PANJAB UNIVERSITY
CHANDIGARH

REVISED STUDY AND EVALUATION SCHEME

FROM

1st TO 4th SEMESTER

MASTER OF ENGINEERING

REGULAR PROGRAMME

IN

INFORMATION TECHNOLOGY

Examination 2013-14
# Scheme of Evaluation (Semester-wise) 2013-14

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

Scheme of Examination for M.E. in Information Technology for examination 2013-14.

## First Semester:

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Paper title</th>
<th>Theory</th>
<th>Practical</th>
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<td>Hrs/wk</td>
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<td>Univ Exam</td>
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<tr>
<td>MEIT 101</td>
<td>Algorithm Analysis &amp; Design</td>
<td>4</td>
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<tr>
<td>MEIT 102</td>
<td>Object Oriented Analysis</td>
<td>4</td>
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<tr>
<td>MEIT 103</td>
<td>Advanced Digital Signal Processing</td>
<td>4</td>
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<tr>
<td>MEIT 104</td>
<td>Wireless &amp; Mobile Comm.</td>
<td>4</td>
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<tr>
<td>MEIT 105</td>
<td>Information Security</td>
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<td><strong>Total</strong></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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<tr>
<td>MEIT 202</td>
<td>Multimedia Systems</td>
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<tr>
<td>MEIT 203</td>
<td>Embedded System Design</td>
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<tr>
<td>MEIT 204</td>
<td>Elective – I</td>
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<tr>
<td>MEIT 205</td>
<td>Elective - II</td>
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<td>MEIT 206</td>
<td>Research Seminar</td>
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<td><strong>Total</strong></td>
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Total Hrs/wk = 8  Total Credits = 4
Total Hrs/wk = 26   Total Credits = 22

### Third Semester:

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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>
<td>4</td>
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<tr>
<td>MEIT 303</td>
<td>Project-based Thesis Work –I</td>
<td>-</td>
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<td><strong>Total</strong></td>
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Total Hrs/wk = 26   Total Credits = 16

### Fourth Semester:

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<th>Theory</th>
<th>Practical</th>
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<tr>
<td></td>
<td></td>
<td>Hrs/wk</td>
<td>Marks Univ Exam</td>
</tr>
<tr>
<td>MEIT 401</td>
<td>Thesis Work – II</td>
<td>-</td>
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<tr>
<td><strong>Total</strong></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>Network Management and Security</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>Grid Computing</td>
<td>Advanced Computer Networks</td>
</tr>
<tr>
<td></td>
<td>Advanced Digital Image Processing</td>
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</table>
MASTER OF ENGINEERING IN INFORMATION TECHNOLOGY

First Semester

Paper title: Algorithm Analysis and Design

Paper Code: MEIT 101
Max. Marks: 50
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

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

Branch and Bound techniques
0-1 knapsack problem, Traveling salesperson problem

Part B

Dynamic Programming and Backtracking algorithms

Linear Programming and Reductions
Introduction, Flow of Networks, Bipartite Matching, Duality, Zero sum games, The simplex algorithm

String Matching Algorithms
The Brute force algorithm, String matching with finite automata, Knuth-Morries-Pratt-Algorithm

NP-Hard, NP-Complete and Approximation Algorithm
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: 50
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**

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**

C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted I/O Operations, Manipulators.Templates.

**File Streams**

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**

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

**Object Oriented Methodologies**

OMT methodology, Object Model, Dynamic Model, Function Model, Relationship among models, Jacksons Model, Booch’s OOA and OOD approach.

**Recommended Books**


179
Paper Title: Advanced Digital Signal Processing

Paper Code: MEIT 103    Max. Marks: 50    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: (12)

Design of Digital Filters: (12)
(a) Finite Impulse Response (FIR) filter-Basic design steps, advantages and disadvantages-Design Techniques: Windowing & Frequency sampling.

Part B

Digital Filter Structures: (08)
Structure of digital filter realizations-Basic FIR & IIR structures (Direct Form I and II), Cascade form, Parallel form.

Finite Word Length Effects: (06)

Introduction of Multi-rate Digital signal Processing: (07)
Sampling rate conversion, decimation and interpolation, Digital Filter Banks, Implementation of narrowband lowpass filters, Subband Coding of speech signals.

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: Wireless & Mobile Communication

Paper code: MEIT 104       Max. Marks : 50       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: (08)
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: (10)
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: (06)
Introduction, FDMA, TDMA, CDMA, comparison of multiple access techniques, packet ratio and SDMA.

Part B

GSM: (05)
Introduction, design consideration, characteristics, services, system architecture, security aspects and architecture, GSM channels and burst structure.

CDMA (IS-95): (05)
Introduction, service aspects, network reference model, security aspects and architecture, radio aspects, features of CDMA system.

Receiver techniques for fading dispersive channels: (07)
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:**
(04)
WiFi, WiMax, EDGE, Bluetooth and cdma-2000.

**Books Recommended:**


**Paper Title: Information Security**  
**Paper Code: MEIT 105**  
Max. Marks: 50  
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**  
(07)
Introduction to Cryptography, Types of Threats—Passive threats, Active threats, Monoalphabetic Substitution Cipher, Polyalphabetic Substitution Cipher, Transposition Cipher.

**Cipher**  
(04)
Block and Stream ciphers, Secret key block ciphers, Stream ciphers

**Symmetric Key Ciphers**  
(06)
DES Algorithm, Triple DES, Cryptanalysis of DES, Differential and Linear cryptanalysis.

**Asymmetric Key Ciphers**  
(06)
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**

4. Firewalls and Internet Security, Bill Cheswick and Steve Bellovin, Addison-Wesley, 2nd Ed
SECOND SEMESTER

Paper Title: Research Methodology

Paper Code: ME IT 201                         Max. Marks: 50                         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: 50 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 (05)
Source, Entropy & Hybrid Coding; Basic Compression Techniques, JPEG; H.261, MPEG, DVI

Multimedia Operating System (06)
Real time, Resource Management, Process Management, Files Systems, System Architecture

Multimedia Communication Systems (06)
Application Subsystems, Transport Subsystem, Quality of Service & Resource Management

Database Systems (07)
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: 50 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: (03)
Comparison of Microprocessors and Microcontrollers. Comparison between RISC and CISC Processors, Harvard and Von Neuman Architectures. Embedded System classification and characteristics,

Overview of 8051: (10)
Architecture, addressing modes and instructions. Interrupts, Timer/Counters, Serial Communication and applications. Interfacing, Overview of Atmel 89C51 microcontroller.

**PIC Microcontrollers**

Introduction and features, PIC 16C6X/7X: Architecture, Registers, Reset actions, Memory Organization, Instructions, Addressing Modes, I/O Ports, Interrupts, Timers, ADC. Input Capture, Output Compare, Frequency Measurement, Serial I/O Device

**Part B**

**Embedded Core based Design:**
System on chip trends, Overview of Embedded processors like ARM, MIPS and Intel MMX series, Architecture, Organization and Instruction set, Memory management. Data parallel issues e.g. SIMD and other high performance approaches.

**Software Development & Tools**


**Real Time Operating Systems**

RTOS Architecture, Task and Task States, Tasks and Data, Semaphores and shared data, Operating System Services: message queues, timer function, events, memory management, interrupt Routines in an RTOS environment, Basic Design Using RTOS

**Books:**

2. An Embedded Software Primer by David E Simon
3. Embedded System Design by Steve Heath (Newnes Publishers, 2nd Ed)
4. ARM system architecture by Steve Furber (Addison Wesley) 1st Ed
5. Programming Embedded System in C/C++ by M.Barr (O’Reilly) 2nd Ed

**Paper Title: Embedded System Design (Practical):**

1. 8051 based programs PC simulator
2. 8051 based programs on kits
3. PIC Programming.
4. PIC microcontroller based projects.
Paper title: Software Testing And Quality Management

Paper code: MEIT 204  Max. Marks: 50  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  (05)

Software Development  (08)

Improving quality with methodologies  (06)
Quality tools, Object-Oriented Software, Reverse Engineering, Measuring Customer Satisfaction, Reliability Models, Reliability Growth Models.

Part B

Software Quality Engineering  (07)
Defining Quality Requirements, Requirement Management, Complexity Metrics And Models, Use Of CASE Tool Technology, Role Of Groupware, Data Quality Control

Project Configuration Management  (06)

Software Testing  (07)
Introduction to software testing, verification and validation, testing techniques: Dynamic testing and static testing, Validation activities: Unit, Integration, function & System testing, Regression testing.

