

M.TECH IN CSE (COMPUTER ENGINEERING)
(REGULAR)

I SEMESTER

Paper Code	Subject	Teaching Hours			Credits Points
		L	T	P	
01MCS101	Advanced Data Structure	4	1	0	5
01MCS102	Architecture of High Performance Computer System	4	1	0	5
01MCS103	Object Oriented Techniques in java	4	1	0	5
01MCS104	High Speed Network	4	1	0	5
	Practical				
01MCS201	Object Oriented Techniques in Java Lab	0	0	3	2
01MCS202	Advance Computer Architecture lab	0	0	3	2
01MCS203	Research Orientation Lab	0	0	3	2
01MCS301	Discipline & Extra Curriculum Activities	0	0	4	1
	Total	16	4	13	27

II SEMESTER

Paper Code	Subject	Teaching Hours			Credits Points
		L	T	P	
02MCS101	Advanced Database Management Systems	4	1	0	5
02MCS102	Software System Design	4	1	0	5
02MCS103	Java Enterprise Systems	4	1	0	5
02MCS104	Parallel And Distributed Computing	4	1	0	5
	Practical				
02MCS201	Project Management Lab	0	0	3	2
02MCS202	Advanced Database Lab	0	0	3	2
02MCS203	Software Engineering Lab	0	0	3	2
02MCS301	Discipline & Extra Curriculum Activities	0	0	4	1
	Total	16	4	13	27

III SEMESTER

Course No.	Title	Teaching Hours			Credit Point
		L	T	P	
03MCS101	Mobile Computing	5	1	0	6
	Elective-II(choose any one)				
03MCS102.1 03MCS102.2 03MCS102.3 03MCS102.4	Artificial Intelligence & Fuzzy Systems Reconfigurable computing Network system design Optical network design and implementation	5	1	0	6
	Practical				
03MCS201	Seminar	4	0	0	4
03MCS202	Thesis stage-I	6	0	0	6
03MCS203	Project	4	0	0	4
03MCS301	Discipline & Extra Curriculum Activities	0	0	4	1
	Total	24	2	4	27

IV SEMESTER

Course No.	Title	Teaching Hours			Credit Points
		L	T	P	
04MCS101	THESIS a) Continuous Evaluation b) Thesis Report c) Viva-Voce	5 6 6	0	0	17
04MCS301	Discipline & Extra Curriculum Activities	0	0	4	1
	Total	17	0	4	18

ADVANCED DATA STRUCTURE

Course/Paper: 01MCS101

MCS Semester I

Advanced data structure: self-adjustment, persistence and multidimensional trees Randomized algorithms: Use of probabilistic inequalities in analysis & applications. Geometric algorithms: Point location, convex hulls and Voronoi diagrams, Arrangements. Graph algorithms: Matching and Flows. Approximation algorithms: Use of Linear programming and primal dual, local search heuristics. Parallel algorithms: Basic techniques for sorting, searching, merging, list ranking in PRAMs and Interconnection networks.

Reference :

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. Monograph on Theoretical Computer Science
5. Papadimitriou and Steiglitz "Combinatorial Optimization", Princeton University Press
6. Joseph Ja'Ja' "Introduction to Parallel Algorithms" Addison-Wesley.
7. Vaizirani "Approximation Algorithms", Springer

ARCHITECTURE OF HIGH PERFORMANCE COMPUTER SYSTEM

Course/Paper: 01MCS102

MCS Semester I

Introduction to high performance computer system with special emphasis to uniprocessor system: objectives. Design techniques. Introduction level parallelism-static and dynamic pipelining, improving branch performance, memory system; cache Design, performance modeling, study of Pentium Architecture and architecture supporting Hyper-threading, Pentium memory management, new instructions, special features, programming; study of RISE & CISC based systems: Characteristics & performance

Reference :

1. D.Sima, T. Fountain, P. Kacsuk. "Advance computer Architectures: A Design Space Approach", Addison Wesley, 1997.
2. M.J. Flynn, "Computer Architecture: Pipelined and Parallel Processor Design", Narosa Publishing House/Jones
3. Kai Hwang, "Advance Computer Architecture", TMH

OBJECT ORIENTED TECHNIQUE IN JAVA

Course/Paper: 01MCS103

MCS Semester I

Enterprise Architectural Overview. Object Oriented Software Development for the Enterprise. Component-Based Software Development for the Enterprise. Java Foundations for Enterprise Development. Java Enterprise System Architecture with the J2EE. Enterprise User Interfacing. Modeling Components with JavaBeans. Enterprise Data. Basic JDBC. Advance JDBC. Distributed Enterprise Communications. Network Communications. Modeling Components with CORBA. CORBA Communications. RMI Communications. Modeling Components with COM/DCOM, DCOM Communications.

Reference :

1. Paul J. Perrone, Venkata,S.R., R. Chaganti "Bulding Java Enterprise System With J2EE", TechMedia
2. Professional Java "Java Sever Programming (Volume 1)" WROX Press Ltd.

HIGH SPEED NETWORK

Course/Paper: 01MCS104
MCS Semester I

Introduction to flow and Congestion Control: Window and Rate Based Schemes, Decbit, TCP, ATM, ABR, hop-by-hop Schemes. Quality of Service: in ATM, IETF integrated service model, Differentiated service Model. Flow identification, Packet Classifiers, Scheduling. Network Management: ASN, SNMP, CMIP. Issues in the management of large networks. Multicast: IGMP, PIM, DVMRP.

Reference :

1. Charle Kaufam. Radia Perlman, Mike Specines, Uyles Black “ Computer Network: Protocols
2. K. c Mansfield , J.L. Antonakos “ An interdiction to computer Networking “PHI.
3. Mobile Comm “ Schiler”

OBJECT ORIENTED TECHNIQUES IN JAVA LAB

Course/Paper: 01 MCS-201.
MCS Semester I

In this lab first 8 experiments are to practice software engineering techniques. Use any open source CASE tool. Many of them are available at www.sourceforge.net. You can choose any other CASE tool, as per choice.

Language : C++ / JAVA

Design Approach : Object Oriented

These designing can be done on any automation system e.g. library management system, billing system, payroll system, bus reservation system, gas agency management system, book-shop management system, students management system.

1. Do a feasibility study
2. Document all the requirements as specified by customer in Software Requirement Specification
3. Design sequence diagrams for project
4. Design Collaboration diagram
5. Design Data Flow Diagram for the project
6. Design Entity Relation Diagram for the project
7. Design Class diagram
8. Design at least 10 test cases for each module.
9. -10: Code and test the project, which you have designed in last 8 labs

ADVANCED COMPUTER ARCHITECTURE LAB

**Course/Paper: 01 MCS-202 .
MCS Semester I**

This lab will be based on assembly programming on of RISC processor simulator SPIM. SPIM simulator is available at site <http://pages.cs.wisc.edu/~larus/spim.html>.

SPIM exercises

1. Read an integer from the keyboard and print it out if (n == n_min AND n <= n_max).
2. Read an integer from the keyboard and print out the following as per switch-case statement

Switch (n)

```
{ n <= 10 print "not a lot"
```

```
n == 12 print "a dozen"
```

```
n == 13 print "a baker's dozen"
```

```
n == 20 print "a score"
```

```
n >= 100 print "lots and lots"
```

```
n != 42 print "integer"
```

```
otherwise print "you have the answer!"
```

```
}
```

3. Read a string from the keyboard and count the number of letters. Use the equivalent of following for loop

```
for (s1=0; str[s1] != '\n'; ++s1)
```

4. Print out a line of characters using simple procedure call.
5. Print out a triangle of characters using recursive procedure call.
6. Print factorial of a number using recursion.
7. Print reverse string after reading from keyboard.
8. Print a string after swapping case of each letter.
9. Print an integer in binary and hex.
10. Implement bubble sort algorithm.
11. Print Pascal Triangle of base size 12.
12. Evaluate and print Ackerman function.

