PANJAB UNIVERSITY
CHANDIGARH

REVISED STUDY AND EVALUATION SCHEME

FROM

1st TO 4th SEMESTER

MASTER OF ENGINEERING

REGULAR PROGRAMME

IN

INFORMATION TECHNOLOGY

Examination 2014-15
Scheme of Evaluation (Semester-wise) 2014-15
M.E. (INFORMATION TECHNOLOGY)

Scheme of Examination for M.E. in Information Technology for examination 2014-15.

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>MEIT 101</td>
<td>Algorithm Analysis &amp; Design</td>
<td>4 100</td>
<td>50 4</td>
</tr>
<tr>
<td>MEIT 102</td>
<td>Object Oriented Analysis</td>
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<td>50 4</td>
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<tr>
<td>MEIT 103</td>
<td>Advanced Digital Signal Processing</td>
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<td>50 4</td>
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<tr>
<td>MEIT 104</td>
<td>Wireless &amp; Mobile Comm.</td>
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<td>MEIT 105</td>
<td>Information Security</td>
<td>4 100</td>
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<tr>
<td>MEIT 106</td>
<td>Information Technology Lab- I</td>
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Total Hrs/wk = 20  Total Credits = 22

Second Semester:

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Paper title</th>
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<tbody>
<tr>
<td>MEIT 201</td>
<td>Research Methodology</td>
<td>4 50</td>
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<tr>
<td>MEIT 202</td>
<td>Multimedia Systems</td>
<td>4 50</td>
<td>50 4</td>
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<tr>
<td>MEIT 203</td>
<td>Embedded System Design</td>
<td>4 50</td>
<td>50 4</td>
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<tr>
<td>MEIT 204</td>
<td>Elective I</td>
<td>3 50</td>
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<tr>
<td>MEIT 205</td>
<td>Elective - II</td>
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<td>50 3</td>
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Total Hrs/wk = 23  Total Credits = 22
### Third Semester:

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<tr>
<th>Paper Code</th>
<th>Paper title</th>
<th>Theory</th>
<th>Practical</th>
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<tbody>
<tr>
<td>MEIT 301</td>
<td>Data Warehousing &amp; Data Mining</td>
<td>4</td>
<td>50</td>
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<tr>
<td>MEIT 302</td>
<td>Elective III</td>
<td>4</td>
<td>50</td>
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<tr>
<td>MEIT 303</td>
<td>Project-based Thesis Work II</td>
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**Total Hrs/wk = 26**  
**Total Credits = 16**

### Fourth Semester:

<table>
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<tr>
<th>Paper Code</th>
<th>Paper title</th>
<th>Theory</th>
<th>Practical</th>
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<tbody>
<tr>
<td>MEIT 401</td>
<td>Thesis Work II</td>
<td>-</td>
<td>25 100 100 15</td>
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**Total Hrs/wk = 25**  
**Total Credits = 15**

The thesis will be graded as follows:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Grade</th>
<th>Condition</th>
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<tbody>
<tr>
<td>1.</td>
<td>A+</td>
<td>Publication from Thesis in SCI indexed journal.</td>
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ELECTIVES

<table>
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<tr>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
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<tbody>
<tr>
<td>Software Testing &amp; Quality</td>
<td>Total Quality Management</td>
<td>Network Management and Security</td>
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<tr>
<td>Assurance</td>
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<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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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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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-Algorithm

**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: 50 Time: 3 hours

Course Duration: 45 lecturers of one hour duration each

Note: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

**Part A**

**Modeling** (5)
The object Modeling Technique, Object Modeling, Associations, Generalization and Inheritance, Advanced Object Modeling, Aggregation, Multiple Inheritance, Metadata, Constraints.

**Dynamic and Functional Modeling** (5)
Events and States, Operations, Concurrency, Advanced dynamic modeling concepts, Functional Models, Data Flow Diagrams

**Design Methodology** (6)
Methodology preview, OMT methodology, Analysis, System Design, Concurrency, Handling Global Resources, Architectural Frameworks,

**Object Design** (6)
Object Design, Algorithm Design, Design Optimization, Control Implementation, Association Design, Physical Packaging, Comparison of Methodologies

**Part - B**

**Implementation** (5)
Implementation using a programming Language, implementation using a database design, Implementation outside a computer, Object Oriented programming Style, Reusability, Extensibility, Robustness

**Languages** (5)
Object Oriented Languages, Class definitions, Creating Objects, Calling Operations, using Inheritance, implementing Associations, Object Oriented Language features

**Non Object Oriented Languages** (5)
Mapping Object Oriented Concepts, Translating Classes into Data Structures, Allocating Objects, Implementing Inheritance, Dealing with concurrency, Encapsulation

**Relational Databases** (5)
DBMS concepts, Relational DBMS concepts, Relational Database Design, Advanced Relational DBMS

**Applications** (3)
Object Diagram Compiler, Computer Animation, Electrical Distribution Design System

**Recommended Books**


**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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.
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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.
**Part A**

**Introduction** (06)

**Cellular Concepts** (10)
Frequency Reuse, Handoff Strategies, Interference and System Capacity, Mechanisms for capacity and coverage improvement-cell splitting, cell sectoring and microcell zone concept

**GSM:** (06)
Services and Features, System Architecture, Radio Aspects, GSM channels and Security Aspects

**Part B**

**Multiple Access Techniques** (05)
Introduction to Multiple Access, FDMA, TDMA, SSMA: types, SDMA, Packet Radio, and CSMA Protocols.

**CDMA (IS-95):** (05)
Service Aspects, Radio Aspects, Key Features

**Mobile Radio Propagation:** (08)
Fading, Types of fading, small scale fading, Equalization, Diversity Techniques: Space Diversity types, Frequency Diversity, Time Diversity, Rake receiver, Interleaving.

**Migration to Advanced Technologies:** (05)
Features, Specifications, Applications and Comparison between: WiFi, WiMax, EDGE, Bluetooth and cdma-2000 Standards.

**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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

**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**
4. Firewalls and Internet Security, Bill Cheswick and Steve Bellovin, Addision-Wesley. 2nd Ed

**Paper Title:** Information Technology Lab – I (Practical)
**Paper Code:** MEIT 106 Max. Marks: 50 (Int Exam) Credits 2

Students will be given two practical problems by all the faculty teaching them in the current 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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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, Correlational 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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

**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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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 (10)
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: (12)
System on chip trends, Overview of Embedded processors like ARM Intel MMX series, Architecture, Organization and Instruction set, Memory management. Data parallel issues e.g. SIMD and other high performance approaches.

Software Development & Tools (06)

Real Time Operating Systems (04)
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: Information Technology Lab – II (Practical)
Paper Code: MEIT 207 Max. Marks: 50 (Int Exam) Credits 2

Students will be given two practical problems by all the faculty teaching them in the current semester.
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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

### Part A

**Software Quality**


**Software Development**


**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**


**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**

- (6) 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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

**Part A**

Fundamentals of Artificial Neural Networks & Applications, Characteristics of ANNs

- 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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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)

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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

**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 ï Training in the field, simulating real life ï role playing and games, incidents and cases ï 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


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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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:**

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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

**Section A**

**Image fundamentals and Transforms:**


**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:** (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, Pseudo-color 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: 50 Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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 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: Network Management and Security

Paper Code: MEIT 302  Max. Marks: 50  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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:
1. Sean Convery, "Network Security Architectures, Published by Cisco Press, First Ed. 2004
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: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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: 50  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of equal marks. First question is compulsory and shall cover the whole syllabus by including questions of conceptual nature. Rest of the syllabus will be divided into A and B parts having three questions each.

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 (6)
Part B

QUALITY OF SERVICE (QOS) (04)

GROUP COMMUNICATION (05)
Multicast Routing and Transport, IP Multicasting: Multicast routing protocols, address assignments, session discovery etc., Multicasting in mobile networks.

TRANSPORT LAYER PROTOCOL (05)
TCP protocol dynamics, TCP extensions for high-speed networks, transaction-oriented applications. Other new options in TCP.

WIRELESS NETWORKS (03)
Wireless LAN architecture, Mobile IP, Broadcast file system, Agent technology, Satellite technology.

SECURITY (05)
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: