M.Sc. INFORMATION TECHNOLOGY

Syllabus

(Academic year 2018 onwards)

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018

(An Autonomous College affiliated to Bharathiar University)

M. Sc., Information Technology and Scheme of Examinations for the Students Admitted from 2018-2019 academic year onwards

ABOUT THE COURSE

The M. Sc. (Information Technology) course offered by this college is a two years full time course consisting of four semesters. It is oriented towards the concepts of the theory of Computer Science and its applications in recent developments both in commercial and scientific areas.

ELIGIBILITY FOR ADMISSION

Candidates for admission to the first year course leading to the degree of Master of Science (M.Sc.) will be required: A pass with 50% of Marks in B.Sc.(CS) or B.C.A. or B.Sc.(IS) or B.Sc.(IT) or B.Sc.(CT) degree in any University recognized by the BharathiarUniversity.

In case of SC/ST candidates, a mere pass in the qualifying examination will be sufficient.

ELIGIBILITY FOR EXAMINATION

A candidate will be permitted to appear for the semester examinations held at the end of each semester only on securing a minimum attendance of 75% and that the candidate's conduct has been satisfactory. If a candidate fails to secure 75% attendance and conduct has been satisfactory it shall be open to the principal or any authority delegated such powers to grant exemption to a candidate for valid reasons subject to usual conditions.

EXAMINATIONS

Semester examinations shall be conducted at the end of each semester for the subjects of study undergone by the students in that semester. UGC pattern of question paper is followed for all the theory subjects. Practical examinations will be conducted with one internal examiner and one external examiner and the question paper for practical examination will be set by both Internal and External examiners.

PASSING REQUIREMENTS

1. Single valuation (External) system will be followed to award marks.

2. A candidate shall be declared to have passed the examinations in a subject if he/she secures not less than 50% in the end of semester examination.

3. A candidate who successfully completes the course and passes the examinations prescribed in all the subjects of study and practical examinations shall be declared to have been qualified for the degree.

CLASSIFICATION OF SUCCESSFUL CANDIDATES

1. All candidates securing not less than 60% of the aggregate marks shall be declared to have passed the degree in FIRST CLASS provided they have passed the examination in every subject including practical, project work and Viva-Voce.

2. Other successful candidates shall be declared to have passed the examinations in SECOND CLASS.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), COIMBATORE - 641 018
DEPARTMENT OF INFORMATION TECHNOLOGY
M. Sc., Information Technology Syllabi and Scheme of Examinations for the Students Admitted from 2018-2019 academic year onwards

Semester	Code	Part	Paper	Title of the Paper	Hrs (wk)	Internal (CA)Mar	External (SE)Mar	Total Marks	SE – Min.	TPM	Credits
I	18MIT11C	A	I	Advanced Java Programming	6	25	75	100	38	50	4
	18MIT12C	A	II	Advanced Operating Systems	6	25	75	100	38	50	4
	18MIT13C	A	III	Object Oriented Analysis and Design	6	25	75	100	38	50	4
	18MIT14C	A	IV	Python Programming	6	25	75	100	38	50	4
	18MIT15P	A		**Practical 1 :**JavaProgramming Lab	3	40	60	100	30	50	2
	18MIT16P	A		**Practical 2 :**Python Programming Lab	3	40	60	100	30	50	2
					30			600			20
II	18MIT21C	A	V	C# Programming	5	25	75	100	38	50	4
	18MIT22C	A	VI	Data Analyticsand R programming	5	25	75	100	38	50	4
	18MIT23C	A	VII	Network Security	5	25	75	100	38	50	4
	18MIT24C	A	VIII	Soft Computing	5	25	75	100	38	50	4
	18MIT25E	B	IX	**Elective I**	4	25	75	100	38	50	5
	18MIT26P	A		**Practical 3:**C# Programming Lab	3	40	60	100	30	50	2
	18MIT27P	A		**Practical 4:**R Programming Lab	3	40	60	100	30	50	2
					30			700			25
III	18MIT31C	A	X	Digital Image Processing	5	25	75	100	38	50	4
	18MIT32C	A	XI	Software Testing	5	25	75	100	38	50	4
	18MIT33C	A	XII	Open Source Tools	5	25	75	100	38	50	4
	18MIT34C	A	XII	Cloud Computing	5	25	75	100	38	50	4
	18MIT35E	B	XIV	**Elective II**	4	25	75	100	38	50	5
	18MIT36P	A		**Practical 5**: Open Source Tools Lab	3	40	60	100	30	50	2
	18MIT37P	A		**Practical 6:**DigitalImage Processing Lab	3	40	60	100	30	50	2
					30			700			25
	18MIT41E	B	XV	**Elective III**	5	25	75	100	38	50	4

IV	18MIT42E	B	XVI	**Elective IV**	5	25	75	100	38	50	4
	18MIT43V	A		**Project and Viva-Voce**		40	160	100	80	100	12
					10			300			20
			Total / Credits					2300			90

Electives for Second Semester: Elective – I

    1.1 Artificial Intelligence and Robotics
    1.2 Grid Computing
    1.3 Parallel Processing

Electives for Third Semester: Elective – II

    2.1 Internet of Things
    2.2 TCP/IP
    2.3 Wireless Sensor Networks

Electives for Fourth Semester
Elective – III

    3.1 Software Quality Assurance
    3.2 E-Commerce
    3.3 Computer Forensics

Elective – IV

4.1 Cyber Security
    4.2 Mobile Application Development
    4.3 Principles of Compiler Design

GUIDELINES FOR PROJECT WORK

- The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied.

- Each student should carry out individually one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.

- The project work should be compulsorily done under the supervision of the department staff concerned.

Viva-Voce
- Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College.

- Out of 200 marks, 100 marks for Project Report, 60 marks for Viva-Voce and 40 marks for Continuous Internal Evaluation.

MODEL QUESTION PAPER

Question Paper Pattern (External 75 marks)

Section-A   **20 marks** (10 Short answer Type Questions of 2 mark each; No choice)
            (10 X 2 = 20)
Section-B   **25 marks** (5 Questions either or type of 5 marks each)
                        (5 X 5 = 25)
Section-C   **30 marks** (Three Questions out of 5 Questions, 10 marks each)
                        (3 X 10 = 30)

Question Paper Pattern (Internal 50 marks)

Section-A   **10 marks** (5 Short answer Type Questions of 2 mark each; No choice)
                        (5 X 2 = 10)
Section-B   **20 marks** (4 Questions either or type of 5 marks each)
                        (4 X 5 = 20)
Section-C   **20 marks** (Two Questions out of 3 Questions, 10 marks each)
                        (2 X 10 = 20)

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ADVANCED JAVA PROGRAMMING**	I	**18MIT11C**

Objectives:
- To enable students to gain problem solving skills using advanced Java concepts.
- On successful completion of the course the students should have acquired skill in advanced Java programming.
- To enable students to develop advanced Java application programs.

UNIT I: Introducing classes: class fundamentals – declaring objects, methods, constructors - this keyword – Method overloading - garbage collection - finalize () method. Inheritance: Inheritance basics – using super – method overriding – dynamic method dispatch – abstract class – final keyword. Packages and interfaces: packages – importing packages – defining interface – implementing interfaces - extending interfaces.

UNIT II: Exception handing: types of Exceptions - uncaught Exception - try, catch, throw, throws, finally - built-in Exception, user defined exception. Multithreading: The Java thread model – main thread - creating a thread – thread priorities - synchronization. I/O basics – Stream Classes – Predefined streams – Reading/Writing console input/output.Applet class: Applet basics – applet architecture – Applet display method – HTML Applet Tag.

UNIT III: The collections framework: collection interfaces – collection classes - string tokenizer. AWT: AWT classes – window fundamentals – control fundamentals – layout managers. Introducing Swing: origins of swing – swing features – MVC Connection – Components and containers – Swing packages – A simple swing application. Event Handling: Event Model – Event Class – Event Listener Interfaces.

UNIT IV: Networking: Basics – Networking classes and interfaces – InetAddress – URL – Datagrams. Java Beans: Introduction – Advantages – Java Beans API. Java Servlets: Introduction – Life Cycle of a Servlet – A simple Servlet. Accessing database with JDBC: Relationship databases – creating a database in MySQL – manipulating databases with JDBC – Transaction processing.

UNIT V: JavaScript: Introduction – Language elements – Variables, Operators, Statements, Functions – Objects of Java Script – Window Object, Document Object, Forms Object, Text Boxes and Text Areas, Buttons, Radio Buttons and Check Boxes, Select Object, Date Object, Strings Object, Math Object – Arrays – Event handlers.

