SCHEME AND SYLLABUS

FOR

MASTER OF ENGINEERING

REGULAR PROGRAMME

IN

INFORMATION TECHNOLOGY

FROM

Examination 2020-21(3rd -4th semester)

Batch 2019-21
## Third Semester

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Subject Name</th>
<th>L-T-P</th>
<th>Contact hrs/week</th>
<th>Credits</th>
<th>Marks</th>
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<tbody>
<tr>
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<td>Theory</td>
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<td>Internal Assessment</td>
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<td>1</td>
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<td>Elective – III</td>
<td>4-0-0</td>
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<td>3</td>
<td>MEIT 317</td>
<td>Project-based Thesis Work – I</td>
<td></td>
<td>20</td>
<td>10</td>
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</table>

* Practical marks are for continuous and end semester evaluation

**Total Marks: 300**  **Total Credits = 18**

<table>
<thead>
<tr>
<th>Elective-III</th>
<th>Elective-IV</th>
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<tbody>
<tr>
<td>(MEIT 311) Network Management and Security</td>
<td>(MEIT 314) Big Data and Analytics</td>
</tr>
<tr>
<td>(MEIT 312) User Interface Design</td>
<td>(MEIT 315) Advanced Data Mining</td>
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<tr>
<td>(MEIT 313) Cloud Computing</td>
<td>(MEIT 316) Advanced Computer Networks</td>
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## Fourth Semester:

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<tr>
<th>S. No.</th>
<th>Subject Code</th>
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<th>Contact hrs/week</th>
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<th>Practical Marks</th>
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<tbody>
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<td>Thesis Work – II</td>
<td>25</td>
<td>15</td>
<td>Internal Assessment</td>
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<tr>
<td>1</td>
<td>MEIT 411</td>
<td>Thesis Work – II</td>
<td>25</td>
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**Total marks: 200**  **Credits = 15**

### Guidelines for thesis grading in internal assessment

<table>
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<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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**Total marks: 500**  **Credits = 33**
Subject Name: Network Management and Security

Subject Code: MEIT 311  Max. Marks: 50  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of 10 marks each. First question has to be compulsory, having parts covering the whole syllabus. Three questions have to be set from Part A and three questions from Part B of the syllabus. Candidate is required to attempt at least two questions from each part.

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

Secure Network Management and Network Security Management

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

References:
2. Jeff Crume “Inside Internet Security” Addison Wesley
Subject Name: **User Interface Design**

Subject Code: MEIT 312

Max. Marks: 50

Time: 3 hours

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

**Note**: The examiner shall set seven questions of 10 marks each. First question has to be compulsory, having parts covering the whole syllabus. Three questions have to be set from Part A and three questions from Part B of the syllabus. Candidate is required to attempt at least two questions from each part.

### 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**

Introduction to Visual C++, building a basic applications, Visual C++ resources.

### Part B

**Graphical User Interface**

Creating menus, working of menus, dialog boxes, combo box, child windows, buttons, check boxes, radio buttons.

**Visual C++ and Database Management**

Open Database Connectivity, Data Access Objects, OLE-DB, building a database application using ODBC.

**Application Development in Visual C++**

Designing application with security, building a help file, packaging the application.

**Recommended Books**

Subject Name: Cloud Computing

Subject code: MEIT 313  Max. Marks: 50  Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of 10 marks each. First question has to be compulsory, having parts covering the whole syllabus. Three questions have to be set from Part A and three questions from Part B of the syllabus. Candidate is required to attempt at least two questions from each part.

Part A

Overview of Cloud Computing

Working with Private Cloud

Working with Public Clouds
What is Public Cloud, Why Public Cloud, When to opt for Public Cloud, Public Cloud Service Models, and Public Cloud Players. Infrastructure as a Service Offerings, IaaS Vendors, PaaS offerings, PaaS vendors, Software as a Service. Implementing public cloud (one out of AWS, Windows Azure, IBM or Rackspace)

Part B

Overview of Cloud Security

Overview of Multi-Cloud Management Systems
Explain concept of multi-cloud management, Challenges in managing heterogeneous clouds, benefits and advantages of multi-cloud management systems. Implementing Multi-Cloud Management System (e.g. RightScale Cloud Management System)
Business Clouds
Cloud Computing in Business, Various Biz Clouds focused on industry domains (Retail, Banking and Financial sector, Life Sciences, Social networking, Telecom, Education). Cloud Enablers (Business Intelligence on cloud, Big Data Analytics on Cloud)

Future directions in Cloud Computing
Future technology trends in Cloud Computing with a focus on Cloud service models, deployment models, cloud applications, and cloud security. Migration paths for cloud, Selection criteria for cloud deployment. Current issues in cloud computing leading to future research directions.

Recommended Books


Reference Books

Elective IV

Subject Name: Big Data and Analytics

Paper Code: MEIT 314  
Max. Marks: 50  
Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of 10 marks each. First question has to be compulsory, having parts covering the whole syllabus. Three questions have to be set from Part A and three questions from Part B of the syllabus. Candidate is required to attempt at least two questions from each part.

Part A

Digital Data: (5)
Types of Digital Data - Structured (Sources of structured data, Ease with Structured data), Semi-Structured (Sources of semi-structured data), Unstructured (Sources of unstructured data, Issues with terminology, Dealing with unstructured data).

Introduction to Big Data: (2)
What is big data?, Why big data? , Other characteristics of data but not definitional for big data, Challenges with big data, Big data stack

Technology Landscape: (6)
Big Data Analytics, Analytics 1.0, Analytics 2.0, Analytics 3.0, Traditional BI vs. Big Data Environment, Big Data technology Landscape, NoSQL Databases, NoSQL Vs. RDBMS, New SQL, Hadoop, Hadoop 1.0 vs. Hadoop 2.0, Data Science is multi-disciplinary, Data Scientist - Your new best friend

Introduction to Hadoop: (9)

Mongo DB: (2)
Recap of NoSQL databases, MongoDB – CRUD, MongoDB- Arrays, Java Scripts, Cursors, Map Reduce Programming, Aggregations

Cassandra: (2)
Cassandra- CQLSH - CRUD, Counter, List, Set, Map, Tracing
Part B

**Introduction to Hive:**

**Introduction to Pig:**
Introducing Pig, History and Anatomy of Pig, Pig on Hadoop, Pig Features, Pig Philosophy, Word count example using Pig, Use Case for Pig, Pig Primitive Data Types, Collection Types and NULL, Pig Latin Overview, Pig Latin Grammar - Comments, Keywords, Identifiers, Case sensitivity in Pig, Common Operators in Pig, Pig Statements- LOAD, STORE, DUMP, Interactive Shell – GRUNT, FILTER, SORT, GROUP BY, ORDER BY, JOIN, LIMIT, Pig Latin Script, Local Mode, Map Reduce Mode, Running Pig Script, Working with, Field, Tuple, Bag, User Defined Function, Parameters in Pig

**Introduction to Jasper Report:**
Introduction to Jasper Report using Jasper Soft Studio, Reporting using MongoDB, Reporting using Cassandra

**Recommended Books:**
2. Data Science and Big Data Analytics by EMC Education Services, 2015
Subject Name: Advanced Data Mining

Paper Code: MEIT 315
Max. Marks: 50
Time: 3 hours

Course Duration: 45 lectures of one hour each.

Note: The examiner shall set seven questions of 10 marks each. First question has to be compulsory, having parts covering the whole syllabus. Three questions have to be set from Part A and three questions from Part B of the syllabus. Candidate is required to attempt at least two questions from each part.

Part A

Introduction to Data Warehousing (02)
Data Warehousing Definition and characteristics, need for data warehousing, DBMS vs. data warehouse, OLAP

Data Warehousing Components (04)
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 (04)
Relational Database Technology for Data warehouse, Database Architectures for Parallel Processing, Parallel RDBMS features, Alternative Technologies, Parallel DBMS Vendors.

Introduction to Data Mining (04)
Functionalities, classification data mining systems, Multidimensional data model, data cubes, Schemas for multidimensional databases, OLAP operations, Data Marts, Metadata.

Data Preprocessing (03)
Data cleaning, integration and transformation, Data reduction, Discretization and Concept Hierarchy Generation.

Concept Description (04)
Data Mining techniques-Concept description, attribute oriented induction, analytical characterization, mining class comparisons, mining descriptive statistical measures.

Part B

Association Rule Mining (05)
Mining single dimension rules from transactional databases, Apriori algorithm, efficiency, mining rules without candidate generation.

Applications and Trends In Data Mining (02)
Commercial Importance of DW, applications of data mining, data mining in business process, Embedded data mining.
Introduction to Business Intelligence:  

Basics of Data Integration (Extraction Transformation Loading)  
Concepts of data integration, need and advantages of using data integration, introduction to common data integration approaches, introduction to ETL, Introduction to data quality, data profiling concepts and applications.

Introduction to Multi-Dimensional Data Modeling,  
Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes, attribute, hierarchies, star and snowflake schema.

Basics of Enterprise Reporting  
Introduction to enterprise reporting, concepts of dashboards, balanced scorecards, and overall architecture.

Data Mining Functionalities:  
Association rules mining, Mining Association rules from single level, multilevel transaction databases, Classification and prediction, Decision tree induction, Bayesian classification, k-nearest neighbor classification

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.
8. Fundamentals of Business Analytics by R N Prasad and Seema Acharya, Wiley India.
Subject Name: Advanced Computer Networks

Paper Code: MEIT 316
Course Duration: 45 lectures of one hour each.
Max. Marks: 50
Time: 3 hours

Note: The examiner shall set seven questions of 10 marks each. First question has to be compulsory, having parts covering the whole syllabus. Three questions have to be set from Part A and three questions from Part B of the syllabus. Candidate is required to attempt at least two questions from each part.

Part A

INTRODUCTION
Overview of computer networks, seven-layer architecture, TCP/IP suite of protocols, etc.

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

INTERNETWORKING AND ROUTING

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: