lists-implementation, Stack ADT, definitions, operations, Array and Linked implementations, applications-infix to postfix conversion, recursion implementation, tail recursion, nontail recursion, indirect recursion, Queue ADT, definitions and operations ,Array and Linked Implementations, Priority Queue ADT, Dequeue ADT, Implementation using doubly linked lists, Stacks and Queues in java.util.

UNIT- III

Non Linear data structures-Trees-Basic Terminology, Binary tree ADT, array and linked representations, iterative traversals, threaded binary trees, Applications-Disjoint-Sets, Union and Find algorithms, Huffman coding, General tree to binary tree conversion, Realizing a Priority Queue using Heap.

Search Trees- Binary Search Tree ADT, Implementation, Operations- Searching, Insertion and Deletion, Balanced Search trees-AVL Trees, Operations – Insertion and Searching-Trees, B-Tree of order m, Operations- Insertion, Deletion and Searching, Introduction to Red-Black Trees, Splay Trees*-Trees, B+-Trees(Elementary treatment), Comparison of Search Trees, Trees in java.util.

UNIT- IV

Searching- Linear Search, Binary Search, Hashing-Hash functions, Collision-Handling schemes, Hashing in java.util,DictionaryADT, Linear list representation, Skip list representation, Hash table representation, Comparison of Searching methods.

Sorting- Bubble Sort, Insertion Sort, Shell sort, Heap Sort, Radix Sort, Quick sort, Merge sort, Comparison of Sorting methods, Sorting in java.util.

UNIT- V

Graphs–Basic Terminology, Graph Representations- Adjacency matrix, Adjacency lists, Adjacency multi lists, Graph traversals- DFS and BFS, Spanning trees-Minimum cost spanning trees, Kruskal's Algorithm for Minimum cost Spanning trees, Shortest paths- Single Source Shortest Path Problem, All Pairs Shortest Path Problem.

TextProcessing - Pattern matching algorithms- The Knuth-Morris-Pratt algorithm, The Boyer-Moore algorithm, Tries- Standard Tries, Compressed Tries, and Suffix tries.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXT BOOKS

1. Data structures and Algorithms in Java, Adam Drozdek, Cengage Learning.
2. Data structures and Algorithms in Java, Michael T.Goodrich and R.Tomassia, Wiley
3. India edition.
4. Data structures, Algorithms and Applications in Java, S.Sahani, Universities Press.

REFERENCE BOOKS

1. Data structures and algorithms in Java, Robert Lafore, Pearson Education.
2. Data structures with Java, W.H.Ford and W.R.Topp, Pearson Education.
3. Classic Data structures in Java, T.Budd, Pearson Education.
4. Data Structures using Java, D.S. Malik and P.S.Nair, Cengage Learning,
5. An Introduction to Data structures and Algorithms, J.A.Storer, Springer.
6. Data structures and Java Collections Frame Work, W.J.Collins, McGraw Hill.
7. Data structures with Java, J.R.Hubbard and A.Huray, PHI.
8. Data Structures using Java, Y.Langsam, M.Augenstein, A.Tanenbaum, Pearson Education.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED DATA MINING

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5013 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to:

- Differentiate Online Transaction Processing and Online Analytical processing
- Learn Multidimensional schemas suitable for data warehousing
- Understand various data mining functionalities
- Inculcate knowledge on data mining query languages.
- Know in detail about data mining algorithms

COURSE OUTCOMES: At the end of the course, the student will be able to

- Design a data mart or data warehouse for any organization
- Develop skills to write queries using DMQL
- Extract knowledge using data mining techniques
- Develop and apply critical thinking, problem-solving, and decision-making skills.
- Describing and demonstrating basic data mining algorithms, methods, and tools.
- Explore recent trends in data mining such as web mining, spatial-temporal mining
- Demonstrate research skills and make effective use of online and written documentation

UNIT-I

Data mining Overview and Advanced Pattern Mining

Data mining tasks – mining frequent patterns, associations and correlations, classification and regression for predictive analysis, cluster analysis , outlier analysis; advanced pattern mining in multilevel, multidimensional space – mining multilevel associations, mining multidimensional associations, mining quantitative association rules, mining rare patterns and negative patterns.

UNIT- II

Advance Classification

Classification by back propagation, support vector machines, classification using frequent patterns, other classification methods – genetic algorithms, roughest approach, fuzzyset approach.

UNIT-III

Advance Clustering

Density - based methods –DBSCAN, OPTICS, DENCLUE; Grid - Based methods – STING, CLIQUE; Expectation – maximization algorithm; clustering High - Dimensional Data; Clustering Graph and Network Data.

UNIT-IV

Web and Text Mining

Introduction, web mining, web content mining, web structure mining, web usage mining, Text mining – unstructured text, episode rule discovery for texts, hierarchy of categories, text clustering.

UNIT-V

Temporal and Spatial Data Mining

Introduction; Temporal Data Mining – Temporal Association Rules, Sequence Mining, GSP algorithm, SPADE, SPIRIT Episode Discovery, Time Series Analysis, Spatial Mining – Spatial Mining Tasks, Spatial Clustering, Data Mining Applications.

TEXT BOOKS

1. Data Mining Concepts and Techniques, Jiawei Hang Micheline Kamber, Jianpei,MorganKaufmannn.
2. Data Mining Techniques – Arun K pujari, Universities Press.

REFERENCE BOOKS

1. Introduction to Data Mining – Pang - Ning Tan, Vipinkumar, Michael Steinbach, Pearson.
2. Data Mining Principles & Applications – T.V Sveresh Kumar, B.Esware Reddy, JagadishSKalimani, Elsevier.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

CRYPTOGRAPHY AND NETWORK SECURITY

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5014 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Provide an introduction to the fundamental principles of cryptography and its applications on the network security domain.
- Study various approaches to Encryption techniques, strengths of Traffic Confidentiality, Message Authentication Codes.
- Be familiar with cryptographic techniques for secure (confidential) communication of two parties over an insecure (public) channel; verification of the authenticity of the source of a message.
- Illustrate how network security and management mechanisms employ cryptography to prevent, detect, and mitigate security threats against the network

COURSE OUTCOMES: At the end of the course, the student will be able to

- Have a fundamental understanding of the objectives of cryptography and network security.
- Become familiar with the cryptographic techniques that provides information and network security.
- Impart knowledge on Encryption techniques, Design Principles and Modes of operation.
- Understand the Key Management techniques and Number Theory.
- Create an understanding of Authentication functions the manner in which Message Authentication Codes and Hash Functions works.
- Examine the issues and structure of Authentication Service and Electronic Mail Security
- Provide familiarity in Intrusion detection and Firewall Design Principles.

UNIT-I

Security Goals, 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

UNIT-II

Conventional Encryption Principles & Algorithms (DES, AES, IDEA), cipher modes of operation, location of encryption devices, key distribution Public key cryptography principles, public key cryptography algorithms (RSA, Diffie-Hellmann, ECC), key distribution

UNIT -III

Approaches of Message Authentication, Secure Hash Functions (SHA-512, Whirlpool) and HMAC. Digital signatures: Comparison, Process-Need for Keys, Signing the digest, Services, Attacks on digital Signatures, Kerberos, X.509 Directory Authentication Service. Email privacy: Pretty Good Privacy (PGP) and S/MIME

UNIT-IV.

IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management. Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

UNIT- V

Introduction: payment types, Enabling technologies: communication technologies, smart cards and smart phones,Card holder present E-Transactions:Attacks,chip card Transaction, Payment over the Internet:Issues and Concerns,Secure Electronic Transaction,On-Line Rail Ticket Booking .Mobile Payments,Electronic cash.

Web Services Security: Motivation: Introduction, Entities Involved, Technologies for web Services: XML, SOAP, WSDL and UDDI, WS-Security: Token types, XML Encryption, XML Signatures

TEACHING METHODOLOGIES

The course will be based on the following teaching and learning activities:

1. Lectures using PowerPoint presentations
2. Practical work
3. Student Presentation selected topics
4. Class lectures, lecture notes, and quizzes are designed to achieve the course objectives.
5. Case studies
6. Review questions

TEXT BOOKS

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Hack Proofing your network by Ryan Russell, Dan Kaminsky, Rain Forest Puppy, Joe Grand, David Ahmad, Hal Flynn I do Dubrawsky, Steve W.Manzuik and Ryan Permeh, wiley Dreamtech

REFERENCE BOOKS

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

SERVICE ORIENTED ARCHITECTURE
ELECTIVE III

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5021 L/T/P/C : 3/1/0/4

PRE-REQUISITES

- Strong programming skills with Java experience.
- Object-Oriented Programming and Design skills.
- Moderate understanding of computer architecture and of operating systems.
- Moderate understanding of distributed computing.

COURSE OBJECTIVES: Students undergoing this course are expected to

- Provide fundamental concepts of Service Oriented Architecture..
- Gain knowledge about SOAP, WSDL and XML to create web services.
- Gain knowledge about design and development of Web services.
- Can describe the principles, characteristics and objectives of service-oriented computing

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Analyze basic principles of Service Oriented Architecture and apply these concepts to develop a sample application
- Identify and select the appropriate framework components in the creation of web service solutions
- Design, develop and test Web services.
- Demonstrate an understanding of the service composition..
- Demonstrate an ability to manage a modern medium scale software development project using SOA principles.
- Demonstrate an understanding of the principles linking business processes, process oriented architectures and service oriented architectures.
- Demonstrate the standards related to Web services: Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP)

UNIT-I

SOA and Web Services Fundamentals: Introducing SOA - Fundamental SOA, Common characteristics of Contemporary SOA, Common tangible benefits of SOA, Common pitfalls of adopting SOA. Evolution of SOA- an SOA timeline, the continuing evolution of SOA, The roots of SOA. Web Services and primitive SOA- the Web Services frame work, Services, Service descriptions, messaging.

UNIT-II

Web Services Extensions: Web Services and Contemporary SOA - Message exchange patterns, Service Activity, Coordination, Atomic transactions, Business Activities, Orchestration, Choreography, Addressing, Reliable messaging, Correlation, Policies, Metadata exchange and Security.

UNIT-III

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

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

UNIT-IV

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

UNIT-V

Building SOA (Technology and Design): Service Oriented Design-Introduction to Service-Oriented design, WSDL related XML schema language basics, WSDL language basics, SOAP language basics, Service interface design tools.

Service Design- Service Design overview, Entity-centric business Service Design, Application Service Design, Task-centric business Service Design, Service Design guidelines. SOA Platforms--SOA Platform basics, SOA support in J2EE and .NET, Integration Considerations.

TEXT BOOKS

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

REFERENCES BOOKS

1. The Definitive guide to SOA, Jeff Devies& others, A press, Dreamtech.
2. Java SOA Cook book, E.H Hewitt, SPD.
3. SOA in practice, N. M. Josuttis, SPD.
4. SOA for Enterprise Applications, Shankar. K, Wiley India Edition.
5. SOA-Based Enterprise Integration, W. Roshen, TMH.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

INFORMATION STORAGE AND RETRIEVAL
ELECTIVE III

M.Tech (CSE) | I Year - II Semester
Course Code: GR17D5017 | L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Learn various data structures involved in IRS.
- Describe Information Retrieval System capabilities.
- Compare and contrast software text search algorithms and hardware text search systems.
- Illustrate measures used in system evaluation.
- Demonstrate Document and term clustering, Cataloging and Indexing

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Summarize the data structures used in IRS.
- Tabulate User search techniques and information visualization technologies.
- Differentiate software text search algorithms and hardware text search sytems.
- Find the accuracy for various clustering algorithms.
- Survey IRS capabilities.
- Explain use of cataloging and indexing.

UNIT-I

Introduction: Definition, Objectives, Functional Overview, And Relationship to DBMS, Digital libraries and Data Warehouses, Information Retrieval System Capabilities: Search, Browse, Miscellaneous

UNIT-II

Cataloging and Indexing: Objectives, Indexing Process, Automatic Indexing, Information Extraction.
Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure. Automatic Indexing: Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages

UNIT-III

Document and Term Clustering: Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters. User Search Techniques: Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, Weighted searches of Boolean systems, Searching the Internet and hypertext. Information Visualization: Introduction, Cognition and perception, Information visualization technologies.

UNIT-IV

Text Search Algorithms: Introduction, Software text search algorithms, Hardware text search systems.

Information System Evaluation: Introduction, Measures used in system evaluation, Measurement example – TREC results.

UNIT-V

Multimedia Information Retrieval- Models and Languages- Data Modeling, Query Languages, Indexing and Searching – Libraries and Bibliographical Systems – Online IR Systems, OPACs, Digital Libraries.

TEACHING METHODOLOGIES

1. Power Point presentations
2. Tutorial Sheets
3. Assignments

TEXTBOOKS

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.

REFERENCE BOOKS

1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrieval by Yates Pearson Education.
3. Information Storage &Retrieval by Robert Korfhage – John Wiley & Sons

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

CLOUD COMPUTING AND APPLICATIONS
ELECTIVE III

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5018 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Understand the emerging area of "cloud computing" and how it is related to the traditional models of computing.
- Understand various types of cloud services and models of cloud computing.
- Provide strong foundation of the Cloud computing, so that students will be able to start using and adopting Cloud Computing services and tools in their real life.
- Develop and Deploy an Application on a Cloud.
- Understand various Schedules and task managements, collaborating on project management and social networks.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Understand the key dimensions of the challenges of Cloud computing.
- Understand the features, advantages of Cloud Computing , compare their operation, implementation and performance.
- Understand, Explain and characterize different types of clouds.
- Understand the different services offered by cloud and exploring the state of art of major cloud players.
- Provide cloud computing solutions for individual users as well as enterprises.
- Collaborate and work in teams to contribute, evaluate and give feedback on case studies on different cloud computing solutions.
- Understand the assessment of the economics , financial, and technological implications for selecting cloud computing for an organization

UNIT-I

UNDERSTANDING CLOUD COMPUTING Cloud Computing –Introduction about Cloud Computing –Cloud Architecture–Cloud Storage–Why Cloud Computing Matters–Advantages of Cloud Computing –Disadvantages of Cloud Computing –Companies in the Cloud Today –Cloud Services

UNIT- II

DEVELOPING CLOUD SERVICES Web-Based Application –Pros and Cons of Cloud Service Development –Types of Cloud service Development –Software as a Service –Platform as a Service –Web Services –On-Demand Computing –Discovering Cloud Services Development Services and Tools –Amazon Ec2 –Google App Engine –IBM Clouds**,** Virtualization.

UNIT-III

CLOUD COMPUTING FOR EVERYONE Centralizing Email Communications–Collaborating on Schedules –Collaborating on To-Do Lists –Collaborating Contact Lists –Cloud Computing for the Community –Collaborating on Group Projects and Events –Cloud Computing for the Corporation

UNIT-IV

USING CLOUD SERVICES Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications –Exploring Online Planning and Task Management – Collaborating on Event Management –Collaborating on Contact Management –Collaborating on Project Management –Collaborating on Word Processing -Collaborating on Databases –Storing and Sharing Files

UNIT-V

OTHER WAYS TO COLLABORATE ONLINE Collaborating via Web-Based Communication Tools –Evaluating Web Mail Services –Evaluating Web Conference Tools –Collaborating via Social Networks and Groupware –Collaborating via logs and Wikis.

TEXT BOOKS

1. “Cloud Computing: Principles and Paradigms”, Raj Kumar Buyya, James Bromberg, Andrej Kosciusko, Wiley, New York, USA

REFERENCE BOOKS

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work ndCollaborate Online, Que Publishing, August 2008.
2. Kumar Saurabh, “Cloud Computing –Insights into New Era Infrastructure”, Wiley Indian Edition,2011.
3. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

HIGH PERFORMANCE COMPUTING
ELECTIVE IV

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5019 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to:

- Improvise and recollect in the basic concepts of parallelism and gain the exposure of architectures.
- Understand and utilize the architecture and design models.
- Aware of all issues and deploy the shared memory programming models .
- Comprehend and recall the Distributed memory programming .
- Manipulate and Illustrate the General-purpose computing on graphics
- processing units in digital applications.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Understand and recall the basic concepts of parallelism such as SIMD,SIMT,SPMD.
- Analyze the data decomposition techniques such as data level parallelism, task level parallelism and data flow parallelism .
- Aware and recognize the implementation of shared memory programming and to know the real time design issues.
- Understand issues associated with load balancing and performance analysis.
- Able to develop parallel programs using MPI/OMP in multicore system.
- Impart and correlate the minutiae of Distributed memory programming and to understand all underlying preliminary concepts.
- Distinguish and design the General-purpose computing on graphics processing units in real time processing.

UNIT-I

Parallel Processing Concepts: Levels of parallelism (instruction, transaction, task, thread, memory, function), Models : SIMD, MIMD, SIMT, SPMD, Dataflow Models, Demand-driven Computation etc, Architectures: N-wide superscalar architectures, multi-core, multi-threaded, Motivating high performance applications

UNIT-II

Designing Parallel Programs: Automatic vs. Manual Parallelization, Understand the Problem and the Program, Partitioning, Communications, Synchronization, Data Dependencies, Load Balancing, Granularity, Limits and Costs of Parallel Programming, Performance Analysis and Optimization tuning

UNIT-III

Shared memory programming: Fundamentals of Shared Memory Programming, Basic OpenMP concepts, PARALLEL directive, Data scoping rules, Basic OpenMP constructs/directives/calls, Examples: Parallelizing an existing code using OpenMP, More advanced OpenMP directives & functions, OpenMP Performance issues, Running threaded/OpenMP programs on multicore system.

UNIT-IV

Distributed memory programming, Fundamentals of message passing concepts, MPI message passing APIs, send, receive, collective operations. Groups, Contexts and Communicators, Topologies, Runtime and Environment Management, MPI profiling interface and tracing, OpenMP 3.0 enhancements.

UNIT-V

GPGPU Programming with CUDA and OpenCL – Introduction to GPGPU Programming and CUDA: Programming Model, CUDA API, CUDA Memory Model, Short introduction to OpenCL. Application case study. Future of Computing: Petascale computing.

TEXT BOOKS

1. Parallel Computer Architecture: A hardware/Software Approach", by David Culler Jaswinder Pal Singh, Morgan Kaufmann, 1999.(I&II)
2. CUDA by Example: An Introduction to General Purpose GPU Programming, by Jason Sanders and Edwards Kandrot, Addison Wesley, 2011.(unit- V)
3. Using MPI - 2nd Edition: Portable Parallel Programming with the Message Passing Interface by, William Gropp, Ewing L. Lusk, and Anthony Skjellum. Scientific and Engineering Computation, 2nd edition, 1999(unit-IV)
4. Using OpenMP: Portable Shared Memory Parallel Programming by Barbara Chapman, Gabriele Jost and Rudvander Pas. Scientific and Engineering Computation, 2nd edition(unit-III)

REFERENCE BOOKS

1. Parallel Programming: Techniques and Application Using Networked Workstations and Parallel Computers, 2nd edition, by B. Wilkinson and M. Allen, Prentice Hall Inc., 2005
2. Heterogeneous Computing with OpenCL. Benedict Gaster, Lee Howes, David R. Kaeli, PerhaadMistry, Dana Schaa, Elsevier, 2011.
3. Scalable Parallel Computing, by Kai Hwang, McGraw Hill 1998.
4. Introduction to Parallel Computing, AnanthGrama, Anshul Gupta, George Karypis, and Vipin Kumar, 2nd edition, Addison-Welsey, 2003.
5. Petascale Computing: Algorithms and Applications, David A. Bader (Ed.), Chapman & Hall/CRC Computational Science Series, 2007.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

NATURAL LANGUAGE PROCESSING
ELECTIVE IV

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5020 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Explain the concepts of syntax, semantics and pragmatics of the language.
- Generalize the various language models and estimating the parameters which influence the language models.
- Discuss machine learning techniques used in NLP, including hidden Markov models and probabilistic models, context-free grammars, clustering and unsupervised methods, log-linear and discriminative models, and the EM algorithm as applied within NLP.
- Summarize the various machine translation schemes such as statistical, word alignment and phrase based translation.
- Describe the applications based on natural language processing in terms of syntactic, semantic and pragmatic processing.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars
- Examine proper experimental methodology for training and evaluating empirical NLP systems
- Manipulate probabilities, construct statistical models over strings and trees
- Design, implement, and analyze NLP algorithms
- Survey research papers in natural language processing
- Estimate parameters using supervised and unsupervised training methods
- Identify the role of machine learning and language models

UNIT-I

Introduction: NLP tasks in syntax, semantics, and pragmatics. Applications such as information extraction, question answering and machine translation, problem of ambiguity, 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 Labelling: 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 Labelling and Semantic Parsing.

UNIT- V

Information Extraction (IE) and Machine Translation (MT): Named entity recognition and Relation extraction, IE using sequence labelling, 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).

TEXT BOOK

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

REFERENCE BOOKS

1. Allen, James. 1995. – "Natural Language Understanding". Benjamin / Cummings, 2nd edition.
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.

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INSTITUTE OF ENGINEERING AND TECHNOLOGY

ADVANCED COMPUTER NETWORKS
ELECTIVE IV

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5015 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing this course are expected to

- Identify different transmission media used for wired networks and wireless networks
- Analyze the functionalities of various kinds of networking devices used for communication
- Design different Routing technologies involved to route packets with respect to Unicasting, Broadcasting and Multicasting
- Compare Internet protocol (IP) , Transmission Control Protocol (TCP) and User Datagram Protocol (UDP)
- Learn routing procedure in Cellular Networks, Wireless Mesh Networks and Optical Systems.

COURSE OUTCOMES: At the end of the course the student will be able to

- Use different kinds of transmission media for wired networks and wireless networks
- Construct various networking devices used for different networks
- Implement routing methods and protocols for unicasting, broadcasting and multicasting communication
- Compare the functionalities of Internet protocol (IP), Transport Control Protocol (TCP) and User Datagram Protocol (UDP).
- Validate various routing procedures used in Cellular Networks, Wireless Mesh Networks and Optical Networks.
- Develop routing protocols for virtual private networks and overlay networks.
- Design Adhoc networks and multimedia networks.

UNIT-I

Computer Networks and the Internet: What is the Internet, The Network edge, The Network core, Access Networks and Physical Media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks.

Foundation of Networking Protocols: 5-layer TCP/IP Model, 7-Layer OSI Model, Equal-Sized Packets Model-ATM

UNIT-II

The Link Layer and Local Area Networks: Link Layers: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access protocols, Link Layer Addressing, Point to Point Protocol (PPP).

Networking Devices: Multiplexers, Modems and Internet Access Devices, Switching and Routing Devices, Router Structure.

Routing and Internetworking: Network-Layer Routing, Least –cost-path algorithms, non-least-cost-path algorithms, Intra-domain Routing Protocols, Inter-domain Routing Protocols, Congestion control at Network Layer

UNIT-III

Logical Addressing: IPV4 Addresses, IPV6 Addresses – Internet Protocol: Internetworking, IPV4, IPV6, Transitions from IPV4 to IPV6 – Multicasting Techniques and Protocols: Basic Definitions and Techniques, Intra-domain Multicast Protocols, Inter-domain Multicast Protocols.

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocols (TCP),User Datagram Protocol (UDP) Applications, The Web and HTTP, FTP, Electronic Mail in the Internet, Domain Name System (DNS) , P2P File sharing, Socket Programming with TCP and UDP

UNIT-IV

Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs)

Optical Networks and WDM Systems: Overview of Optical Networks, Basic Optical Networking Devices, Large- Scale Optical Switches, Optical Routers, Wavelength Allocations in Networks, Case Study: An All-optical Switch

UNIT-V

VPNs, Tunneling and Overlay Networks: Virtual Private Networks(VPNs) , Multiprotocol Label Switching(MPLS), Overlay Networks –VoIP and Multimedia Networking : Overview of IP Telephony , VoIP Signaling Protocols, Real-Time Media Transport Protocols, Stream Control Transmission Protocol-Mobile A-Hoc Networks : Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks, Routing Protocols for Ad-Hoc Networks.

TEACHING METHODOLOGIES

1. Power point presentation
2. Interactive sessions through self assessment tests
3. Assignments

TEXT BOOKS

1. Computer Networking: A Top Down Approach Featuring the Internet, James F. Kurose, Keith W. Ross, Third edition, Pearson Education,2007
2. Computer and Communication networks, Nader F. Mir, Pearson Education, 2007

REFERENCE BOOKS

1. Data communications and Networking, Behrouz Z. Forouzan, Fourth Edition, Tata McGraw Hill, 2007
2. Guide to Networking Essentials, Greg Tomsho, Ed Title, David Johnson, Fifth Edition, Thomson.
3. An Engineering Approach to Computer Networking, S. Keshav, Pearson Education.
4. Campus Network design Fundamentals, Diane Teare, Catherine Paquet, Pearson Education (CISCO Press)
5. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.
6. The Internet and Its protocols, A. Farrel, Elsevier

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

DATAWARE HOUSING DATA MINING / INFORMATION SECURITY LAB

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5022 L/T/P/C : 0/0/4/2

COURSE OBJECTIVES : Students undergoing this course are expected to:

- Differentiate On-line Transaction Processing and On-line Analytical processing
- Learn Multidimensional schema suitable for data warehousing
- Understand various data mining functionalities
- Deals with the implementation of cryptographic algorithms
- Understanding of the various network security aspects

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Adapt to new data mining tools.
- Explore recent trends in data mining such as web mining, spatial-temporal mining
- To understand the basic principles, concepts and applications of data warehouse and data mining.
- Ability to create training data set using data mining tools.
- Will able to implement cryptographic algorithms to solve the security issues.
- Understand security : Attacks ,services &mechanisms
- Understand analyze and work on activities fraud prevention monitoring, investigation, reporting.

Data Warehousing and Data Mining:

Task 1: Credit Risk Assessment

Description:

The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient. To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant. Case histories.Find records of actual

cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data:

Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. credit dataset (original) Excel spreadsheet version of the German credit data.In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer !)A few notes on the German dataset
DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter). owns_telephone. German phone rates are much higher than in Canada so fewer people own telephones. foreign_worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents. There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

Subtasks : (Turn in your answers to the following tasks)

1. List all the categorical (or nominal) attributes and the real-valued attributes separately.
2. What attributes do you think might be crucial in making the credit assessement.Come up with some simple rules in plain English using your selected attributes.
3. One type of model that you can create is a Decision Tree - train a Decision Treebusing the complete dataset as the training data. Report the model obtained after training.
4. Suppose you use your above model trained on the complete dataset, and classify credit good/bad for each of the examples in the dataset. What % of examples can you classify correctly? (This is also called testing on the training set) Why do you think you cannot get 100 % training accuracy?
5. Is testing on the training set as you did above a good idea? Why orWhy not?
6. One approach for solving the problem encountered in the previous question is using cross-validation? Describe what is cross-validation briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease?Why ?
7. Check to see if the data shows a bias against "foreign workers" (attribute 20),or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.
8. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the arff data file to get all the attributes initially before you start selecting the ones you want.)

9. Sometimes, the cost of rejecting an applicant who actually has a good credit (case 1) might be higher than accepting an applicant who has bad credit (case 2). Instead of counting the misclassifcations equally in both cases, give a higher cost to the first case (say cost 5) and lower cost to the second case. You can do this by using a cost matrix in Weka. Train your Decision Tree again and report the Decision Tree and cross-validation results. Are they significantly different from results obtained in problem 6 (using equal cost)?
10. Do you think it is a good idea to prefer simple decision trees instead of having long complex decision trees ? How does the complexity of a Decision Tree relate to the bias of the model ?
11. You can make your Decision Trees simpler by pruning the nodes. One approach is to use Reduced Error Pruning - Explain this idea briefly. Try reduced error pruning for training your Decision Trees using cross-validation (you can do this in Weka) and report the Decision Tree you obtain? Also, report your accuracy using the pruned model. Does your accuracy increase
12. (Extra Credit): How can you convert a Decision Trees into "if-then- else rules". Make up your own small Decision Tree consisting of 2-3 levels and convert it into a set of rules. There also exist different classifiers that output the model in the form of rules - one such classifier in Weka is rules.PART, train this model and report the set of rules obtained. Sometimes just one attribute can be good enough in making the decision, yes, just one! Can you predict what attribute that might be in this dataset?OneR classifier uses a single attribute to make decisions (it chooses the attribute based on minimum error). Report the rule obtained by training a one R classifier. Rank the performance of j48, PART and oneR.

Task Resources

- Mentor lecture on Decision Trees
- Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
- Decision Trees (Source: Tan, MSU)
- Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)

Weka Resources

- Introduction to Weka (html version) (download ppt version)
- Download Weka
- Weka Tutorial
- ARFF format
- Using Weka from command line

Task 2: Hospital Management System

Data Warehouse consists of Dimension Table and Fact Table.REMEMBER The following Dimension The dimension object (Dimension): _ Name_ Attributes (Levels) , with one primary key _ Hierarchies One time dimension is must. About Levels andHierarchiesDimension objects (dimension) consist of a set of levels and a set of hierarchies defined over those levels. The levels

represent levels of aggregation. Hierarchies describe parent-child relationships among a set of levels.

For example, a typical calendar dimension could contain five levels. Two hierarchies can be defined on these levels:
H1: YearL>QuarterL>MonthL>WeekL>DayL H2: YearL>WeekL>DayL
The hierarchies are described from parent to child, so that Year is the parent of Quarter, Quarter the parent of Month, and so forth.
About Unique Key Constraints
When you create a definition for a hierarchy, Warehouse Builder creates an identifier key for each level of the hierarchy and a unique key constraint on the lowest level (Base Level) Design a Hospital Management system data warehouse (TARGET) consists of Dimensions Patient, Medicine, Supplier, Time. Where measures are ' NO UNITS', UNIT PRICE.
Assume the Relational database (SOURCE) table schemas as follows TIME (day, month, year), PATIENT (patient_name, Age, Address, etc.,)
MEDICINE (Medicine_Brand_name, Drug_name, Supplier, no_units, Uinit_Price, etc.,)
SUPPLIER :(Supplier_name, Medicine_Brand_name, Address, etc.,)
If each Dimension has 6 levels, decide the levels and hierarchies, Assume the level names suitably. Design the Hospital Management system data warehouse using all schemas. Give the example 4-D cube with assumption names.

INFORMATION SECURITY LAB

List of programs:

1. Write a Java program to perform encryption and decryption using the following algorithms a. Ceaser cipher b. Substitution cipher c. Hill Cipher
2. Write a C/ JAVA program to implement the DES algorithm logic.
3. Write a C/JAVA program to implement the Blowfish algorithm logic.
4. Write a C/JAVA program to implement the AES algorithm logic.
5. Write the RC4 logic in Java.
6. Implement DES-2 and DES-3 using Java cryptography package.
7. Write a Java program to implement RSA algorithm.
8. Implement the Diffie-Hellman Key Exchange mechanism 9. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
10. Calculate the message digest of a text using the MD5 algorithm in JAVA.
11. Explore the Java classes related to digital certificates.
12. Write a program in java, which performs a digital signature on a given text.

OPEN ELECTIVE - II

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

HUMAN COMPUTER INTERACTION
(Open Elective-II)

M.Tech (CSE) I Year - II Semester

Course Code: GR17D5184 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: Students undergoing the course are expected to:

- Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
- Recognize how a computer system may be modified to include human diversity.
- Select an effective style for a specific application.
- Design mock ups and carry out user and expert evaluation of interfaces.
- Carry out the steps of experimental design, usability and experimental testing, and
- Evaluation of human computer interaction systems.
- Use the information sources available, and be aware of the methodologies and technologies supporting advances in HCI.

COURSE OUTCOMES: At the end of the course, the student will be able to:

- Describe what interaction design is and how it relates to human computer interaction and other fields.
- Describe the social mechanisms that are used by people to communicate and collaborate.
- Describe how technologies can be designed to change people's attitudes and behavior.
- Discuss how to plan and run a successful data gathering program.
- Discuss the difference between qualitative and quantitative data and analysis.
- Discuss the conceptual, practical, and ethical issues involved in evaluation.
- Describe how to perform two types of predictive techniques, GOMS and Fitts Law, and when to use them.

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

Develop System Menus and Navigation Schemes-Select the proper kinds of Windows, -Select the proper Device based Controls, Choose the proper screen based controls.

UNIT-V

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

Interaction Devices – Keyboard and Function Keys – Pointing Devices – Speech Recognition Digitization and Generation – Image and Video Display – Drivers.

TEXT BOOKS

1. The essential guide to user interface design, Wilbert O Galitz, Wiley Dreamtech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia
3. Brian Fling, “Mobile Design and Development”, First Edition, Reilly Media Inc., 2009

REFERENCE BOOKS

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

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

BIG DATA ANALYTICS
(Open Elective-II)

M.Tech (IT) I Year - II Semester

Course Code: GR17D5185 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: The objective of the course is to provide the student:

- Understanding about big data for business intelligence
- Learning business case studies for big data analytics
- Learning about the cloud and big data
- Knowledge about risk management involved in big data
- Understandingnosql big data management
- Understanding about map reduce work flows.
- Capability to Perform map-reduce analytics using Hadoop and related tools

COURSE OUTCOMES: At the end of the course the student will be able to:

- Understand the importance of big data
- Understand challenges with big data
- Knowledge about the technological developments in big data environment
- Understanding about map reduce work flows
- Knowledge about nosql data environment.
- Analysis with Hadoop and related tools
- Capability of understanding the usage of big data in context to cloud and other technologies.

UNIT-I

INTRODUCTION TO BIG DATA What is big data, why big data, convergence of key trends , unstructured data ,industry examples of big data ,web analytics, big data and marketing, fraud and big data ,risk and big data ,credit risk management, big data in medicine, introduction to Hadoop open source technologies , cloud and big data

UNIT-II

UNDERSTANDING BIG DATA Types of digital data, characteristics of data, challenges with big data, definition of big data, big data analytics,data science, technologies in big data environments, CAP theorem.

UNIT-III

NOSQL DATA MANAGEMENT Introduction to NoSQL, aggregate data models, aggregates, key-value and document data Models, relationships, graph databases , schemaless databases ,materialized views, distribution models, sharding ,master-slave replication, peer-peer replication, sharing and replication

UNIT-IV

BASICS OF HADOOP Data format ,features of Hadoop, analyzing data with Hadoop , design of Hadoop distributed file system (HDFS) ,HDFS concepts, scaling out ,Hadoop streaming , Hadoop pipes, Hadoop related tools

UNIT- V

MAPREDUCE APPLICATIONS MapReduce workflows, unit tests with MRUnit , test data and local tests, anatomy of MapReduce job run ,classic Map-reduce, YARN ,failures in classic Map-reduce and YARN , job scheduling , shuffle and sort ,task execution, MapReduce types ,input formats, output formats

TEXT BOOKS

1. Seema Acharya,S.Chellappan,"Big Data and Analytics",Wiley,2014

REFERENCE BOOK

1. Michael Minelli, Michelle Chambers, and AmbigaDhiraj, "Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses", Wiley, 2013.
2. P. J. Sadalage and M. Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Addison-Wesley Professional, 2012.
3. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
4. Eric Sammer, "Hadoop Operations", O'Reilley, 2012.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

NEURAL AND FUZZY SYSTEMS
(Open Elective-II)

M.Tech (EEE) I Year - II Semester

Course Code: GR17D5186 L/T/P/C : 3/1/0/4

PRE–REQUISITE: Control Systems, Power Systems, Mathematics, Physics.

COURSE OBJECTIVES: The objective of the course is to provide the student

- To introduce the students with the concepts of learning methods.
- To provide students with the artificial neural networks and their architecture.
- To familiarize the students with the various applications of artificial neural networks.
- To introduce the concepts of the fuzzy logic control and their real time applications.

COURSE OUTCOMES: At the end of the course the student will be able to

- Define the advances in neural networks
- Evaluate the design and control of fuzzy systems.
- Articulate the applications of fuzzy control block sets.
- Evaluate the design of various models in neural networks
- To analyze the techniques of various types of neural networks
- Evaluate the design and control of associative memories
- Techniques to Design fuzzy logic system

UNIT-I

Introduction to Neural Networks: Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and- Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT-II

Essentials of Artificial Neural Networks: Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

Feed Forward Neural Networks

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

UNIT-III

Multilayer Feed forward Neural Networks

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Associative Memories

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network.

UNIT-IV

Self-Organizing Maps (SOM) and Adaptive Resonance Theory (ART)

Introduction, Competitive Learning, Vector Quantization, Self-Organized Learning Networks, Kohonen Networks, Training Algorithms, Linear Vector Quantization, Stability-Plasticity Dilemma, Feed forward competition, Feedback Competition.

UNIT-V

Classical and Fuzzy Sets and Fuzzy Logic System Components

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions. Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

Applications Neural network applications: Process identification, Function Approximation, control and Process Monitoring, fault diagnosis and load forecasting.

Fuzzy logic applications: Fuzzy logic control and Fuzzy classification.

TEACHING METHODOLOGIES

1. White board
2. PPTs
3. Seminars

TEXT BOOK

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and G.A.VijayalakshmiPai – PHI Publication.

REFERENCE BOOKS

1. Introduction to Artificial Neural Systems - Jacek M. Zuarda, Jaico Publishing House, 1997.
2. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
3. Neural Networks and Fuzzy Logic System by Bork Kosko, PHI Publications

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

PROJECT MANAGEMENT

M.Tech(Civil) I Year - II Semester

Course Code: GR17D5187 L/T/P/C : 3/1/0/4

COURSE OBJECTIVES: On completion of this Subject/Course, following objectives shall get accomplished

- To provide students about the basics of Management in general and Project Management in particular.
- To train the students about the Monitoring of Projects.
- To make understand the students about the Planning of projects.
- To make understand the students about the Scheduling of projects.
- To train the students about the drawing of CPM & PERT Networks.
- To train the students about teaching of Project Management to UG & PG students
- To motivate the students about the Research Development activities of Project Management which results in timely completion of projects without time and cost over runs.

Course outcomes: On completion of this Subject/Course the student shall be able to

- Perform the Project Management functions effectively.
- Plan the projects.
- Schedule the various activities of Projects.
- Monitor the actual progress with planned progress.
- Draw the CPM & PERT Networks/
- Handle Resources planning including levelling & smoothing.
- Interpret the Indian Contract Act and understand the litigations involved for better Contract Management.

UNIT- I

PROJECT PLANNING: Prime Objectives of Project Management, Main Functions of Project Management, Planning, Principles of Planning, Objectives of Planning, Steps involved in Planning, Stages of Planning, Advantages & limitations of Planning, Failures of Projects & Construction Projects.

UNIT-II

PROJECT SCHEDULING: Scheduling, Project/Construction Schedules, Steps involved in Scheduling, Methods of Scheduling, Bar Charts, Steps involved in Bar Charts, Limitations of Bar Charts, Milestone Charts and Limitations of Milestone Charts.

UNIT-III

PROJECT MONITORING: Network Techniques, Prime Objectives of Networks, Network Terminology, Types of Networks, CPM & PERT, Differences between CPM & PERT, Rules to draw the Network, Drawing of Networks, Advantages of Network , Critical Path, Float and its Types, Slack and Types of Slack.

UNIT-IV

PROJECT COST CONTROL: Direct Costs, Indirect Costs, Total Project Cost, Optimisation of Cost and Steps involved, Resources, Resources Smoothing and Resources Levelling, Crashing of Activities, Time and Cost Over runs of Project.

UNIT-V

PROJECT QUALITY & CONTRACTS:

Quality, Quality Control, Quality Assurance, Project Quality Plans in Construction Projects, Inspection & Test Plans, Method Statements, ISO Certification; Project Contracts, Contract Law, Types of Contracts and Indian Contract Act.

TEXT BOOKS

1. Project Planning and Control with PERT & CPM – BC Punmia, KK Khandielwala.
2. Project Scheduling & Monitoring in Practice – S Chowdhury

REFERENCE BOOKS

1. Project Management Handbook – Lock, Gower
2. Project Management – NJ Smith- Blackwell Publication.

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

HARDWARE - SOFTWARE CO-DESIGN
(Open Elective-II)

M.Tech (ECE) I Year - II Semester

Course Code: GR17D5188 L/T/P/C : 3/1/0/4

Course Objectives

- Describe an embedded system design flow from specification to physical realization
- Describe structural behavior of systems.
- Master complex systems.
- Devise new theories, techniques, and tools in design, implementation and testing.
- Master contemporary development techniques.

Course Outcomes: After going through this course the student will be able to

- Gain knowledge of contemporary issues and algorithms used.
- Know the interfacing components, different verification techniques and tools.
- Demonstrate practical skills in the construction of prototypes.
- Understand the use of modern hardware and software tools for building prototypes of embedded systems.
- Apply embedded software techniques to satisfy functional and response time requirements.
- Apply verification tools.
- Understand design representation for system level synthesis.

UNIT-I:

Co- Design Issues: Co- Design Models, Architectures, Languages, A Generic Co-design Methodology.

Co- Synthesis Algorithms:

Hardware software synthesis algorithms: hardware – software partitioning distributed system cosynthesis.

UNIT –II:

Prototyping and Emulation: Prototyping and emulation techniques, prototyping and emulation environments, future developments in emulation and prototyping architecture specialization techniques, system communication infrastructure

Target Architectures: Architecture Specialization techniques, System Communication infrastructure, Target Architecture and Application System classes, Architecture for control dominated systems (8051-Architectures for High performance control), Architecture for Data dominated systems (ADSP21060, TMS320C60), Mixed Systems.

UNIT-III

Compilation Techniques and Tools for Embedded Processor Architectures: Modern embedded architectures, embedded software development needs, compilation technologies, practical consideration in a compiler development environment.

UNIT-IV

Design Specification and Verification: Design, co-design, the co-design computational model, concurrency coordinating concurrent computations, interfacing components, design verification, implementation verification, verification tools, interface verification

UNIT-V

Languages for System – Level Specification and Design-I: System – level specification, design representation for system level synthesis, system level specification languages,

Languages for System – Level Specification and Design-II:

Heterogeneous specifications and multi language co-simulation, the cosyma system and lycos system.

TEXT BOOKS

1. Hardware / Software Co- Design Principles and Practice – Jorgen Staunstrup, Wayne Wolf –2009, Springer.
2. Hardware / Software Co- Design - Giovanni De Micheli, Mariagiovanna Sami, 2002, Kluwer Academic Publishers

REFERENCE BOOKS

1. A Practical Introduction to Hardware/Software Co-design -Patrick R. Schaumont - 2010 –Springer

GOKARAJU RANGARAJU

INSTITUTE OF ENGINEERING AND TECHNOLOGY

NON CONVENTIONALENERGYRESOURCES

(Open Elective-II)

M.Tech (ME) I Year - II Semester
Course Code: GR17D5189

Course Objectives: The Objective of this course is to provide the student to

- Introduce the need of the non-convectional energy sources.
- Impart the role of non-convectional energy for the environment.
- Identify the energy resources utilization systems.
- Recognise the source and potential of wind energy and understand the classifications of wind mills.
- Summarize the principles of bio-conversion, ocean energy and geo thermal energy.

Course Outcomes: At the end of the course the learners will be able to

- Choose the appropriate renewable energy as an alternate for conventional power in any application.
- Analyze the environmental and cost economics of using renewable energy sources compared to fossil fuels.
- Apply the principles of various energy systems in day to day life.
- Analyze the industrial needs and convert theoretical model to practical circuits with wide range of specifications.
- Evaluate the importance of the renewable resources of energy as the fossil fuels are depleting in the world very fast express about clean and green energy for next generation.
- Analyse large scale demand of heat energy for meeting day to day domestic, institutional and industrial requirements can be met by utilizing solar thermal systems, biogas, PV cells, wind energy, Geothermal, MHD etc.
- Design the various techniques and models fabricated in utilizing the above said sources of energy.

UNIT-I

Introduction: Various non-conventional energy resources-Introduction, availability, classification, relative merits and demerits.
Solar Cells: Theory of solar cells. Solar cell materials, solar cell array, solar callower plant, limitations.

UNIT-II

Solar Thermal Energy: Solar radiation, floatplane collectors and their materials, applications and performance, focusing of collectors and their materials, applications and performance; solar thermal power plants, thermal energy storage for solar heating and cooling, limitations.

UNIT-III

Geothermal Energy: Resources of geothermal energy, thermodynamics of geo-thermal energy conversion-electrical conversion, non-electrical conversion, environmental considerations.
Magneto-hydrodynamics (MHD):
Principle of working of MHD Power plant, performance and limitations

Fuel Cells:

Principle of working of various type souffle cell sand their working, performance and limitations.

UNIT-IV

Thermos and the rmionic Conversions:
Principle of working, performance and limitations.
Wind Energy: Wind power and it surcease, sites election, criterion, momentum theory, classification of rotors, concentrations and augments, wind characteristics. Performance and limitations of energy conversion systems.

UNIT-V

Bio-mass: Availability of bio-mass and its conversion theory.
Ocean Thermal Energy Conversion (OTEC):
Availability, theory and working principle, performance and limitations.
Wave and Tidal Wave:
Principle of working, performance and limitations. Waste Recycling Plants.

TEXT/REFERENCESBOOKS

1. John Twideu and Tony Weir, “Renewal Energy Resources” BSP Publications, 2006.
2. M.V.R. Koteswara Rao, “Energy Resources: Conventional & Non-Conventional “ BSP Publications, 2006.
3. D.S. Chauhan, ”Non-conventional Energy Resources” New Age International.
4. C.S. Solanki, “Renewal Energy Technologies: A Practical Guide for Beginners” PHI Learning.