GURU KASHI UNIVERSITY

Masters of Science in Information Technology
Session: 2023-2024

Department of Computer Applications

GRADUATE OUTCOMES OF THE PROGRAMME

Graduates will have a strong foundation in technical skills related to computer science and information technology, including programming, database design and management, software development, networking, security, web development and including the ability to adapt to new technologies and trends in the field.

PROGRAM LEARNING OUTCOMES: After completing the programme, the Learner will be able to:

1. Apply mathematical foundation, computing knowledge for the conceptualization of computing models from defined problems.
2. Identify, critically analyze and formulate complex computing problems using fundamentals of computer science and application domains.
3. Use the modern programming languages, tools, techniques, and skills necessary for designing, developing, and deploying software-based applications.
4. Apply ethical principles and commit to professional ethics, responsibilities, and norms of the computer practice.
5. Communicate effectively with different stakeholders using a variety of modes and techniques, including written reports, oral presentations, and visual aids.
6. Adopt a research culture and implement policies to address pressing local and global concerns.

Program Structure

Semester I						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
MIT114	Fundamentals of Information Technology	Core	4	0	0	4
MIT115	Programming Using C++	Core	4	0	0	4
MIT103	Database Management Systems	Core	4	0	0	4
MIT116	Fundamentals of Information Technology Lab	Technical Skill	0	0	2	1
MIT117	Programming using C++ Lab	Technical Skill	0	0	4	2
MIT105	Database Management Systems Lab	Technical Skill	0	0	2	1
Disciplinary Elective I (Any one of the following)						
MIT111	Internet Concepts and Web Designing	Disciplinary Elective I	3	0	0	3
MIT118	Data Warehousing and Data Mining					
MIT119	IoT and Its Applications					
Disciplinary Elective II (Any one of the following)						
MIT120	Management Information Systems (MIS)	Disciplinary Elective II	3	0	0	3
MIT121	Data Network & Security					
MIT122	Software Project Management					
Total			**18**	**0**	**8**	**22**

Semester II						
Course Code	**Course Title**	**Type of course**				
			L	**T**	**P**	**Credits**
MIT201	Data Structures	Core	4	0	0	4
MIT209	Artificial Intelligence	Core	4	0	0	4
MIT212	Programming using Python	Core	4	0	0	4
MIT213	Data Structures Lab	Technical Skill	0	0	4	2
MIT214	Programming using Python Lab	Technical Skill	0	0	4	2
Disciplinary Elective III (Any one of the following)						
MIT202	Digital Electronics	Disciplinary Elective III	3	0	0	3
MIT210	Machine Learning					
MIT211	Parallel Processing					
Disciplinary Elective IV (Any one of the following)						
MIT215	Computer System Architecture	Disciplinary Elective IV	3	0	0	3
MIT216	Software Engineering & Testing					
MIT217	Essentials of Digital Marketing					
Value added Course (For other Department)						
MIT218	Communication Skills	VAC	2	0	0	2
Total			**20**	**0**	**8**	**24**

Semester III						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
MIT312	Research Methodology	Compulsory Foundation	4	0	0	4
MIT398	Research Proposal	Research Skill	0	0	8	4
MIT314	Ethics & IPR	Research Skill	2	0	0	2
MIT397	Proficiency in Teaching	Research Skill	2	0	0	2
MIT316	Computer Lab	Research Skill	0	0	4	2
MIT396	Service Learning	Skill Based	0	0	4	2
MIT399	XXX	MOOC	-	-	-	4
Total			**8**	**0**	**16**	**20**

Semester IV						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
MIT402	Dissertation	Research Skill	-	-	-	20
Total						**20**
Grand Total			**48**	**0**	**28**	**86**

Evaluation Criteria for Theory Courses

A. Continuous Assessment: [25 Marks]
   CA1- Surprise Test (Two best out of three) (10 Marks)
   CA2- Assignment(s) (10 Marks)
   CA3-Term Paper/Quiz/Presentations (05 Marks)

B. Attendance (5 Marks)
C. Mid Semester Test: [30 Marks]
D. End-Semester Exam: [40 Marks]

Semester-I

Course Title: Fundamentals of Information Technology
Course Code: MIT114

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Develop and utilize vocabulary of key terms related to the computer and software program and Recognize functions of mouse and keyboard.
2. Apply commands of window and menu.
3. Compose, format and edit a word document.
4. Create and Send email messages with or without attachments.

Course Content

UNIT-I **14 hours**

Information concepts and processing: Evolution of information processing, data, information language and communication.

Elements of computer processing system: Hardware-CPU, storage devices and media. Input-output devices, data communication equipment, Software-system software, application software.

UNIT-II **16 hours**

Programming Language: classification, machine code, assembly language, higher level languages, and fourth generation languages.

Introduction to Operating System: its need and Operating System services; Operating System classification- single user, multi-user, simple batch processing, Multiprogramming, Multitasking, Parallel system, Distributed system, Real time system. Typical commands of DOS, GUI - Windows.

UNIT-III **15 hours**

Computers and Communication: Single user, multi-user, work station, client server systems, Computer networks, network protocols, LAN, MAN, WAN.

Introducing the Internet: Description of the Internet–Working, Surfing, Internet Domain Names and Addresses

UNIT-IV **15 hours**

Connecting LAN to Internet: Protocols, IP Address, and Web Server.

Internet Applications: Email, working of email, Advantages of email, Understanding of Internet Email, Net news, Search Engines, Introducing

Usenet, organization of Usenet articles, reading, saving, mailing, writing and posting of an article.
WWW- World Wide Web, Working of WWW, Hypertext and Hypermedia, URL, Searching the WWW, Web access using web browser, locating information on the Web.

Transactional modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Sinha P. K., & SinhaP. (2010). Computer fundamentals. BPB publications.*
- *RajaramanV.(2010)Fundamentals of Computers**.**Prentice Hall.*

Web Sources

- *https://www.tutorialspoint.com/computer_fundamentals/computer_applications.htm*
- *https://www.tutorialspoint.com/computer_fundamentals/computer_output_devices.htm*
- *https://computerhindinotes.com/fundamentals-of-computer-information-technology-pgdca-notes-in-hindi-new-2018/*
- *https://www.academia.edu/34854470/Computer_Fundamentals_and_Information_Technology_Series_1_With_Simple_Visual_Basic_2008_Jumpstart*
- *https://testbook.com/computer-awareness/computer-fundamentals*
- *https://www.javatpoint.com/computer-fundamentals-tutorial*

Course Title: Programming using C++
Course Code: MIT115

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Describe all the basic concepts of C++ and its features such as composition of objects, Operator overloading.
2. Implement the various access modifiers in C++ programs.
3. Analyze inheritance with the understanding of early binding and late binding.
4. Analyze and explore various Stream classes, I/O operations and exception handling.

Course Content

UNIT I **17 Hours**

Programming Basics: Introduction to Programming, Programming Paradigms, Programming Languages and Types. Introduction to C - Basic Program Structure, Execution flow of C Program, Directives, Basic Input /Output Introduction to Object Oriented Programming- OOP concepts, Advantages, Applications, Comparison of C and C++-Data Types, Control Structures, Operators and Expressions.

Introduction to C++: Structure of a C++ program, Execution flow, Classes and Objects, Access modifiers, Data Members, Member Functions, Inline Functions, passing parameters to a Function (pass by Value, pass by Address, pass by Reference), Function with default arguments, Function Overloading, Object as a Parameter, Returning Object Static data members and functions, Constant Data members and functions

Constructors- Default, Parameterized, Copy, Constructor Overloading, Destructors Arrays, Array as a Class Member, Array of Objects, Strings C style strings and String Class.

UNIT II **14 Hours**

Operator Overloading and Pointers: Operator Functions-Member and Non Member Functions, Friend Functions Overloading Unary operators Overloading binary operators(Arithmetic, Relational, Arithmetic Assignment, equality), Overloading Subscript operator Type Conversion Operators- primitive to Object, Object to primitive, Object to Object Disadvantages of operator Overloading, Explicit and Mutable Pointers, Pointer and Address of Operator, Pointer to an Array and Array of Pointers, Pointer arithmetic, Pointer to a Constant and Constant Pointer, Pointer Initialization, Types of Pointers(void, null and dangling), Dynamic Memory Allocation, Advantages and Applications of pointers .

UNIT III **13 Hours**

Inheritance and Polymorphism: Inheritance Concept, protected modifier, Derivation of Inheritance- Public, Private and Protected,
Types of Inheritance-Simple, Multilevel, Hierarchical, Multiple, Hybrid, Constructors and Inheritance, Function Overriding and Member hiding Multiple Inheritance, Multipath inheritance – Ambiguities and solutions Polymorphism, Static and Dynamic Binding, Virtual Functions, Pure Virtual Functions, Virtual destructors, Abstract Classes, Interfaces.

UNIT IV **16 Hours**

Streams and Exceptions: Files, Text and Binary Files, Stream Classes, File IO using Stream classes, File pointers, Error Streams, Random File Access, Manipulators, Overloading Insertion and extraction operators Error handling, Exceptions, Throwing and catching exceptions, Custom Exceptions, Built in exceptions
Advanced C++: Casting- Static casts, Const Casts, Dynamic Casts, and Reinterpret Casts. Creating Libraries and header files. Namespaces Generic Programming, Templates, Class Templates, Function Templates, Template arguments.

Transactional modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Kamthane, A. (2012). Programming in C++, 2/e. Pearson Education India.*
- *Salaria, R. S. (2016). Mastering Object-Oriented Programming with C++. KHANNA PUBLISHING HOUSE.*
- *Balagurusamy, E. (2001). Object-Oriented Programming with C++, 7e. McGraw-Hill Education.*

Web Sources

- *https://www.tutorialspoint.com/basic-concepts-of-object-oriented-programming-using-cplusplus*
- *https://www.geeksforgeeks.org/operator-overloading-cpp/*
- *https://www.simplilearn.com/tutorials/cpp-tutorial/types-of-inheritance-in-cpp*

Course Title: Database Management Systems
Course Code: MIT103

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Develop an Entity-Relationship model based on user requirements.
2. Implement the role of the database administrator and his responsibilities.
3. Apply Normalization techniques to normalize a database.
4. Declares and enforces integrity constraints on a database

Course Content

UNIT I **14 hours**

Traditional file processing system: Characteristics, limitations, Database: Definition, composition.

Database Management System: Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance.

UNIT II **16 hours**

DBMS architecture, data independence, mapping between different levels.

Database languages: DDL, DML, DCL.

Database utilities, Data Models, Keys: Super, candidate, primary, foreign.

UNIT III **15 hours**

Entity relationship model: concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, Overview of Network and Hierarchical model.

Relational Data Model: concepts, constraints. Relational algebra: Basic operations, additional operations.

UNIT IV **15 hours**

Database Design: Functional dependency, decomposition, problems arising out of bad database design, Normalization- Normal forms based on primary keys (1 NF, 2 NF, 3 NF, & BCNF), multi-valued dependency, Database design process, database protection, database integrity.

Database concurrency: Definition and problems arising out of concurrency.

Transactional modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Ramakrishnan, R., Gehrke, J., &Gehrke, J. (2003). Database management systems (Vol. 3). New York: McGraw-Hill.KorthF. Henry. Database System Concepts, McGraw Hill.*

- *Dittrich, K. R., Gatziu, S., & Geppert, A. (1995, September). The active database management system manifesto: A rulebase of ADBMS features. In International Workshop on Rules in Database Systems (pp. 1-17). Springer, Berlin, Heidelberg.*

Web Sources

- *https://www.tutorialspoint.com/dbms/dbms_architecture.htm*
- *https://www.geeksforgeeks.org/introduction-of-er-model/*
- *https://www.javatpoint.com/dbms-tutorial*
- *https://www.w3schools.in/dbms*
- *https://www.youtube.com/watch?v=T7AxM7Vqvaw*
- *https://www.youtube.com/watch?v=c5HAwKX-suM*
- *https://www.youtube.com/watch?v=DxoRUmW44JE*

Course Title: Fundamentals of Information Technology Lab
Course Code: MIT116

L	T	P	Credits
0	0	2	1

Total Hours: 30

Learning Outcomes After completion of this course, the learner will be able to:

1. Compose, format and edit a word document.
2. Discover, Navigate and search through the internet.
3. Use Open Office (Word processing, Spreadsheets and Presentation).
4. Utilize Microsoft PowerPoint.

Course Content

1. [MS-WORD] Creating, opening, closing, saving and editing a word Document.
2. [MS-WORD] Insert header and footer in the document.
3. [MS-WORD] Create a link between two files using Hyperlink.
4. [MS-WORD] Create a mail-merge and add data of 5 recipients.
5. [MS-WORD] Protect a document.
6. [MS-WORD] Implement macro.
7. [MS-POWERPOINT] Create duplicate slides in PowerPoint. Give an example.
8. [MS-POWERPOINT] Make a master slide.
9. [MS-POWERPOINT] Design a chart of population.
10. [MS-POWERPOINT] Insert Animation.
11. [MS-POWERPOINT] Insert a background in PowerPoint.
12. [MS-EXCEL] How you can filter your data.
13. [MS-EXCEL] Sort data in ascending and descending order.
14. [MS-EXCEL] To show the use of goal seek
15. [MS-EXCEL] To show the use of scenarios.
16. [MS-EXCEL] Perform any 5 Date and Time functions.
17. [MS-EXCEL] Perform any 5 Math & Trig functions.

Course Title: Programming using C++ Lab
Course Code: MIT117

L	T	P	Credits
0	0	4	2

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Design an algorithmic solution for a given problem.
2. Debug a given Program.
3. Identify solutions to a problem and apply control structures and use defined functions for solving the problem.
4. Implement Programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

Course Content

1. Write a Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.
2. Write a Program to swap two Characters of different data types using function overloading.
3. Write a program to demonstrate the use of inline, friend functions and this keyword.
4. Write a program to implement static data members and member functions.
5. Write a Program to implement Constructor and Destructor.
6. Write a Program to demonstrate Constructor Overloading.
7. Write a Program to calculate factorial using Copy Constructor.
8. Write a Program to allocate & deallocate memory using new [ ] and delete [ ].
9. Write a Program to demonstrate the use of function overloading.
10. Write a Program to overload comparison operator operator== and operator! = .
11. Write a Program to create an array of pointers.
12. Create a base class containing the data member roll number and name. Also create a member function to read and display the data using the concept of single level inheritance. Create a derived class that contains marks of two subjects and total marks as the data members.
13. Write a Program to create multilevel inheritance. (Hint: Classes A1, A2, A3)
14. Write a program to demonstrate the concept of function overriding.
15. Write a Program to demonstrate the use of virtual functions and polymorphism.
16. Write a Program to demonstrate the use of pure virtual functions.
17. Write a Program to demonstrate the concepts of abstract class.
18. Write a Program to perform exception handling.

19. Write a Program to copy the contents of one file to another file.
20. Write a Program to create Generic Functions using Template.

Course Title: Database Management Systems Lab
Course Code: MIT105

L	T	P	Credits
0	0	2	1

Total Hours: 30

Learning Outcomes After completion of this course, the learner will be able to:

1. Populate and query a database using SQL DML/DDL commands.
2. Designs SQL queries to create database tables and make structural modifications.
3. Design the concept of inbuilt functions.
4. Implement the concept of join, views and indexes.

Course Content

1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update and Delete Commands.
3. Nested Queries and Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end Tools
7. Forms
8. Triggers
9. Menu Design
10. Reports
11. Database Design and implementation (Mini Project).

Course Title: Internet Concepts and Web Designing
Course Code: MIT111

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Recognize the basic HTML Tags, List, Types of lists, Adding graphics to HTML documents.
2. Design forms with various attributes, Buttons, Text Area and Radio Button.
3. Develop a web site with the help of HTML tags and CSS.
4. Apply the fundamentals of PHP to develop a dynamic website.

Course Content

UNIT I **10 hours**

Introduction The World Wide Web (WWW), History, Hypertext and Hypertext Markup Language, Microsoft Front Page, HTML Documents, various Tags.

Elements of an HTML Document: Text Elements, Tag Elements, Special Character Elements Structural elements of HTML documents: Header tags, Body tags, Paragraphs, Titles, Numbered list, Non-Numbered lists, and Definition lists.

Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed).

UNIT II **10 hours**

Managing images in Html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images, Frames.

Tables in HTML documents Hypertext and Link in HTML Documents, URL/FTP/HTTP

Types of links: Internal Links, External Links, Link Tags, Links with images and buttons, Links that send email messages

UNIT III **12 hours**

Special effects in HTML documents: Text fonts, Sensitive Images, Tip tables, Page background (Variable, Fixed), Rotating messages (Marquee)

Managing forms: Interactive forms, creating data entry forms

Cascading Style Sheets: ways of inserting a style sheet: External style sheet, Internal style sheet, Inline style.

CSS Id and Class, Inheritance in CSS

UNIT IV **13 hours**

Scripting and websites: Java scripting

PHP: This course is an introduction to the PHP programming language. Topics include installation and configuration with the Apache http server, variables and data types, language syntax, control structures, functions, strategies and tools for handling input and generating output, error handling, sending email, manipulating dates and times, string manipulation and regular expressions, SQL and MySQL database access, object oriented programming (OOP), Though primarily focused on PHP 5.0. We will emphasize security and sound coding practices throughout.

Transactional modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Duckett, J. (2014). Web design with HTML, CSS, JavaScript and jQuery set (Vol. 1). IN: Wiley.*
- *Raggett, D., Lam, J., Alexander, I., & Kmiec, M. (1998). Raggett on HTML 4. Addison-Wesley Longman Publishing Co., Inc*

Web Sources

- *https://www.tutorialspoint.com/internet_technologies/website_designing.htm*
- *https://tutorial.techaltum.com/webdesigning.html*
- *https://www.w3schools.com/css/css_intro.asp*
- *https://www.w3schools.com/js/js_operators.asp*
  https://www.codecademy.com/catalog/subject/web-design
- *https://www.entheosweb.com/website_design/responsive_web_design.asp*

Course Title: Data warehousing and Data Mining
Course Code: MIT118

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand the functionality of various Data mining techniques.
2. Familiarize yourself with the process of data analysis, identifying the problems, and choosing the relevant models and algorithms to apply.
3. Identify the Classifications & Prediction Data Mining Techniques
4. Compare the classification Techniques of Data Mining.

Course Content

UNIT I **10 hours**

Data Warehousing: Definition, Characteristics of a Data Warehouse, Data warehouse Usage, DBMS vs. Data warehouse.

Developing Data Warehouse: Data warehousing components, Steps and Crucial decisions for the design and construction of Data Warehouses, Three-tier Data warehouse architecture, Data Warehouse Implementation, Design, performance and technological considerations, Metadata.

UNIT II **10 hours**

Developing Data Mart based Data warehouse: Types of data marts, Metadata for a data mart, Data model for a data mart, Maintenance of a data mart, Software components for a data mart, Performance issues, Security in data mart.

OLAP Systems: Types of OLAP, Relational vs. Multidimensional OLAP, Data modeling: Star schema, Snowflake schema, OLAP tools.

UNIT III **12 hours**

Data Mining: Introduction to data mining, Data mining process, Major issues and Application of Data mining, Data preprocessing: Data cleaning, Data integration and transformation and Data reduction; Tools for data mining.

Data Mining Techniques: Association rules: Introduction, Market basket analysis, Frequent Pattern Mining algorithms: Apriori algorithm, Partition algorithm.

UNIT IV **13 hours**

Classification and Prediction: Definition, Issues regarding Classification and Prediction, Classification by Decision Tree Induction, Support Vector Machines, k-Nearest-Neighbor, Prediction: Linear and Non-Linear Regression.

Clustering: Definition, Types of data in cluster analysis, clustering paradigms: K-Means and K-Medoids, Mining Sequence patterns:

Generalized Sequential Patterns(GSP) mining algorithm, Hidden Markov Model, Social Network Analysis.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Inmon, W. H., 2002: Building the Data Warehouse, John Wiley.*
- *Prabhu, C.S.R., 2010 : Data Warehousing, PHI.*
- *Jiawei Han, Micheline Kamber, 2000: Data Mining: Concepts and Techniques, Morgan Koffman Elsvier.*
- *Pujari, Arun K, 2013 : Data Mining Techniques, Universities Press*

Web Sources

- *https://www.javatpoint.com/data-mining-cluster-vs-data-warehousing*
- *https://www.ibm.com/topics/data-warehouse*
- *https://www.geeksforgeeks.org/difference-between-data-warehousing-and-data-mining/*
- *https://www.investopedia.com/terms/d/data-warehousing.asp*

Course Title: IOT & Its Applications
Course Code: MIT119

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Identify the different types of sensors and devices used in IoT.
2. Understand the security and privacy challenges associated with IoT.
3. Compare and contrast different IoT platforms and architectures
4. Develop IoT prototypes using hardware and software components.

Course Content

UNIT I **10 hours**

FUNDAMENTALS OF IoT- Evolution of Internet of Things, Enabling Technologies, M2M Communication, IoT World Forum (IoTWF) standardized architecture, Simplified IoT Architecture, Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II **10 hours**

IoT PROTOCOLS- IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks,6LoWPAN, Application Transport Methods: SCADA, Application Layer Protocols: CoAP and MQTT

UNIT III **12 hours**

DESIGN AND DEVELOPMENT- Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, Arduino Board details

UNIT IV **13 hours**

Data Analytics: Introduction, Structured Versus Unstructured Data, Data in Motion versus Data at Rest, IoT Data Analytics Challenges, Data Acquiring, Organizing in IoT/M2M

Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services, Everything as a service and Cloud Service Models.

CASE STUDIES/INDUSTRIAL APPLICATIONS: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipment, Industry 4.0 concepts.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry,Cisco(2017) ,IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Press.*
- *Arshdeep Bahga, Vijay Madisetti (2015) ,Internet of Things – A hands-on approach, Universities Press.*
- *Rajkamal, Internet of Things: Architecture, Design Principles and Applications, McGraw Hill Higher Education.*

Web Sources

- *https://www.javatpoint.com/iot-internet-of-things*
- *https://www.simplilearn.com/tutorials/data-analytics-tutorial/what-is-data-analytics*
- *https://www.tutorialspoint.com/iot-network-protocols*

Course Title: Management Information Systems
Course Code: MIT120

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Relate the basic concepts and technologies used in the field of management information systems;
2. Compare the processes of developing and implementing information systems.
3. Translate the role of information systems in organizations, the strategic management processes, with the implications for the management.
4. Apply the understanding of how various information systems like ERP work together to accomplish the information objectives of an organization.

Course Content

UNIT I **10 hours**

MIS Definition - Characteristics - Evolution of MIS: Concepts; framework for understanding and designing MIS in an organization; MIS and other related disciplines: MIS and Management Accounting, MIS and Computer Science, MIS and OR, MIS and Organizational Behavior, MIS and Management. Concept of information: definition, features, types, process of generation and communication; quality of information; information overload; techniques for managing overload; summarizing; filtering; inferences and message routing. System concepts: definition, types and characteristics of system-control in systems: feedback: positive and negative; negative feedback control system, input, process and output control; law of requisite variety.

UNIT II **12 hours**

Structure of MIS: Basic structural concepts: formal and informal information systems; public and private information systems; multiple approaches to the structure of MIS: Operational elements (physical components, process, outputs for users), activity subsystems, functional subsystems and decision support – synthesis of multiple approaches into a conceptual structure for MIS.

UNIT III **10 hours**

Information systems: Transaction Processing Systems, Office Automation Systems, Information Reporting Systems, Decision Support Systems, Executive Support Systems, Expert systems.

UNIT IV **13 hours**

Systems Development and Implementation: System development methodologies; SDLC approach; prototyping approach and user development approach - Systems Analysis; Systems Design; Concepts of

database and database design; system implementation; management of information system projects; system documentation – information system audit. Security of information resources; threats to information resources; security systems for risk management. Enterprise Resource Planning Systems –Features-ERP Modules - implementation of ERP.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *O'Brien, James A: Management Information Systems, Tata McGraw Hill, New Delhi.*
- *George M. Scott: Management Information Systems, McGraw Hill Book Company, New Delhi.*
- *Schultheis, Robert and Summer, Mary: Management Information Systems, Tata McGraw Hill, New Delhi.*
- *Gordon B Davis, et. El: Management Information Systems, Prentice Hall of India, New Delhi.*

Web Sources

- *https://www.techtarget.com/searchitoperations/definition/MIS-management-information-systems*
- *https://www.tutorialspoint.com/management_information_system/management_information_system.htm*
- *https://www.javatpoint.com/mis-management-information-systems*

Course Title: Data Network & Security
Course Code: MIT121

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand the fundamental concepts of data networks
2. Explain the different network security threats and vulnerabilities
3. Evaluate network security measures and technologies
4. Implement network security controls

Course Content

UNIT I **12 hours**

Introduction to Computer networks and applications: Network Structure and Architecture, Network Hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture-point to point, multicast, broadcast, Classification of networks on the basis of Geographical Span (PAN, LAN, MAN and WAN) , LAN topologies (Bus, Ring, Star, Mesh, Tree and Hybrid). Network Connecting Devices: Repeaters, Hubs, Bridges, Routers, Gateways and Switches, Network Reference models: OSI model, TCP / IP model. Comparison between OSI and TCP/IP.

UNIT II **10 hours**

Introduction: Attacks, Services and Mechanisms, Security Attacks, Security Services, Integrity check, digital Signature, authentication, has algorithms.

Secret Key Cryptography: Block Encryption, DES rounds, S-Boxes IDEA: Overview, comparison with DES, Key expansion, IDEA rounds, Uses of Secret key Cryptography; ECB, CBC, OFB, CFB, Multiple encryptions DES.

UNIT III **13 hours**

Hash Functions and Message Digests: Length of hash, uses, algorithms (MD2, MD4, MD5, SHS) MD2: Algorithm (Padding, checksum, passes.) MD4 and 5: algorithm (padding, stages, digest computation.) SHS: Overview, padding, stages.

Public key Cryptography: Algorithms, examples, Modular arithmetic (addition, multiplication, inverse, and exponentiation) RSA: generating keys, encryption and decryption. Other Algorithms: PKCS, Diffie-Hellman, El-Gamal signatures, DSS, Zero-knowledge signatures.

UNIT IV **10 hours**

Authentication: Password Based, Address Based, Cryptographic Authentication. Passwords in distributed systems, on-line vs offline guessing, storing. Cryptographic Authentication: passwords as keys, protocols, KDC's Certification Revocation, Inter domain, groups,

delegation. Authentication of People: Verification techniques, passwords, length of passwords, password distribution, smart cards, biometrics.
Security Policies and Security Handshake Pitfalls: What is security policy, high and low level policy, user issues? Protocol problems, assumptions, Shared secret protocols, public key protocols, mutual authentication, reflection attacks, use of timestamps, nonce and sequence numbers, session keys, one-and two-way public key based authentication.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Tanenbaum, A. S. (2002). Computer networks. Pearson Education India.*
- *Peterson, L. L., & Davie, B. S. (2007). Computer networks: a systems approach. Elsevier.*
- *Kiesler, S. (1986). The hidden messages in computer networks (pp. 46-47). Harvard Business Review Case Services.*
- *Atul Kahate .Cryptography and Network Security ,TMH.*
- *Behourz A Forouzan,Data Communications and Networking*

Web Sources

- *https://www.geeksforgeeks.org/data-communication-definition-components-types-channels/*
- *https://www.studytonight.com/computer-networks/reference-models-in-computer-networks*
- *https://www.bing.com/ck/a?!&&p=2b949258678ed6ceJmltdHM9MTY4MzUwNDAwMCZpZ3VpZD0yYzYwNzgyMS05YmI2LTY0ZDItMDJmNi02OGJmOWEyZDY1NjkmaW5zaWQ9NTIxMQ&ptn=3&hsh=3&fclid=2c607821-9bb6-64d2-02f6-68bf9a2d6569&psq=cOMPUTER+nETWORKS&u=a1aHR0cHM6Ly93d3cuamF2YXRwb2ludC5jb20vY29tcHV0ZXItbmV0d29yay10dXRvcmlhbA&ntb=1*

Course Title: Software Project Management
Course Code: MIT122

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Identify the different project contexts and suggest an appropriate project management strategy.
2. Practice the role of project planning, risks associated in successful software development.
3. Understand the role of resource allocation and effort estimation in the project management process.
4. Learn to apply the concept of project management and planning to organize team and people's behavior.

Course Content

UNIT I **10 Hours**

Introduction to Software Project Management: Project Definition, Contract Management, Activities Covered by Software Project Management, Overview of Project Planning, plan methods, methodology.

Project Evaluation: Strategic Assessment, Technical Assessment, Cost Benefit Analysis, Cash Flow Forecasting, Cost Benefit Evaluation Techniques, Risk Evaluation, selection of project approach: discussion on models, choice of process models.

UNIT II **12 Hours**

Activity Planning: Objectives, Project Schedule, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass, Backward Pass, Activity Float, Shortening Project Duration, Activity on Arrow Networks,

Risk Management: Nature of Risk, Types of Risk, Managing Risk, Hazard Identification, Hazard Analysis, Risk Planning and Control.

UNIT III **11 Hours**

Monitoring and Control: Creating Framework, Collecting the Data, Visualizing Progress, Cost Monitoring, Earned Value analysis, Prioritizing Monitoring, Getting Project Back to Target, and Change Control.

Managing Contracts: Introduction, Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance.

Resource allocation: introduction and nature of resources, identification of resource requirements, scheduling, creating critical path, cost schedule, counting cost.

UNIT IV **12 Hours**

Effort estimation: basics of software estimation, techniques, COCOMO-II, cost, staffing pattern.

Managing People and Organizing Teams: Introduction, Understanding Behavior, Organizational Behavior: Background, Selecting The Right Person for The Job, Instruction In The Best Methods, Motivation, The Old man, Hackman Job Characteristics Model, Working In Groups, Becoming A Team, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety

Transactional modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning.

Suggested Readings

- *Bob Hughes, Mike Cotterell, Software Project Management, Tata McGraw Hill Publishing*
- *Ramesh, Gopalaswamy, Managing Global Projects, Tata McGraw Hill Publishing*
- *Royce, Software Project Management, Pearson Education Publishing*
- *Jalote, Software Project Management in Practice, Pearson Education Publishing*

Web Sources

- *https://www.javatpoint.com/software-project-management*
- *https://www.geeksforgeeks.org/software-engineering-software-project-management-spm/*
- *https://www.wrike.com/project-management-guide/faq/what-is-software-project-management/*
- *https://www.tutorialspoint.com/software_engineering/software_project_management.htm*

Semester II

Course Title: Data Structures
Course Code: MIT201

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Analyze algorithms and algorithm complexity.
2. Attain knowledge of tree and graph concepts.
3. Implement link list and its applications in data structures.
4. Apply the different linear data structures like stack and queue to various computing problems.

Course Content

UNIT I **15 hours**

Basic concept and notations: data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.

Arrays: Linear array, representation of linear array in memory, Traversing linear array, insertion and deletion in an array, multi-dimensional array: row-major, column major order, sparse array.

UNIT II **16 hours**

Stacks: Push and Pop in stack. Representation of stack in memory (linked and sequential) applications of Stack: conversion from infix notation to postfix notations, evolution of postfix notation, matching of Parentheses, recursion, Tower of Hanoi.

UNIT III **14 hours**

Queue: Queues and Deques, Priority Queues, Operations on queues.

Linked list: Representation of linked list using static and dynamic data structures, Comparison of Linear and non-linear data structures, Insertion and deletion of a node from a linear linked list, Introduction to doubly and circular linked lists, Application of linked lists.

UNIT IV **15 hours**

Searching and Sorting: Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quicksort comparison of various searching and sorting algorithms.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Samet, H. (1990). The design and analysis of spatial data structures (Vol. 85, p. 87). Reading, MA: Addison-wesley.*
- *Wirth, N. (1985). Algorithms & data structures. Prentice-Hall, Inc..*
- *Samet, H. (1990). Applications of spatial data structures: computer graphics, image processing, and GIS. Addison-Wesley Longman Publishing Co., Inc.*

Web Sources

- *https://www.javatpoint.com/data-structure-introduction*
- *https://www.javatpoint.com/ds-linked-list*
- *https://www.geeksforgeeks.org/array-data-structure/*
- *https://www.programiz.com/dsa/bubble-sort*
- *https://www.geeksforgeeks.org/binary-search-tree-data-structure/*
- *https://www.programiz.com/dsa/bubble-sort*

Course Title: Artificial Intelligence
Course Code: MIT209

L	T	P	Credits
4	0	0	4

Total Hours:60

Learning Outcomes After completion of this course, the learner will be able to:

1. Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
2. Solve the problem solving by Search.
3. Perform the knowledge representation, mapping and approaches to knowledge representation.
4. Implement the AI programming Languages using PROLOG

Course Content

UNIT I **15 hours**

AI History and Applications: Defining AI: Acting Humanly (Turing Test Approach), Thinking Humanly (Cognitive Modelling Approach), Thinking Rationally (laws of thought approach), Acting Rationally (Rational Agent Approach); Foundations of Artificial Intelligence; History of AI, AI techniques, Expert Systems.

UNIT II **14 hours**

Problem Solving by Search: Defining the problem as a State Space Search Strategies: Breadth first Search, Depth- first search, Depth limited search, Iterative Deepening depth first search. Heuristic Search Techniques: Hill Climbing, Simulated Annealing, Best First Search: OR Graphs, Heuristic Functions, A* Algorithm, AND –OR graphs, AO* Algorithms.

UNIT III **16 hours**

Knowledge Representation: Representations and mappings, Approaches to knowledge Representation, Procedural versus Declarative knowledge; Predictive Logic: Representing Simple facts, Instance and Isa relationships in Logic, Proposition versus Predicate Logic, Computable Functions and Predicates- not, Rules of Inferences and Resolution-not, Forward versus Backward Reasoning, Logic Programming and Horn Clauses. Weak slot and Filler Structure: Semantic Nets Frames. Strong slot Filler Structures: Conceptual Dependency, scripts.

UNIT IV **15 hours**

AI Programming Languages (PROLOG): Introduction, How Prolog works, Backtracking, CUT and FAIL operators, Built –in Goals, Lists, Search in Prolog. Foundations for Connectionist Networks, Biological Inspiration;

Different Architectures and output functions: Feed forward, Feedback, Recurrent Networks, step, Sigmoid and different functions.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Dean, T., Allen, J., & Aloimonos, Y. (1995). Artificial intelligence: theory and practice. Benjamin-Cummings Publishing Co., Inc..*
- *Winston, P. H. (1992). Artificial intelligence. Addison-Wesley Longman Publishing Co., Inc..*

Web Sources

- *https://www.tutorialspoint.com/artificial_intelligence/index.htm*
- *https://www.javatpoint.com/artificial-intelligence-ai*
- *https://intellipaat.com/blog/tutorial/artificial-intelligence-tutorial/*
- *https://www.w3schools.com/ai/default.asp*
- *https://www.guru99.com/ai-tutorial.html*
- *https://youtu.be/BaFz5q9Ffkg*
- *https://youtu.be/JMUxmLyrhSk*
- *https://www.mygreatlearning.com/blog/artificial-intelligence-tutorial/*

Course Title: Programming using Python
Course Code: MIT212

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand basic of Python Programming
2. Apply conditional and looping constructs.
3. Learn basic algorithmic problem-solving techniques (decision structures, loops, functions).
4. Know the basics of Strings and Dictionaries of programming.

Course Content

UNIT I **15 hours**

Introduction to Python Getting Started: Introduction to Python- an interpreted high-level language, interactive mode and script mode.
Variables, Expressions and Statements: Values, Variables and keywords; Operators and Operands in Python: (Arithmetic, relational and logical operators), operator precedence, Expressions and Statements (Assignment statement); Taking input (using raw_input() and input()) and displaying output(print statement);Putting Comments
Conditional constructs and looping: if else statement While, for (range function), break, continue, else, pass, Nested loops, use of compound expression in conditional constructs and looping

UNIT II **15 hours**

Functions: Importing Modules (entire module or selected objects), invoking built in functions, functions from math module, using random() and randint() functions of random module to generate random numbers, composition.
Defining functions, invoking functions, passing parameters, scope of variables, void functions and functions returning values, flow of execution

UNIT III **16 hours**

Strings: Creating, initializing and accessing the elements; String operators: +, *, in, not in, range slice [n:m]; Comparing strings using relational operators; String functions & methods: len, capitalize, find, isalnum, isalpha, isdigit, lower, islower, isupper, upper, lstrip, rstrip, isspace, istitile, partition, replace, join, split, count, decode, encode, swapcase, Pattern Matching
Lists: Concept of mutable lists, creating, initializing and accessing the elements, traversing, appending, updating and deleting elements; List

operations (joining, list slices); List functions & methods: len, insert, append, extend, sort, remove, reverse, pop

UNIT IV **14 hours**

Dictionaries: Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, traversing, appending, updating and deleting elements. Dictionary functions & Methods: cmp, len, clear(), get(), has_key(), items(), keys(), update(), values()

Tuples: Immutable concept, creating, initializing and accessing the elements in a tuple; Tuple functions: cmp(), len(), max(), min(), tuple()

Input and Output: Output Formatting, Reading and Writing Files

Errors and Exceptions: Syntax Errors, Exceptions, Handling Exceptions, Raising Exceptions, User-defined Exceptions, Defining Clean-up Actions, Predefined Clean-up Actions

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Dawson Michael.Programming with python, A users Book Cengage Learning*
- *Beazley Davi. Python Essential Reference, Third Edition*

Web Sources

- *https://www.w3schools.com/python/python_syntax.asp*
- *https://www.pythontutorial.net/python-basics/*
- *https://www.geeksforgeeks.org/python-programming-language/*
- *https://www.programiz.com/python-programming*
- *https://www.tutorialspoint.com/python/index.htm*
- *https://www.javatpoint.com/python-functions*
- *https://www.guru99.com/python-tutorials.html*
- *https://www.learnpython.org/*

Course Title: Data Structure Lab

Course Code: MIT213

L	T	P	Credits
0	0	4	2

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Create the applications of data structures.
2. Solve the algorithmic problems like insertion and deletion of data.
3. Interpret the programming code to implement the Link List Structure.
4. Implement the insertion and deletion on BST and heap sort.

Course Content

1. Program to input 1-D Array
2. Program to perform insertion in Arrays
3. Program to perform deletion in Arrays
4. Program to input 2-D arrays (Matrices)
5. Program to find transpose of a matrix. Multiply 2 matrices.
6. Program to implement sparse matrices.
7. Program to perform linear search
8. Program to perform Binary search
9. Program to reverse array without using another variable.
10. Program to perform Bubble sort.
11. Program to perform sorting using Selection Sort.
12. Program to perform sorting using Insertion Sort.
13. Program to input and traverse N-nodes in a one way linked list.
14. Program to reverse a one way linked list.
15. Program to perform insertion/deletion in linked lists.
16. Program to input and traverse doubly linked list.
17. Program to implement stack operations.
18. Program to implement Queues.
19. Program to find factorial using recursion.
20. Program to print Fibonacci series using recursion.
21. Program to input a BST.
22. Program to perform insertion in a BST.
23. Program to perform deletion in a BST.
24. Program to implement min-heaps.
25. Program to implement max-heaps.
26. Program to implement AVL trees.
27. Program to perform rotations in AVL trees.
28. Program to perform rotations in AVL trees.
29. Program to input a graph.
30. Program to print adjacency list of a graph.
31. Program to perform traversal in graphs using DFS.
32. Program to perform traversal in graphs using BFS.

33. Program to implement shortest path methods.
34. Programs to perform Dynamic memory allocation.
35. Programs to perform sorting on data stored in a file.
36. Programs to delete duplicates in arrays and linked lists.

Course Title: Programming using Python Lab
Course Code: MIT214

L	T	P	Credits
0	0	4	2

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Demonstrate proficiency in writing Python programs.
2. Summarize and describe the flow control structures (conditionals, loops) in Python.
3. Utilize Python libraries and modules to extend the functionality of their programs
4. Debug and fix errors in Python programs using appropriate debugging techniques.

Course Content

1. Write a Program to Install Python.
2. Write a Program to print Hello Your Name in Python.
3. Write a Program to Add numbers and Concatenate strings
4. Write a Program to take Input from user
5. Write a Program to making a sum of first 10 natural number through Loops in python
6. Write a Program to making a Student Result through nested IF-Else Conditional Statements
7. Write a Program to make Calculator through Functions
8. Write a Program to show working of Math library
9. Write a Program to implement the String Operations
10. Write a Program to Illustrate the Exceptional Handling
11. Write a Program to Random Numbers/String Generation in Python
12. Write a Program to show working on List
13. Write a Program to show working of Dictionary
14. Write a Program to show working of Tuple
15. Write a Program to show working of file Handling
16. Write a Program to delete the file from the system through File Handling

Course Title: Digital Electronics
Course Code: MIT202

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Solve the conversions of various number systems.
2. Learn the basics of Logic Gates.
3. Analyze and Design various combinational and sequential circuits.
4. Analyze and prevent various hazards and timing problems in a digital design.

Course Content

UNIT I **12 hours**

Information Representation: Number systems, Integer and floating point representation, character codes (ASCII, EBCDIC).

Digital IC's: Logic gates, flip-flops, clocks and timers, shift registers, counters.

UNIT II **12 hours**

Boolean Algebra & Circuit Design: Basic laws of Boolean algebra, circuit design using standard (NAND) gates, Adder, coder / De-multiplexer, encoder / multiplexer design.

UNIT III **11 hours**

MOS & LSI Digital Systems: Semiconductor memory, static and dynamic devices, read only & random access memory chips, PROMS and EPROMS. Address selection logic. Read and write control timing diagrams for memory ICs.

UNIT IV **10 hours**

Logical Families: TTL, STTL, CMOS logic families.

