

Master of Technology (CSE)

2 YEARS PROGRAMME

CREDIT BASED SYSTEM
wef JULY 2006



Department
of
Computer Sc. & Engineering
GJUS&T HISAR

**SCHEME OF EXAMINATION for M.Tech.(CSE)
(TWO-YEAR PROGRAMME)
Credit System w.e.f July 2006**

SEMESTER –1

Paper	Nomenclature of Paper	Total credits
CSL-711	Data Structure and Comp Algorithm	4
CSL-712	Computer Org. & Architecture	4
CSL-713	Advanced DBMS	4
CSL-714	Computer Networks	4
CSL-715	Distributed Operating System	3
CSP-711	Data Structure and Algorithm Lab.	2
CSP-712	ADBMS Lab	2
	Presentation and Communication Skills	-
(On qualifying basis only non-credit course)		
Total:		23

SEMESTER –II

Paper	Nomenclature of Paper	Total Credits
CSL-721	Software Project Management	4
CSL-722	Theory of Computation	4
CSL-723	Design & Dev.of uP Based System	4
CSL-724	High Speed Network	4
	Programme Elective-I	3
CSP-721	Lab (based on current Technologies)	2
CSP-722	Microprocessor Lab	2
Total:		23

List of Electives for Programme Elective –I (II Semester):

CSL-725	Soft Computing
CSL-726	Advance Computer Architecture
CSL-727	Embedded Systems
CSL-728	Computer Graphics
CSL-729	Compiler Construction

SEMESTER –III

Paper	Nomenclature of Paper	Total Credits
CSD-731	Dissertation and Seminar –I	3
Programme Elective-II		3
Programme Elective-III		3
Open Elective –I		4
CSP-731	Computer Network Lab	2
Total:		15

CSD-731 (Dissertation and Seminar –I):
To be evaluated by committee constituted by Chairman, CSE.

List of Elective for programme elective –II & III (III Semester)

CSL-731	Mobile and Wireless Communication
CSL-732	Performance Modeling
CSL-733	Securities of Information Systems
CSL-734	Knowledge and Discovery Management
CSL-735	Research Methodologies

List of Elective for open elective –I (III Semester)

To be offered by other M.Tech. departments of university

SEMESTER –IV

Paper	Nomenclature of Paper	Total Credits
CSD-741	Dissertations and Seminar-II	9

CSD-741 (Dissertation and Seminar –II):
To be evaluated jointly by internal supervisor and external examiner.

Total Credits for all Semester 70

Note :One credit in theory papers is equivalent to 1 hour classroom teaching per week and one credit in practical/lab course is equivalent to 2 hour practical/lab work per week. A teacher will conduct practical class in a group of 10 students.

CSL-711 **Data Structures and Comp. Algorithm**

(MTech CSE 1st Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P
4 - -

Time: 3 Hours
(Examination)

SYLLABUS

A review of data types, abstract data types, data and storage structures, arrays, linked lists, queues and their applications.

Binary tree, operations on binary tree, applications of binary tree, representations of binary tree, tree traversals, threading and their implementation, binary search tree, Trees in general, height balanced trees, red and black trees, splay trees, multi-way search trees, B- trees

Graphs, their representation and applications, path matrix and shortest path, graph traversals. spanning trees and related algorithms

Comparative study of sorting techniques with their complexities, Dynamic Memory management, hashing

Solving recurrence relations

Principles and techniques of algorithm analysis :

Algorithm design techniques: Divide and conquer, greedy method, Dynamic programming, Backtracking. (Two examples of each technique should be discussed with a complexity analysis)

References:

1. Data structure using C and C++, Yedidyah Langsam, Moshe J. Augenstein, Aaron M.Tenenbaum, Pearsons Education Asia, 1996.
2. Algorithms in C, Robert Sedgewick, Addison Wesley 1999.
3. Data Structures and Algorithms, A. V. Aho, John E. Hopcroft, Jeffery D. Ullman, Pearson Education Asia.
4. Fundamentals of Computer Algorithm, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran

CSL-712

Computer Organization & Architecture

(MTech CSE 1st Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P
4 - -

Time: 3 Hours
(Examination)

SYLLABUS

Register Transfer and Microoperations

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Microoperations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design

Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory reference instructions, Input Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.

Microprogrammed Control

Control Memory, Address Sequencing, micro-program Example, Design of Control Unit.

Central Processing Unit

General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer(RISC),

Pipeline and Vector Processing

Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

Computer Arithmetic

Introduction, Addition and Subtraction, Multiplication Algorithms, Division Algorithms, Floating Point Arithmetic Operations, Decimal Arithmetic Unit, Decimal Arithmetic Operations.

Input Output Organization

Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access(DMA), Input Output Processor (IOP), Serial Communication.

Memory Organization

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

Multiprocessors

Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration, Interprocessor Communication and Synchronization, Cache Coherence.

Reference :

1. "Computer System Architecture", M. Morris Mano, PHI New Delhi
2. "Computer Organization and Architecture", J.P. Hayes, McGraw Hill

CSL-713 **Advanced DBMS** (MTech CSE 1st Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P
4 - -

Time: 3 Hours
(Examination)

SYLLABUS

Introduction: Architecture, Advantages, Disadvantages, Data models, relational algebra, SQL, Normal forms.

Query Processing: General strategies for query processing, transformations, expected size, statistics in estimation, query improvement, query evaluation, view processing, query processor.

Recovery: Reliability, transactions, recovery in centralized DBMS, reflecting updates, buffer management, logging schemes, disaster recovery.

Concurrency: Introduction, serializability, concurrency control, locking schemes, timestamp based order, optimistic scheduling, multiversion techniques, deadlock.

Object Oriented Data base Development: Introduction, Object definition language, creating object instances, Object query language.

Distributed Databases: Basic concepts, options for distributing a database, distributed DBMS.

Data warehousing: Introduction, basic concepts, data warehouse architecture, data characteristics, reconciled data layer, data transformation, derived data layer, user interface.

Object Relational Databases: Basic concepts, enhanced SQL, advantages of object relational approach.

References:

1. An Introduction to database systems by Bipin C. Desai, Galgotia Publications.
2. Modern Database Management by Feffray A. Hoffer, Mary B. Prescott, Fred R Mcfadden, 6th edition, LPE Pearson Education.
3. Principles of distributed database systems, by M. Tamer & Valduriez, 2nd edition , LPE Pearson education.
4. Database system concepts by Korth, Mc Graw Hill.

CSL-714 **Computer Networks** (MTech CSE 1st Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P
4 - -

Time: 3 Hours
(Examination)

SYLLABUS

Introduction

Uses of Computer Networks, Network Hardware, Network Software, Reference Models.

Physical Layer

The Theoretical Basis of Data Communications-- The Maximum Data Rate of a Channel. Introduction to Transmission Media. Basics of Wireless Transmission, Communication Satellites, The Public Switched Telephone Network, Structure of Telephone network, The Local Loop, Modems, ADSL, Wireless, Trunks and Multiplexing, Switching.

Data Link Layer

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, One bit Sliding Window Protocols, Example Data Link Protocol: HDLC- High Level Data Link Control.

Medium Access Control Sublayer

Introduction, The Channel Allocation Problem, Multiple Access protocols---- ALOHA, Carrier Sense Multiple Access Protocols, Collision Free Protocols.

Ethernet: Ethernet Cabling, Manchester Encoding, The Ethernet MAC Sublayer Protocol, The Binary Exponential Backoff Algorithm, Performance. Data Link Layer Switching: Bridges from 802.x to 802.y, Local Internetworking, Spanning Tree Bridges, Remote Bridges, Repeaters, Hubs, Bridges, Switches, Routers, Gateways, Virtual LAN's.

The Network Layer

Routing Algorithms, Congestion Control Algorithms, Internetworking, The Network Layer in Internet: IP Protocol, IP Addresses, Internet Control Protocols, Internet Multicasting, Mobile IP, IPv6

The Transport Layer

Elements of Transport Protocols, Introduction to Internet Transport Protocols: UDP, TCP --- Introduction, TCP Service Model, TCP Protocol, TCP Segment Header, TCP Connection Establishment, TCP Connection Release, TCP congestion control, TCP timer management.

The Application Layer

Introduction to DNS, Electronic Mail, WWW, Multimedia.

Reference Books:

1. Andrew S. Tanenbaum, "Computer Networks" PHI
2. Forouzan, "Data Communication and networking", TMH.
3. William Stallings, "Data & Comp. Communication", 6th edition, LPE Pearson Education.

CSL-715 **Distributed Operating System** (MTech CSE 1st Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3
L T P
3 - -

Time: 3 Hours
(Examination)

SYLLABUS

Operating system, types of O.S., Distributed Computing System, Evolution of Distributed Operating System, Distributed Computing System Models, Distributed Operating System, Issues in designing a Distributed Operating System.

Desirable Features of a message passing system, Synchronization, Buffering, Multidatagram messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication.

The RPC Model, Transparency of RPC, Stub generation, RPC Messages, Marshaling Arguments and Results, Server Management, Parameter-Passing Semantics, Call Semantics, Communication Protocols for RPCs, Complicated RPCs, Client Server Binding, Exception Handling, Security.

