



**JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY,
JAIPUR**

SYLLABUS

**MASTER OF TECHNOLOGY
(M.TECH.) IN
COMPUTER SCIENCE &
ENGINEERING (CSE)**

YEAR – 2017

DURATION – 2 YEARS (4 SEMESTERS)

**SYLLABUS FOR:
1 YEAR**

FACULTY OF ENGINEERING & TECHNOLOGY

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I Semester

Nature of Course	Course Name	C	T	D&T	P	PS
Core Computer Science	Advanced Data Structures	8.5	5	1.5	1.2	0.8
Core Computer Science	Advanced Computer Networks	6	6	0	0	0
Management	Advanced Data Base Management System	8.1	6	0.5	1.6	0
Core Computer Science	Computer graphics and Image Processing	6	6	0	0	0
University Compulsory Course	WRL	1	1	0	0	0
University Compulsory Course	Curriculum Training & Exposure	1	0	0	1	0
University Compulsory Course	Community Development Activities	1	0	0	1	0
University Optional Course	Professional Activity	--	--	--	--	--
Total Credits		31.6	24	2	4.8	0.8

II Semester

Nature of Course	Course Name	C	T	D&T	P	PS
Core Computer Science	Advanced Software Engineering	6.5	5	0.4	1.1	0
Core Computer Science	Parallel & Distributed Computing	6	6	0	0	0
Core Computer Science	Design of Embedded Systems	6	6	0	0	0
Management	Modern Compiler Design	6	6	0	0	0
Core Computer Science	Wireless Sensor Network	6	6	0	0	0
English	English Communication	2	2	0	0	0
University Compulsory Course	Curriculum Training & Exposure	1	0	0	1	0
University Compulsory Course	Community Development Activities	1	0	0	1	0
University Optional Course	Professional Activity	--	--	--	--	--
Total Credits		34.5	31	0.4	3.1	0

Programme Structure - I Year

I year consists of I, II Semester

First Year Motive: The aim of 1st year of M. Tech. Computer Science is give the knowledge of advanced areas in computer science like advanced data structure, advanced database, compiler design, parallel and distributed computing and advanced computer networks with the knowledge of Women Rights and Empowerment.

I SEMESTER

Nature of Course	Paper Name	C	T	D&T	P
Core Computer Science	Advanced Data Structures I: Fundamental Data Structure and Concepts of Advanced data structures	2.4	2	0	0.4
	Advanced Data Structures II: Randomized algorithms and Geometric algorithms	2.5	1	1	0.5
	Advanced Data Structures III: Graph algorithms and Parallel algorithms	2.8	2	0.5	0.3
	<i>8 Practice sessions from unit I in University Lab</i>	0.8	0	0	8 Sessions
Core Computer Science	Advanced Computer Networks I: Random Variables, Stochastic Process and Markov Chains	2	2	0	0
	Advanced Computer Networks II: Stochastic Process and Markov Chains	2	2	0	0
	Advanced Computer Networks III: Satellite Networks and Local Area Networks	2	2	0	0
Core Computer Science	Advanced Data Base Management System I: Relational Databases	2.6	2	0	0.6
	Advanced Data Base Management System II: Objected Oriented and Object Relational Databases	2.7	2	0	0.7
	Advanced Data Base Management System III: Parallel and Distributed Databases	2.8	2	0.5	0.3
Core Computer Science	Computer graphics and Image Processing I: Review of Graphics Fundamentals	2	2	0	0
	Computer graphics and Image Processing II: Surface detection and Shading	2	2	0	0
	Computer graphics and Image Processing III: Image Manipulation, Advanced Modeling Techniques and Animation	2	2	0	0
University Compulsory Course	Women's Right and Law	1	1	0	0
University Compulsory Course	Curriculum Training & Exposure	1	0	1	0
	Community Development Activities	1	0	1	0
University Optional Course	Professional Activity	--	--	--	--
Total Credits		31.6			

Note:

- C represents number of Credit per course.

- T represents number of Theory Credit per course.
- D&T represents number of Demo and Tute credits as per course.
- P represents number of Practical Credits.
- PS represents number of practice credit sessions
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II SEMESTER

Nature of Course	Paper Name	C	T	D&T	P
Core Computer Science	Advanced Software Engineering I: Advanced Concepts	2.5	2	0	0.5
Core Computer Science	Advanced Software Engineering II: Object-Oriented Design and Software Testing	2	1.5	0.2	0.3
Core Computer Science	Advanced Software Engineering III: Software quality and SCM	2	1.5	0.2	0.3
Core Computer Science	Parallel & Distributed Computing I: Parallel Computing, software and hardware taxonomy	2	2	0	0
Core Computer Science	Parallel & Distributed Computing II: Parallel Processors	2	2	0	0
Core Computer Science	Parallel & Distributed Computing III: Distributed computing Paradigms	2	2	0	0
Core Computer Science	Design of Embedded Systems I: Embedded Computing Requirements	2	2	0	0
Core Computer Science	Design of Embedded Systems II: Embedded Computing Platform and memory organization	2	2	0	0
Core Computer Science	Design of Embedded Systems III: Embedded Software Analysis and Design	2	2	0	0
Core Computer Science	Modern Compiler Design I: Basic compiler design	2	2	0	0
Core Computer Science	Modern Compiler Design II: Control-Flow Analysis and Data Flow analysis	2	2	0	0
Core Computer Science	Modern Compiler Design III: Semantic Analysis and code optimization	2	2	0	0
Core Computer Science	Wireless Sensor Network I: Basics of WSN	2	2	0	0
Core Computer Science	Wireless Sensor Network II: Network Architecture	2	2	0	0
Core Computer Science	Wireless Sensor Network III: Network Topology and routing protocols	2	2	0	0
University Compulsory Course	English Communication	2	2	0	0

University Compulsory Course	Community Development Activities	1	0	1	0
University Compulsory Course	Curriculum Training & Exposure	1	0	1	0
Total Credits		34.5			

Note:

- C represents number of Credit per course.
- T represents number of Theory Credit per course.
- D&T represents number of Demo and Tutorial.
- P represents number of Seminars, group discussion, workshop.

Semester I

Sub: Advanced Data Structures

UNIT I (Advanced data structures) (2.4-0.4-0)

Theory (2.4 Credits)

Advanced data structures: Self-adjustment, persistence and multidimensional trees. Randomized algorithms: Use of probabilistic inequalities in analysis & applications.

Practical (0.4 Credit)

S.No.	Name Of Practical
1	Implementation of Singly, Doubly and Circular linked list.
2	Implementation of Multistack in a Single Array.
3	Implementation of Circular Queue.
4	Implementation of Binary Search trees.

UNIT II (Geometric algorithms) (1.5-0.5-0.4)

Theory (1.5 Credits)

Geometric algorithms: Point location, convex hulls and Voronoi diagrams, Arrangements. Graph algorithms: Matching and Flows.

Practical (0.5 Credit)

Practice (0.4 Credit) D&T (1 Credit)

S.No.	Name Of Practical
1	Implementation of Hash table.
2	Implementation of Heaps.
3	Implementation of AVL Rotations.
4	Implementation of Breadth First Search Techniques.
5	Implementation of Depth First Search Techniques.

UNIT III (Parallel algorithms) (2-0.3-0.4)

Theory (2 Credits)

Parallel algorithms: Basic techniques for sorting, searching, merging, list ranking in PRAMs and Interconnection networks. Approximation algorithms: Use of Linear programming and primal dual, local search heuristics.

Practical (0.3 Credit)

Practice (0.4 Credit) D&T (0.5 Credit)

S.No.	Name Of Practical
1	Implementation of Prim's Algorithm.
2	Implementation of Dijkstra's Algorithm.
3	Implementation of Kruskal's Algorithm.

Recommended text Books:

1. Advanced Data Structures, Peter Brass, Cambridge

Reference Books:

1. Motwani and Raghavan "Randomized Algorithms", Cambridge University Press
2. Preparata and Shamos "Computational Geometry", Springer Verlag
3. Mehlhorn "Data Structures and Algorithms: 1, Searching and Sorting", Springer Verlag EATCP
4. Papadimitrou and Steiglitz "Combinatorial Optimization", Princeton University Press
5. Joseph Ja'Ja' "Introduction to Parallel Algorithms" Addison-Wesley.
6. Vaizirani "Approximation Algorithms", Springer

Sub: Advanced Computer Networks

UNIT - I

Networks, Queues and Performance Modeling (2-0)

Theory (2Credits)

Introduction, Network types, Multiple-access protocols, Discrete-time queues, Performance measures, Probability, Random variables, Distributions and Conditional distributions.