RESEARCH ORIENTATION LAB

Course/Paper: 01MCS203
MCS Semester I

In this Lab students have to prepare and give presentation (both in terms of soft copy and hard bound file) on latest research topics in field of computer science and engineering.

Semester-II

ADVANCED DATABASE MANAGEMENT SYSTEM

Course/Paper: 02MCS101
MCS Semester II

Overview of DBMS, concurrency control, failure recovery. Introduction to distributed data base management systems, Semantic Database Models and Systems, Object-Oriented Database Systems, Relational Extensions: Design Techniques, Extension Techniques Object / Relational Systems: Open ODB, Transaction Management, Interface, OSQL, Oadapter, Case Study of an ORDBMS, Related Development, Current Product Scenario. Standard For OODBMS Products and Applications: ODM – Standards, ODMG, Smalltalk Binding, SQL, User Defined ADT in SQL, Routines, ADT Subtypes and Inheritance, Tables, Procedural Facilities, Other Type Constructions, Generic ADT Packages, Language Bindings.

Reference :

1. C S R Prabhu, "Object Oriented Data Base Systems" approaches and Architectures, PHI,
2. F. H. Lochousky, DC Tsichritzis "DBMS" New York Academic Press.
3. F. H. Lochousky, DC Tsichritzis "Data Models" PHI.
4. C.J.DATE "Introduction to Data Base to Management System" Addison Wesley.
5. N. Goodman, V. Hadzilacos "Concurrency Control and Recovery in Data Base System" Addison Wesley.

SOFTWARE SYSTEM DESIGN

Course/Paper: 02MCS102
MCS Semester II

Concepts and techniques relevant to production of large software systems: Structured programming. Requirements, specification and analysis. Top-down design and development. Information hiding, abstraction, modularity, object-oriented techniques. Separate compilation, configuration management, and program libraries. Design patterns, UML Documentation. Validation. Quality assurance, safety. Testing and test case generation. Software metrics. Cost analysis and estimation, manpower and time management. Organization and management of large software design projects; use of CASE tools.

Reference :

1. Sommerville, "Software Engineering", Addison-Wesley, 1999.
2. Peters and Pedrycz, "Software Engineering: an Engineering Approach", Wiley, 1999.
3. Pressman "Software Engg", PHI

JAVA ENTERPRISE SYSTEMS

Course/Paper: 02MCS103
MCS Semester II

High- Assurance Enterprise Applications. Security Basics. Basic Java Security. CORBA Security. Web Browser and Servers in the Enterprise. Traditional Web Programming and Java. XML. Java Servlets. Java Server Pages. Enterprise Application Platforms. Application Servers and Enterprise Java Beans. Modeling Components with Enterprise JavaBeans. Advanced Enterprise JavaBeans Serving. Enterprise Application Integration.

Reference :

1. Paul J. Perrone, Venkata S.R., R. Chaganti "Building Java Enterprise System With J2EE, Tech Media
2. Professional Java "Java Server Programming (Volume 2)" WROX Press Ltd.

Parallel & Distributed Computing

Course/Paper: 02MCS104
MCS Semester II

Introduction to Parallel and Distributed Systems, goals, hardware concepts, software concepts, client server model; communication, layered protocols, remote procedure call, objective invocation, message & stream oriented communication; processes, threads, clients, servers; naming entities, mobile and unreferenced entities; clock synchronization, algorithms, transaction; consistency and replication, data-centric & client-centric models, protocols; fault tolerance, process resilience, reliable client-server & group Communication, commit, recovery; security, channels, access, security control; distributed object-based systems explanation and comparison; distributed file systems (SUN, CODA) and comparison; distributed document-based system and coordination-based systems, multimedia systems, Parallel Programming Languages and Algorithms.

Reference :

Andrew S. Tanenbaum, marten van steen "Distributed Systems Principals and Paradigms" Pearson Edu.
George Coulouris, Jean Dollimore, Tim Kindberg "Distributed Systems Concepts and Design" Pearson Edu.
Joel M. Crichlow " An Introduction to Distributed & Parallel Computing" 2nd ed. PHI.
M. Sasikumar, Dinesh Shikhare P Ravi Prakash "Introduction to parallel Processing" PHI
Andrew S. Tanenbaum "Distributed Operating System"TMH
K. H. Wang "Advanced Computer Architecture" TMH.

PROJECT MANAGEMENT LAB

Course/Paper: 02MCS201
MCS Semester-II

In this lab students have to explain how a Real Time Project undergoes following stages

1. Requirements specification (Requirement Analysis)
2. Design
3. Implementation (or Coding)
4. Integration
5. Testing (or Validation)
6. Deployment (or Installation)
7. Maintenance

ADVANCED DATABASE LAB

Course/Paper: 02MCS202
MCS Semester-II

Student can use MySql (preferred open source DBMS) or any other Commercial DBMS tool (MS-Access / ORACLE) at backend and

C++ (preferred) VB/JAVA at front end.

1. (a) Write a C++ program to store students records (roll no, name, father name) of a class using file handling.

(Using C++ and File handling).

(b) Re-write program 1, using any DBMS and any compatible language.(C++/MySQL) (VB and MS-Access)

2. Database creation/ deletion, table creation/ deletion.

(a) Write a program to take a string as input from user. Create a database of same name. Now ask user to input two more string, create two tables of these names in above database.

(b) Write a program, which ask user to enter database name and table name to delete. If database exist and table exist then delete that table.

3. Write a program, which ask user to enter a valid SQL query and display the result of that query.

4. Write a program in C++ to parse the user entered query and check the validity of query.

(Only SELECT query with WHERE clause)

5 - 6. Create a database db1, having two tables t1 (id, name, age) and t2 (id, subject, marks).

(a) Write a query to display name and age of given id (id should be asked as input).

(b) Write a query to display average age of all students.

(c) Write a query to display mark-sheet of any student (whose id is given as input).

(d) Display list of all students sorted by the total marks in all subjects.

7 - 8. Design a Loan Approval and Repayment System to handle Customer's Application for Loan and handle loan repayments by depositing installments and reducing balances.

9 -10. Design a Video Library Management System for managing issue and return of Video tapes/CD and manage customers

SOFTWARE ENGINEERING LAB

Course/Paper: 02MCS203
MCS Semester-II

For the instructor: Assign any two projects to a group of exactly two students covering all of the experiments from given experiment list. Each group is required to prepare the following documents for projects assigned to them and develop the software using software engineering methodology.

1. Problem Analysis and Project Planning Thorough study of the problem- identify project scope, infrastructure.
2. Software Requirement Analysis- Describe the individual Phases/modules of the project deliverables.
3. Data Modeling Use work products – data dictionary, use case diagrams and activity diagrams, build and test class diagrams, sequence diagrams and add interface to class diagrams.
4. Software Developments and Debugging.
5. Software Testing – Prepare test plan, perform validation testing coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor.
6. Describe: Relevance of CASE tools, high – end and low – end CASE tools, automated support for data dictionaries, DFD, ER diagrams.

S. No.	List of Experiments	Software Required:
1	Course Registration System	Case Tools: Rational Suite, Win runner, Empirix Languages: C/C++/JDK, JSDK, INTERNET EXPLORER UML Front End: VB, VC++, Developer 2000, .NET
2	Quiz System	
3	Online ticket reservation system	
4	Remote computer monitoring	
5	Students marks analyzing system	
6	Expert system to prescribe the medicines for the given symptoms	

7	Platform assignment system for the trains in a railway station	Back End: Oracle, MS – Access, SQL
8	Stock maintenance	
9	Student Marks Analyzing System	
10	Online Ticket Reservation System	
11	Payroll System	
12	Export System	

