PANJAB UNIVERSITY
CHANDIGARH

REVISED STUDY AND EVALUATION SCHEME

FROM

1st TO 4th SEMESTER

MASTER OF ENGINEERING PROGRAMME

REGULAR PROGRAMME

IN

INFORMATION TECHNOLOGY

Examination 2011-12
## Scheme of Evaluation (Semester-wise) 2011-12

**M.E. (INFORMATION TECHNOLOGY)**

Scheme of Examination for M.E. in Information Technology for the batch admitted in 2010

### First Semester:

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Paper title</th>
<th>Theory</th>
<th>Practical</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Hrs/wk</td>
<td>Marks</td>
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<tr>
<td>MEIT 101</td>
<td>Algorithm Analysis &amp; Design</td>
<td>4</td>
<td>100</td>
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<tr>
<td>MEIT 102</td>
<td>Object Oriented Analysis</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>MEIT 103</td>
<td>Distributed Operating Systems</td>
<td>4</td>
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<td>MEIT 104</td>
<td>Wireless &amp; Mobile Comm.</td>
<td>4</td>
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<td>MEIT 105</td>
<td>Information Security</td>
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Total Hrs/wk = 26  Total Credits = 22

### Second Semester:

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<tr>
<td>MEIT 201</td>
<td>Research Methodology</td>
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<td>MEIT 203</td>
<td>Embedded System Design</td>
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<tr>
<td>MEIT 204</td>
<td>Elective – I</td>
<td>3</td>
<td>100</td>
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<tr>
<td>MEIT 205</td>
<td>Elective - II</td>
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<tr>
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<td>Research Seminar</td>
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Total Hrs/wk = 26  Total Credits = 22
Third Semester:

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<tr>
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<td></td>
<td>Hrs/wk</td>
<td>Marks Univ Exam</td>
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<tr>
<td>MEIT 301</td>
<td>Data Warehousing &amp; Data Mining</td>
<td>4</td>
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<tr>
<td>MEIT 302</td>
<td>Elective – III</td>
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<td>MEIT 303</td>
<td>Project-based Thesis Work – I</td>
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Total Hrs/wk = 26    Total Credits = 16

Fourth Semester:

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<td>Marks Univ Exam</td>
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<td>MEIT 401</td>
<td>Thesis Work – II</td>
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Total Hrs/wk = 25    Total Credits = 15

**ELECTIVES**

<table>
<thead>
<tr>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
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<tbody>
<tr>
<td>Software Testing &amp; Quality Assurance</td>
<td>Total Quality Management</td>
<td>Advanced DSP</td>
</tr>
<tr>
<td>Soft Computing</td>
<td>HRD &amp; Training Methods</td>
<td>User Interface Design</td>
</tr>
<tr>
<td>Theory of Computation</td>
<td>Network Management and Security</td>
<td>Advanced Computer Networks</td>
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<tr>
<td>Advanced Digital Image Processing</td>
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MASTER OF ENGINEERING IN INFORMATION TECHNOLOGY

First Semester

Paper title: Algorithm Analysis and Design

Paper Code: MEIT 101

Max. Marks: 100  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Analysis of Algorithms  (7)

Divide and Conquer algorithms and Dynamic Programming  (7)
Introduction, Quick sort, Strassen’s multiplication, Knapsack problem, Minimum spanning tree, Single source shortest path algorithm and their performance analysis.

Branch and Bound techniques  (5)
0-1 knapsack problem, Traveling salesman problem.

Part B

Dynamic Programming and Backtracking algorithms  (7)

Linear Programming and Reductions  (6)

String Matching Algorithms  (7)
The Brute force algorithm, String matching with finite automata, Knuth-Morries-Pratt-Algorith.

NP-Hard , NP-Complete and Approximation Algorithm  (6)
Non-deterministic problem, NP-hard and NP-complete Classes, Introduction to approximation, absolute approximation, polynomial time approximation scheme.

Text Books
1. Cormen, Leiserson, Rivest and Stein, “Introduction to Algorithms”, PHI.

References

Paper Title: Object Oriented Analysis And Design

Paper Code: ME IT 102 Max. Marks: 100 Time: 3 hours

Course Duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Object Oriented Concepts
Difference between Procedure-Oriented and Object-Oriented Programming, Basic Concepts of Object Oriented Programming, Abstract data types: Object, Classes, Data Abstraction and Encapsulation, Inheritance, Polymorphism.

C++ Programming Language and Functions
Tokens, Keywords, Identifiers, Basic Data Types, User Defined Data Types, Derived Data Type, Variables, Scope Resolution Operator, Memory Management Operator, Manipulators, Type Cast Operator, Operator Overloading, Operator Precedence, Control Structure, Function Prototype, Call by Reference, Call by Value, Inline functions, Default Argument, Function Overloading

Classes and Objects
Structures and Classes, Class declaration, Creating Objects, Assessing Class Members, Class Function Definition, Member Function Definition, Private and Public Member Function, Nesting of Member Functions, Memory Allocation for objects, Array of objects, Objects as Function Arguments.

Inheritance: Extending Classes
Base and Derived Classes, Visibility Modes, Concept of Protected Member, Types of Inheritance- Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance.
Operator overloading (05)
Definition, Overloading Unary Operators, Overloading Binary Operators, Type Conversions-
Built in to Class Type, Class Type to Built in Type, One Class conversion to another Class.

Part - B

Streams and Templates (05)
C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted I/O Operations,
Manipulators.
Templates.

File Streams (05)
Classes for File Stream Operation, Opening and Closing a File, Detecting End-of-File, File
Pointers and Manipulators, Functions- put() and get(), write() and read().

Object Oriented Analysis and Object Oriented Design (08)
Object Oriented Notations and Graphs, Steps in Object Oriented Analysis, Steps in Object
Oriented Design, System analysis, System Design, Object Design

Object Oriented Methodologies (04)
OMT methodology, Object Model, Dynamic Model, Function Model, Relationship among
models, Jacksons Model, Booch’s OOA and OOD approach.

Recommended Books

2. Objecting Modeling and Design, James, Rumbaugh, Michael Blaha, William
Premerlani, Frederick Eddy and William Lorensen, PHI 1998,2nd Ed.
Pvt. Ltd., 1994, paperback Ed

Paper title: Distributed Operating System

Paper Code: MEIT 103 Max.Marks:100 Time: 3 hours

Course Duration: 45 lectures of one hour each
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

**Operating System Structures** (05)

**Distributed Systems** (08)
The micro-kernel based client-server approach. Inter process communication and Remote Procedure Call. Tasks and Threads. Examples from LINUX, Solaris 2 and Windows NT.

**Resource Management** (08)
Resource allocation and deadlock. Deadlock prevention, avoidance and detection. Resource management in distributed systems: Logical time, reaching agreement, failure recovery and distributed deadlocks.

**Part B**

**Protection and Security** (08)
Requirements for protection and security regimes. The access matrix model of protection. System and user modes, rings of protection, access lists, capabilities. User authentication, passwords and signatures.

**File Systems** (09)

**Middleware** (07)
The common Object Request Broker Architecture and Microsoft DCOM models and software and their relationship to Operating Systems.

**Recommended Books**
1. Distributed Systems: Principles and Paradigms by Andrew S. Tanenbaum, 2nd Ed
2. Distributed Operating Systems by Andrew S. Tanenbaum, 1st Ed, Pearson Publishers

**Paper Title: Wireless & Mobile Communication**

**Paper code: MEIT 104**
Max. Marks : 100
Time: 3 Hours

Course Duration: 45 lecturers of one hour duration each
Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

**Introduction**
Evolution of Mobile radio Communication, reasons for developing a cellular mobile telephone system, a basic cellular system, types of mobile communication systems, Intelligent network, Introduction to mobile communication standard.

**Cellular communication concepts**
Cell fundamentals, Frequency reuse, cell clustering, handoff strategies, co-channel and adjacent interference, improving coverage and capacity in cellular systems, mechanism for capacity improvement-cell splitting, cell sectoring and microcell zone concept

**Multiple Access Techniques**
Introduction, FDMA, TDMA, CDMA, comparison of multiple access techniques, packet ratio and SDMA.

**Part B**

**GSM:**
Introduction, design consideration, characteristics, services, system architecture, security aspects and architecture, GSM channels and burst structure.

**CDMA (IS-95):**
Introduction, service aspects, network reference model, security aspects and architecture, radio aspects, features of CDMA system.

**Receiver techniques for fading dispersive channels:**
Fading, types of fading, overview of channel impairment, Mitigation techniques, Diversity schemes: Frequency Diversity, Time Diversity, Space Diversity, Path Diversity, Rake receiver, Channel equalization, operating modes of an equalization.

**Migration to 3G technologies:**
WiFi, WiMax, EDGE, Bluetooth and cdma-2000.

**Books Recommended:**
Paper Title: Information Security  
Paper Code: MEIT 105  
Max. Marks: 100  
Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

**Foundation of Cryptography**  
Introduction to Cryptography, Types of Threats—Passive threats, Active threats, Monoalphabetic Substitution Cipher, Polyalphabetic Substitution Cipher, Transposition Cipher.

**Cipher**  
Block and Stream ciphers, Secret key block ciphers, Stream ciphers

**Symmetric Key Ciphers**  
DES Algorithm, Triple DES, Cryptanalysis of DES, Differential and Linear cryptanalysis.

**Asymmetric Key Ciphers**  
Principles of Public Key Cryptosystems, RSA Systems, Knapsack Systems.

**Part B**

**Message Authentication and Hash Functions**  
Authentication Requirements, Authentication Functions, Message Authentication codes, Hash Functions, Hash Algorithms (MD-5 and SHA-1), Key Management Algo.

**Digital Signatures and Authentication Protocols**  
Digital Signatures and Digital Signature Standard.

**IP Security**  
Overview, Architecture, Authentication Header, Encapsulating Security Payload (Tunnel and Transport mode)

**Firewalls**  
Design Principles, Characteristics, Capabilities, Limitations, Controls, Types of Firewall, and Trusted systems, Reference monitor concepts.

**Recommended Books**
SECOND SEMESTER

Paper Title: Research Methodology

Paper Code: ME IT 201 Max. Marks: 100 Time: 3 hours

Course Duration: 45 lecturers of one hour duration each

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Introduction to Educational Research (02)
Concept, types-basic, applied and action, Need for educational research

Reviewing Literature (02)
Need, Sources-Primary and Secondary, Purposes of Review, Scope of Review, Steps in conducting review

Identifying and defining research problem (05)
Locating. Analyzing stating and evaluating problem, Generating different types of hypotheses and evaluating them.

Method of Research (08)
Descriptive research design-survey, case study, content analysis, Ex-post Facto Research, Corelational and Experimental Research

Sampling Techniques (06)
Concept of population and sample’ sampling techniques-simple random sampling, stratified random sampling, systematic sampling and cluster sampling, snow ball sampling, purposive sampling, quota sampling techniques determining size of sample

Part – B

Design and development of measuring instruments, Tests, questionnaires, checklists, observation schedules, evaluating research instruments, selecting a standardized test. (08)

Procedure of data collection (03)
Aspects of data collection, coding data for analysis

Statistical Methods of Analysis (07)
Descriptive statistics: Meaning, graphical representations, mean, range and standard deviation, characteristics and uses of normal curve.
Inferential statistics: t-test. Chi-square tests. Correlation (rank difference and product moment), ANOVA (one way)

**Procedure for writing a research proposal** (02)
Purpose, types and components of research proposal

**Procedure for writing a research report** (02)
Audiences and types of research reports, Format of Research report and journal

Strategies for evaluating, research, disseminating and utilizing research- An Overview

3. CPSC: Developing Skills in Technician Education Research Modules 1 to 11 Singapore, Colombo Plan Staff College for Technician Education

**Paper Title:** Multimedia Systems

**Paper Code:** ME IT 202 **Max. Marks:** 100 **Time:** 3 hours

Course Duration: 45 lecturers of one hour duration each

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

**Media & Data Streams** (05)
Types of media, Properties of Multimedia system, Traditional Data Stream Characteristics, Data stream characteristics for Continuous Media,

**Sound & Audio** (05)

**Images and Graphics** (05)

**Video & Animation** (06)
Video Signal Representation, Conventional Television Systems, EDTV, HDTV, Basic Concepts of Computer based Animation.

**Part B**

**Data Compression**
Source, Entropy & Hybrid Coding; Basic Compression Techniques, JPEG; H.261, MPEG, DVI

**Multimedia Operating System**
Real time, Resource Management, Process Management, Files Systems, System Architecture

**Multimedia Communication Systems**
Application Subsystems, Transport Subsystem, Quality of Service & Resource Management

**Database Systems**
Multimedia DBMS, Characteristics of MDBMS, Data Analysis, Data Structure, Operation on Data, Integration in Database Model.

**Recommended Books**
Basic Book: Multimedia :Computing ,Communications & Applications  by Ralf Steinmetz Klara Nahrstedt

3. Multimedia Technology and Application by David Hillman , Galgotia Publication 2001 Ed

**Paper Title:Embedded System Design**

**Paper Code: MEIT 203**
Max. Marks: 100
Time: 3 hours

**Course Duration**: 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

**Introduction to Embedded System:**
Their classification & characteristics, Concepts and Processes of system level design of embedded system.

**Micro-controllers:**
Introduction to Micro-controllers, CPU, its architecture, pipe lining, memory organization, CPU family registers, addressing modes, instruction set and assembly language programming using timers, subroutines, Interrupts, I/O ports. Specific examples of Micro-controllers: PIC, 8051 and AVR series.

**Architecture Design, Task Modeling and Management:**
Timing and clocks in Embedded Systems, Embedded software modeling and design, modeling of multiprocessing systems, Embedded project management.

**Part B**

**Embedded Core based Design:**
(08)
System on chip trends, Overview of Embedded processors like ARM, MIPS and Intel MMX series, Architecture, Organization and Instruction set, Memory management. High-level logic synthesis. Introduction to FPGA. Data parallel issues e.g. SIMD and other high performance approaches.

**Digital Signal Processor (DSP) for Embedded System:**
(08)
Architecture, Instruction Set and programming. Introduction to some popular DSP series e.g. DSPs of Texas Instruments.

**Real Time Operating System (RTOS) and RTOS based programming.**
(08)
RTOS Overview, Basics of RT- Linux as a RTOS, Vx Works facilities, Interrupt Service Routines.

**Books:**
2. Embedded System Design by Steve Heath (Newnes Publishers, 2nd Ed)
3. ARM system architecture by Steve Furber (Addison Wesley) 1st Ed
4. Programming Embedded System in C/C++ by M.Barr (O’Reilly) 2nd Ed
7. Real Time Systems by H.Kopetz (Kluwer Publisher 1st Ed)

**Paper Title:** Embedded System Design (Practical):
1. PIC Programming.
2. PIC microcontroller based projects.
3. FPGA serial communication controller.

**ELECTIVE**
**Group-I**

Paper title: Software Testing And Quality Management

**Paper code: MEIT 204** Max. Marks: 100 Time: 3 hours
Course Duration 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from
Part A and Part B.

**Part A**

**Software Quality**

**Software Management**

**Improving quality with methodologies**

**Part B**

**Software Quality Engineering**
Defining Quality Requirements, Requirement Management, Complexity Metrics And Models, Management Issues For Software Quality, Project Tracking And Oversight, Use Of CASE Tool Technology, Role Of Groupware, Data Quality Control.

**Project Configuration Management**

**Software Testing**
Unit, Integration & System testing, Benchmarking and Certification.

**Paper title: Soft Computing**

**Paper Code: MEIT 204**
Max. Marks: 100  
Time: 3 hours
Course Duration: 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

Fundamentals of Artificial Neural Networks & Applications, Characteristics of ANNs

The Biological Prototype, Perceptron, Multilayer NN

Learning Methods

Backpropagation, Counterpropagation, ART, BAN, Associative memories

Introduction to Fuzzy logic, Fuzzy sets, Fuzzy model, Fuzzy rule generation

Fuzzy inference system, Defuzzification.
Part B

Introduction to Neuro Fuzzy Systems, Architecture of a Neuro Fuzzy systems and its applications (05)

GENETIC ALGORITHM: An overview, Problem solving using GA (05)
Implementation of GA & GP (04)
Applications of GA & GP, Hybrid systems (04)

Recommended Books
1. Neuro fuzzy and soft computing by Jang, Pearson Education, 1996
2. Learning and soft computing by Kecman, MIT Press 1st Ed.
3. Fuzzy sets and fuzzy logic-Kir and Yuan PHI, 2005 ed
5. Neural Network in computing Intelligence by Fu, TMH, 1994
6. Neural Networks and fuzzy systems by Bar Kosko, PHI, 1st Ed

Paper title: Theory Of Computation

Paper Code: MEIT 204 Max. Marks: 100 Time: 3 hours
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Finite Automata (10)
Finite state machine & its limitation, Regular expressions, Transition Graph, Kleene's Theorem, Equivalence Theorem.

Turing Machine (12)
Turing machine, Post machines, Finite machines with pushdown store, non-determinism, turning machines as acceptors, formal language, primitive recursive function, halting problem, solvability of class, post correspondence problems, partial solvability.

Part B

Predicate calculus (15)
Rule.

**Verification of programs** (10)
Flow chart program, partial correctness, inductive assertion methods, termination

**Recommendation Books**

**Group-II**

**Paper title: Total Quality Management**

**Paper Code: MEIT 205** Max. Marks: 100 Time: 3 hours

**Course Duration:** 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Part A**

**Introduction** (04)
Quality and Total Quality Management – Concepts, definition and applications of TQM.

**Just - in- Time (JIT)** (06)
JIT Manufacturing and waste elimination, layout for JIT, Kanban, MRP Vs. JIT, JIT cause and effect chain, JIT implementation and benefits.

**Total Employees Involvement (TEI)** (04)
Empowering employee, Team building, Quality circles, Transparent communication, Reward and recognition, Education and training, suggestion schemes.

**Statistical Process Control (SPC)** (06)

**Part B**

**Benchmarking** (05)
Definition, concept, process and types of benchmarking.

**Quality Systems** (04)
Concept of Quality Systems Standards (QSS), Relevance and origin of ISO 9000 and ISO 14000, elements, benefits.
Customer Satisfaction (05)
Internal and external customers, quality chain, customer focus, satisfaction and delight, customer complaints, and redressal mechanism.

Quality Planning Process (05)
Policy deployment and implementation, Plan formulation and implementation.

Process Management (06)
Factors affecting process management, Quality Function Deployment (QPD), Quality assurance system and quality audit.

Recommended Books
3. TQM for engineers by M. Zairi, Aditya books.
5. Environmental Engineering and Management by Dr. S.K. Dhamelja.

Paper title: Human Resource Development & Training Methods

Paper Code: MEIT 205 Max. Marks: 100 Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Introduction to Human Resource Development (06)
Evolution, Mission and Purpose, Components of HRD, HRD problems and issues related to Indian Industry and technical, education, HRD in the context of new Industrial policy.

Staff Development, Professional Development and Career Development (06)
Stages Of HRD, Initial Or Induction Training, Training For Job-Related/Professional Development, Training For Horizontal And Vertical Mobility Of Employees.

Concept of Training (05)
Assumptions for prevailing and alternative concept of training; action through training or action through force.

Training Strategy (05)
Strategic issue; basic phases; modalities in training; formulating a coherent strategy.

**Part B**

**Training Methods** (05)
Learning on the job – Training in the field, simulating real life – role playing and games, incidents and cases – individualized training, seminars and syndicates; lecture method.

**Developing Group and the Climate** (05)
The social process; indicators of group development; training climate.

**Evaluation of Training** (05)
Issues for evaluations; role of the training system with evaluators from other constituencies.

**Systems Approach to HRD** (08)

**Recommended Books**
3. HRD Training and Development by RF Mayer and Peter Pipe.

**Paper: Network Management and Security**

**Paper Code: MEIT 205** Max. Marks: 100 Time: 3 hours

**Course Duration:** 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**PART – A**

**Introduction** (5)

**Secure Networking Threats** (6)

**Encryption Techniques** (6)

**Designing Secure Networks** (8)

**PART - B**

**Network Security Platform Options** (6)

**IPsec VPN Design Considerations** (6)

**Secure Network Management and Network Security Management** (8)

**Text:**
2. William Stalling “Cryptography and Network Security” Pearson Education

**References:**
2. Jeff Crume “Inside Internet Security” Addison Wesley

**Paper: Advanced Digital Image Processing**

**Paper Code: MEIT 205** Max. Marks: 100 Time: 3 hours

**Course Duration:** 45 lectures of one hour each.

**Note:** Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

**Section A**

**Image fundamentals and Transforms:** (06)
Steps in Image processing, Building blocks of Digital Image Processing System, Digital Image representation, Sampling and Quantization, Basic relationship between Pixels. Problem and application areas of digital image processing, Fourier transforms, Discrete Fourier Transform,

**Image Enhancement Techniques:**
(12)
Spatial Domain and frequency domain approaches, Image subtraction, image average, Low-pass spatial filters, Median filters, High-pass spatial filters, derivative filters, Frequency domain ideal low-pass filters, Butterworth Low pass filters, high pass filters, homomorphic filters

**Image Restoration:**
(06)
Image degradation and restoration process, Noise models, Noise filters, Estimation of degradation function, Inverse filtering, Least Mean Square filter, interactive restoration, constrained least square restorations

**Section B**

**Color Image Processing:**
(05)
Color image representation, Color Models, Pseudocolor image processing, color transformations, noise removal in color images.

**Image Compression:**
(07)
Coding redundancy, Inter-pixel redundancy, Psycho-visual redundancy, image compression models, Huffman coding, Lossy compression techniques, Threshold coding, Vector quantization, JPEG compression

**Image Segmentation:**
(07)
Detection of isolated points, line detection, edge detections using gradient operator & laplacian operator, edge linking and boundary detection, region oriented segmentation, segmentation using threshold, Hough transformation

**Image Representation & Object Recognition:**
(06)
Boundary representation: chain codes, polygon approximation, Boundary segments, Boundary descriptors; Simple descriptor, Fourier descriptor, Regional descriptors: Simple descriptor & Texture descriptor. Introduction to Object Recognition methods.

**Text Book:**


**Reference Books:**

1. Anil K. Jain : Fundamentals of digital image processing, PHI.
THIRD SEMESTER

Paper title: Data Warehousing and Data Mining

Paper Code: MEIT 301       Max. Marks: 100       Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Introduction to Data Warehousing (03)
Data Warehousing Definition and characteristics, need for data warehousing, DBMS vs. data warehouse, OLAP

Data Warehousing Components (05)
Overall Architecture, Data Warehouse Database, Sourcing Acquisition, Cleanup and Transformation Tools, Metadata Access Tools, Data Marts, Data Warehouse Administration and Management, Information Delivery Systems.

Mapping the Data Warehouse to a Multiprocessor Architecture (05)
Relational Database Technology for Data warehouse, Database Architectures for Parallel Processing, Parallel RDBMS features, Alternative Technologies, Parallel DBMS Vendors.

Introduction to Data Mining (08)
Functionalities, classification data mining systems, Multidimensional data model, data cubes, Schemas for multidimensional databases, OLAP operations, Data Marts, Metadata.

Part B

Data Preprocessing (06)
Data cleaning, integration and transformation, Data reduction, Discretization and Concept Hierarchy Generation.

Concept Description (06)
Data Mining techniques-Concept description, attribute oriented induction, analytical characterization, mining class comparisons, mining descriptive statistical measures.
Association Rule Mining  
Mining single dimension rules from transactional databases, Apriori algorithm, efficiency, mining rules without candidate generation.

Applications and Trends In Data Mining  
Commercial Importance of DW, applications of data mining, data mining in business process, Embedded data mining.

Recommended Books
1. Data Mining –Concepts & Techniques; Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers.
2. Data Warehousing in the Real World; Sam Anahory & Dennis Murray; Pearson Education
4. Data Warehousing, Data Mining and OLTP; Alex Berson, 1997, McGraw Hill.

GROUP-III

Paper Title: Advanced Digital Signal Processing

Paper Code: MEIT 302  Max. Marks: 100  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Transformations:  

Digital Filter Structures:  
Structure of digital filter realizations-Basic FIR & IIR structures (Direct Form I and II), Cascade form, Parallel form.

Design of Digital Filters:  
(a) Finite Impulse Response (FIR) filter-Basic design steps, advantages and disadvantages-Design Techniques: Windowing & Frequency sampling.

Part B

Finite Word Length Effects: (05)

Introduction of Multi-rate Digital Signal Processing: (08)
Filter Banks, Subband Coding, Wavelet Transform-Multi Resolution Analysis, Scaling Functions And Wavelets, Its Relation To Multi –Rate Filter Banks.

DSP Chips: (08)
DSP chips and their applications. ADSP 21xx architecture and instruction set.

Recommended Books:
1. Digital Signal Processing by Proakis & Manolakis (PHI)
3. Digital Signal Processing by S.K.Mitra (TMH)
4. Modern Filter Theory by Johnson & Johnson
5. Theory and Applications of Digital Signal Processing by Rabiner & Gold

Paper title: User Interface Design

Paper Code: MEIT 302 Max. Marks: 100 Time: 3 hours
Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

User Interface: An introduction and overview (06)
Importance of user interface, goals of user interface design, characteristics of graphical and web user interfaces

The User Interface Design Process (05)
Obstacles And Pitfalls In The Development Path, Usability, The Design Team, Managing Design Process.

Human Computer Interaction (08)
Importance Human Characteristics In Design, Cognitive Engineering, Mental Models, User Psychology, Interaction Styles And Hypermedia.

Visual C++ Basics (06)
Introduction to Visual C++, building a basic applications, Visual C++ resources.
Part B

Graphical User Interface (08)
Creating menus, working of menus, dialog boxes, combo box, child windows, buttons, check boxes, radio buttons.

Visual C++ and Database Management (08)
Open Database Connectivity, Data Access Objects, OLE-DB, building a database application using ODBC.

Application Development in Visual C++ (04)
Designing application with security, building a help file, packaging the application.

Recommended Books

Paper title: Advanced Computer Networks

Paper code: MEIT 302 Max. Marks: 100 Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: Examiner shall set eight questions, four from Part-A and four from Part-B of the syllabus. Candidate will be required to attempt any five questions selecting at least two questions from Part A and Part B.

Part A

Overview: (02)

The OSI reference model layer entities, layer interfaces and service access points. Connection-oriented and Connectionless services. Reliable and unreliable services. Services primitives. TCP/IP reference model.

Hubs, Bridges, Switches, Routers and Gateways.

Data link layer: (05)

Local/Personal Area Networks: (06)
IEEE LAN standards: 802.3 (CSMA/CD), Gigabit Ethernet, Bluetooth 802.11 based Wireless LAN and 802.16. (Broadband wireless)
Network Layer:
Routing: Dijkstra’s Shortest Path Routing, Flooding, Distance-Vector Routing, Link-State Routing, Hierarchical Routing, Broadcast Routing And Multicast Routing.
Congestion control: Principles and policies of congestion control in Virtual-circuit and Datagram subnets.
Load shedding and Jitter control.
Quality of service: Techniques for achieving good QoS. Integrated Services. Differentiated Services. Label Switching and MPLS.

Part B

Internetworking:
Tunneling, Fragmentation. IP addresses. Subnetting and supernetting. Classless Inter-Domain Routing (CIDR). Network Address Translation (NAT).
Internet protocols: IPv-4, ICMP, ARP, DHCP, OSPF, BGP and IPv6.

Wide Area Networks: X-25, Frame relay, ATM.

Transport Layer:
Transport layer protocol issues: addressing, establishing connection, releasing connection, flow control and multiplexing. TCP and UDP.

Network Applications:
DNS, Electronic Mail, TELNET, FTP, SNMP. World-Wide Web Multi-Media.

Network Security:
Introduction to Cryptography. Symmetric- Key and Public Key algorithms. Digital Signatures.

Recommended Books
8. Sheldon, Tom Encyclopedia Of Networking, TMH.