UNIT - II

Stochastic Process and Markov Chains (2-0)

Theory (2 Credits)

Poisson process and its properties, Markov chains and Markov chain models. Performance measures and Little's result, Discrete-time queuing conventions, Discrete-time $M/M/1$ queue, Discrete-time $M/M/1/J$ queue, Discrete-time $Man/M/1$, Discrete-time $Man/Mdm/\infty$ queue, S -queues, Tandem S -queues, Network of S -queues, Discrete-time queuing network models for multiple access protocols, Equilibrium point analysis, Different customer classes.

UNIT - III

Satellite Networks and Local Area Networks (2-0)

Theory (2 Credits)

Time-division multiple access, Slotted Aloha, Code division multiple access, Buffered slotted Aloha, Carrier sensing networks, Token passing networks, Slotted rings.

Case study: Study of various network simulators, Network performance analysis using NS2

Recommended text Books:

1. Woodward, M. E., "Communication and Computer Networks: Modeling with discrete-time queues", Systems Publication Date: January 1994, Wiley-IEEE Computer Society Pr, ISBN: 0818651725.

Reference Books:

1. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W Ross, pearson
2. A.S. Tanenbaum- Computer Networks - (PHI)
3. B.A. Forouzan-Data Communications and Networking, Tata McGraw Hill.
4. William stallings - Data and Computer communication - (PHI)
5. J.F. Kurose and K.W. Ross-Computer Networking Pearson Education Asia.

Sub: Advanced Data Base Management System**UNIT I (2-0.6-0)****Theory (2 Credits)**

Relational Databases: Integrity Constraint revisited: Functional, Multi-valued and Join Dependency, Template Algebraic, Inclusion and Generalized Functional Dependency, Chase Algorithms Query Processing and Optimization: Valuation of Relational Operations, Transformation of Relational Expressions, Indexing and Query Optimization, Limitations of Relational Data Model, Null Values and Partial Information. Advanced Transaction Processing: Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors.

Practical (0.6 Credit)

S.No.	Name Of Practical
1 2	Write simple SQL Queries for: <ul style="list-style-type: none"> • String handling • Update statement
3 4	Write SQL Queries for: <ul style="list-style-type: none"> • Group By , Aggregate, Having Clause • SET operations like UNION ,UNION ALL,ORDER BY • Nested queries : in, not_in, Exists
5 6	To perform basic PL/SQL blocks <ol style="list-style-type: none"> I. Display square of given no from 1 to 10 using loop, for and while. II. Write a PL-SQL block for checking weather a given year is a Leap year or not.

UNIT II (2-0.7-0)**Theory (2 Credits)**

Objected Oriented and Object Relational Databases: Modeling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases Case Studies: Gemstone, O2, Object Store.

Practical (0.7 Credit)

S.No.	Name Of Practical
1 2	To perform basic PL/SQL blocks <ol style="list-style-type: none"> I. Write a PL-SQL block to find total no of odd and even (from 1 to 20) II. Write a PL-SQL block for reverse the string.
3 4 5 6	To perform the concept of loop <ol style="list-style-type: none"> 1) Display Employee Names, Joining Date (Monday 24th of May, 2004 format) of all the employees using a) Loop – End Loop b) While Loop and c) For Loop 2) The manager has decided to raise the salary for all the employees in the department number 10 by 0.7. Whenever any such raise is given to employees, a record for the same is maintained in the emprise table. Write a PL/SQL block to update the salary of each employee and insert a record in the emprise table. Use for loop
7	To perform the concept of locking <ol style="list-style-type: none"> 1) Write a PL/SQL block that will accept the employee code, department no, amount and operation. Based on specified operation amount is added or deducted from salary of said employee. Use locking concept at appropriate place

UNIT III (2-0.3-0)**Theory (2 Credits)**

Parallel and Distributed Databases: Distributed Data Storage – Fragmentation & Replication, Location and Fragment Transparency Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols, Design of Parallel Databases, Parallel Query Evaluation. Active Database and Real Time Databases: Triggers in SQL, Event Constraint and Action : ECA Rules, Query Processing and Concurrency Control, Compensation and Databases Recovery Image and Multimedia Databases: Modeling and Storage of Image and Multimedia Data.