General Architecture of DSM Systems, Design and Implementation Issues of DSM, Granularity, Structure of Shared Memory Space, Consistency Models, Replacement Strategy, Trashing.

Clock Synchronization, Event Ordering, Mutual Exclusion, Deadlock, Election Algorithms.

Features of a global scheduling algorithm, Task assignment Approach, Load Balancing Approach, Load Sharing Approach.

Process Migration, threads.

File models, File Accessing Models, File Sharing Semantics, File Caching Schemes, File Replication, Fault Tolerance.
Naming, Security

References:

1. “Distributed Operating System Concept and Design”, Pradeep K. Sinha, PHI
2. “Distributed Operating System” Andrew S. Tananbaum, Pearson Education Asia.

CSP-711 Data Structure & Algorithm Lab.(2 credits)

Lab. work on the basis of syllabus of CSL-711 (Data Structures & Algorithms)

CSP-712 ADBMS Lab.(2 credits)

Lab. work on the basis of syllabus of CSL-713 (Advanced DBMS)

CSL-721 **Software Project Management** (MTech CSE 2nd Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4

L	T	P
4	-	-

Time: 3 Hours
(Examination)

SYLLABUS

Project Life Cycle Models: Project Life Cycle Model, A Framework for studying different life cycle models, The waterfall model, The prototyping model, The rapid Application Development (RAD) model, The spiral model and its variants. **Process Models:** Characteristics of a process, what constitutes a effective process, why are the processes important, process models, Common misconceptions about processes.

Metrics : The metrics roadmap, A typical metrics strategy, what should you measure, Set targets and track them, Understanding and trying to minimize variability, Act on data, people and organizational issues in metrics programs, Common pitfalls to watch out for in Metrics programs, Metrics Implementation Checklist and tools.

Software Configuration Management: The processes and activities of software configuration management, configuration status accounting, Configuration Audit, Software configuration management in geographically distributed teams, Metrics in software configuration management, **Software Quality Assurance:** how do you define quality, why is quality important in software, quality control and quality assurance, Cost and benefits of quality, software quality analyst's functions, some popular misconceptions about the SQA's role, Software Quality assurance tools, Organizational Structures, Profile of a successful SQA, Measures of SQA success, pitfalls to watch out for in the SQA's role.

Risk management : What is risk management and why it is important? Risk Management Cycle, Risk Identification: Common Tools and Techniques Risk quantification, Risk Monitoring , Risk mitigation, Risks and mitigation in the context of Global Project Teams. Some Practical Techniques in Risk Management, Metrics in risk management.

Project Initiation: Activities during Project initiation, Outputs, quality records and completion criteria for the project intimation phase. Interfaces to the process database.

Project planning and Tracking: Components of project planning and tracking, the "What" part of a project plan, The "What Cost" part of a Project plan, The "When" part of project planning, The "How" part of project planning , The "By whom" part of project management plan, putting it all together: The software project management plan Activities specific to project tracking, Interfaces to the process database.

Project Closure: When does project closure happen. Why should we explicitly do a Closure? An Effective Closure process, Issues that Get Discussed During Closure, metrics for project Closure, Interfaces to the process Database.

Estimation: What is estimation? When and why is estimation done? The three phases of estimation, Estimation Methodology, Formal models for size estimation. Translating size estimate into effort Estimate, translating effort estimates into schedule estimates, Common challenges during estimation, Metrics for the estimation processes. Design and Development Phases: some differences in our chosen approach, silent features of design, Evolving an Architecture/ Blueprint, design for Reusability, Technology choices / constraints, design of standards, Design of portability, user interface issues. Design for testability, design for Diagnosability, Design for maintainability, Design for Install ability Inter-operability design, Inter-operability design, Challenges during design and development phases, Skill sets for design and development, Metrics for design and development phase. Project Management in Testing phase; What is testing, What are the activities that make up Testing? Test scheduling and type of test, people issues in testing, Management structures for testing in global teams, metrics for Testing phase. Project management in the maintenance phase. Activities during the maintenance phase, management issues during the maintenance Phase, Configuration management during the maintenance phase, Skill sets for people in the maintenance phase, Estimating size, effort and people resources for the maintenance phase, Advantages of using geographically distributed teams for the maintenance phase , metrics for the maintenance phase.

References:

1. Gopaldaswamy Ramesh “Managing Global Software project” TMH Publishing Company, New Delhi. (2001)
2. tom Demarco, Controlling Software Pfoject Management, , Measurement, Prentice Hall , New jersey. 91982).
3. Tom Glib, Finzi Susannah, Principals of Software Engineering management, Addison Wesley, England.

CSL-722 Theory of Computation (MTech CSE 2nd Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P
4 - -

Time: 3 Hours
(Examination)

SYLLABUS

Finite Automata, Deterministic finite automata, Non deterministic finite automata, finite automata with epsilon transitions. Application of finite automata.

Regular Expressions, finite automata and regular expressions, algebraic laws of regular expressions, Application of regular expression.

Context free grammars, The language of a grammar, sentential form, parse trees, ambiguity in grammars and languages, Applications of context free grammar.

Normal forms for context free grammar, Chomsky normal form, The pumping lemma for context free languages. Decision properties of context free language.

Push down automata, Languages of a PDA, parsing and pushdown automation.

Turing machine, Programming techniques for turing machine, restricted turing machines, turing machine and computers.

References:

1. Introduction to automata theory, language & computations- Hopcroft & O.D. Ullman, R. Mothwani. AW, 2001
2. Theory of Computer Science(automata, languages, and computation): K.L.P Mishra and N. Chandrasekaran, PHI,2000
3. Introduction to formal languages & automata- Peter Linz, Narosa Pub. 2001.
4. Fundamentals of the theory of computation- principles and practice by Ramond Greenlaw and H . James Hoover, Harcourt India Pvt. Ltd.1998.
5. Elements of theory of computation by H.R. Lewis & C.H. Papaditriou, PHI,1998.

CSL-723 Design and Development of Microprocessor Based System
(MTech CSE 2nd Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits:	4	Time:	3	Hours
L	T	P	(Examination)	
4	-	-		

SYLLABUS

Architecture of 8086/8088- Introduction, Digital Computers, Microprocessors, 8086/8088 internal Architecture, Memory Organization, Addressing Modes, Assembly directives, Introduction, Symbols, Variables and constants, Data Definition and storage allocation directives, structures, records, Assigning Names to Expressions, Segment Definition, alignment directives, Value Returning Attribute operators.

The 8086/8088 Instructions- Introduction, Instruction Formats, Instruction execution Timing, assembler instruction format, Data transfer Instruction, Arithmetic Instruction, Branch Instruction, and conditional and unconditional, loop instructions, NOP and HLT instructions, Flag manipulation instructions, logical instructions, Shift and Rotate Instructions, String Instructions, Assembly Language Programming,

Advanced Processors- Introduction, Intel 80286, Intel 80386, Intel 80486, Intel Pentium and Intel P6 processor- Internal Block Diagram Only.

I/O Programming- Fundamentals, I/O Considerations, Programmed I/O, Interrupt I/O, Block Transfer & DMA. I/O Design Example,

Basic 8086/88 Minimum Mode, maximum mode, Interrupt priority Management, based on single 8259A and multiple 8259, I/O interfaces, Asynchronous , Synchronous , 8251A Programmable Communications interface, 8255 A Programmable Peripheral Interface.

Micro processor Applications- Data Acquisition System, Temperature Monitoring, Speed Control etc.

References:

1. Yu- Cheng Liu, Glenn A. Gibson,” Microcomputer System: The 8086/8088 Family Architecture, Programming and Design.
2. Douglas V. Hall,” Microprocessors and Interfacing Programming and Hardware”

CSL-724 **High Speed Networks** (MTech CSE 2nd Sem)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 4
L T P
4 - -

Time: 3 Hours
(Examination)

SYLLABUS

UNIT 1 **HIGH SPEED LAN**

- **Gigabit Ethernet** → overview of fast Ethernet, IEEE 802.3z standard, protocol architecture, network design using Gigabit Ethernet, applications, 10GB Ethernet.
- **Wireless Networks** → Existing & Emerging standards, Wireless LAN(802.11), Broadband Wireless(802.16), Bluetooth(802.15) their architecture, protocol stack and frame format. Mobile Networks
- **Fibre Channel** → Fibre channel characteristics, topology, ports, layered model, session management, flow control, addressing, SAN.

UNIT 2 **HIGH SPEED WAN**

- **Frame Relay** → Protocol architecture, frame format, routing.
- **ISDN & B-ISDN** → Channels, interfaces, addressing, protocol architecture, services.
- **ATM** → Virtual circuits, cell switching, reference model, traffic management.

UNIT 3 **PERFORMANCE ANALYSIS & QoS IN COMPUTER NETWORKS**

- **N/W analysis & modeling** → Probability and network queuing models(Little's theorem, M/M/1, M/M/m, M/M/∞, M/G/1), modeling network as a graph.
- Open queuing network(Jackson's Theorem) and closed queuing networks, managing network performance.
- **QOS Protocols** → Overview of QoS protocols(RSVP, RTP).