Semester-III

MOBILE COMPUTING

Course/Paper: 03MCS101 MCS Semester III

Introduction to mobile computing: Principles, classifications & overview of devices, operating system, wireless transmission, Brief overview, multi-path propagation, hidden & exposed terminals. Introduction to challenges in mobile computing Cellular architecture, co-channel interference, frequency reuse, capacity by cell splitting, evaluation of mobile systems CDMA, FDMA, TDMA. Medium access control & protocols. Wireless LAN: Infrastructure & ad-hoc networks, IEEE 802.11, HIPER LANs, blue Tooth. Mobile Network Layer: Mobile IP, infrastructure Ad-hoc Routing. Mobile Transport Layer: Indirect TCP, snooping TCP, mobile TCP etc. Mobile support, WWW & mobility, file system, Wireless Application protocol WML, Overview of GSM, GPRS & UMTS

Reference:

Hansmann & mark "Principles of mobile computing", Springer.
Jochen Schiller "Mobile Communications", Pearson
Matthew S Gast "Wireless Networks" O'REILLY.

ARTIFICIAL INTELLIGENCE & FUZZY SYSTEMS

Course/Paper: 03MCS102.1 MCS Semester III

Neuro-Fuzzy and Soft Computing: Introduction to Neuro-Fuzzy and Soft Computing, Fuzzy Set Theory, Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Adaptive Neural Networks, Supervised Learning Neural Networks, Learning from Reinforcement, Unsupervised Learning and Other Neural Networks, ANFIS: Adaptive Neuro-Fuzzy Inference Systems, Neuro-Fuzzy Control, ANFIS Applications (Printed Character Recognition, Adaptive Noise Cancellation), Fuzzy Sets and Genetic Algorithms in Game Playing, Soft Computing for Color Recipe Prediction.

Reference :

- 1). J.S.R. Jang, C. – T, Son, E.Mizutani "Neuro-fuzzy and Soft Computing" PHI ,
- 2). Russel and Norvig: "AI, a modern approach", Pearson Education
- 3). Rich and Knight: "AI" Tata McGraw Hill
- 4). KM Fu: "Neural Networks in Computer Intelligence", McGraw Hill

RECONFIGURABLE COMPUTING

Course/Paper: 03MCS102.2 MCS Semester III

Evolution of programmable devices: Introduction to AND-OR structured Programmable Logic Devices PROM, PLA, PAL and MPGAs; Combinational and sequential circuit realization using PROM based Programmable Logic Element (PLE); Architecture of FPAD, FPLA, FPLS and FPID devices. FPGA Technology: FPGA resources - Logic Blocks and Interconnection Resources; Economics and applications of FPGAs; Implementation Process for FPGAs Programming Technologies - Static RAM Programming, Anti Fuse Programming, EPROM and EEPROM Programming Technology; Commercially available FPGAs - Xilinx FPGAs, Altera FPGAs; FPGA Design Flow Example - Initial Design Entry, Translation to XNF Format, Partitioning, Place and Route, Performance Calculation and Design Verification. Technology Mapping for FPGAs: Logic Synthesis - Logic Optimization and Technology Mapping; Lookup Table Technology Mapping - Chortle-crf Technology Mapper, Chortle-d Technology Mapper, Lookup Table Technology Mapping in mis-pga, Lookup Table Technology Mapping in Asyl and Hydra Technology Mapper; Multiplexer Technology Mapping - Multiplexer Technology Mapping in mis-pga. Logic Block Architecture: Logic Block Functionality versus Area-Efficiency - Logic Block Selection, Experimental Procedure, Logic Block Area and Routing Model and Results. Routing for FPGAs: Routing Terminology;

Strategy for routing in FPGAs; Routing for Row-Based FPGAs - Segmented channel routing, 1-channel routing algorithm, K – channel routing algorithm and results.