Practical (0.3 Credit) D&T (0.5 Credit)

S.No.	Name Of Practical
1	To perform the concept of trigger Write a PL/SQL block to update the balance. Generate trigger that will store the original record in other table after updation take place
2	To perform the concept of trigger Write a PL/SQL block to update the salary where job is Manager. Generate trigger that will store the original record in other table after updation take place
3	How to implement Queries using Procedure

Recommended text Books:

1. Database Management System, P. K Yadav, s. k. kataria & sons

Reference Books:

1. C.J. Date, "Introduction to Database System", 7th Edition
2. S. Abiteboul, R. Hull and V. Vianu, "Foundations of Databases", 1995, Addison –Wesley Publishing Co., Reading Massachutts
3. W. Kim, "Modern Database Systems", 1995, ACM Press, Addison – Wesley,
4. D. Maier, "The Theory of Relational Databases", 1993, Computer Science Press, Rokville, Maryland

Sub: Computer Graphics and Image Processing

UNIT - I (Review of Graphics Fundamentals) (2-0)

Theory (2 Credits)

Basic raster graphical algorithm for 2D primitives, Line drawing algorithm, 2D and 3D transformations; Window, Viewport, Clipping algorithm; Circle drawing algorithm, Ellipse drawing algorithm, Bezier curve, b-Spline curve, surfaces and Solid modeling. Parallel projection, Perspective projection and Computation of vanishing point; Z-buffer algorithm, Scan line algorithm. Area subdivision and Ray tracing algorithms

UNIT - II (Surface detection and Shading) (2-0)

Theory (2 Credits)

Visible surface detection: Z-buffer algorithm, Scan line algorithm. Area subdivision and Ray tracing algorithms, Illumination mode, Specular reflection model, Shading models for curve surfaces, Radiosity method, Rendering, Recursive ray tracing, Texture mapping

UNIT - III (Image Manipulation, Advanced Modeling Techniques and Animation) (2-0)

Theory (2 Credits)

What is an Image, Elementary Image processing techniques; Multi-pass transformation, Image Compositing. Procedural Models, Fractal Models, Grammar based models, particle systems, Volume rendering. 3D animation, morphing and simulation of key frames

Recommended text Books:

1. Hearn & Baker, "Computer Graphics C version", 2nd ed. Pearson Education.

Reference Books:

1. Roger and Adams, "Mathematical Element for Computer Graphics", 2nd ed., Tata McGraw Hill.
2. Rogers, "Procedural Element for Computer Graphics", 2nd ed, Tata McGraw Hill.
3. Milan Sonka and Vaclav, "Image Processing, Analysis and Machine Vision", 3rd Ed (2007) Thomson Learning.

Sub: Women Rights and Law

(1-0-0)

Credits-1

Objective: The paper aims at creating awareness as to importance and role of women in society through the medium of law. It also focuses on women welfare laws.

Unit – I: Meaning of law ,Constitutional Safeguards for Women, Right to Equality (Art-14),Life & Personal Liberty, Right to Education (Art-21,21-A), Right against Sexual Exploitation (Art-23,24), Constitutional Remedies (Writs- Art-32-35), Participation in Panchayat and Municipalities, Marriage : Conditions,Ceremonies,Registration, Restitution of Conjugal Rights, Judicial Separation, Void & Voidable Marriages, Legitimacy of Children of Void & Voidable Marriages, Punishment of Bigamy, Divorce Common Grounds for Divorce, No Petition for divorce within 1year of marriage, Divorced Person when may marry again,Maintenance: Wife, widowed daughter-in-law, Children, Amount of Maintenance , Interim Maintenance, Maintenance Provisions under Cr.PC, Adoption: Requisites of a valid adoption,Capacity of a male Hindu to take in adoption, Capacity of a female Hindu to take in adoption, Persons capable of giving in adoption, Persons who may be adopted, Effects of Adoption,.

Unit – II: Indian Penal Code, 1860 Right of Private Defence, Dowry Death, Abetment of Suicide, Cruelty by Husband or Relatives of Husband, Sex Selection & Causing Miscarriage, Hurt & Grievous Hurt, Wrongful Restraint & Confinement, Outraging the modesty of a woman, Kidnapping and Abduction, Offences regarding Prostitution, Rape, Bigamy, Adultery, Domestic Violence, Sex Determination Test -The Medical Termination of Pregnancy Act, 1971, The Pre-Conception and Pre-Natal Diagnostic Techniques Act, 1994, Reproductive Technologies: Meaning, Concept & Challenges of A.I, IVF & Surrogacy, Right of HIV/ AIDS Victims, Introduction to Consumer Protection Act , Tenancy Act, Right to Information Act, Motor Vehicles Act, Intellectual Property Rights, Act & Rules Maternity Benefits Act 1961.

Recommended Books:

1. Law relating to Women – S.R.Myneni
2. Law relating to Women – Dr. S.C. Tripathi

Reference Books:

1. Women and Law – Prof. Nomita Aggarwal
2. Women and Law – Dr. Manjula Batra
3. Women and Law – G.P. Reddy

Semester - II

Sub: Advanced Software Engineering

UNIT I (Advanced Concepts) (2-0.5-0)

Theory (2 Credits)

Advanced Concepts: Component based development, Agile Software Engineering: Basic concepts, human issues, agile methods. Web Engineering: Attributes of Web-based applications. Analyzing Web Based Systems. Design of Web Based systems, Design principles, Technological issues. Introduction to Object Oriented Methodology, Overview of Requirements Elicitation, Requirement, Model-Action & Use cases, Requirements Elicitation Activities, Managing Requirements Elicitation

S.No.	Name Of Practical	Practical	Practice			
1	A unit test is required for a method which reads in an integer, x where $10 \leq x \leq 20$. The function should return an error message if the input is non-alphabetic. Use this example to explain how equivalence partitions might be used in selecting test data.	0.2				
2	<p>Suppose we have a java class Weight, as shown in UML notation below, to represent a weight value and its unit of measure.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">Weight</td> </tr> <tr> <td style="text-align: center;">-amount : integer - unitOfMeasure : String</td> </tr> <tr> <td style="text-align: center;">+ getAmount() + getUnitOfMeasure() + add(Weight m) : Weight</td> </tr> </table> <p>Using a code fragment, show how the information shown in the class Weight is implemented in Java. Include a full constructor method that sets the amount and unit of measure but for other methods, show only the headers</p>	Weight	-amount : integer - unitOfMeasure : String	+ getAmount() + getUnitOfMeasure() + add(Weight m) : Weight	0.2	
Weight						
-amount : integer - unitOfMeasure : String						
+ getAmount() + getUnitOfMeasure() + add(Weight m) : Weight						
3	Suppose the Weight class has an optional 1:1 association with another class, Patient. Show how this association might best be implemented in Java to take account of the optional nature of the association?	0.1				

UNIT II (Object-Oriented Design and Software Testing) (1.5-0.3-0)

Theory (1.5 Credits) D&T(0.2 Credit)

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Software Testing: Software Testing Fundamentals, Test Case Design, White Box testing Basis path Testing, control Structure Testing, Black box Testing and Testing for Specialized Environments, Architectures and Applications. Software Quality Assurance: Quality concepts, Quality Movement, SQA Activities and Formal Approaches to SQA.

S.No.	Name Of Practical	Practical	Practice
1	Select three components that you have developed recently, and assess the types of cohesion that each exhibits. If you had to define the primary benefit of high cohesion, what would it be	0.1	
2	Why performance testing is important for Web based systems? Give an example to clarify your explanation.	0.1	
3	Study of any bug tracking tool (e.g. Bugzilla, bugbit)	0.1	

UNIT III (Software quality and SCM) (1.5-0.3-0)**Theory (2 Credits) D&T(0.2 Credit)**

Software quality: A framework for product metrics, A product metrics taxonomy, Metrics for the analysis model, Metrics for the design model, Metrics for maintenance.

Plans for testing: Snooping for information, Coping with complexity through teaming, Testing plan focus areas, Testing for recoverability, Planning for troubles.

Software Configuration Management: SCM Process, Objects in software configuration, Version control, Change control, Configuration audit, Status reporting, SCM standards. Software maintenance: Maintenance characteristics, Maintenance tasks and side effects. Risk management.

