Syllabus and Courses of Reading for
M.Tech. (Computer Science & Engineering)
Examination
Session 2011-12

Available from: 

<table>
<thead>
<tr>
<th>Available from</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incharge (Publication)</td>
<td>At the Counter: Rs. 50/-</td>
</tr>
<tr>
<td>Maharshi Dayanand University</td>
<td>By Regd. Parcel: Rs. 75/-</td>
</tr>
<tr>
<td>Rohtak-124 001 (Haryana)</td>
<td>By Ordinary: Rs. 60/-</td>
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</table>
### SEMESTER-I

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Teaching Schedule</th>
<th>Mark</th>
<th>Credits</th>
<th>Duration of Exam</th>
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<tbody>
<tr>
<td>MTCE-601A</td>
<td>Computer system software</td>
<td>4 - - 50</td>
<td>150</td>
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<tr>
<td>MTCE-603A</td>
<td>Mathematical foundation of Computer Science</td>
<td>4 - - 50</td>
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<tr>
<td>MTCE-605A</td>
<td>Analysis and Design of Algorithms</td>
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<td>MTCE-607A</td>
<td>Elective I</td>
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<tr>
<td>MTCE-609A</td>
<td>OOPS lab.</td>
<td>- - 4 50</td>
<td>100</td>
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<tr>
<td>MTCE-611A</td>
<td>Internet lab</td>
<td>- - 4 50</td>
<td>100</td>
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<tr>
<td>MTCE-613A</td>
<td>Seminar</td>
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**ELECTIVE-I**

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MTCE 607(A)</td>
<td>Internet &amp; Web Technology</td>
</tr>
<tr>
<td>MTCE 607(B)</td>
<td>Embedded Systems</td>
</tr>
</tbody>
</table>

**Note:**
1. The paper setter shall set each theory paper of 100 marks covering the entire syllabus and the same will be evaluated on marks.
2. The Sessional of Theory /Practical Courses shall also be evaluated on the basis of marks.
3. The choice of students for any elective shall not be binding on the Deptt. to offer it.

### SEMESTER-II

<table>
<thead>
<tr>
<th>Course No.</th>
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<th>Duration of Exam</th>
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<tr>
<td>MTCE-602A</td>
<td>Soft Computing</td>
<td>4 - - 50</td>
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<tr>
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<td>MTCE-608A</td>
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<td>Operating System Lab.</td>
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**ELECTIVE-II**

<table>
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<tr>
<th>Course No.</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MTCE 608(A)</td>
<td>Software Verification Validation &amp; Testing</td>
</tr>
<tr>
<td>MTCE 608(B)</td>
<td>Advanced Microprocessors</td>
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### SEMESTER-III

<table>
<thead>
<tr>
<th>Course No.</th>
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<th>Duration of Exam</th>
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<td>MTCE-703A</td>
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<td>MTCE-705A</td>
<td>System &amp; Network Administration</td>
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<td>MTCE-707A</td>
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</table>

#### ELECTIVE-III

- MTCE 707A(A) Software Project Management
- MTCE 707A(B) Security of Information Systems

**Note:**

1. The paper setter shall set each theory paper of 100 marks covering the entire syllabus and the same will be evaluated on marks.
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### SEMESTER-IV

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<th>Course No.</th>
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<td>400</td>
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**Note:**

The university shall combine both sessional and external exam. marks and compute the overall grade of the subject on the guidelines approved by the university.
Introduction to Object Oriented Programming and Object Oriented Design.

Concepts of classes, objects, abstraction, encapsulation, inheritance, function overloading, virtual functions, function overriding, templates.

Object modeling: Class and object diagrams, association, aggregation, generalization, dynamic modeling and functional modeling.

Introduction to UML: Class diagrams, Use cases, interaction diagrams, collaboration diagrams, deployment diagrams.

Principles of class design: Open close principle, Liskov's substitution principle, dependency inversion principle, package cohesion principle etc.

System Software design issue. Design of assemblers, macro processors, linkers and loaders, dynamic linking.

References
1. Object Oriented Programming with C++ By Robert Lafore
2. Object Oriented Modeling and Design By James Rumbaugh
3. System Programming By Dhamdhere
4. System Programming By Donovan
5. Object Oriented Analysis & Design By Grady Booch
Regular Grammar and Finite automata, N DFA and DFA, N DFA to DFA conversion, Pumping Lemma to checking the regularity of regular grammars, Reduction of states and design of equivalent finite automata, Context Free Grammar, possible defects in CFG and their removal, Chomsky and Greibach Normal Form. Push down automata, design of CFG corresponding to PDA and vice versa, Design of parser using PDA, Linear bound automata.

Turing machines as language recognizer, computer for positive integers, enumerator, universal Turing machine, halting problem, multi-tape and multi-head turing machine, Post Machine, solvability and undecidability, Rice's theorem, equivalence of general recursive and Turing computable function, primitive recursive function, post correspondence problem. Introduction to complexity theory, space and time complexity of turing machine.

References
1. Introduction to automata theory, language & computation - Hopcroft & O.D. Ullman, R Mothwani, 2001, AW
2. Introduction to formal Languages & Automata - Peter Linz, 2001, Narosa Publ.
5. Introduction to languages and the Theory of Computation by John C. Martin 2003, T.M.H.
Unit 5: Web site Development

MTCE 607A (A)
INTERNET & WEB TECHNOLOGY

<table>
<thead>
<tr>
<th>Theory Marks</th>
<th>100</th>
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<td>Sessional</td>
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</table>

Total 150

Time: 3 hrs.
Credits: 4

2. Internet & World Wide Programming, Deitel, Deitel & Nieto, 2000 Pearson Education.
5. Intranet & Internet Engg. By Minoli
6. Internet & Web Technology By Rajkamal.
synthesis of Hardware/Software co-emulation, simulation, speed of emulators. JTAG/OCD.

Communication protocols with special reference to embedded system. TCP/IP, UDP wireless protocols, IRDA, Blue tooth IEEE 8.2.11.

References:

2. Programming for Embedded system by Dreamtch software team.
3. Embedded System design by Rajkamal (TMH)
4. Embedded Real Time System Programming by lyer Gupta (TMH)

MTCE 611A
OOPS lab

L  T  P
4  0  0

Credits: 2

Practicals based on theory paper Computer System Software

MTCE 613A
Internet lab

L  T  P
4  0  0

Credits: 2

Practicals based on theory paper Elective I

Syllabus M.Tech. (Computer Science & Engineering)

2nd Semester
MTCE 602A
SOFT COMPUTING

Theory Marks: 100  L  T  P
Sessional: 50  4  0  0

Total: 150
Time: 3 hrs.
Credits: 4


Operations on Fuzzy Sets: Compliment, Intersection, Union, Combination of Operations, Aggregation Operation.


References:

1. Neural Networks Simon Haykin
2. Neural Networks Kosko
3. Fuzzy Logic & Fuzzy Sets Klir & Yuan
4. Neural Networks Satish Kumar
MTCE 604A
RESOURCE MANAGEMENT OF COMPUTER SYSTEMS
Theory Marks : 100  L  T  P
Sessional  :  50  4  0  0
------
Total  150
Time  :  3 hrs.  Credits : 4

Historical perspectives, concurrent process; mutual exclusion and synchronization, system calls and protection; context switching and the notion of a process and threads; synchronization and protection issues, scheduling memory management including virtual memory and paging techniques; I/O architecture and device management, process deadlocks—models of deadlock resources; graph reduction method, deadlock detection, prevention and avoidance.

Distributed operating: Architecture, design issues, Lamport's logic clocks, vector clocks, causal ordering of messages, distributed mutual exclusion, token and non token based algorithms. Distributed file system Mechanism for building DFS, design issues of DFS, case studies, Protection and security, access matrix model, implementation of access matrix model using the capabilities, access control list, lock & key methods. Advance model Advance models: Take grant method, Bell La Padula method.

Case studies. Laboratory experiments on internals of Linux, Windows NT.

References:
1. Design of the Unix operating system Maurice Bach
2. Distributed Operating System Tanenbaum

MTCE 606A
MOBILE AND WIRELESS COMMUNICATION
Theory Marks : 100  L  T  P
Sessional  :  50  4  0  0
------
Total  150
Time  :  3 hrs.  Credits : 4

Unit 1: Introduction
Application, history, market, reference model and overview. Wireless Transmission—Frequencies, signals, antennae, 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, PKMA, reservation TDM. Collision avoidance, polling inhibit sense multiple access. CDMA, comparison, CSM-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 layered 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, algorithm, alternative metric.

Mobile Transport Layer:
Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP fast retransmission, Transaction oriented TCP.

Support for Mobility:
File, System, WWW—HIT, HTML, system architecture, WAP architecture, wireless datagram protocol, wireless transport layer security, wireless transaction protocol, application environment, telephony application.
References:
3. Wireless Communications : Theodore S Rappaport; Pearsons

Elective II
MTCE 608A(A)
SOFTWARE VERIFICATION, VALIDATION AND TESTING

<table>
<thead>
<tr>
<th>Theory Marks</th>
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<td>Time</td>
<td>3 hrs.</td>
<td>Credits : 4</td>
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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.

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

Basic 8086/88 Minimum Mode, maximum mode interrupt priority management based on single and multiple 8259, I/O interfaces, Asynchronous, Synchronous, data transfer 8231A Programmable Communications interface, 8255 A Programmable Peripheral Interface. Micro Processor Application-Data Acquisition system, Temperature Monitoring, Speed Control etc.

References:
1. Microprocessors and interfacing: D. V. Hall; TMH
2. The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Application: Triebel & Singh; PHI
3. Microcomputer systems; the 8086/8088 Family: Architecture, Programming & Design: Yu-Chang Liu & Glenn A Gibson; PHI
4. Microprocessors By Berry
5. Advanced Microprocessors and Interfacing: Badri Ram; TMH

MTCE 610A
Operating System Lab

Practicals based on theory paper Resource Management in Computer Systems.

MTCE 612A
Soft Computing Lab

3rd Semester
MTCE 701A
KNOWLEDGE BASED SYSTEM DESIGN

Knowledge representation, semantic nets, partitioned nets, parallel implementation of semantic nets. Frames, Common Sense reasoning and thematic role frames, Architecture of knowledge based system, rule based systems, forward and backward chaining, Frame based systems.
Search techniques. Uninformed Search, DFS, BFS, Iterative deepening Heuristic Search, A*, Hill Climbing etc.

References:
1. Artificial Intelligence: Nilsl J Nilson
2. Artificial Intelligence: Elain Rich and Kevin knight
3. Artificial Intelligence: Staurt Russel and Peter norvig
4. Artificial Intelligence: Patrick Henry Winston
MTCE 703A
ADVANCED DBMS

Theory Marks : 100
Sessional : 50
------
Total 150
Time : 3 hrs.

Credits : 4

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 ordering, optimistic scheduling, multiversion techniques, deadlocks.

Object Oriented Database 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.
4. Database system concepts by Korth.

MTCE 705A
SYSTEM AND NETWORK ADMINISTRATION

Unit 1: N/w Administration

Unit 2: Security
Concept of Security, its need, issues, cryptography techniques: ciphers, substitution cipher, transposition, symmetric key algorithms like AES, DES, public key algo's like RSA, Authentication algorithms IPSEC, VAN, Digital Signatures, IDS, Firewall. Types of attacks, access control list, filtering rules.

Unit 3: Host Administration
Introduction to system Administration, what are the necessary issues to be tackled in host management, installation of unix, linux, windows OS, formatting file systems like FAT, NTFS, etc., Booting process in various OS, User accounts, group accounts, passwords, shadow passwords, directory structure of analysis of host machine and how to improve the systems performance.

Unit 4: Knowledge of UNIX commands, administration based commands, Shell scripting, AWK, Perl.

References:
1. The unix programming environment - Brain Kernighen & Rob Pike
2. Design of the Unix operating system - Maurice Bach
3. Advanced Unix programmer's Guide - Stephen Prato
4. Unix Concepts and applications-Featuring - Sumitabha Das
5. SCO Unix and Linux,

Metrics: The metrics roadmap. Atypical 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 Metric 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 configuration management tools and automation.

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.

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:

SECURITY OF INFORMATION SYSTEMS

Encryption and De-encryption
Terminology and Background: cryptosystems, Plain Text and cipher. Encryption algorithms., crypt analysis. introduction to ciphers, Monoalphabetic, substitutions, polyalphabetic.

Secure encryption systems
Hard problems: complexity NP-complete problems, characteristics of NP complete, the meaning of NP completeness, NP completeness and cryptography, properties of arithmetic operations, inverse, primes, GCD, modular arithmetic, properties of modular arithmetic, computing the inverse, Fermat’s theorem, algorithms for computing inverses, random number generation.

Public key encryption systems: concept and characteristics, introduction to merkle-hellman knapsacks, RSA, Digital signatures, DSS.

Hash Algorithms: hash concept, description of hash algorithms, MD4, MD5, SHA1, SHA2

Secure Secret key systems: DES, AES

Applied cryptography, protocols, practices, key management protocols

Operating system, database, program security, Network Security

References Books
4. Digital Certificates Applied Internet Security, Jala Feghhi, Jalli Feghhi and Peter Williams, Addison Wesley Longman.