Reference :

- 1). FPGA Based System Design by Wayne Wolf published by Pearson Education
- 2). Digital System Design Using Programmable Logic Devices by Parag K Lala published by BS publications
- 3). Field-Programmable Gate Arrays by Stephen Brown published by Kluwer Academic Publishers

NETWORK SYSTEM DESIGN

Course/Paper: 03MCS102.3
MCS Semester III

Review of Protocols & Packet Format; Network Systems & the Internet, Network Systems Engineering, Packet Processing, Achieving high speed, Network Speed, Hardware, Software & hybrids. A conventional computer system, Fetch-Store paradigm, Network Interface Card functionality, Onboard address recognition, Packet Buffering, Promiscuous mode. IP Datagram, Fragmentation, Reassembly, Forwarding, TCP Splicing. RISC vs. CISC, Network Processors, Ingress & Egress Processing, Parallel & Distributed Architecture, Network Processor Design, Examples of Commercial Network Processors, Overview of Intel Network Processor, Micro engine Programming, Core Programming.

Laboratory work: Build packet analyzer, IP fragment, Ethernet bridge, packet forwarding. Project should be assigned to students to build software component using IXP 1200.

Reference :

- 1). Network Systems Design using Network Processor, Douglas Comer, Pearson Education, ISBN 81-7808-994-7
IXP 1200 programming, Erik J. Johnson and Aaron Kunze, Intel Press.

OPTICAL NETWORK DESIGN AND IMPLEMENTATION

Course/Paper: 03MCS102.4
MCS Semester III

Introduction to Optical Networking: Optical network requirements; Time-Division Multiplexing; Analog Signal Processing. The T-Carrier. The E-Carrier. ISDN. TDM Network Elements; Fiber-Optical Technologies. Fiber-Optic Communications. Fiber- Optic Applications. The Physics Behing Fiber Optics. Optical-Cable Construction. Propagation Modes. Fiber-Optic Characteristics. Fiber Types. Fiber-Optic Cable Termination. Splicing Physical-Design Considerations. Fiber-Optic Communications System. Fiber Span Analysis; Wavelength-Division Multiplexing; coarse wavelength-division multiplexing. Dense wavelength-division multiplexing. ITU Grid. Periodic filters, frequency slicers, and interleaves. WDM characteristics and impairments to transmission. Dispersion and compensation in WDM; SONET architectures SONET Integration of TDM Signals. SONET Electrical and Optical Signals. SONET Layers, Framing, Transport Overhead Alarms, Virtual Tributaries, Multiplexing, Network Elements, Topologies, Protection Architectures, Ring Architectures, Network Management; SDH Architectures; SDH Integration of TDM Signals, SDH Layers, Multiplexing, Framing, Transport, Overhead, Alarms, Higher-Level Framing, Network Elements, Topologies, Protection Architectures, Ring Architecture, Network Management; Packet Ring Technologies; Ethernet Services , Ethernet over SONET/ SDH. Shared Packet Ring. Resilient Packet Ring.

Reference :

- 1). Vivek Alwayn “Optical Network Design and Implementation”. CISCO Press
- 2). Simmons, Jane M. “Optical Network Design and Planning”. Springer
- 3). Rajiv Ramaswami, Kumar N. Sivarajan Optical networks: a practical perspective

SEMINAR

**Course/Paper: 03MCS201
MCS Semester III**

OBJECTIVE

The students are to select one technical topic related its branch for Seminar. The student is to submit the synopsis for assessment and approval. Progress for preparation of the seminar topic would be continuously assessed from time to time. Two periods per week are to be allotted and students are expected to present the seminar Progress. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain the attendance.

Students have to give a final presentation for 15 minutes on his topic. Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models. This will enable them to gain confidence in facing the placement interviews

PROJECT WORK

**Course/Paper: 03MCS203
MCS Semester III**

OBJECTIVE

The objective of the project work is to enable the students in convenient groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution.

The student should select any one of the topics offered from the department or select one on his own duly approved from the department. Candidate is required to submit the detailed synopsis of the work that he would complete in the part-II

Each student shall finally produce a comprehensive report covering back ground information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.

Semester IV

THESIS

Course/Paper: 4MCS-201

MDC Semester-IV

The student will submit a synopsis at the beginning of the semester for the approval from the University Thesis committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the Thesis work, should be held with in a one month. Thesis Report must be submitted in a specified format to the University for evaluation purpose.