S.No.	Name Of Practical	Practical	Practice
1	Study of any open source-testing tool(e.g. Test Link)	0.1	
2	Study of any testing tool (e.g. Win runner)	0.1	
3	Take a mini project (e.g. University admission, Placement Portal) and execute it. During the Life cycle of the mini project create the various testing documents* and final test report document.	0.1	

Recommended Books:

1. Pressman : Software Engineering - A practitioner's Approach, Mc Graw Hill Internationa.
2. Ian Sommerville-Software Engineering, Pearson Education India

Reference Books:

1. Fairly Richard – Software Engineering Concepts, Tata Mcgraw Hill
2. Software Engineering, K. K. Aggarwal, Yogesh Singh, New Age International
3. Behforooz and F.J. Hudson : Software Engineering Fundamentals Oxford University Press.

Sub: Parallel & Distributed Computing

UNIT I (Parallel Computing and software taxonomy) (2-0-0)

Theory (2 Credits)

Introduction to Parallel Computing: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous -MIMD, reduction paradigm. Hardware taxonomy: Flynn's classifications, Handler's classifications. Software taxonomy: Kung's taxonomy, SPMD. Abstract parallel computational models: Parallelism approaches - data parallelism, control parallelism Performance Metrics: speedups, efficiency, utilization, communication overheads, single/multiple program performances, bench marks.

UNIT II (Parallel Processors) (2-0-0)

Theory (2 Credits)

Parallel Processors: Taxonomy and topology - shared memory multiprocessors, distributed memory networks. Distributed Computing: An Introduction, Definition, history, different forms of computing, strengths and weakness of computing. Interprocess communication: An Archetypal IPC Program interface - Event synchronization - timeouts and threading - deadlocks and threading - Data representation - data encoding - text based protocols - Request response protocols - event diagram and sequence diagram - connection oriented versus connectionless IPC .

UNIT III (Distributed computing Paradigms) (2-0-0)

Theory (2 Credits)

Distributed computing Paradigms: Paradigms and Abstraction - Paradigms for Distributed Applications - Trade- offs. The socket API: Background - The Socket Metaphor in IPC - The Datagram Socket API - The Stream Mode socket API - Client server Paradigm - Group communication - Distributed Objects.

Recommended Books:

1. Distributed and Cloud Computing: From Parallel Processing to the Internet of Things, Kai Hwang, Pearsons

Reference Books:

1. M. J. Quinn. *Parallel Computing: Theory and Practice*, McGraw Hill
2. T. G. Lewis and H. El-Rewini. *Introduction to Parallel Computing* , Prentice Hall, New Jersey, 1994.
3. Distributed Computing , Principles and Applications , M.L. Liu, Pearson Education

Sub: Design of Embedded systems

UNIT I (Embedded Computing Requirements)(2-0-0)

Theory (2 Credits)

Embedded Computing Requirements: Characteristics and applications of embedded systems; Components of Embedded Systems; challenges in Embedded System Design and design process; Formalism for system design. Embedded Processors: RISC vs. CISC architectures; ARM processor – processor architecture and memory organization, instruction set, data operations and flow control; SHARC processor.

UNIT II (Embedded Computing Platform and memory organization) (2-0-0)

Theory (2 Credits)

Memory organization, data operations and flow control, parallelism within instructions; Input and output devices, supervisor mode, exception and traps; Memory system, pipelining and superscalar execution. Embedded Computing Platform: CPU Bus – Bus protocols, DMA, system bus configurations, ARM bus; Timers and counters, A/D and D/A converters, Keyboards, LEDs, displays and touch screens; Design examples.

UNIT III (Embedded Software Analysis and Design) (2-0-0)

Theory (2 Credits)

Embedded Software Analysis and Design: Software design pattern for Embedded Systems; Model programs – data flow graphs and control/data flow graphs; Assembly and linking; Compilation techniques; Analysis and optimization of execution time, energy, power and program size. Embedded System Accelerators: Processor accelerators, accelerated system design

Recommended text Books:

1. Computer as Components by Wayne Wolf published by Elsevier Inc.

Reference Books:

1. ARM System Developer's Guide by Andrew S. Loss published by Elsevier Inc
2. Embedded System Design by Steve Heath published by Elsevier Inc
3. Embedded System design: A unified hardware/software Introduction by Frank Vahid & Tony Givagi published by John Wiley & Sons Inc.

Sub: Modern Compiler Design

UNIT I (Basic compiler design) (2-0-0)

Theory (3 Credits)

Introduction to Compilers: Basic compiler design – Phases of Compilation – Lexical Analysis – Parsing Semantic Analysis – Intermediate Code Generation – Assembly Code Generation – Machine code generation and linking. Lexical Analysis: File processing and Tokens – DFA – Regular Expressions – JAVA CC A lexical analyzer and parser generator, Context-free Grammars – Top – down Parsing techniques – Bottom – up Parsing techniques, Operator precedence parsing, recursive descent parsing.

UNIT II (Control-Flow Analysis and Data Flow analysis) (2-0-0)

Theory (2 Credits)

Introduction to Advanced Topics of Informal Compiler Algorithm Notation (ICAN), Control-Flow Analysis, Data-Flow Analysis, Intermediate representation for flow analysis, Various dataflow analyses, Transformations using dataflow analysis Speeding up dataflow analysis Dependence Analysis and Dependence Graphs, Alias Analysis,

UNIT II (Semantic Analysis and code optimization) (2-0-0)

Theory (2.5 Credits)

Semantic Analysis : Semantic errors – Environments – Type Checking – Semantic Analyzer overview –Code Generation – Target Assembly code. Code Optimization techniques, Introduction to Optimization, Machine dependent and machine independent code optimization, Scope of Optimization, local optimization, Redundancy Elimination, Loop Optimizations, Dominators, Loop-invariant computations, Induction variables, Array bounds checks, Loop unrolling, Procedure Optimizations

Recommended text books:

1. Compiler Design:- Principles and tools by Aho-Ullman, Pearson Publication.
2. Modern Compiler Implementation in ML, Andrew W. Appel

Reference Books:

1. Modern Compiler Design by David Galles, Pearson Education.

Sub: Wireless Sensor Network

UNIT I (Basics of WSN) (2-0-0)

Theory (2 Credits)

Introduction to Wireless Sensor Networks (WSN), Types of applications, challenges for WSN, Enabling Technologies for WSN, Hardware Component, Energy Consumption issues, operating system and execution Environment, case study – Tiny OS and nisc, example nodes – Mica Mote, Eyes nodes

UNIT II (Network Architecture) (2-0-0)

Theory (2 Credits)

Sensor Network Scenarios – Single hop vs multi hop networks, multiple sinks and sources, optimization goals and figure of merit. Design Principles of WSN, Service interface of WSN, Gateway concept, Properties of localization and positioning procedures and approaches, mathematical basis for lateral problems, single loop localization, positioning in multi-hop environment.

UNIT III (Routing Protocols) (2-0-0)

Theory (2 Credits)

Motivation and basic idea, controlling topology in flat networks, hierarchical networks by domain set hierarchical network by clustering. Many faces of forwarding & routing, gossiping and agent based multi casting energy efficient market, broadcast & multicast geographical routing, mobile nodes Data Centric and content based networking, Data Centric routing and Data aggregation

Recommended text Books:

1. Hoger Karl, "Protocols and Architecture of Wireless Sensor Networks", Wiley Publications.

English Communication (2-0-0)

Theory (2 credits)

Objective: To enable students to develop four major skills Reading, Writing, Speaking and listening in relevance to English culture according to time and venue.

Unit 1: Reading and Listening

Types of passages, purpose of reading, reading strategies, vocabulary building, antonyms and synonyms and one-word substitution etc., Role of Listening, Barriers of Listening, Remedies to remove the barriers. Listening to Narratives, Listening to specific information or data, listening to Conversational contexts etc.

Unit 2: Writing and Speaking

Subject- Verb Concord, Sentence Pattern (SVOCA), Time and Tenses. Different Letter Writing Formats: Application, Cover Letter, Notice, Report etc. Resume Building. Introduction to the sounds of English-Vowels, Diphthongs and Consonants phonetic sounds, Introduction to Stress and Intonation, Situational Dialogues / Role Play 'Just a minute' Sessions (JAM), action verbs (play way method), Describing Objects/ Situations/ People (personality), Debates (current topics), Turn Coat, Telephonic Conversation.

Recommended Books:

1. Phonetics by Peter Roach, Oxford University Press 2004.
2. Better English Pronunciation by J.D.O'Connor, OUP 2010.
3. Accents of English by J.C.Wells, Cambridge University Press.
4. English Grammar Today with CD: An A-Z of Spoken and Written
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