Digital Peripherals: Keyboard, multiplexed seven segment display, CRT display schemes, Printers, Control interfaces (parallel and serial) for the peripheral units.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Maini, A. K. (2007). Digital electronics: principles, devices and applications. John Wiley & Sons.*
- *Cook, N. P. (2001). Digital electronics with PLD integration.*

- *Rosenberg, P. (2005). Audel Basic Electronics (Vol. 29). John Wiley & Sons*

Web Sources

- *https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/*
- *https://www.tutorialspoint.com/digital_circuits/index.htm*
- *https://youtu.be/DBTna2ydmC0*
- *https://youtu.be/XrSgsJ-28Do*
- *https://codescracker.com/digital-electronics/*
- *https://www.tutorialandexample.com/digital-electronics-tutorial*

Course Title: Machine Learning
Course Code: MIT210

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Recognize the basic concepts of Bayesian Decision Theory.
2. Apply structured thinking to unstructured problems.
3. Class conditional probability distributions.
4. Apply Multi-Layer Perceptions and Back Propagation learning.

Course Content

UNIT I **10 hours**

Overview and Introduction to Bayes Decision Theory: Machine intelligence and applications, pattern recognition concepts classification, regression, feature selection, supervised learning class conditional probability distributions, Examples of classifiers bayes optimal classifier and error, learning classification approaches.

UNIT II **12 hours**

Linear machines: General and linear discriminates, decision regions, single layer neural network, linear reparability, general gradient descent, perception learning algorithm, mean square criterion and widrow-Hoff learning algorithm; multi-Layer perceptions: two-layers universal approximates, back propagation learning, on-line, off-line error surface, important parameters.

UNIT III **11 hours**

Learning decision trees: Inference model, general domains, symbolic decision trees, consistency, learning trees from training examples entropy, mutual information, ID3 algorithm criterion, C4.5 algorithm continuous test nodes, confidence, pruning, learning with incomplete data
Instance-based Learning: Nearest neighbor classification, k-nearest neighbor, nearest neighbor error probability

UNIT IV **12 hours**

Machine learning concepts and limitations: Learning theory, formal model of the learnable, sample complexity, learning in zero-bayes and realizable case, VC-dimension, fundamental algorithm independent concepts, hypothesis class, target class, inductive bias, occam's razor, empirical risk, limitations of inference machines, approximation and estimation errors, Trade off.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Zhang, C., & Ma, Y. (Eds.). (2012). Ensemble machine learning: methods and applications. Springer Science & Business Media.*
- *Marsland, S. (2011). Machine learning: an algorithmic perspective. Chapman and Hall/CRC..*
- *C. M. Bishop.Pattern Recognition and Machine Learning, Springer, (2006).*

Web Sources

- *https://www.geeksforgeeks.org/machine-learning/*
- *https://www.javatpoint.com/machine-learning*
- *https://www.w3schools.com/python/python_ml_getting_started.asp*
- *https://www.simplilearn.com/tutorials/machine-learning-tutorial*
- *https://www.tutorialspoint.com/machine_learning/index.htm*
- *https://www.kaggle.com/learn/intro-to-machine-learning*

Course Title: Parallel Processing
Course Code: MIT211

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Learn fundamental concepts of concurrency and parallelism.
2. Attain the major concepts and ideas in parallel computing and its applications.
3. Measure runtime performance of parallel programs and improve performance bottlenecks.
4. Compare the various models of parallelism (e.g., shared versus distributed memory models) and their strengths and limitations.

Course Content

UNIT I **10 hours**

Introduction: Paradigms of parallel computing: Synchronous - vector/array, SIMD, Systolic; Asynchronous -MIMD,
Hardware taxonomy: Flynn's classifications, Handler's classifications.
Software taxonomy: Kung's taxonomy.

UNIT II **12 hours**

Abstract parallel computational models: Combinational circuits, Sorting network, PRAM models, Interconnection RAMs. Parallelism approaches - data parallelism, control parallelism
Performance Metrics: Laws governing performance measurements. Matrices - speedups, efficiency, communication overheads, single/multiple program performances.

UNIT III **12 hours**

Parallel Processors: Taxonomy and topology - shared memory multiprocessors, distributed memory networks, Processor organization - Static and dynamic interconnections, Embeddings and simulations.

UNIT IV **11 hours**

Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional programming.
Scheduling and Parallelization: Scheduling parallel programs, Loop scheduling, Parallelization of sequential programs, Parallel programming support environments.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Krishnamurthy, E. V. (1990). Parallel processing: principles and practice. Addison-Wesley Longman Publishing Co., Inc..*
- *LewisT.G. Parallel Programming: A Machine-Independent Approach, IEEE Computer Society Press, Los Alamitos, (1994).*

Web Sources

- *https://www.techtarget.com/searchdatacenter/definition/parallel-processing#:~:text=Parallel%20processing%20is%20a%20method,time%20to%20run%20a%20program.*
- *https://www.javatpoint.com/parallel-processing*
- *https://www.spiceworks.com/tech/iot/articles/what-is-parallel-processing/*
- *https://www.geeksforgeeks.org/what-is-parallel-processing/*
- *https://www.techopedia.com/definition/4598/parallel-processing*
- *https://www.tutorialspoint.com/what-is-parallel-processing*

Course Title: Computer System Architecture
Course Code: MIT215

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Determine the designing process of combinational and sequential circuits.
2. Understanding of instruction pipelining and RISC architecture.
3. Simplify Boolean expressions.
4. Design basic Gates, Sequential & Combinational circuits.

Course Content

UNIT I **10 hours**

Boolean Algebra: Boolean operations, Truth Tables, Boolean Laws, K-maps (2,3 and 4 variable maps, don't care about conditions).
Basic Gates, Combinational logic design: half-adder, full adder, parallel adder.

UNIT II **12 hours**

Sequential circuits: concept, flip-flops (D, RS, JK, T), counters (Ripple, Asynchronous, Synchronous). Instruction codes, Instruction formats, Instruction cycle, addressing modes.

UNIT III **10 hours**

Register Transfer Language, Arithmetic, Logic and Shift micro-operations, Arithmetic Logic Shift unit
Control Memory: Design of control unit, Microprogrammed and hardwired control unit (overview only), Features of RISC and CISC

UNIT IV **13 hours**

Memory Organization: memory hierarchy, Memory types: cache, associative and other types. I/O organization: I/O interface, Modes of data transfer: Programmed I/O, Interrupt initiated I/O, DMA, Block diagram depicting architecture of 8085 machine.

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *M.M. Mano.Computer System Architecture. Third Edition, Prentice-Hall of India, 2002.*
- *A.S.Tanenbaum. (1999).Structured Computer Organisation. Prentice-Hall of India,*
- *William Stallings.(2002)Computer Organisation and Architecture. 6th Edition, Pearson Education.*

Web Sources

- *https://www.javatpoint.com/computer-organization-and-architecture-tutorial*
- *https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/*
- *https://www.learncomputerscienceonline.com/computer-organization-and-architecture/*
- *https://www.gatevidyalay.com/computer-organization-architecture/*

Course Title: Software Engineering & Testing
Course Code: MIT216

L	T	P	Credits
3	0	0	3

Total Hours: 45

Learning Outcomes After completion of this course, the learner will be able to:

1. Analyze and model customer's requirements and model its software design.
2. Estimate cost and efforts required in building software.
3. Analyze and compute impact of various risks involved in software development.
4. Design and build test cases, and to perform software testing.