TEXT BOOKS
1. Herbert Schildt, "The Complete Reference Java" 7th Edition Tata McGraw-Hill Pub. Company Ltd. (Unit I, II, III, IV)
2. Deitel and Deitel, "Java How to Program", Seventh Edition, Pearson Education Asia. (Unit IV - JDBC).
3. N.P Gopalan "Web Technology – A Developer`s Perspective", Prentice Hall of India Pvt. Limited. (Unit V).

REFERENCE BOOKS
1. Keyur shab, "Java 2 programming", Tata McGraw-Hill Pub. Company Ltd.
2. Cays S. Horstmann, Gary Cornell, "Core Java2 Volume I – Fundamentals", Pearson Edition, 2001.

3. Cays S. Horstmann, Gary Cornell, "Core Java2 Volume II – Fundamentals", Pearson Edition, 2003.
4. Steven Bright, "JavaScript Fundamental A Step by Step Guide".

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ADVANCED OPERATING SYSTEM**	I	**18MIT12C**

Objectives:
- Reading operating systems evolution and Understanding systems concepts like process management
- Gaining practical experience with systems programming
- Presenting technical details of Linux operating system

UNIT–I: Introduction – History of Operating systems — Computer Hardware review – Operating System Concepts – System calls – Processes – Model – Creation – Termination – Process Hierarchy – Process States – Implementation of Processes.

UNIT–II: Threads – Thread Usage – Classical Thread model- POSIX threads - Pop-up threads - Inter Process Communication – Race condition – Critical Region – Mutual Exclusion with busy waiting – Sleep and wakeup – Semaphores – Mutexes – Monitors - Message Passing - Classical IPC Problems: The Dining Philosophers Problem – The Readers and Writers Problem- Memory management: virtual memory – Paging- Paging tables- Speeding up paging – Page tables for large memories.

UNIT–III: Page replacement algorithms: the optimal page replacement algorithm- The not recently used page replacement algorithm- FIFO Page replacement algorithms – The second-chance Page replacement algorithms- The Clock Page replacement algorithms- LRU Page replacement algorithms- Simulating LRU in software- The working set Page replacement algorithms- The WSClock Page replacement algorithms.

UNIT–IV: File systems: File naming - File structure - File types - File access - File attributes - File operations- Directories: Single-level directory systems- Hierarchical directory systems- Path names- Directory operations- File system management and optimization: Disk space management- File system backups- File system consistency- File system performance - Defragmenting disks.

UNIT–V: LINUX: Overview of Linux- Linux goals – Interfaces to Linux – The Shell – Linux Utility Programs – Kernel Structure – Processes in Linux – Fundamentals concepts – Process Management system calls – Scheduling in Linux - Memory management in Linux – Memory Management Fundamentals – Memory management system calls -– Input/ Output in Linux – I/O Fundamentals – Networking – I/O system calls - The Linux File System – File system Fundamentals – File system calls.

TEXT BOOK
1. Andrew S.Tanenbaum, "Modern Operating Systems", PHI/Eastern Economy Edition, Third Edition, 2015.

REFERENCE BOOKS
1. William Stallings, "Operating Systems", Prentice Hall of India, Second Edition, 2000.
2. Maurice J. Bach, "The Design of the Unix Operating System", Prentice Hall of India, 2002.

Year	Subject Title	Sem	Sub. Code

2018-19 Onwards	**OBJECT ORIENTED ANALYSIS AND DESIGN**	II	18MIT13C

Objectives:
- Learn the basics of Object Oriented Analysis and Design
- Learn the UML design and Diagrams and be exposed to the various testing techniques
- Design and Implement projects using OO concepts

UNIT-I: Object Basics -Objects-Attributes-Class Hierarchy-Polymorphism-Object relationships and associations-Aggregations and object containment – Object-Oriented systems Development life cycle-The software development process-Building high-quality software- OOSD: A Use-case driven approach-Reusability.

UNIT-II: Object-Oriented Methodologies- Rumbaugh Object modeling technique-The Booch methodology-The Jacobson methodologies- The Unified Approach- UML- Class Diagrams- Dynamic Modeling.

UNIT-III: Object-Oriented Analysis process – Use-case Model-Object Analysis: Classification- Noun Phrase approach – Classes, responsibilities and collaborators - Associations-Super-Sub class relationships-Aggregation.

UNIT-IV: Object-Oriented Design Axioms- Design Patterns- Designing classes- Class visibility-Refining attributes-designing methods and protocols- Access layer: DBMS- OODBMS.

UNIT-V: Software Quality Assurance-Quality Assurance Tests-Testing strategies-Test Plan-Usability Testing-User Satisfaction Test.

TEXT BOOK
1. Ali Bahrami, "Object Oriented Systems Development", TATA McGraw-Hill Edition, 2008.

REFERENCE BOOKS
1. Booch G., "Object oriented analysis and design", Addison-Wesley Publishing Company,2007.
2. Rambaugh J, Blaha.M. Premeriani, W., Eddy F and LoresenW."Object Oriented   Modeling and Design", PHI 2005.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**PYTHON PROGRAMMING**	**I**	**18MIT14C**

Objectives
- To study and write simple Python programs with conditionals and loops
- To Use functions for structuring Python programs
- Represent compound data using Python lists, tuples and dictionaries

UNIT-I: Introduction to Python: Python Overview-Getting Started with Python-Python Identifiers-Reserved Keywords-Variables-Standard Data Types-Operators- Statement and Expression-String Operations-Boolean Expressions-Control Statements-Iteration-while Statement-Input.

UNIT-II: Functions: Introduction-Built-in Functions-Composition of Functions-User Defined Functions-Parameters and Arguments-Function Calls- The Return Statement-Python Recursive Function-The Anonymous Functions-Writing Python Scripts.

UNIT-III: Strings: Strings-Compound data types- len function- String Slices-Strings are Immutable-String Traversal-Escape Characters-String formatting operators and functions. Lists: Values and accessing elements-lists are mutable-Traversing and deleting elements –Built-in operators and methods.

UNIT-IV: Tuples: Creating tuples-accessing values-tuple assignment-tuples as return values- variable length argument tuples-basic tuple operations-built-in tuple functions. Dictionaries: Creating and accessing values in a dictionary - updating and deleting elements -operations and built-in dictionary methods. Files: Opening and Closing a file-Reading and Writing a file.

UNIT-V: Classes and Objects: Overview of OOPs-Class Definition-Creating Objects-Objects as Arguments-Objects as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data Hiding.

TEXT BOOK
1. E.Balagurusamy, "Introduction to Computing and Problem Solving Using Python", McGraw Hill Education Private Limited, 1st Edition, New Delhi.

REFERENCE BOOKS
1. Martin C. Brown, "PYTHON: The Complete Reference", McGraw-Hill, 2001.
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition,
Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python/).
3. Mark Summerfield. "Programming in Python 3: A Complete introduction to the Python Language",
Addison-Wesley Professional, 2009.

Year	Subject Title	Sem	Sub. Code

2018-19 Onwards	JAVA PROGRAMMING LAB	I	18MIT15P

LIST OF PROGRAMS

1. Write a java program to create a class, objects using constructor.

2. Write a java program to implement inheritance.

3. Write a java program to illustrate run time exception and I/O exception.

4. Write a java program to create a package.

5. Create an Employee package to maintain the information about the employee. Use the Constructors to initialize the Employee number and use Overloading method to get the Basic pay of the employee, by using package create a java program.

6. Write a java program to implement multithreading.

7. Write a java program to create GUI components.

8. Write a java program to draw images and animate them.

9. Write a java program that connects to a database using JDBC and performs addition, deletion, modification and retrieval operation.

10. Write a java program to design a web page using applet and HTML.

11. Write a java Script to perform all arithmetic operations.

12. Write a java Script to search and element in an array.

Year	Subject Title	Sem	Sub. Code

2018-19 Onwards	PYTHON PROGRAMMING LAB	I	18MIT16P

LIST OF PROGRAMS

1. Write a Python program to check if the input year is a leap year or not.

2. Write a Python program to print Fibonacci sequences.

3. Write a Python program to find the biggest number among the given numbers.

4. Write a Python program to Create functions, classes and objects using python. Demonstrate exception handling and Inheritance.

5. Write a Python program using recursion to find out sum of several natural numbers.

6. Write Python Programming Code to Make Calculator.

7. Write a Python program that can encode and decode Caesar ciphers.

8. Write a Python program to demonstrate Linear search.

9. Write a Python function that takes two lists and returns True if they have at least one common member.

10. Write a Python program to sum all the items in a dictionary.

11. Write a Python program to multiply two Matrices using Array.

12. Write a Python program to create a file and count number of lines, words and characters in a file.

13. Creating GUI with python containing widgets such as labels, textbox, radio, checkboxes and custom dialog boxes.

14. Simulate a Square using Python Turtle.

15. Simulate a multicolor flower using Python Turtle.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	C# PROGRAMMING	II	18MIT21C

Objectives:
- Understanding OOAD concepts and build C# applications
- Developing console based applications using C#
- Developing windows applications using C#
- Understanding Web based application using C#

UNIT-I: Introduction to C#: Evolution of C# - Characteristics of C# - How does C# differ from C++ and Java - Literals - Variables - Data types - Boxing and Unboxing - Operators and Expressions-Arithmetic - Relational – Logical – Assignment – Increment and Decrement – Conditional – Bitwise and special operators - Type conversions - Mathematical functions - Decision making and branching : Decision making with if statement-Simple if statement-The if… else statement –Nesting of if…else statements-else…if Ladder- Switch statement- ?: Operator – Looping: While statement – do statement – for statement – for each statement – jumps in loops.

UNIT-II: Object Oriented Programming In C#: Methods- Declaring Methods – Main Methods – Invoking Methods – Nesting of Methods – Method Parameters – Pass by value – Pass by Reference – Output Parameters - Handling Arrays in C# : One-dimensional arrays – Creating an arrays – Two-dimensional arrays – Variable size arrays – System.Array class - Manipulating strings: Creating strings – String methods – Inserting string – Comparing strings – Finding substrings – Mutable strings- Arrays of strings -Structures and enumerations: Structures – Structs with methods – Nested Structs – Enumerations – Initialization – Base type – Enumerator type conversion.

UNIT-III: Classes and objects: Basic principles of OOP – Defining a class – Adding variables – Adding Methods – Member access modifiers – Creating objects – Accessing class members – Constructors – Overloaded constructors – Static members – Static constructors – Private constructors – copy constructors – Destructors - Advanced Features of C: #: Inheritance: Classical Inheritance – Containment Inheritance – Defining a subclass – Visibility control – Defining sub-class constructors – Multilevel inheritance – Hierarchical inheritance – Overriding methods – Hiding methods - Abstract classes- Abstract methods – Sealed classes : Preventing inheritance – Sealed Methods – Polymorphism.

UNIT-IV: Interfaces: Defining an interface – Extending an interface – Implementing interface – Interfaces and inheritance - Operator overloading: Overloadable operators – Need for operator overloading – Defining operator overloading – Overloading unary operators – Overloading binary operators – Overloading comparison operators - Delegates and events : Delegates-Delegate declaration-Delegate methods-Delegate instantiation-delegate invocation-using delegates-multicast delegates-events.

UNIT-V: Managing Errors and Exceptions: Debugging – Types of errors - Exceptions-Syntax of exception-Handling code -Multiple catch statements -Exception hierarchy-General catch handler- Using finally statement- Nested try blocks- Throwing our own exceptions- Checked and unchecked operators-Using exceptions for debugging - Window forms and Web-Based Application on .NET: Creating window Forms - Customizing a form - Overview of design patterns-Web-based application on .NET.

TEXT BOOK

1. E. Balagurusamy, "Programming in C# A Primer", Fourth Edition, McGraw Hill Education Private Limited, 2016.

REFERENCE BOOKS

1. Stanley B.Lippman, "C# Primer A Practical Approach", Pearson Education, 2002.
2. Tom archer, "Inside C#", Microsoft Press, 2001.
3. "Microsoft C# Language Specification", Microsoft Press, 2001.
4. Ian Griffiths, Matthew Adams and Jesse Liberty, "Programming C# 4.0,' O'Reilly Sixth Edition.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**DATA ANALYTICS AND R PROGRAMMING**	**II**	**18MIT22C**

Objectives: On successful completion of course, the students should have learnt the concept of Data Mining Techniques, R tool and Data analytics.

UNIT-I: Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives –Association rule mining: Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining various kinds of association rules.

UNIT-II: Classification and Clustering: Classification and Prediction - Basic Concepts- Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation Cluster Analysis - Types of Data – Categorization of Major Clustering Methods–K-means-Partitioning Methods – Hierarchical Methods – Clustering High Dimensional Data- Constraint Based Cluster Analysis – Outlier Analysis – Data Mining Applications.

UNIT-III: Big Data Analytics: Introduction to the Big Data Era – Description of Big Data – Industry Examples of Big Data – Descriptive power and predictive Pattern Matching – The Value of Data – Big Data Analytics – Architectures, Frameworks, and Tools – Big Data Analytics Methodology – Challenges – Big Data Analytics in Healthcare.

UNIT-IV: Getting Started with R- R Nuts and Bolts - Getting Data in and Out of R - Using Textual and Binary Formats for Storing Data- Interfaces to the Outside World- Subsetting R Objects - Vectorized Operations - Managing Data Frames with the dplyr package.

UNIT-V: Control Structures -Functions- Scoping Rules of R - Loop Functions- Debugging Tool in R- Profiling R Code- Simulation.

TEXT BOOKS
1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second
Edition, Elsevier, 2007. (Unit I and II)
2. Stephan Kudyba Foreword by Thomas H.Davenport, "Big Data, Mining, and Analytics", CRC Press, 2015. (Unit III)
3. Roger D. Peng, "R Programming for Data Science" Lean Publishing, 2014. (Unit IV & V)

REFERENCE BOOKS
1. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data mining Theory and
Practice", Easter Economy Edition, Prentice Hall of India, 2006.
2. G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy
Edition, Prentice Hall of India, 2006.
3. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, "A Beginner's Guide to R", Springer, 2009.
4. Graham Williams, "Data Mining with Rattle and R", Springer Science, 2011.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	NETWORK SECURITY	II	18MIT23C

Objectives:
On successful completion of this course the students should have learnt the concept of Security Trends, Security Algorithms, Authentication Function, Electronic Mail Security and System Security.

UNIT-I: Introduction: Security Trends - Security Attacks - Security Services - Security Mechanisms - A Model for Network Security. Classical Encryption Techniques: Symmetric Cipher Model - Substitution Techniques - Transposition Techniques - Steganography. Block Ciphers and the Data Encryption Standard: Block Cipher Principles - The Data Encryption Standard - the Strength of DES - Block Cipher Design Principles.

UNIT- II: Advanced Encryption Standard: Evaluation Criteria for AES - The AES Cipher. Public-key Cryptography and RSA: Principles of Public-Key Cryptosystems - The RSA Algorithm. Key Management - Diffie-Hellman Key Exchange - Elliptic Curve Arithmetic - Elliptic Curve Cryptography

UNIT-III: Message Authentication and Hash Functions: Authentication Requirements - Authentication Functions - Message Authentication Codes - Hash Functions - Security of Hash Functions and MACs. Hash and MAC Algorithms: Secure Hash Algorithm. Digital Signatures and Authentication Protocols: Digital Signatures - Authentication Protocols - Digital Signature Standard. Authentication Applications: Kerberos -X.509 Authentication Service - Public-key infrastructure.

UNIT-IV: Electronic Mail Security: Pretty Good Privacy - S/MIME. IP Security: IP Security overview -IP Security Architecture - Authentication Header - Encapsulation Security Payload. Web Security: Web Security Considerations - Secure Socket Layer and Transport Layer Security - Secure Electronic Transaction.

UNIT-V: System Security: Intruders - Intrusion Detection - Password Management. Malicious Software: Viruses and Related Threats - Virus Countermeasures. Firewalls: Firewall Design Principles - Trusted Systems - Common Criteria for Information Technology Security Evaluation.

TEXT BOOK
1. William Stallings, "Cryptography and Network Security Principles and Practices",   4th Edition, PHI/Pearson Education.

REFERENCE BOOKS
1. Bruce Schneir, "Applied Cryptography", CRC Press.
2. A.Menezes, P Van Oorschot and S.Vanstone, "Hand Book of Applied Cryptography",CRC Press,1997.
3. Ankit Fadia, "Network Security", MacMillan, 2nd Edition.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**SOFT COMPUTING**	**II**	**18MIT24C**

Objectives:
- To expose the students to the concepts of various architecture of neural networks
- To provide adequate knowledge about fuzzy and neuro-fuzzy systems
- To provide comprehensive knowledge of fuzzy logic control to real time systems

UNIT-I: Fundamentals of Neural Networks: Basic concepts of Neural Networks –Human Brain – Model of an Artificial Neuron – Neural Network Architectures – Characteristics of Neural Networks – Learning methods - Easy Neural Network Architectures – Some Application domains.

UNIT-II: Back propagation Networks: Architecture of a Back-Propagation Network – Back propagation Learning- Effect of Tuning parameters of the Back Propagation Neural Network – Selection of various parameters in BPN.

UNIT-III: Adaptive Resonance Theory: Introduction: Cluster Structure, Vector Quantization, Classical ART Networks, Simplified ART Architecture. ART1: Architecture of ART1–Special features of ART1 Models-ART1 Algorithms. ART2: Architecture of ART2– ART2 Algorithms.

UNIT-IV: Fuzzy Set Theory: Fuzzy versus crisp, Crisp sets: Operation on Crisp sets- Properties of Crisp Sets-Partition and Covering. Fuzzy sets: Membership Function – Basic fuzzy set Operations-properties of fuzzy sets. Crisp relations: Cartesian product-Other Crisp Relations-Operations on Relations. Fuzzy relations: Fuzzy Cartesian product- Operations on Fuzzy Relations.

UNIT-V: Fuzzy Systems: Crisp logic: Laws of Propositional Logic-Inference in propositional Logic. Predicate logic: Interpretations of Predicate Logic Formula – Inference in Predicate Logic. Fuzzy logic: Fuzzy Quantifiers – Fuzzy Inference, Fuzzy rule based system – Defuzzification.

TEXT BOOK
1. S.Rajasekaran & G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy logic, and Genetic Algorithms Synthesis and Applications, PHI, 2005.

REFERENCE BOOKS
1. James A. Freeman, David M.Skapura, "Neural Networks-Algorithms, Applications, and Programming Techniques", Pearson Education.
2. Fredric M. Ham, Ivica Kostanic, "Principles of Neuro computing for science of Engineering", TMCH.

Year	Subject Title	Sem	Sub. Code

2018-19 Onwards	C# PROGRAMMING LAB	II	18MIT26P

LIST OF PROGRAMS

1. Write a C# program to generate Fibonacci series and Prime numbers
2. Write a C# program to find sum of N odd numbers and find sum of sin series.
3. Write a C# program to find the area of square, triangle, and rectangle.
4. Write a C# program for Calculation of nCr and nPr values.
5. Write a C# program to find the area and circumference of circle.
6. Write a C# program for conversion of dollar to rupee, rupee to dollar.
7. Write a C# program for Student details using inheritance.
8. Write a C# program for Sales bill preparation using interface.
9. Write a C# program for Student Mark statement preparation.
10. Write a C# program for Display clock time using delegates and events.
11. Write a C# program for Arithmetic operations.
12. Write a C# program for Passing values from one form to another form.
13. Write a C# program for Calculator.
14. Write a C# program to Insert record using data grid view.
15. Write a C# program to Create user login form.
16. Write a C# program for matrix multiplication and addition of two matrices.
17. Write a C# program for reverse the string and Concatenate two strings.
18. Write a C# program for sort the given numbers in ascending order.
19. Write a C# program for sum of the given digits and print the multiplication table.

Year	Subject Title	Sem	Sub. Code

2018-19 Onwards	R PROGRAMMING LAB	II	18MIT27P

LIST OF PROGRAMS

1. Write a R program to implement Apriori algorithm to extract association rule of data mining.
2. Write a R program to Implement Classification using decision tree.
3. Write a R program to Implement k-means clustering technique.
4. Write a R program to Implement any one Hierarchal Clustering.
5. Write a R program to Implement any one Partitioning around Medoid (PAM) Clustering.
6. Write a R program to Implement Classification algorithm.
7. Write a R program to Visualize the data using histogram.
8. Write a R program to Visualize the data using Box plot.
9. Write a R program to Visualize the data using Scatter plot.
10. Write a R program to Implement preprocessing concept.

Reference material:
- Data set available at: http://www.rdatamining.com/data.

- R Data Mining package and project: http://www.rdatamining.com/package

- Program examples: https://www.programiz.com/r-programming/examples

- Graham Williams, "Data Mining with Rattle and R",Springer Science, 2011.

- https://mineriaddatos.wikispaces.com/file/view/Data+Mining+With+Rattle+and+R_+The+Art

  +of+Excavating+Data+for+Knowledge+Discovery+-+Graham+Williams.pdf

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**DIGITAL IMAGE PROCESSING**	**III**	**18MIT31C**

Objectives:

The students should be

- Able to learn digital image processing fundamentals and Exposed to simple image processing techniques
- Familiar with image compression and segmentation techniques
- Apply the above techniques practically using MATLAB tool

UNIT-I: Introduction:- Digital Image-Digital Image Processing-Origins of Digital Image Processing-Applications of Digital Image Processing-Basic steps in Digital Image Processing. Digital Image Fundamentals: Light and the Electromagnetic Spectrum-Image sensing and acquisition-Image sampling and quantization-Basic relationships between pixels-Linear and non-linear operations.

UNIT-II: Image Enhancement (Spatial domain): - Introduction-Basic Gray Level Transformations-Histogram Processing-Arithmetic/Logic Operations-Basics of spatial filtering-Smoothing-Sharpening. Image restoration (Spatial domain): Model of the Image degradation/Restoration Process-Noise Models-Noise reduction filters-Mean Filters-Order statistics filters-Adaptive filters.

UNIT-III: Image Compression: Fundamentals – Some basic compression methods – Huffman coding – Arithmetic coding – LZW coding - Bit-Plane coding – Run-Length coding. Image Segmentation: Fundamentals – Point, Line, and Edge Detection.

UNIT-IV: Introduction to MATLAB: -Programming Environment-Basic Commands-Characters-Strings-Operators-Conditional statements-Loop Statements-Built-in functions-User defined functions-Input/output functions-Matrix Manipulations-Plots-Subplots-Figures-m-files-Example programs.

UNIT-V: Image Processing Tools:- Image file read/Write-Image display commands-Create image, image show, image tool, Sub image, Color bar-Image arithmetic-add, subtract, divide, multiply, complement-Spatial transformations-image rotation, image resize, cropping-Image statistics-mean, variance, standard deviation, histogram, pixel values-Image enhancement-normalized histogram-adjusting image intensity, adding/removing noise, median and order statistic filtering-contrast stretching-Linear filtering.

TEXT BOOKS

1. Gonzalez R C., and Woods R.E., "Digital Image Processing", Prentice Hall, Third Edition.
2. Prathap R, "Getting started with MATLAB 7: A Quick introduction for Scientists and Engineers", Oxford University Press, 2005.

REFERENCE BOOKS

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Thomson Publishers, Second Edition.
2. R.C. Gonzalez, R.E. Woods and L. Eddins, "Digital Image Processing using MATLAB", Prentice Hall, Second Edition, India.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**SOFTWARE TESTING**	**III**	**18MIT32C**

Objectives:
- To employ correct testing terminology throughout the testing process.
- To execute specific software tests with well-defined objectives and targets by applying various testing techniques
- To execute program and test evaluations

UNIT-I: Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance and Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing.

UNIT-II: Black-Box Testing: What is Black-Box Testing - Why Black-Box Testing– When to do Black-Box Testing – How to do Black-Box Testing-Integration Testing: Integration Testing as a Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

UNIT-III: System and Acceptance Testing: System Testing Overview – Why is System Testing done – Functional versus Non-functional Testing – Functional system Testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT-IV: Performance Testing: Factors Governing Performance Testing – Methodology for Performance Testing – Tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing– Best Practices in Regression Testing.
.
UNIT-V: Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

TEXTBOOK
1. Srinivasan Desikan & Gopalswamy Ramesh, "Software Testing Principles and Practices", Pearson Education, 2006.

REFERENCE BOOKS
1.William E.Perry, "Effective Methods of Software Testing", 3rd Edition, Wiley India.
2. RenuRajani, Pradeep Oak,"Software Testing",2007, TMH.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**OPEN SOURCE TOOLS**	III	**18MIT33C**

Objectives:
- Students can understand Open source.
- Learn programming like Ruby on rail, PERL, PHP, and OS linux and database MySQL.
- Develop their own open source software using these tools.

UNIT-I: Introduction to OSS :Introduction - Need for Open Source Applications - Advantages of Free Open Source Software - Disadvantages of Free Open Source Software - History - Meaning and Extraction of the Terms Free Software and Open Source Software - Free Software Foundation and Open Source Initiative Presentation- Free Software and Open Source Software Licenses Comparison - Licensing - Familiar Licenses - Free and Open Source Software (Game Theory) - Security and Reliability - Economical Aspects and Adoption - Applications of Open Source Software – Open source grid computing : Open Grid Service Architecture – OGSI – Security Issues – Globus Toolkit – Open source cloud: Introduction-FOSS cloud software environment.

UNIT-II: Open Source OS Linux: Linux Basics: Introduction - Kernel/User Mode – Process – Advanced Concept-Scheduling – Personalities- Cloning - Signals - Development with Linux - OSS Installation. Linux shell Commands – Vi Editor - Shell programming: Shell Syntax - Variables – conditions – control structures – functions – commands – command execution.

UNIT-III: PHP: Introduction – Identifier -Variables - Constants – Data types – Operators - Statements – loops. Advanced PHP –Arrays – Get and Post – Object oriented concepts – Strings –File handling and data storage. MySQL Databases – Setting –Starting, terminating and writing own SQL programs – record selection technology, strings functions, date and time –starting query – generating summary – working with metadata – using sequences – PHP and MySQL databases.

UNIT-IV: PERL: Introduction – advantages –working environment of Perl – variables – strings – statements –subroutines – files –packages and modules – Object-Oriented PERL.

UNIT-V: Ruby on Rails: Welcome to Ruby –Conditions, methods, loops and blocks - classes and objects. Welcome to rails: Connecting to databases – working with databases.

TEXT BOOKS
1. M.N. Rao, "Fundamentals of open source software", PHI Learning Private Limited, 2015.
2. Neil Matthew and Richard Stones, "Beginning Linux Programming", 4th Edition, WROX, 2011.
3. Steven Holzner, "Beginning ruby on rails", Wiley publishing, Inc, 2007.

REFERENCE BOOKS
1. Chris DiBona, Danese Cooper and Mark stone O Reilly,"Open Sources 2.0 – The Continuing Evolution", First Edition, 2005.
2. Elliot White III, Jonathan.D.Eisenhamer, "PHP 5 in practice" pearson Education,2007.
3. Paul Du Bois,O Reilly Publishers,"My SQL- Cookbook",Second Edition,2010.
4. Larry Wall, Tom Christiansen, Jon Orwart- O Reilly, "Programming PERL",3rd Edition, 2010.
5.Yashavant P. Kanetkar," Unix Shell Programming", BPB publications, 2003.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**CLOUD COMPUTING**	**III**	**18MIT34C**

Objectives:
- To know how the data is stored in the cloud and the various services offered by the cloud.
- To develop the skills in Web Application Development using cloud technologies.

UNIT-I: Introduction – Essentials – Benefits – Why cloud – Business and IT perspective – cloud and virtualization – cloud service requirements – dynamic cloud infrastructure – cloud computing characteristics – cloud adoption – cloud rudiments. Cloud deployment models: introduction – cloud characteristics – measured service accounting – cloud deployment models – security in a public cloud – public versus private clouds – cloud infrastructure self-service.

UNIT-II: Cloud as a service: introduction – gamut of cloud solutions – principal technologies- cloud strategy – cloud design and implementation using SOA – conceptual cloud model – cloud service defined. Cloud solutions: introduction – cloud ecosystem – cloud business process management – cloud service management – on premise cloud orchestration and provisioning engine – computing on demand.

UNIT-III: Cloud offerings: Introduction – introduction storage, retrieval archive and protection-cloud analytics – testing under cloud – information security – virtual desktop infrastructure-storage cloud. Cloud Management: Introduction – resiliency – provisioning – asset management-cloud governance – high availability and disaster recovery – charging models – usage reporting, and metering. Cloud Virtualization Technology: Introduction – virtualization demand – virtualization benefits – server virtualization – virtualization for x86 architecture – hypervisor management software – virtual infrastructure requirements.

UNIT-IV: Cloud Infrastructure: Introduction – storage virtualization – storage area networks-network-attached storage – cloud server virtualization – networking essential to the cloud. Cloud and SOA: Introduction – SOA Journey to Infrastructure – SOA and the cloud – SOA Defined – SOA and infrastructure as a service – SOA based cloud infrastructure steps – SOA Business and IT services.

UNIT-V: Cloud Mobility: Introduction – the business problem – mobile enterprise application platforms – mobile application architecture overview. Cloud Governance: Introduction – service level agreement and compliance – data privacy and protection risks – enterprise governance – risk management – third party management – information management.

TEXT BOOK
1. Dr. Kumar Saurabh "Cloud Computing-Unleashing Next Gen Infrastructure to Application", 3rd Edition, Wiley India Pvt Ltd, 2014.

REFERENCE BOOKS
1. RajkumarBuyya, James Broberg, Andrzej Goscinski , "Cloud computing principles and paradigms", Wiley India, 2014.
2. Michael Miller, "Cloud computing web based application that change the way you work & collaborate online", Pearson Education, 2013.
3. Kris Jamsa, "Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	OPEN SOURCE TOOLS LAB	III	18MIT36P

LIST OF PROGRAMS

PHP

1. Write a PHP program to display date and time using AJAX
2. Write a PHP program to check user login
3. Write a PHP program to create a college website
4. Write a PHP program for cookies and session scripts
5. Write a PHP program to perform file read, write, open and append operation
6. Write a PHP program to create a library information using inheritance
7. Write a PHP program for online examination
8. Write a PHP program to send the mail using mail concept
9. Write a PHP program for super market
10. Write a PHP program for on line recharging

LINUX Shell Programming

1.Write a Shell Script with menu driven to check if the input string or the given number is a palindrome or not.

2.Write a Shell Script which displays:

i.) List of all files in the current directory to which you have read, write and execute permissions.

ii).Receive any number of file names as arguments and whether the argument supplied is a file or directory. If it is a directory it should appropriately reported. If it is a file name then name of the file as well as the number of lines present in it should be reported.

3.Write a Shell Script to accept a number in the command line and display the sum of the digits of that number and the sum   up to that number

4.Write a Shell Script with Menu Driven for computing factorial value of a given number and generating Fibonacci series of the given number of terms using recursive functions

5.Write a Shell Script with Menu Driven for File manipulation which includes   1) Creating a file 2) Editing a file 3) Removing a file/directory 4) Copying a file 5) Appending contents of files

6. Displaying content of a file and 7) Translating   contents of a file either lowercase or uppercase.

7.Write a Shell Script to sort the given N numbers and print the biggest and   smallest numbers and their corresponding positions.

8.Write a shell program to perform case conversion.

9. Write a shell program to find the grade of the student from his mark statement.

10. Write a shell script to check the status of file using test command.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**DIGITAL IMAGE PROCESSING LAB**	**III**	**18MIT37P**

LIST OF PROGRAMS

1. Write a program to read an image and display.

2. Write a program to perform image quantization.

3. Write a program to perform basic gray level transformations.

4. Write a program to calculate the histogram of an image and display the histogram plot.

5. Write a program to adjust the intensity of an image.

6. Write a program to implement the smoothing and sharpening spatial filter.

7. Write a program to add and remove the noise in image.

8. Write a program to implement the Mean filter and order statistics filter for noise reduction.

9. Write a program to implement the Adaptive filters for noise reduction.

10. Write a program to perform color complement transformation.

11. Write a program to perform color slicing transformation.

12. Write a program to separate RGB components and represent the three individual components

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	ELECTIVE-I: ARTIFICIAL INTELLIGENCE & ROBOTICS	II	18MIT25E

Objectives:
- To understand the concept of AI like Heuristic, Hill Climbing, Planning, etc.,
- To gain knowledge about Robotics and their Applications.

UNIT-I: The AI Problems: AI technique – Criteria for success – Define the Problem as a state space search – Production System – Characteristics – Problem Characteristics.

UNIT-II: Heuristic Search Techniques: Generate and Test – Hill climbing –Best First Search – Problem Reduction – Constraints Satisfactions – Means End Analysis.

UNIT-III: Knowledge Representation Issues: Approaches to knowledge Representation – The Frame Problem – Computable Functions & Predicates – Resolution – Procedural versus Declarative Knowledge.

UNIT-IV: Fundamentals of Robotics: Introduction, classification of Robots, History of Robots, Advantages and Disadvantages of Robot, Robot components, Robot degree of freedom, Robot joints and coordinates, Robot workspace, Robot reach, Robot languages.

UNIT-V-: Sensors: Introduction to internal and external sensors of the Robot, Position sensors, Velocity sensors, Acceleration sensors, SONAR and IR sensors, Touch and tactile sensors. Applications of Robots: Applications of robots, selection of robots, economic factors and justification for Robotic application; safety requirements.

TEXT BOOKS
1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, Second Edition.
2. Craig J J, "Introduction to Robotics, Mechanics and Control", Pearson Education, New Delhi, 2004.

REFERENCE BOOKS
1. Saeed B Niku, "Introduction to Robotics", Pearson Education, New Delhi 2003.
2. George F Luger, "Artificial Intelligence", Pearson Edition Publication, 4th Edition, 2002.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ELECTIVE-I: GRID COMPUTING**	**II**	**18MIT25E**

Objectives:
- To enable the students to learn the concepts of the Open Grid Service Architecture of all the web services
- To learn the Resource Management and Data Management Services

UNIT-I: Introduction to Grid computing: Early Grid activities – Current Grid activities – Grid Business Areas – Grid applications – Grid computing organizations and their roles.

UNIT-II: The grid computing anatomy: the grid problem - Grid Architecture-Virtual organizations – grid computing roadmap. Service oriented architecture - Web service architecture - XML messages and enveloping - Service message description mechanisms - relationship between web service and grid service.

UNIT-III: Open grid services architecture (OGSA) - OGSI – OGSA use cases: Commercial Data Center (CDC), National Fusion Collaborator (NFS), online media and entertainment – OGSA platform components.

UNIT-IV: OGSA basic services: Common Management Model (CMM) - Service Domains - Policy Architecture – security architecture- Meeting and Accounting – Common distributed logging - Distributed areas access and replication.

UNIT-V: Resource management on the grid - Grid resource management systems - work management layers of grid computing Globus gt3 toolkit: gt3 software architecture model - Resource Allocation-Resource management services – Data management services.

TEXT BOOK
1. Josh Joseph, Craig fellenstein, "GRID COMPUTING", IBM press, Pearson Education Indian Reprint, 2005.

REFERENCE BOOKS
1. Ian foster, Carl kesselman, Morgan Kaufmann, "The grid2: blue print for a new computing infrastructure", II Edition.
2. Frederic Magoules, "Fundamentals of Grid Computing: Theory, Algorithms and Technologies", CRC Press, 2009.
3. Christophe Cerin, Gilles Fedak, "Desktop Grid Computing", CRC Press, 2012.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	ELECTIVE-I: PARALLEL PROCESSING	II	18MIT25E

Objectives:
- To understood the concepts and principles of parallel processing
- To study about Multiprocessor Architecture

UNIT-I: Evolution of Computer Systems – Parallelism in Uniprocessor Systems – Parallel Computer Structures – Parallel Processing Applications.

UNIT-II: Hierarchical Memory Structure – Virtual Memory System – Memory allocation and management – Cache memories and management – Input-Output subsystems.

UNIT-III: Pipelining: An Overlapped Parallelism – Instruction and arithmetic pipelines – Principles of designing pipelined processors – Vector processing requirements.

UNIT-IV: SIMD array processors – SMID interconnection networks – Parallel algorithms for array processors – Associative array processing.

UNIT-V: Functional Structures – Interconnection networks – Parallel memory organizations – Multiprocessor operating systems – Parallel algorithms for multiprocessors.

TEXT BOOK
1. Kai Hwang & Faye A. Briggs, "Computer Architecture and Parallel Processing", McGraw Hill International Editions, Computer science series.

REFERENCE BOOKS
1. Bharat Bhushan Agarwal and Sumit Prakash Tayal, "Computer Architecture and Parallel Processing" Kindle Edition.
2. Rajaraman V, "Parallel Computers – Architecture and Programming".

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	ELECTIVE-II: INTERNET OF THINGS	III	18MIT35E

Objectives:
- To know about Internet technologies and Internet of things standardization
- To learn about the applications of Internet of Things
- To know about the security procedures in Internet of Things
- To learn about the functional architecture of Internet of Things

UNIT-I: Internet of Things: An Overview: Conceptual Framework - Architectural View - Sources - M2M Communication. Design Principles of Connected Devices: IoT/M2M Systems Layers and Design Standardisation - Communication Technologies - Data Enrichment, Data Consolidation and Device Management- Ease of Designing and Affordability.

UNIT-II: Design Principles for Web Connectivity: Web Communication Protocols for Connected Devices– Message Communication Protocols for Connected Devices- Web Connectivity for Connected-Devices Network using Gateway, SOAP, REST, HTTP RESTful and Web Sockets. Internet Connectivity Principles: Internet Connectivity- Internet based Communication -IP Addressing in the IoT - Media Access Control – Application layer protocols: HTTP, HTTPS and FTP.

UNIT-III: Data Acquiring, Organising, Processing and Analytics: Data Acquiring and Storage – Organising the Data – Transactions, Business Processes, Integration and Enterprise Systems – Analytics – Knowledge Acquiring, Managing and Storing Processes. Data Collection, Storage and Computing using Cloud Platform: Cloud Computing Paradigm – Everything as a Service and Cloud Service Models – IoT Cloud based Services.

UNIT-IV: Sensors, Participatory Sensing, RFIDs and WSN: Sensor Technology – Participatory Sensing, Industrial and Automotive IoT – Sensor Data Communication Protocols - RFID and WSN Technology. Prototyping the Embedded Devices for IoT and M2M: Embedded computing basics-Platforms for Prototyping – Things always connected in to the Internet/Cloud.

UNIT-V: IoT Privacy, Security and Vulnerabilities Solutions: Vulnerabilities, Security Requirements and Threat Analysis – IoT Security Tomography and Layered Attacker Model – Security Models, Profiles and Protocols for IoT. Business Models and Processes using IoT:Business Models and Business Model Innovation – Value Creation – Business Model Scenarios for IoT.

TEXT BOOK
1. Raj Kamal, "Internet of Things-Architecture and Design Principles", Tata McGraw Hill Publications, 1st Edition.

REFERENCE BOOKS
1. ArshdeepBahga, Vijay Madisetti, "Internet of Things-A Hands-on Approach", University Press, 2015.
2. Michael Miller, "The Internet of Things", Pearson Education, 2015.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ELECTIVE-II: TCP / IP**	**III**	**18MIT35E**

Objectives:
- Introduce the student to advanced networking concepts
- Analyze and differentiate networking protocols used in TCP/IP protocol suite

UNIT-I: A Brief History: Arpanet – (TCP/IP) – Milnet – Csnet – Nsfnet – Ansnet – Protocols and Standards – Standards Organisations – TCP/IP Protocol Suite – Addressing – Connection Devices. Introduction – Classful addressing – Subnetting – Supernetting – Classless addressing.

UNIT-II: ARP & RARP – ARP over ATM – Proxy ARP. ARP Package – RARP – Internet Protocol (IP) – Datagram – Fragmentation – options – Checksum: IP Package. Internet Control Messang Protocol (ICMP) – Types of Message – Message format – error Reporting – Query – Checksum – ICMP Package.

UNIT-III: Group Management – IGMP Message: IGMP operation – Process to Process Communication – UDP Operation – TCP services – Flow control – Multicast Routing: Multicast routing protocols. Bootp& DHCP – Booth – UDP Ports – using TFTP – Dynamic host Configuration Protocols (DHCP) – Domain Name system (DNS) – Name Space – Domain Name Space – distribution of Name space – DNS in the Internet – Resolution – DNS Message – Types of records.

UNIT-IV: File Transfer Protocol (FTP): Connections – Communication Command Processing – file Transfer – User interface – Anonymous FTP. Simple Mail Transfer Protocol (SMTP): User Agent (UA) – Addresses – delayed Delivery – Aliases – Mail transfer agent (MTA) – Commands and Responses – Mail Transfer Phases – Multipurpose Internet Mail Extensions (MIME) – Mail Delivery – Mail Access Protocols.

UNIT-V: Simple Network Management Protocols: (SNMP) – Concept – Management Components – SMI – MIB – SNMP – Messages – UDP Ports – Security. IP over ATM: ATM Wans – Carrying Datagram in cells – Routing the cells – Atmarp – Logical IP Subnet (LIS). Mobile IP: Addressing – Agents – Three Pahses – Agent Discovery – Registration – Data Transfer – Inefficiency in Mobile IP – Virtual Private Networks (VPN).

TEXT BOOK
1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata Mcgraw-Hill Publishing Company, Second edition.

REFERENCE BOOKS
1. W. Richard Stevens, "TCP/IP Illustrated: The Protocols", Vol.1, Pearson Education.
2. Comer, "Internetworking with TCP/IP: Principles, Protocols & Architecture", Vol.1, Fourth Edition, Pearson Education.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ELECTIVE-II: WIRELESS SENSOR NETWORKS**	**III**	**18MIT35E**

Objectives:
- To learn the basic principles behind a Wireless Sensor Network and following the ISO Open Systems Interconnection(OSI) model
- To present the particular challenges of designing network protocols, services and applications for WSNs composed of large numbers of constrained devices

UNIT-I: Introduction - Unique Constraints and Challenges -Advantages of Sensor Networks -Energy advantage -Detection advantage -Sensor Network Applications -Habitat monitoring- Tracking chemical plumes -Smart Transportation-Collaborative Processing -Key Definitions of Sensor Networks. Canonical Problem: Localization and Tracking -A Tracking Scenario -Problem Formulation -Sensing model –Collaborative localization Bayesian state estimation -Distributed Representation and Inference of States -Impact of choice of representation -Design desiderata in distributed tracking -Tracking Multiple Objects -State-space decomposition -Data association -Sensor Models -Performance Comparison and Metrics.

UNIT-II: Networking Sensors -Key Assumptions -Medium Access Control - The S-MAC Protocol - IEEE 802.15.4 Standard and ZigBee -General Issues- Geographic, Energy-Aware Routing -Unicast Geographic Routing - Routing on a Curve -Energy-Minimizing Broadcast - Energy-Aware Routing to a Region -Attribute-Based Routing - Directed Diffusion - Rumor Routing Geographic Hash Tables.

UNIT-III: Infrastructure Establishment - Topology Control - Clustering -Time Synchronization - Clocks and Communication Delays -Interval Methods- Reference Broadcasts - Localization and Localization Services -Ranging Techniques –Range Based Localization Algorithms -Other Localization Algorithms -Location Service.

UNIT-IV: Sensor Network Databases -Sensor Database Challenges -Querying The Physical Environment - Query Interfaces -Cougar sensor database and abstract data types -Probabilistic queries - High-level Database Organization - In-Network Aggregation - Query propagation and aggregation - TinyDB query processing - Query processing scheduling and optimization - Data-Centric Storage -Data Indices and Range Queries –One-dimensional indices- Multi-dimensional indices for orthogonal range searching –Non orthogonal range searching -Distributed Hierarchical Aggregation - Multi-resolution summarization - Partitioning the summaries -Fractional cascading -Locality preserving hashing - Temporal Data-Data aging -Indexing motion data.

UNIT-V: Sensor Network Platforms and Tools - Sensor Network Hardware -Berkeley motes - Sensor Network Programming Challenges -Node-Level Software Platforms -Operating system: TinyOS - Imperative language: nesC -Dataflow style language: TinyGALS -Node-Level Simulators - ns-2 and its sensor network extensions –TOSSIM-Programming Beyond Individual Nodes: State-centric programming - Collaboration groups -PIECES: A state-centric design framework -Multitarget tracking problem revisited.

TEXT BOOK
1. Feng Zhao and Leonidas Guibas Margan, "Wireless Sensor Networks- An Information Processing Approach", Kaufmann Publisher (An Imprint Elsevier), 2004.

REFERENCE BOOKS

1. Holger Karl & Andreas Willig, John, "Protocols And Architectures for Wireless Sensor Networks", Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ELECTIVE-III:** **SOFTWARE QUALITY ASSURANCE**	**IV**	**18MIT41E**

Objectives: Students will be able to:
- Distinguish between the various activities of quality assurance, quality planning and quality control.
- Understand Software Quality, Software quality factors, SQA Components, Reviews, Software Quality Metrics & Quality Management Standards.
- Understand the importance of standards in the quality management process and their impact on the final product.

UNIT I: Introduction to Software Quality: What is software? – Software errors, faults and failures – Classification of the causes of software errors – Software quality – definition – Software quality assurance – definition and objectives. Software quality factors: The need for comprehensive software quality requirements – Classification of software requirements into software quality factors – Product operation software quality factors – Product revision software quality factors – Product transition software quality factors. The components of the software quality assurance system – overview: The SQA system – an SQA architecture – Pre – project components – SQA standards, system certification, and assessment components – Organizing for SQA – the human components.

UNIT II: Development and quality plans: Development plan and quality plan objectives – Elements of the development plan – Elements of the quality plan. Integrating quality activities in the project life cycle: Factors affecting intensity of quality assurance activities in the development process – Verification, validation and qualification – A model for SQA defect removal effectiveness and cost. Reviews: Review objectives – Formal design reviews (DRs) – Peer reviews – A comparison of the team review methods – Expert opinions.

UNIT III: Assuring the quality of software maintenance components: The foundations of high quality – Pre-maintenance software quality components – Maintenance software quality assurance tools. Assuring the quality of external participants' contributions: Types of external participants – Risks and benefits of introducing external participants – Assuring quality of external participants' contributions: objectives. CASE tools and their effect on software quality: CASE tool – The contribution of CASE tools. to software product quality, to software maintenance quality to improved project management.

UNIT IV: Procedures and work instructions: The need – procedures manuals – work instruction manuals – Preparation, implementation and updating. Supporting quality devices: Templates – Checklists. Staff training and certification: "3S" development team – The objectives – The training and certification process – Determining training and updating needs – Defining positions requiring certification – Planning the certification processes – Delivery of training and certification programs.

UNIT V: Software quality metrics: Classification of software quality metrics – Process metrics – Product metrics – Implementation of Software quality metrics - Quality management standards: ISO 9001 and ISO 9000-3 – Certification according to ISO 9000-3 – Capability Maturity Models – CMM and CMMI assessment methodology. SQA project process standards – IEEE software engineering standards: IEEE Std 1012 – verification and validation – IEEE Std 1028 – Reviews.

TEXT BOOK

1. Daniel Galin, "Software Quality Assurance from Theory to Implementation", Pearson Publication, 2009.

REFERENCE BOOKS

1. Alan C. Gillies, "Software Quality: Theory and Management", International Thomson Computer Press, 1997.
2. Mordechai Ben-Menachem "Software Quality: Producing Practical Consistent Software", International Thompson Computer Press, 1997.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ELECTIVE-III: E-COMMERCE**	**IV**	**18MIT41E**

Objectives: To enable the students to understand the technology of e-Commerce for Business Applications and to be aware of Techniques in the Application of e-Commerce.

UNIT-I: Electronic Commerce: Framework – Media Convergence –Applications of Consumer and Organization. Network Infrastructure for Electronic Commerce: Components of the I-Way-Network Access Equipment. Business of Internet Commercialization: Internet Users and Service Providers-On-Line Services.

UNIT-II: Network Security and Firewalls: Client-Server Network Security – Threats – Firewalls – Data and Message Security – Challenge Response Systems – Encrypted Documents and Electronic Mail. Electronic Commerce and World Wide Web: Architectural Framework – WWW as the Architecture – Hypertext Publishing – Technology behind the Web – Security.

UNIT-III: Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications-Mercantile Process Models – Perspective Models of Consumer and Merchant. Electronic Payment Systems: Types of EPS - Digital Token Based - Smart Cards – Credit Card-Based – Risk and Designing.

UNIT-IV: Inter-Organizational Commerce and EDI: Applications in Business – Legal, Security and Privacy Issues. EDI Implementation, MIME and Value-Added Networks: Standardization – Software Implementation – Envelope for Message Transport - Internet-Based. Intra-Organizational Electronic Commerce: Macro-forces and Internal Commerce – Work-Flow Automation and Coordination – Customization and Internal Commerce – Supply Chain Management.

UNIT-V: Advertising and Marketing on the Internet: Advertising on the Internet – Charting the On-line Marketing Process. On-Demand Education and Digital Copyrights: Computer-Based Education and Training – Digital Copyrights and Electronic Commerce. Software Agents: Characteristics and Properties of Agents – Technology behind Software Agents.

TEXT BOOK
1. Ravi Kalakota and Andrew B.Whinston, "Frontiers of Electronic Commerce", Dorling Kindersley (India) Pvt.Ltd-2006.

REFERENCE BOOKS
1. Bharat Bhasker, "Electronic Commerce", Tata McGraw Hill Publishing Co. Ltd., New Delhi-2006.
2. Daniel Minoli, Emma Minoli, "Web Commerce Technology Handbook", Tata McGraw Hill Publishing, New Delhi.
3. Dr.C.S.Rayudu, "E-Commerce &E-Business",Himalaya Publishing House, New Delhi, 2004.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	ELECTIVE-III: COMPUTER FORENSICS	IV	18MIT41E

Objectives:
- To provide understanding Computer forensics fundamentals
- To analyze various computer forensics technologies
- To identify methods for data recovery and apply the methods for preservation of digital evidence.

UNIT-I: Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology.

UNIT-II: Types of Computer Forensics Technology: Types of Military Computer Forensic Technology, Types of Law Enforcement: Computer Forensic Technology, Types of Business Computer Forensic Technology, Specialized Forensics Techniques, Hidden Data and How to Find It, Spyware and Adware. Encryption Methods and Vulnerabilities, Protecting Data from Being Compromised, Internet Tracing Methods, Security and Wireless Technologies, Avoiding Pitfalls with Firewalls, Biometric Security Systems.

UNIT-III: Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems, Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems. Satellite Encryption Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity Management Security Systems, Identity Theft, Biometric Security Systems, Homeland Security Systems

UNIT-IV: Data Recovery: Data Recovery Defined, Data Backup and Recovery, The Role of Backup in Data Recovery, The Data-Recovery Solution, Hiding and Recovering Hidden Data- Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure Collection and Archiving, Methods of Collection, Artifacts.

UNIT-V: Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Step. Computer Image Verification and Authentication Special Needs of Evidential Authentication, Practical Considerations.

TEXT BOOK
1. John R. Vacca, "Computer Forensics: Computer Crime Scene Investigation", 2nd Edition, Charles,River Media, 2005. ISBN: 1584503890, 9781584503897

REFERENCE BOOKS
1. Christof Paar, Jan Pelzl, "Understanding Cryptography: A Textbook for Students and Practitioners",2nd Edition, Springer's, 2010.
2. Ali Jahangiri, "Live Hacking: The Ultimate Guide to Hacking Techniques & Countermeasures for Ethical Hackers & IT Security Experts", Ali Jahangiri, 2009.
3. "Computer Forensics: Investigating Network Intrusions and Cyber Crime", Ec-Council Press Series: Computer Forensics, 2010.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	ELECTIVE-IV: CYBER SECURITY	IV	18MIT42E

Objectives:

This course enables the students to learn

- the concepts of Information security and cyberlaw
- the process of implementing Information security & Cyber law

UNIT-I: Threats to Information Security: What is information Security – Common threats. The structure of an Information Security Program: Overview – Business Unit Responsibilities- awareness program – Program Infrastructure.

UNIT II: Information Security Policies: Policy is the corner stone- why implement an information security policy – corporate policies – Organization wide (Tier1) policies – Policy document –Legal requirements – Business requirements – Definitions – Policy key elements – Policy formats.

UNIT III: Asset classification: Introduction – overview – Why classify information – What is information classification – where to begin – Category examples – urge to add the categories – Constitution of confidential information – Employee responsibilities – classification examples – Declassification of information – Records management Policy- Information handling standards matrix – Information classification Methodology – Authorization for access.

UNIT-IV: Access Control: Business requirements for Access control – User Access Management – System and network access control – Operating system access control – Monitoring access control – Cryptography. Physical Security: Data Centre requirement – Physical access control – Fire prevention and detection – Verified disposal of documents – Agreements – Intrusion Detection Systems.

UNIT-V: Information Security and Cyber Law: Introduction – Objectives – Intellectual property rights – Strategies for cyber security – Policies to mitigate cyber risk – Network security – IT Act – Signatures – Offence and penalties.

TEXT BOOKS

1. Thomas R. Peltier Justin Peltier, John Blackley, "Information Security and Fundamentals", Auer Bach Publications.
2. "Information Security and Cyber Law", tutorials point simply easy learning, www.tutorialspoint.com/information_security_cyber_law/information_security_cyber _law_tutorial.pdf (E-book)

REFERENCE BOOKS

1. Bruce Schneir, "Applied Cryptography", CRC Press, 1997.
2. A.Menezes, P Van Oorschot and S.Vanstone, "Hand Book of Applied Cryptography", CRC Press, 1997. [Free Downloadable].
3. Jennifer L.Bayuk&etl, "Cyber Security Policy Guide Book", Wiley Publications, 2012.
4. William Stallings, "Cryptography and Network Security – Principles and Practice", Pearson Education, 2014, Sixth Edition.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	ELECTIVE-IV: MOBILE APPLICATION DEVELOPMENT	IV	18MIT42E

Objectives:
On successful completion of the course the students should:
- Understand the architecture of Android Operating System for Mobile Devices.
- Understand the skills for creating and deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment.

UNIT-I: Introduction to Android OS: Android Description – Open Handset Alliance – Android. Ecosystem – Android versions – Android Activity – Features of Android – Android Architecture – Stack Linux Kernel. Configuration of Android Environment: Operating System – Java JDK – Android SDK – Android Development Tools (ADT) – Android Virtual Devices (AVDs) – Emulators - Dalvik Virtual Machine – Differences between JVM and DVM – Steps to Install and Configure Eclipse and SDK. (Chapters 1 & 2)

UNIT-II: Create the first android application: Directory Structure. Android User Interface: Understanding the Components of a screen– Linear Layout – Absolute Layout – Frame. Layout – Relative Layout – Table Layout. (Chapters 3 & 4)

UNIT-III: Designing User Interface with View – Text View – Button – Image Button – Edit Text – Check Box – Toggle Button – Radio Button and Radio Group – Progress Bar – Auto complete Text View – Spinner – List View – Grid View – Image View - Scroll View – Custom Toast – Alert – Time and Date Picker. (Chapter 5)

UNIT-IV: Activity: Introduction – Intent – Intent filter – Activity life cycle – Broadcast life cycle – Service. Multimedia: Android System Architecture – Play Audio and Video – Text to Speech. (Chapters 6 & 7)

UNIT-V: SQLite Database in Android: SQLite Database – Creation and Connection of the database – Transactions. Case Study: SMS Telephony and Location Based Services. (Chapters 8, 9, & 10)

TEXT BOOK
1. Prasanna Kumar Dixit, "Android", Vikas Publishing House Private Ltd., Noida, 2014.

REFERENCE BOOKS
1. Reto Meier and Wrox Wiley, "Professional Android 4 Application Development", 2012.
2. ZiguradMednieks, LaridDornin, G.BlakeMeike, Masumi Nakamura, "Programming Andriod", O'Reilly,2013.
3. Robert Green, Mario Zechner, "Beginning Android 4 Games Development", Apress
Media LLC, New York, 2011.

Year	Subject Title	Sem	Sub. Code
2018-19 Onwards	**ELECTIVE-IV: PRINCIPLES OF COMPILER DESIGN**	**IV**	**18MIT42E**

Objectives:
- Students will understand the phases of the compilation process and be able to describe the purpose and implementation approach of each phase
- To develop an awareness of the function and complexity of compilers
- Identify the similarities and differences among various parsing techniques and grammar transformation technique

UNIT-I: Introduction – Structure of a Compiler – Compiler writing Tools – Basic constructs of High Level Programming languages: Data structures, Parameter transmission. Lexical analysis – Role of lexical analyser – Finite automata – Regular expressions to Finite automata – NFA to DFA – Minimising the number of states of a Deterministic Finite Automata – Implementation of a Lexical Analyser.

UNIT-II: Parsing techniques – Context free grammars – Derivations and Parse trees – Ambiguity – Capabilities of Context free grammars – Top down and Bottom up parsing – Handles – Shift Reduce parsing – Operator precedence parsing – Recursive descent parsing – Predictive parsing.

UNIT-III: Automatic parsing techniques – LR parsers – Canonical collection of LR(0) items – Construction of SLR parsing table – LR(1) sets of items Construction – Construction of canonical LR Parsing Tables.

UNIT-IV: Syntax Direction Translation – Semantic actions – Implementation of Syntax Directed Translators – Intermediate Code: Postfix notation, Quadruples, Triples, Indirect triples – Methods of translation of Assignment statements, Boolean expressions and Control statements.

UNIT-V: Symbol tables and Code generation: Representing information in a Symbol Table – Data Structures for Symbol table – Introduction to Code Optimization: Basic blocks – DAG representation – Error detection and recovery – Introduction to Code Generation.

TEXT BOOK
1. Aho A. V. R, Ullman J. D., "Compilers, Principles, Techniques and Tools", Addison Wesley, 2001.

REFERENCE BOOKS
1. Dhamdhere D. M., "Compilers construction Principles and Practice", Macmillan India Ltd.
2. Puntambekar A A., **"**Principles of Compiler Design", Technical publications, 2009.
3. Dr.R.Venkatesh, Dr.N.Uma Maheshwari and Dr.S.Jeyanthi., "Compiler Design" Yes Dee Publisher -2015.