Risk Management  (06)
Risk Identification, Risk Projection, risk refinement, Risk mitigation, Monitoring and Management, The RMMM plan
Recommended Books

Paper title: Soft Computing

Paper Code: MEIT 204 Max. Marks: 50 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 (05)
The Biological Prototype, Perceptron, Multilayer NN (05)
Learning Methods (04)
Backpropagation, Counterpropagation, ART, BAN, Associative memories (05)
Introduction to Fuzzy logic, Fuzzy sets, Fuzzy model, Fuzzy rule generation (04)
Fuzzy inference system, Defuzzification. (04)

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: 50       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  (13)

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: 50  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. Dhameja.

Paper title: Human Resource Development & Training Methods

Paper Code: MEIT 205    Max. Marks: 50    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
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
Stages Of HRD, Initial Or Induction Training, Training For Job-Related/Professional Development, Training For Horizontal And Vertical Mobility Of Employees.

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

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

Part B

Training Methods
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
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: Grid Computing**

**Paper Code: MEIT 205**  
Max. Marks: 50  
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:**  
(06)  

**Building Blocks for Grid Systems:**  
(06)  
XML, SOAP, UDDI, Service Oriented Architecture, Web Services, Web Services Architecture, WSRF, Relationship between Grid and Web Services, Grid and Web Services Invocation

**Data Management:**  
(05)  
Overview of Data Management in GT4, Data Movement: GridFTP, RFT, Data Replication: RLS, Higher level data services

**Resource Management and Scheduling:**  
(06)  

**Part B**

**Security:**  
(08)

**Monitoring and Discovery Services:** (04)
Index Services, Resource Discovery, UDDI, Introduction to MDS in GT4.

**Grid Middleware and Programming Model:** (10)
Study of Globus Toolkit 4 Components and its Programming Model, Singleton and Multiple Resources, Logging, Lifecycle Management, Notifications, Study of important distributed systems like Legion, CRISIS.

**Text Books:**

**Reference Books:**

**Paper: Advanced Digital Image Processing**

**Paper Code: MEIT 205**
Max. Marks: 50
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)
**Image Enhancement Techniques:**
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:**
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:**
Color image representation, Color Models, Pseudocolor image processing, color transformations, noise removal in color images.

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

**Image Segmentation:**
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:**
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.
Paper title: Data Warehousing and Data Mining

Paper Code: MEIT 301  Max. Marks: 50  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  (08)
Mining single dimension rules from transactional databases, Apriori algorithm, efficiency, mining rules without candidate generation.

Applications and Trends In Data Mining  (04)
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 Warehouseing in the Real World; Sam Anahory & Dennis Murray; Pearson Education
4. Data Warehousing, Data Mining and OLTP; Alex Berson, 1997, McGraw Hill.

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**GROUP-III**

**Paper: Network Management and Security**

**Paper Code: MEIT 302** Max. Marks: 50 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

IPsec VPN Design Considerations

Secure Network Management and Network Security Management

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

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

Paper title: User Interface Design

Paper Code: MEIT 302 Max. Marks: 50 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
Importance of user interface, goals of user interface design, characteristics of graphical and web user interfaces

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

Human Computer Interaction
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: 50    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  (05)
Overview of computer networks, seven-layer architecture, TCP/IP suite of protocols, etc.

MEDIUMACCESS  (5)
MAC protocols for high-speed LANS, MANs, and wireless LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless ethernet, etc.)

INTERNETWORKING AND ROUTING  (7)
RESOURCE MANAGEMENT

Part B

QUALITY OF SERVICE (QOS)

GROUP COMMUNICATION
Multicast Routing and Transport, IP Multicasting: Multicast routing protocols, address assignments, session discovery etc., Multicasting in mobile networks.

TRANSPORT LAYER PROTOCOL
TCP protocol dynamics, TCP extensions for high-speed networks, transaction-oriented applications. Other new options in TCP.

WIRELESS NETWORKS
Wireless LAN architecture, Mobile IP, Broadcast file system, Agent technology, Satellite technology.

SECURITY
Network security at various layers. Secure-HTTP, SSL, ESP, Authentication header, Key distribution protocols. Digital signatures, digital certificates.

BOOKS:
Andrew Tanenbaum. Computer Networks, PHI

REFERENCES: