# Scheme of Examination

## “FIRST SEMESTER”

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sub. Code</th>
<th>Subject Name</th>
<th>Contact Hours</th>
<th>Internal Assessment Marks</th>
<th>End Sem. Exam</th>
<th>Total Marks</th>
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<tbody>
<tr>
<td>1</td>
<td>MCTA 101</td>
<td>Mathematical Foundations Of Computer Application</td>
<td>3 -</td>
<td>50</td>
<td>100 -</td>
<td>150</td>
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<tr>
<td>2</td>
<td>MCTA 102</td>
<td>Programming Systems</td>
<td>3 -</td>
<td>50</td>
<td>100 -</td>
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<tr>
<td>3</td>
<td>MCTA 103</td>
<td>Object Oriented Modeling &amp; UML</td>
<td>3 -</td>
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<td>100 -</td>
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<td>4</td>
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<td>Advanced D.B.M.S.</td>
<td>3 -</td>
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<td>100 -</td>
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<td>5</td>
<td>MCTA 105</td>
<td>Computer Graphics &amp; Multimedia</td>
<td>3 -</td>
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<tr>
<td>6</td>
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<td>Lab – I</td>
<td>- 3</td>
<td>25</td>
<td>- 100</td>
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<td>MCTA 107</td>
<td>Lab – II</td>
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Total: 300 500 200 1000
# Scheme of Examination

"SECOND SEMESTER “

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<tr>
<td>1</td>
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<td>3</td>
<td>MCTA 203</td>
<td>Elective I</td>
<td>3</td>
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<td>4</td>
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<td>3</td>
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<thead>
<tr>
<th>MCSE/MCTA-203 Elective-I</th>
<th>MCSE/MCTA-204 Elective-II</th>
<th>MCSE/MCTA-205 Elective-III</th>
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<tbody>
<tr>
<td>(A) S/W Engg and Project Mgt</td>
<td>(C) VLSI</td>
<td>(A) MIS ERP CRM</td>
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<tr>
<td>(B) Artificial Intelligence &amp; Computing Logic</td>
<td>(D) Robotics &amp; comp. vision</td>
<td>(B) Parallel Computing</td>
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<tr>
<td>(C) Advanced Micro processor</td>
<td>(E) Digital signal Proc.</td>
<td>(C) Simulation &amp; Modeling</td>
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<tr>
<td>(D) Process Dynamics &amp; Cont</td>
<td>(F) Mobile Computing</td>
<td>(D) Digital Image Process</td>
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<tr>
<td>(F) Distributed System</td>
<td>(G) Human Comp Interface</td>
<td>(E) CORBA Architecture</td>
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<tr>
<td>(G) Biometrics</td>
<td>(H) SW architecture</td>
<td>(F) Knowledge MGT</td>
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<tr>
<td>(H) Wireless LAN Tech</td>
<td>(I) Adv. Programming and J2EE</td>
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<tr>
<td>(I) Advance System SW</td>
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<tr>
<td>(J) Computer Architecture</td>
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## Scheme of Examination

### THIRD SEMESTER

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<th>Subject Name</th>
<th>Contact Hours L</th>
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<th>End Sem. Exam Marks</th>
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<tbody>
<tr>
<td>1</td>
<td>MCTA-301</td>
<td>Elective IV</td>
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<td>MCTA-302</td>
<td>Elective V</td>
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### MCSE/MCTA-301 Elective IV

- (A) Data Mining and Ware Housing
- (B) Web Engineering
- (C) Real Time & Fault Tolerant syst.
- (D) Mechatronics
- (E) Virtual Reality
- (F) Logistics and SCM
- (G) Bio informatics
- (H) Ad-hoc Networks
- (I) Middleware Technologies

### MCSE/MCTA-302 Elective V

- (A) Software testing and Quality assurance
- (B) Semantic Networks
- (C) Embedded Systems
- (D) CAD/ CAM
- (E) Multimedia management
- (F) Network Security
- (G) Grid computing
- (H) Computing Ethics
- (I) Third and fourth generation networks
Rajiv Gandhi Technological University, Bhopal (MP)  
M.E./ M.Tech. Computer Tech. & Applications (UTD, RGTU, Bpl)  
Software Systems SATI (Vidisha)

Scheme of Examination

"FOURTH SEMESTER"

<table>
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<tr>
<th>S.N o.</th>
<th>Code No.</th>
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<tr>
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<td>MCTA 401</td>
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<td>200</td>
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Grand Total of Marks: 1000+1000+500+500=3000

*Max. / Min. Pass Marks:*
1. Theory Marks = 100  Pass Min = 40
2. Practical Max. 50/100  Pass Min = 25/50
3. Internal Ass. Marks 25/50/200  Pass Min = 15/30/120
4. Dissertation End. Exam = 300  Pass Min = 150
<table>
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<tr>
<th>Category of Course</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Contact Hrs</th>
<th>Theory Papers</th>
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<tr>
<td></td>
<td>Mathematical Foundations Of Computer Application</td>
<td>MCTA-101</td>
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<td>Max. Marks-100</td>
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<td>Duration: 3 hrs.</td>
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Unit 1
Sets: Relationship between sets, Operations on sets, set identity, principle of inclusion and exclusion, Min-sets, Cut-sets. Relations, properties of binary relations, equivalence relations and partitions, partial ordering relations, functions, inverse functions, composition of functions and lattices, chains and anti-chains, complemented & distributive lattices, Boolean algebra, canonical forms

Unit 2
Prepositional logic, conjunction, disjunction and negation, interpretation of formulas in prepositional logic, Validity and consistency, normal form in prepositional logic and logic consequences, first order predicate logic

Unit 3
Introduction to finite state machine, finite state machine as models of physical system, equivalence machines, finite state machine as language recognizers.

Unit 4
Introduction to discrete numeric functions and generating functions, introduction to combinatoric problems, introduction to recurrence relational and recursive algorithms, linear recurrence, relations with constant coefficients, Homogeneous solutions, particular solutions, total solutions.

Unit 5
Graph: Finite graphs, incidence and degree, isomorphism, sub graphs and union of graphs, connectedness, reachability, paths, and circuits, Eulerian graphs, tree: properties of trees, pendant vertices in tree, center of tree, spanning trees and cut vertices, binary tree, matrix representation of graph, incidence and adjacency matrix and their properties, applications of graphs in computer science.

Reference Books:
1. Discrete structure, Schaum series
2. C.L. Liu, Elements of Discrete mathematics
4. Levy L.S., Discrete Structure of Computer Science
<table>
<thead>
<tr>
<th>Category of Course</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Contact Hrs</th>
<th>Theory Papers</th>
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<tbody>
<tr>
<td></td>
<td>Programming Systems</td>
<td>MCTA-102</td>
<td>3</td>
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</table>

Unit 1
Introduction to software design principles, modularity abstract data types, data structures and algorithms, Linear data structures-Stacks, arrays, lists, queues and linked representations; Pre-fix in-fix and post-fix expressions; Recursion; Set operations; Hashing and hash functions; Binary and other trees, traversal algorithms, Huffman codes; Search trees, priority queues, heaps and balanced trees.

Unit 2
Models of computation. Algorithm analysis, order arithmetic, time and space complexities and average and worst case analysis, lower bounds.

Unit 3
Algorithm design techniques: divide and conquer, search and traversals. Dynamic programming, backtracking, branch and bound.

Unit 4
Sorting and searching algorithms, combinatorial algorithms, string processing algorithms.
Algebraic algorithms, set algorithms. Hard problems and approximation algorithms.

Unit 5
Problem classes P, NP, NP-hard and NP-complete, deterministic and nondeterministic polynomial time algorithms, Approximation algorithms for some NP-complete problems.

Reference books::
2. V Aho, JE Hopcroft, JD Ullman, Design & Analysis of Algorithms, Addison Wesley
4. K.Mehlhorn, Data Structures and Algorithms, Vols. 1 and 2, Springer Verlag,
5. Purdom, Jr.and C. A. Brown, Analyses of Algorithms, Holt Rinechart and Winston,
<table>
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<tr>
<th>Category of Course</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Contact Hrs</th>
<th>Theory Papers</th>
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<tbody>
<tr>
<td></td>
<td>Object Oriented Modeling and UML</td>
<td>MCTA-103</td>
<td>3</td>
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<td>Duration: 3 hrs.</td>
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</table>

Unit 1
Object Oriented Concepts: Objects and classes, methods messages, encapsulation, interface, implementation, reuse, inheritance and polymorphism, object oriented development life cycle. UML: Class relationships in UML, use cases, sequence diagrams, state models and activity diagrams.

Unit 2
Structural Modelling: Classes, Advance Classes, Relationships, class diagrams, interfaces, packages, instances and object diagrams.

Unit 3
Behavioral Modelling: modelling interaction, use cases, interaction diagrams, activity diagrams, events, signals, state machines, process, threads, time, space, state chart diagrams.

Unit 4
Architectural Modelling: Components, deployment, collaborations, pattern, frameworks, component & deployment diagram. An overview of CORBA, Java beans and .NET.

Reference Books:
4. Booch, Object Oriented Analysis and Design with Applications, Addision Wesley.
<table>
<thead>
<tr>
<th>Category of Course</th>
<th>Course Title</th>
<th>Course Code</th>
<th>Contact Hrs</th>
<th>Theory Papers</th>
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<tbody>
<tr>
<td></td>
<td>Advance DBMS</td>
<td>MCTA-104</td>
<td>3</td>
<td>Max. Marks-100 Min. Marks-40 Duration: 3 hrs.</td>
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</table>

Unit 1
DBMS Concept introduction, data models, E-R diagram, Keys, Relational database schemas, integrity constraints, relational algebra and calculus, normalization, normal form.

Unit 2
Indexing, Query processing and optimization, concurrency control.
Distributed database: fragmentation transparency, distributed query processing and optimization, distributed transaction modal and concurrency control, distributed deadlock and commit protocol.

Unit 3
Object oriented and object relational databases: specialization generalization, aggregation and association, object, object identity, architecture of object oriented and object relational databases.

Unit 4
Web databases: accessing databases through web, web server, XML database.

Unit 5
Introduction to image and multimedia database and data structure. Data structure R-Tree, K-D tree, Quad tree, content based retrieval: color histogram.

Reference Books:
1. R. Elmasri, S. Navathe, Benjamin Cumming, Fundamentals of Database system
3. C.J. Date, An Introduction to Database System Volume I (V ed), Addision Wesley
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<td>Duration: 3 hrs.</td>
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Unit 1

Unit 2
Basic Raster Graphics for drawing 2_D primitives: Scan converting lines, circles, ellipse; filling rectangles, polygons, generating characters; antialiasing. Matrix representation and Homogeneous coordinates, two dimensional transformations, 2D line clipping, polygon clipping algorithms, window to viewport transformation.

Unit 3
Viewing in 3D: Three dimensional transformation, projections: Parallel, perspective, view points.

Unit 4
Representation of curves & surfaces, Bézier method, B-spline methods.
Visible surface determination: Z-buffer, Algos, List priority algorithms, Scan line algorithms.
Light and shading models: Illumination models, shading models for polygons, shading algorithms, Gouraud & Phong, color models like RGB, YIU, copy, HSV etc.

Unit 5
Introduction to multimedia, multimedia components; multimedia hardware, SCSI, IDE, MCI, Multimedia data and file formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia tools, presentations tools, Authoring tools, presentations. Graphics animation: Tweaking, Morphing simulating accelerator, motion specification.

Reference Books:
1. Foley, Van Dam, Fundamentals of Interactive Computer Graphics, Addison Wesly
6. R Steinmetz, K Nashitet, Multimedia Computing Communications & Appl., PHI
7. John F.K. Buford, Multimedia System, Addision Wesley
<table>
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<th>Course Title</th>
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<td>Soft Computing</td>
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Unit 1

Unit 2

Unit 3

Unit 4
**GENETIC ALGORITHMS**: Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction - Rank method - Rank space method.

Unit 5

Reference Books:

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Unit 1
Layering, Client Server Model, Application Programming Interfaces, RFCS. Internet address, Link Layer, SLIP, PPP, Ethernet 802 Encapsulation, IP header, Routing, Subnet Addressing, Subnet Mask, CIDR, special case IP Addresses.

Unit 2
Address Resolution Protocol, ARP Cache, Proxy ARP, RARP, Internet Message Control Protocol (ICMP), IP Routing, Routing Principles, Dynamic Routing, RIPv2, OSPF, BGP.

Unit 3
TCP Header, TCP services, UDP, IP Fragmentation, Broadcasting, Multicasting, Internet Group Management Protocol (IGMP), Domain Name System (DNS), Resource Records, Caching, DNS Message Format.

Unit 4
TCP/IP over ATM, Mobile IP, Private Network Interconnection-NAT, VPN, DHCP, Voice and Video over IP, IPV6, Internet Management, SNMP, Socket Programming, RPC and NFS.

Unit 5

Reference Books:
2. Forouzan, TCP/IP Protocol Suite, TMH
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<th>Credits</th>
<th>Theory Papers</th>
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<td>MCSE/ MCTA-203 (A)</td>
<td>L 3 T - P</td>
<td>Max. Marks-100</td>
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UNIT 1
Introduction, Life cycle models, Project effort estimation, LOC and function point based estimates. Requirement analysis and specifications, formal requirements, specifications.

UNIT 2

UNIT 3
Coding standards and guidelines, Code walkthrough and reviews, Unit testing, Black box and white box testing, integration and system testing.

UNIT 4
Software quality and reliability, software project management, project planning, measurement and metrics, cost estimation. Scheduling and tracking, team management, risk analysis, project management tools and techniques, PERT, CPM. Software Quality Assurance: factors and components.

UNIT 5
Configuration management, software maintenance issues and techniques, software reuse, client-server software development.

Reference Books:
1. Pressman R.S. Sofware Engineering: A Practitioner’s Approach, MGH
3. Foundation of Software Engineering- Mall, PHI
4. Foundation of Software Engineering- Ghezzi, PHI
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UNIT 1
Game playing: Overview, Mini-max Search procedure, Adding Alpha-Beta Cutoffs, Additional Refinements, Iterative Deepening, References on specific games.

UNIT 2

UNIT 3

UNIT 4
Connectionist Models: Introduction, Learning in Neural Networks, Applications of Neural Networks, Recurrent Networks, Distributed representations, connectionist AI and symbolic AI, Case studies, of NNs in pattern recognition, Image processing, Computer vision etc. Common Sense: Qualitative Physics, Common sense ontology, Memory organization, Case-based reasoning.

UNIT 5

UNIT 6
Introduction to Neuro-fuzzy systems & its applications in real world computing. Overview of Evolutionary Algorithms & its applications in search and optimization areas.

Reference Books:
1. Artificial Intelligence - E. Rich, K. Knight, TMH
3. Introduction to Neural Networks - Wassermann, Van Nostrand Reinhold.
4. Fuzzy sets and Fuzzy logic - G.Klir and B Yuan, PHI
5. Artificial Intelligence, an Engineering approach- R.J. Schal Koft, Mc Graw hill
### Course Information

<table>
<thead>
<tr>
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<td>Advanced Microprocessors</td>
<td>MCSE/M CTA-203 (C)</td>
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8086/88 Architecture and Instruction Set, Programming Techniques, Microprocessor Product Development, designing 8086 CPU Module, Main Memory System design, Basic I/O Overview of the 80386, Memory Segmentation, Privilege levels, Paging, Multitasking, communicating among tasks, Handling faults and Interrupts, 80286 Emulation, 8086 Emulation.

80387 Numeric processor Extension, Programming for performance, Reset and Real Mode.

Overview of 80486, Memory Segmentation, 80386 Emulation, 80286 Emulation, 8086 Emulation.

Introduction to latest families of Intel processors.

Case Studies of Microprocessor System design for various applications.

Reference Books:
1. The 8086 microprocessor, Ayala, Cengage
2. The 8086/8088 family - J.Uffenbeck, PHI
3. Advanced 80386 Programming Techniques - J.L. Turley, Osborne TMH.
5. Advanced 80486 Programming Techniques - J.L. Turley, Ostorne TMH.
<table>
<thead>
<tr>
<th>Category of Course</th>
<th>Course Title</th>
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<th>Credits</th>
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<tr>
<td></td>
<td>COMPUTER ARCHITECTURE</td>
<td>MCIT-203(J)</td>
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<td>(MCSE-103)</td>
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**UNIT 1**
Flynn's and Handler's Classification of parallel computing structures. Pipelined and Vector Processors.

**UNIT 2**
Data and control hazards and method to resolve them. SIMD multiprocessor structures. I

**UNIT 3**

**UNIT 4**
Scheduling and load balancing in multiprocessor systems, Multiprocessing control and algorithms.

**Reference Books:**
1. Advance Computer Architecture, parthasarthy, Cengage (Thomson)
3. Computer Architecture and Parallel Processing- Hwang And Briggs, TMH.

Ray Solutions (Coaching + Software) 102,C Sector Indrapuri Bhopal 9300930012 ,0755-4003005 http://www.Ray-India.com
Basic components of robotics system, Kinematics and manipulators, selection of Co-ordinate frames, Homogeneous transformation, solution of kinematics equations, Lagrangian equations and manipulator dynamics, Control design, Languages for Robots and Applications.

3D-vision, Prespective vision, CCD camera study, real time processing. Segmentation using Genetic Algorithm: Adaptive algorithm for inddor scene, and outdoor scene. Interpretation of pictures, shape recognition, dynamic scane analysis. Introduction to AGV, clusting and non supervised learning method.

Reference Books:

To Be detailed and Expanded

Discrete time signals and system, Z transforms, Design procedure for FIR & IIR Filters. Introduction to DFT errors in digital filtering, method of fast computation of DFT, NTT & WTFA. Powerspectrum. Estimation of DFT, NTT, WTFA & int
application to digital filter. Multirate digital filtering, Linear Phase design of filter, & H/W implementation consideration.

Reference Books:
1. Digital Signal Processing Using Matlab, Ingle, Cengage
2. Digital Signal Processing,White,Cengage (Thomson)
UNIT 1

UNIT 2
Cell coverage for signal & Traffic: Introduction, obtaining the mobile point to point model. Propagation over water or flat open areas, Foliage loss, Propagation in near in distance, long distance Propagation obtain path less from a point to point Prediction model, call-site antenna Heights & Signal coverage calls, mobile to mobile Propagation.

UNIT 3
Co channel Interference reduction: Co channel interference, exploring co channel interference area, in a system, Real time co channel interference measurement at mobile radio Transceivers, Decision of an omni directional antenna system, Design of a directional antenna system., Lowering the antenna height, reduction of co channel interference by mean of a notech in the tilted antenna Pattern, Power control.

UNIT 4
Frequency management & channel Assignment: Frequency management, Frequency-spectrum utilization, set up channels definition of channel assignment, fixed channel assignment, non fixed channel assignment algorithms How to operate north additional spectrum, Traffic & channel assignment, Perception of call blocking from the subscribers.

UNIT 5
Handoffs & Dropped calls: Value of Implementing Handoffs, initiation of a hand off, Delaying a handoff, Forced Handoffs, Queuing of Handoffs, power difference handoff, Mobile assisted handoff & soft Handoff, call site Handoff only, intersystem Handoff, introduction to dropped call rate, Formula of Dropped call rate, Finding the values of g & u.

UNIT 6

Reference Books:
2. Wireless Network, Kaveh Pahalwan
3. Adhoc Networking by Charles E. Perkins, Addison Wisely
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<tr>
<td></td>
<td>Management Information System ERP-CRM</td>
<td>MCSE/ MCTA-205 (A)</td>
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UNIT 1
Management Information System (MIS) definition, Objectives and benefits, MIS as strategic tool, obstacles and challenges for MIS, functional and cross functional systems, hierarchical view of CBIS, structured and unstructured decision, Operation and mgt support, Decision process and MIS, info system components and activities, Value chain and MIS support.

UNIT 2
System concepts: types, definition, characteristics, feedback (Pull) and feed-forward (Push) control, system stress and entropy, computer as closed system, law of requisite variety, open and flexible (Adaptive) systems, work system model and comparison with input-process-output model, five views of work system: structure, performance, infrastructure, context and risk and their effect on product performance.

UNIT 3
Info concepts: define data, info, knowledge, intelligence and wisdom. Information characteristics and attributes, info measurement and probability, characteristics of human as info processor.

UNIT 4
Planning and control Concepts: terminologies, difficulties in planning, system analysis and development plan-purpose and participants, info planning, (SDLC) system development life cycle for in-house and licensed sw, system investigation, analysis of needs, design and implementation phases, training of Operational personnel, evaluation, Control and Maintenance of Information Systems.

UNIT 5
E-business components and interrelationship, Evolution of Enterprise Resource Planning (ERP) from MRP, Supply chain management (SCM) and Customer relationship management (CRM), Integrated data model, strategic and operational issues in ERP, Business Process Re-Engineering (BPR), significance and functions, BPR, information technology and computer NW support to MIS.

UNIT 6
ERP Implementation, role of consultants, vendors and users, customization, methodology of ERP implementation and guidelines for ERP implementation, ERP modules.

Reference books:
1. Davis and Olson, MIS, TMH
2. James O’ Brian, MIS, TMH
3. Oz, MIS, Cengage
4. Business Process Re-Engineering, Jayaraman, TMH.
5. ERP by V.K. Garg, PHI
6. ERP by Alex Leon, and manuals of SAPP, MFG-pro.
7. ERP, Monk, Cengage (Thomson)
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<td></td>
<td>Parallel Computing</td>
<td>MCSE/M CTA-205 (B)</td>
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<td>Max. Marks-100 Min. Marks-40 Duration: 3 hrs.</td>
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Parallel processing, Parallel computer structure, designing of parallel algorithms, analyzing algorithms, general principles of parallel computing, Parallel sorting algorithms Batcher’s bitonic sort, Bitonic sort using the perfect shuffle, parallel bubble sort, add-even transport sort, Tree sort, quicksort, sorting on the CRCW, CRFW, EREW models, searching a sorted sequence, CREW, CRCW & EREW searching, searching on a random sequence EREW, ERCW, CREW & CRCW searching on SIMD computers, searching on a Tree, mesh, A Network for merging, merging on the CRFW, ERFW models, Computing Fourier Transforms, computing the DFT in parallel, a parallel FFT algorithm.

**Reference Books:**
1. Design & Analysis of Parallel Algorithm by Salim & Akl, PHI.
2. Design Efficient Algorithm for Parallel Computers by Michel J. Quinn, TMH.
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<td>Simulation &amp; Modeling</td>
<td>MCSE/M CTA-205 (C)</td>
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<td>Max. Marks-100 Min. Marks-40 Duration: 3 hrs.</td>
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Introduction to modeling and simulation: Modeling and simulation methodology, system modeling, concept of simulation, continuous and discrete time simulation.

Basic concept of probability and random variables, continuous and discrete random variables and their distributions, Compartmental models: linear, nonlinear and stochastic models.

Introduction to Queuing Theory: Characteristics of queuing system, Poisson’s formula, birth-death system, equilibrium of queuing system, analysis of M/M/1 queues. Application of queuing theory in computer system like operating systems, computer networks etc.


Verification and validation: Design of simulation experiments, validation of experimental models, testing and analysis. Simulation languages comparison and selection, study of Simulation sw -SIMULA, DYNAMO, STELLA, POWERSIM.

**Reference Books:**
4. Spriet, Computer Aided Modeling and Simulation, W.I.A.
5. Sushil, System Dynamics, Wiley Eastern Ltd.
7. Law and Kelton; Simulation Modeling
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<td>Digital Image Processing</td>
<td>MCSE/M CTA-205 (D)</td>
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<td>Max. Marks-100 Min. Marks-40 Duration: 3 hrs.</td>
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- Texture analysis, texture classification feature extraction, rule-based picture segmentation. Introduction to Color Images, Representation, Segmentation.

**Reference Books:**
3. Image Processing analysiss and Machine Vision, Cengage
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<td>CORBA Architecture</td>
<td>MCSE/ MCTA- 205 (E)</td>
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UNIT 1
Support for analysis and design: Unified Modelling Language (UML) and the Meta-Object Facility (MoF)

UNIT 2
Basic Object-Oriented Computing model: The Object Request Broker (ORB); Interface Definition Language (IDL) and its mapping to C, C++, Java, smalltalk, Cobol, and Ada.

UNIT 3
Distribution: The protocol content specification General Inter-ORB Protocol (GIOP) and its mapping to TCP/IP, Internet Inter ORB Protocol (IIOP) Component Model: CORBA components and scripting, multiple interfaces, objects by value. Specialized modes: Support for Real-Time, Fault tolerant, and Embedded CORBA.

UNIT 4
CORBA services: basic services for distributed Object-Oriented applications: naming and trader services, the event and notification services, the Object Transaction service (OTS), and the security service.

UNIT 5
Horizontal CORBA facilities: systems management, print spooling. Vertical market CORBA facilities: Support for enterprise, a currency facility from finance, person identifier service, the lexicon query service, an audio/visual stream control object CORBA-based Network-management.

Reference Books:
2. CORBA fundamentals & Programming - Siegel, J., Wiley.
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<td>Data Mining and Warehousing</td>
<td>MCSE/M CIT-301 (A)</td>
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<td>Max. Marks-100 Min. Marks-40 Duration: 3 hrs.</td>
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Introduction: Data Mining: Definitions, KDD v/s Data Mining, DBMS v/s Data Mining, DM techniques, Mining problems, Issues and Challenges in DM, DM Application areas.
Association Rules & Clustering Techniques: Introduction, Various association algorithms like A Priori, Partition, Pincer search etc., Generalized association rules. Clustering paradigms; Partitioning algorithms like K-Medoid, CLARA, CLARANS; Hierarchical clustering, DBSCAN, BIRCH, CURE; categorical clustering algorithms, STIRR, ROCK, CACTUS.
Other DM techniques & Web Mining: Application of Neural Network, AI, Fuzzy logic and Genetic algorithm, Decision tree in DM. Web Mining, Web content mining, Web structure Mining, Web Usage Mining.
Temporal and spatial DM: Temporal association rules, Sequence Mining, GSP, SPADE, SPIRIT, and WUM algorithms, Episode Discovery, Event prediction, Time series analysis.
Spatial Mining, Spatial Mining tasks, Spatial clustering, Spatial Trends.
Data Mining of Image and Video: A case study. Image and Video representation techniques, feature extraction, motion analysis, content based image and video retrieval, clustering and association paradigm, knowledge discovery.

The vicious cycle of Data mining, data mining methodology, measuring the effectiveness of data mining data mining techniques. Market baskets analysis, memory based reasoning, automatic cluster detection, link analysis, artificial neural networks, generic algorithms, data mining and corporate data warehouse, OLA

Reference Books:
1. Data Mining Techniques; Arun K.Pujari; University Press.
2. Data Mining; Adriaans & Zantinge; Pearson education.
3. Mastering Data Mining; Berry Linoff; Wiley.
4. Data Mining; Dunham; Pearson education.
5. Text Mining Applications, Konchandy, Cengage
Web Engineering
MCSE/M CIT-301 (B)

Introduction: layering, DNS - encapsulation, de-multiplexing, client/server model, port numbers, standardization process, the Internet.
Link layer: introduction, Ethernet and IEEE 802 encapsulation, trailer encapsulation, SLIP, PPP- Loop back interface, MTU.
Internet protocol: introduction, IP header, IP routing, subnet addressing, subnet mask- special case of IP addresses, a subnet example.

Address Resolution Protocol: Introduction, an example, ARP cache, ARP packet format, ARP examples, Proxy ARP, ARP command.
RARP: Introduction, RARP packet format, RARP examples, RARP server design.
ICMP: Introduction, ICMP message types, ICMP address mask request and reply- ICMP timestamp request and reply- 4.4 BSD processing of ICMP Messages.


UDP: introduction, UDP header, UDP checksum, IP Fragmentation, UDP Server design. DNS Introduction- basics, message format, simple example, pointer queries, resource records, caching. UDP. TFTP: introduction, protocol, security. BOOTP: introduction, packet format, server design, through router.

TCP: Introduction, services, headers, connection establishment and termination, timeout of connection establishment- maximum segment size- half, close, state transition diagram, reset segments, simultaneous open and close- options, server design.

SNMP Introduction, protocol, structure of management information, object identifiers, management information base, instance identification.
Telnet: rlogin protocols, examples, telnet protocol and examples. FTP, protocol, examples, SMTP protocols, examples, NFS, TCP/IP Applications.

Reference Books:

Components of a real time system. Real time operating system, tasks and task scheduling, task synchronization and data transfer factors in selecting a real time operating system. The design specifications, the development environment, ASM Diagram and Data flow analysis. Response time specification.

**Reference Books:**

**Category of Course** | **Course Title** | **Course Code** | **Credits** | **Theory Papers**
---|---|---|---|---
| Real time & Fault Tolerant Systems | MCSE/M CIT-301 (C) | 3 | Max. Marks-100 Min. Marks-40 Duration: 3 hrs.

Introduction to Mechatronix, Mechatronix tools, Mechatronix sensitivity analysis and stress analysis for hydraulic systems, feedback control. Use of mechatronix for designing and manufacturing of: surface mount component, assembling & testing mix technology board.

Basic components of a Robotics system; Robot kinematics: Homogeneous transformations, Denavit-Hartenberg representation; Inverse Kinematics; Euler angles, Euler angle solution to inverse Kinematics, Dynamics: Lagrange-Euler, Newton euler formulations. path planning: Joint interpolated and cartesian path planning, collision avoidance, Sensing: mechanisms; Range and proximity sensing, Touch, force & torque sensors:

Transducers: Solenoid valve, differential voltage transformers, flow meters, pressure sensors, thermo couple.

Case study: Electronic braking system, (hydraulics based)

**Reference Books:**
1. Mechatronics system design, Shetty, Cengage
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<td>Bioinformatics</td>
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**Unit 1**
Introduction to Bioinformatics, algorithm design and computational complexity aspects in bioinformatics, paradigms for algorithm design like greedy, divide-and-conquer, dynamic programming, exhaustive search and randomization help in obtaining useful bioinformatics algorithms.

**Unit 2**
Genome rearrangement, bock alignment, global sequence alignment, finding regulatory motifs in DNA sequences, finding minimum energy conformation in drug molecules respectively exemplifying the uses of these paradigms.

**Unit 3**
Application of computational learning in bioinformatics, the learning of probabilistic finite automata (Hidden Markov Models)

**Unit 4**
Several important problems in computational biology, like protein folding which turn out to be NP-hard, study some of these problems and corresponding approximation algorithms that address the issue of intractability.

**Reference Books:**
1. Neil Jones and P Pevzner; An introduction to Bioinformatics Algorithms, MIT Press
2. Peter Clote and R Backofen, Computational Molecular Biology, J Wiley
3. R. Durbin, Eddy etc; Biological sequence analysis, probabilistic models of protein and nucleic acids; Cambridge Univ Press.

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<td><strong>Multimedia management</strong></td>
<td>MCSE/MCTA-302 (E)</td>
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<td>Max. Marks-100 Min. Marks-40 Duration: 3 hrs.</td>
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Introduction to video audio and image compression, JPEG, GIF video compression, MPEG-1, -2, -4 and -7, H.267 MPEG audio compression, multimedia information, delay sensitive and time based media data modeling, multimedia storage and retrieval techniques, multimedia communications, synchronizations, delay compensation, QoS notification protocols, architectures and issues for distributed multimedia systems, multimedia systems like video-on-demand, video and conferencing, HDTV.

**Reference Books:**
1. Venkatram; Design aspects of Multimedia information systems; Pearson
2. Koegel Buford, Multimedia systems; Addison Wesley
3. Raghvan SV and Tripathi SK; Networked Multimedia systems; --
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<td><strong>Embedded Systems</strong></td>
<td>MCSE/M CTA-302 (C)</td>
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Unit 1 Description and attributes of an embedded systems, CPU, memory, peripherals, timers, communication interfaces

Unit 2 Software tool chains used for development and testing of programs, project manager editor, assembler, compiler, linker, locator, loader debugger, monitor and profiler, use of integrated development environment, GNU, command line tools, build process in embedded systems

Unit 3 Software architecture for implementing various tasks, round robin with and without interrupts, function queue scheduling architecture, real-time operating systems

Unit 4 Hardware and software development methodology and use of hardware debugging aids like in circuit emulators and logic analyzers

Unit 5 Architecture of simple RTOS, definition of tasks, task controller, task information, scheduling priority, shared data problems and mutual exclusion critical section implementation

Unit 6 Intertask communication, semaphores, message queues, buffers pipes, reentrance issues, timer functions, interrupts and I/O, designing a real time application using a RTOS like Vworks, μCOS II or embedded linux.

Unit 7 Power optimization strategies for processes, ACPI, design case studies, Networked embedded system, distributed embedded architecture, HW and SW architecture, IIC bus, CAN bus, Myrinet network based design, communication analysis, system performance analysis, HW platform design, allocation and scheduling, internet embedded systems. System design techniques.

Reference Books:
1. Simon DE; an embedded software primer; Pearson
2. Ayala K; 8051 programming and interfacing; Peram
3. Vahid F and Givargis T; Embedded system design...; John Wiley
4. Heath Steve; Embedded system designs; Oxford newness

Internet sites
www.embedded.com
www.washington.edu
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<td>Network Security</td>
<td>MCSE/M CIT-302 (F)</td>
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Conventional Encryption

Public Key Encryption And Hash Functions
Public Key Cryptography, Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management, Diffie Hellman Key Exchange, Elliptic Curve Cryptography
Message Authentication and Hash Functions
Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions

Hash And Mac Algorithms
MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA-1), RIPEMD, HMAC
Digital Signatures and Authentication Protocols
Digital Signatures, Authentication Protocols -Digital Signature Standard

Authentication Applications, IP Security, Web Security

Intruders, Viruses and Worms
Intruders, Viruses and Related Threats
Firewalls
Firewall Design Principles, Trusted Systems

Reference Books:
4. Introduction to network security, Krawetz, Cengage