UNIT 4 **INTERNET SUITE OF PROTOCOLS**

- **Internet Layer** → IPV4 and IPV6, IP addressing, ARP, IP routing(OSPF & BGP), internet multicasting, mobile IP.
- **Transport Layer** → UDP/TCP protocols & architecture, TCP connection management, wireless TCP.
- **Application Layer** → DNS, FTP, Voice over IP, audio & video compression.

References :

- "Building high speed Networks", Tere Parnell, TMH.
- "High Speed Networks and Internets", William stalling, Pearson Education.

Programme Elective – I (3 Credits)

Student has to select any one elective out of the following :

CSL – 725	Soft Computing
CSL – 726	Advanced Computer Architecture
CSL – 727	Embedded Systems
CSL – 728	Computer Graphics
CSL – 729	Compiler Construction

CSP-721 Lab Based on current Technologies (2 Credits)

This paper will cover practical work based on current technologies which will be decided by chairman of the department or teacher concerned before the start of semester keeping in view the latest changes in the field of Computers

CSP-722 Microprocessor Lab.(2 Credits)

This lab will cover practical work based on the syllabus of CSL-723(Design & Development of Microprocessor based system)

CSL-725 **Soft Computing** (MTech CSE Programme Elective-I)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3

L	T	P
3	-	-

Time: 3 **Hours**
(Examination)

SYLLABUS

Introduction to genetic algorithms: Representation, initial population, evaluation function, genetic operators, working of genetic algorithms using optimization of a simple function, study of parameters of genetic algorithms and its performance, sampling mechanisms, mathematical foundations of genetic algorithms and schemata processing, computer implementation of genetic algorithms and applications of genetic algorithms.

Parallel and distributed genetic algorithms.

Introduction to genetic based machine learning: Classifier system, rule and message system, the bucket brigade algorithm and application of genetic based learning.

Introduction to neural networks and fuzzy sets and logic

Evolutionary strategies: Comparison of genetic algorithm and evolutionary strategies, multi modal and multi objective function optimization, the transport problem and traveling salesman problem.

References:

1. Genetic Algorithms in Search, Optimization and machine learning, David.E. Goldberg, Addison Wesley, 1999.
2. Genetic algorithms +Data Structures = Evolution Programs, Zbigniew Michalewicz, Springers-Verlag, Berlin, 1996.
3. Handbook of genetic algorithms, Edited by Lawrence Davis, Van Nostrand Reinhold, New York, 1991

CSL-726 **Advanced Computer Architecture** (MTech CSE Programme Elective-I)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3
L T P
3 - -

Time: 3 Hours
(Examination)

SYLLABUS

Parallel Computer Models

The state of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI Models

Program and Network Properties

Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanism, System Interconnect Architecture,

Processors and Memory Hierarchy

Advanced Processor Technology, Superscalar and vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

Bus, Cache, and Shared Memory

Backplane Bus Systems, Cache Memory Organizations, Shared-Memory Organizations, Sequential and Weak Consistency Models

Pipelining and Superscalar Techniques

Linear Pipeline Processors, Nonlinear Pipeline Processors, Instruction Pipeline Design, Arithmetic Pipeline Design, Superscalar and Superpipeline Design

Multiprocessors and Multicomputers

Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Message-Passing Mechanisms

Multivector, Scalable, Multithreaded, Data Flow Architecture

Vector Processing principles, Multivector Multiprocessors, Compound Vector Processing, Principles of Multithreading, Dataflow and Hybrid Architectures.

References :

1. Advanced Computer Architecture by Kai Hwang, McGraw Hill {Single author edition}
2. Computer Architecture by Micheal J. Flynn, Narosa.

CSL-727 **Embedded Systems Design** (MTech CSE Programme Elective-I)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3
L T P
3 - -

Time: 3 Hours
(Examination)

SYLLABUS

Real time operating system overview, Exposure to Windows CE, QNX, Micro kernels and μ c/OS of introduction to process models. Interrupt routines in an RTOs environment, encapsulation semaphores and queues, hard real-time scheduling considerations, saving memory space.

16 & 12 bit microprocessor and micro controller and DSP hardware with reference to Embedded system.

Embedded software development tools and compilers-host and target machines linkers/locators for embedded software, cross compilers, cross assemblers and tool chains, gcc compiler, basic concept of device drivers, serial communication interface device driver.

System synthesis of Hardware/Software co-emulation, simulation speed of emulators. JTAG OCD.

Communication protocols with special reference to embedded system. TCP/IP, VDP wireless protocols, IRDA, Blue tooth IEEE 8.8.11.

References:

1. An embedded system primer by Devid E Simon Addison Wesley,1999.
2. Programming for Embedded system by Dreamtech software team, John wiley,2002.
3. TCP/IP lean: web servers for embedded systems by Jeramy Bentham, 2002,
4. Real time programming: A guide to 32 bit embedded development , Rick Grehan, AW, 1999

CSL-728 Computer Graphics
(MTech CSE Programme Elective-I)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3	Time: 3	Hours
L T P	(Examination)	
3 - -		

SYLLABUS

Basic raster graphics algorithms for drawing 2D Primitive, linear , circles, ellipses. Arcs, clipping, clipping circles, ellipses and polygon.

Geometric transformation: 2D, 3D transformations, Window-to-viewport transformations.

Graphics Hardware: Display techniques, Input Devices, Image Scanners, Hard Copy

Shading Techniques: Transparencies, Shadows, Object reflection, Gouraud & Phony Shading Techniques.

Visible Surface determination techniques for visible line determination, Z- Buffer algorithm, Scanline algorithm, Algorithm for oct-tres, algorithm for curve surfaces visible surfaces, ray tracing, recursive ray tracing.

Image manipulation & Storage: File formats for BMP, GIF, TIFF, IPEG, MPEG-II.

Animation: Conventional and Computer Assisted Animation, Methods of Controlling Animation, Tweening, Morphing.

Multimedia: Applications, Components, Hypertext, Hypermedia, Authoring Tools.

References:

1. "Computer Graphics Principles and Practices", Foley et. Al., Addison Wesley.
2. "Computer Graphics", Hearn and Baker, Mc Graw Hill.
3. "Computer Graphics", N. Krishnamurty, Tata McGraw Hill.

CSL-729

Compiler Construction (MTech CSE Programme Elective-I)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3
L T P
3 - -

Time: 3 Hours
(Examination)

SYLLABUS

Compilers and Translators, Lexical analysis, Syntax analysis, Intermediate code generation, Optimization, Code generation.

Context free grammars, derivation and parse trees, capabilities of context free grammars.

Parsers, Shift reduce parsing, operator precedence parsing, topdown parsing, predictive parsers.

LR parsers, The canonical collection of LR(o) items, constructing SLR parsing tables, constructing LR parsing table, constructing LALR parsing tables, ambiguous grammars usages, implementation of LR parsing tables, constructing LALR sets of items.

Syntax directed translation schemes and their implementation, post fix notation, parse tree and syntax trees, quadruples and triples, assignment statements, Boolean expressions, flow control alteration, postfix translation, translation with top-down parsers, array references in arithmetic expressions, procedure calls, declarations, case statements, record structures, PL/I style structures.

The contents of a symbol table, data structures for symbol tables, representing scope information.

Error, lexical phase errors, synthetic phase errors, semantic errors.

Sources of optimization, Loop optimization, DAG representation of logic blocks, loop invariant computations, induction variable elimination, machine code generation.

References:

1. Affred V. Aho and Jaffrey D . Ullman, “Principles of Compiler Design”, Narosa Publication.
2. Ravi Sethi, “ Compiler, Principles, Techniques and Tools”, Pearson Education Asia.

CSD-731 Dissertation & Seminar –I (3 Credits)

Dissertation should be of research nature only. Student should carry out research work individually at GJU Hisar. They are required to complete the following in this semester.

- Basic concepts if any required for research in required area.
- Review of literature.
- Problem formulation.
- Seminar based upon the problem chosen for dissertation in front of the departmental committee constituted by Chairman

Programme Elective – II / Elective – III (3 Credits)

Student has to select any two elective out of the following :

CSL – 731	Mobile and Wireless Communication
CSL – 732	Performance Modeling
CSL – 733	Securities of Information Systems
CSL – 734	Knowledge and Discovery Management
CSL – 735	Research Methodologies

CSP-731 Computer Networking Lab(2 Credits)

This lab will cover practical work based on different protocols in the field of Computer Network, Wireless N/W and setting up of Networked Environment.

CSL-731 **Mobile and Wireless Communication**

(MTech CSE Programme Elective-II / III)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3
L T P
3 - -

Time: 3 Hours
(Examination)

SYLLABUS

Introduction:

Applications, history, market, reference model and overview. Wireless Transmission--- Frequencies, signals, antennas, signal propagation, multiplexing, modulation, spread spectrum, cellular system

MAC and Telecommunication system:

Specialized MAC, SDMA, FDMA, TDMA- fixed TDM, classical ALOHA, slotted ALOHA, CSMA, DAMA, PRMA, reservation TDMA. Collision avoidance, polling inhibit sense multiple access. **CDMA, comparison, GSM-** mobile services, architecture, radio interface, protocol, localization, calling, handover, security, new data services, Introduction to WLL.

Satellite and Broadcast Systems:

History, Applications, GEO, LEO, MEO, routing, localization , handover in satellite system. Digital audio and video broadcasting.

Wireless LAN:

IEEE 802.11-System and protocol architecture, physical layer. MAC layer and management. **Bluetooth---** User scenarios, physical layer, MAC layer, networking, security and link management.

Mobile network Layer:

Mobile IP- goals, assumption, requirement, entities, terminology, IP packet delivery, Agent advertisement and discovery, registration, tunneling, encapsulation, optimization , reverse tunneling, IPV6.

DHCP. Adhoc Networks---routing , destination sequence distance vector, dynamic source routing, hierarchical algorithm, alternative metric.

Mobile Transport Layer:

Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP fast retransmission/recovery, transmission/time out freezing, selective retransmission, Transaction oriented TCP.

Support for Mobility:

File System, WWW-HTTP, HTML, system architecture. **WAP –** architecture, wireless datagram, protocol, wireless transport layer security, wireless transaction protocol, application environment, telephony application.

References:

1. Jochen Schiller, " **Mobile Communication** " , Pearson Education, 2002.
2. Lee, " **Mobile Cellular Telecommunications** " McGRAW- WILL, 2nd Edition.

CSL-732

Performance Modelling
(MTech CSE Programme Elective-II / III)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3

L	T	P
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Time: 3 Hours
(Examination)

SYLLABUS

Overview of probability and stochastic process

Probability, Random Variables, Stochastic Processes

Queuing Paradigm and elements of Performance issues

- How queue behave?
- Why queuing analysis?
- Queuing Theory and models
- Case Study : Performance model of a distributed file service; Single Bus Multiprocessor modeling, Performance model of a shared medium packet switch

Single Queuing System

M/M/P Q.S., Poisson process, Foundation of the Poisson process, The Markov Property, Exponential Service times, Foundation of the M/M/1 Q.S., Flows and balancing, Little's law, Performance measures.

State-dependent Q.S.

- M/M/1/N q.s. : the finite buffer case
- M/M/ ∞ q.s. infinite member of servers
- M/M/M q.s. : m parallel servers with a queue (Erlang C formula)
- M/M/m/m queue : A loss system (Erlang B formula)
- Central server CPU model

Network of queue and Simulation of Communication networks:

- Open networks (The product from solution)
- Closed queuing networks
- Norton's equivalent for queuing networks
- Simulation of communication networks

Network Traffic Modelling

- Continuous Time Models- Poisson process, Generally Modulated Poisson process, Markov modulated Poisson Process.
- Auto regressive – Moving average model
- Fluid flow approximation model
- Self-similar data traffic
- Continuous-time definition, Long-range dependence, Spectral density, Examples :World wide traffic, TCP, FTP, TELNET traffic

- Burstiness
- Network Performance

References :

1. Thomas G. Robertazzi, “ Computer networks and systems- queuing theory and performance evaluation”, 3rd edition, Springer
2. Kishore S. Trivedi, “Probability & Statistics with reliability, queuing and computer Sc. Applications”, PHI

CSL-733 Security of Information Systems

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3	Time: 3	Hours
L T P	(Examination)	
3 - -		

SYLLABUS

UNIT 1 CRYPTOGRAPHY

- **Overview of Information Security** → Basic Concepts, Cryptosystems, Cryptoanalysis, Ciphers & Cipher modes.
- **Symmetric Key Cryptography** → DES, AES.
- **Asymmetric Key Cryptography** → RSA algorithm, Key management protocols, Diffie Hellman Algorithm.
- **Digital Signature** → Digital Signatures, Public Key Infrastructure.

UNIT II SYSTEM SECURITY

- **Program Security** → Security problems in Coding, Malicious Logic, Protection.
- **Database Security** → Access Controls, Security & Integrity Threats, Defence Mechanisms.
- **OS Security** → Protection of System Resources, Models for OS security.
- **.Net Security** → User based security, Code access security, form authentication.

UNIT III NETWORK & INTERNET SECURITY

- **LAN Security** → Threats, Authentication & access control, Secured communication Mechanisms (IPSec, Kerberos, Biometric, PKI), Secured Design for LAN.
- **Firewall & IDS** → Firewall Techniques, Firewall Architecture, Types of IDS, IDS Tools.
- **Email & Transaction Security Mechanisms** → Privacy Enhanced Mail(PEM), S/MIME, SET protocol, Client-Server Security on web.

UNIT IV WIRELESS SECURITY

- **Wi-Fi & IEEE 802.11 Security** → Protocol architecture, WEP, Access controls.
- **Wireless Transport Layer Security** → Transport Layer Security, SSL, IPSEC, WAP security.
- **Bluetooth Security** → Protocol architecture, Attacks, Security architecture.

References:

- “ Security in Computing (Second Edition)”, Charles P. Pfleeger, Prentic- Hall International, Inc., 1996.
- “ Applied Cryptography Protocols, Algorithms, and Source Code in C (Second Edition)”, Bruce Schneier, John Wiley & Sons, Inc., 1995.
- “ Security Technologies for World Wide Web”, Rolf Oppliger, Artech House: Inc.

CSL-734 Knowledge & Discovery Management (MTech CSE Programme Elective-II / III)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3
L T P
3 - -

Time: 3 Hours
(Examination)

SYLLABUS

Introduction: What is knowledge, the knowledge edge, Completing chain from Data, Information to knowledge., the technology push for knowledge management , Demystifying Knowledge management.

The Technology Prospective: Knowledge Management Techniques, IS & IT are not quite synonymous, Transformation Model Technologies, AI & Expert System, Networking, Web Publishing, Search Engine & Text Mining, Document Management, Work Flow, Dissemination Technologies, KBMS

Convergence of Technologies

What is convergence of Technologies, Chaos & Attractors or Factors Responsible for present development.

Revisiting Some Technologies used in knowledge management: Data mining and the data warehouse, the knowledge discovery process, Setting up a KDD environment, Knowledge Representation Issues, Web Technology & internet specific for knowledge management.

Implementing Knowledge Management: The Ten-steps Kn Road Map, Infrastructural Evolution & Leverage evaluation, Knowledge Management System Analysis & Design, KMS Development, Review & Measuring ROI (Return of Investment)

Implementation KM in your organization: Re-emphasised a lining or lining knowledge strategy to Business Strategy, The K-gap analyzer as a tool, the four phase Knowledge methodology, creating the knowledge organization

Changing Lives Every Where : E-Governance-the Knowledge Management way, Smart schools, Virtual University, Building knowledge societies

The Future & Case Studies

Text Books:

- i) The knowledge Management Toolkit by Amrit Tiwana Pearson Education Asia,k (200)
- ii) Knowledge Management, Enabling Business Growth by Ganesh Natrajan & Sandhya Shekhar, Tata McGrawHill(200)
- iii) Data Mining by Pieter Adriaans & Dolf Zantinge, Pearson Education Asia (1999, reprint2000)

CSL-735 Research Methodologies
(MTech CSE Programme Elective-II / III)

Note: Total 8 questions are to be set by the examiner/teacher covering the entire syllabus uniformly. A candidate is required to attempt any five questions. All questions shall carry equal marks.

Total Credits: 3	Time: 3	Hours
L T P	(Examination)	
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SYLLABUS

Scientific Research: Nature and objective of research, types and methods of research; historical, descriptive, and experimental.

Study and formulation of research problem; feasibility, preparation and presentation of research proposal.

Information and how to deal with it.

Nature and use of argument.

Scientific methods and responsible conduct in research.

Statistical analysis: Measures of central tendency and dispersion; mean, median, mode, range, mean and standard deviations.

Random variables and probability: Probability and probability distributions; binomial, poisson, geometric, negative binomial uniform exponential, normal and log normal distribution.

Test of hypothesis: basic ideas of testing hypothesis, test of significance based on normal, t and chi-square distributions, analysis of variance technique.

References:

1. Borth, Wayne C, et.AL. The Craft of Research: Chicago Guides to Writing Edition and Publishing.
2. Johnson, R.A. Probability and Statistics, PHI, New Delhi, 1994
3. Williman, Nicholas, Your Research Project, SAGE, 2001
4. Peter Medawar, Advice to A Young Scientist, Basic Books, 1981.
5. R. Cajal, Advice for a Young Investigator, (English Translation) MIT Press, 1999.

CSD-741**Dissertation & Seminar – II (9 Credits)**

The research on problem formulated after review of literature done in 3rd semester should be continued in this semester. Student should do their research at GJU Hisar only. However they may visit other organizations for any kind of help in their dissertation with prior approval of Chairman on recommendation of supervisor. Before submission of final dissertation student is required to present himself/herself for pre-submission seminar in front of departmental committee.

Student shall present before submission a paper on any topic related to his/her work in a Seminar/ Conference/ Symposia or should have published a paper in a journal or proceedings of a Seminar/ Conference/ Symposia without which dissertation could not be submitted. Paper accepted for publication will be considered to have been published for this purpose.

SYLLABUS
of
M.Tech(CSE)
(2 year scheme)

wef July 2006
(Credit system)

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