Course Content

UNIT I **12 hours**

Introduction: Software Engineering – A Layered Approach; Software Process – Process Framework, Umbrella Activities; Process Models – Waterfall Model, Incremental Model, and Evolutionary process Model (Prototyping, Spiral Model); Introduction to Agile – Agility Principles, Agile Model – Scrum.

Software Requirements Analysis and Specifications: Use Case Approach, Software Requirement Specification Document, Flow oriented Modeling, Data Flow Modeling, Sequence Diagrams.

UNIT II **11 hours**

Design Modeling: Translating the Requirements model into the Design Model, The Design Process, Design Concepts – Abstraction, Modularity and Functional Independence; Architectural Mapping using Data Flow.

Software Metrics and Project Estimations: Function based Metrics, Software Measurement, Metrics for Software Quality; Software Project Estimation (FP based estimations, COCOMO II Model); Project Scheduling (Timeline charts, tracking the schedule).

UNIT III **12 hours**

Quality Control and Risk Management: Quality Control and Quality Assurance, Software Process Assessment and Improvement Capability Maturity Model Integration (CMMI); Software Risks, Risk Identification, Risk Projection and Risk Refinement, Risk Mitigation, Monitoring and Management.

UNIT IV **10 hours**

Testing and maintenance: Software Testing Techniques, Software testing fundamentals: objectives principles,testability;test case design, Unit testing: white box testing, basis path testing: Control structure testing: Black box testing, testing for specialized environments, Software Reliability and Quality Assurance: Quality concepts, Software quality

assurance: SQA activities; Software reviews; cost impact of software defects, defect amplification and removal; formal technical reviews: The review meeting, review reporting record keeping, review guidelines; Formal approaches to SQA;

Transaction Mode

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Pressman Roger S, Software Engineering - A Practitioner's Approach, MGH, New Delhi, New Delhi. Publications, New Delhi.*
- *Ian Sommerville, Software Engineering, Pearson Education, 5th Edition, New Delhi*
- *Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publications,New Delhi.*
- *Mall Rajib, Fundamentals of Software Engineering, PHI, New Delhi.*
- *Ali Bethforooz, Frederick J. Software Engineering Fundamentals, Hudson Oxford University.*

Web Sources

- *https://www.tutorialspoint.com/software_engineering/index.htm*
- *https://www.javatpoint.com/software-engineering*
- *https://www.geeksforgeeks.org/software-engineering/*
- *https://www.tutorialsduniya.com/notes/software-engineering-notes/*
- *https://ecomputernotes.com/software-engineering/levels-of-software-testing*

Course Title: Essentials of Digital Marketing
Course Code:MIT217

L	T	P	Credits
3	0	0	3

Total Hours:45

Learning Outcomes After completion of this course, the learner will be able to:

1. Develop strategies for online marketing.
2. Create effective email and social media campaigns.
3. Optimize websites for search engines.
4. Analyze data and manage online reputation.

Course Contents

UNIT I **12 Hours**

Introduction to Marketing, Importance and Scope of Marketing, Elements of Marketing - Needs, Wants, Demands, Consumer, Markets and Marketers; Marketing vs Sales. Introduction to Digital Marketing, Benefits & Opportunity of Digital Marketing, Inbound and Outbound Marketing, Content Marketing, Understanding Traffic, Understanding Leads, Digital Marketing use in 'Business to Business' (B2B), 'Business to Consumer' (B2C) and 'Not-for Profit' marketing

UNIT II **13 Hours**

Search Marketing (SEO): Introduction to Search Engine, Search Engine Optimization (SEO), importance of SEO for business websites, Search Results & Positioning, Benefits of Search Positioning, Role of Keywords in SEO, Meta Tags and Meta Description, On-page & Off-page optimization, Back Link, Internal & External Links, Ranking, SEO Site Map, Steps for B2B SEO and B2C SEO, Advantages & Disadvantages of SEO.

Email Marketing: Introduction to Email Marketing, Elements of Email, Email List Generation, Email Structure, Email Delivery, Online Data Capture, Offline data Capture, Creating an Email campaign, Campaign Measurement, Concept of A/B testing & its use in email marketing.

UNIT III **10 Hours**

Digital Display Advertising: Concepts, Benefits, Challenges, Ad Formats, Ad Features, Ad Display Frequency. Overview of Google AdWords.

Social Media Marketing: Key Concepts, Different Social Media Channels – Facebook, YouTube, Twitter, Instagram, Business Page- Setup and Profile, Social Media Content, Impact of Social Media on SEO, Basic concepts – CPC, PPC, CPM, CTR, CR. Importance of Landing Page. How to create & test landing Pages. User Generated Content (Wikipedia etc.), Multimedia - Video (Video Streaming, YouTube etc), Multimedia - Audio & Podcasting (iTunes etc), Multimedia - Photos/Images (Flickr etc).

UNIT IV **10 Hours**

Introduction to Mobile Marketing, Overview of the B2B and B2C Mobile Marketing, Use of Mobile Sites, Apps (Applications) and Widgets, Overview of Blogging Web Analytics: Introduction to Web Analytics, Web Analytics – Types & Levels, Introduction of Analytics Tools and its use case (Google Analytics and others), Analytics Reporting, Traffic and Behaviour Report, Evaluate Conversion.

Transactional Modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Charles Worth, A. (2014). Digital marketing: A practical approach. Routledge*
- *Stokes, R. (2011). EMarketing: The essential guide to digital marketing (Vol. 563). Quirk eMarketing.*
- *Chaffey, D., & Smith, P. R. (2017). Digital marketing excellence: planning, optimizing and integrating online marketing. Routledge.*

Web Sources

- *https://www.investopedia.com/terms/d/digital-marketing.asp*
- *https://study.com/learn/lesson/web-presence-overview-importance.html*

Course Title: Communication Skills
Course Code: MIT218

L	T	P	Credits
2	0	0	2

Total Hours: 30

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand the basic grammar, sentence construction and vocabulary.
2. Apply comprehension and writing skills.
3. Improve vocabulary sought through mind and word games.
4. Develop a consulting dictionary for usage of words, correct spellings and pronunciation.

Course Contents

UNIT I **8 Hours**

Communication: Concepts and definition - Importance - Process-communication - Model - Types - Mode of communication - Objectives - Inter, Intra personal Communication - Barriers - Commandments of communication.

Developing Communication Skills: a) Reading: Preparation - Reading Styles -Linear reading - Faster Reading - Reading Techniques b) Writing: Effective writing – Report writing - Speech Writing - Minutes - Communication aids - Agenda Writing - Letters – Article writing - Improving English language Writing - When to write and when not to write.

Listening and Speaking: a) Listening: Listening - Importance - Art of Listening -Advantages - Mode of expression - Listening tests b) Speaking: Art of conversation – Using telephone - Methods of asking questions - Brainstorming - Presenting reports –Improving speech delivery - Expressing Techniques

UNIT II **7 Hours**

Interview Techniques: What and Why? - Types of Interviews – Understanding the intricacies - Planning for interviews - Answering skills – Effective Communication during interviews - TIPS - Mock Interview.

Group Discussion: Group Discussion - Purpose - Process of Group Discussion -Preparation - Getting Started - Art of guiding and controlling discussion - Personality test through group discussion - Lateral thinking - Participation techniques - mock G.D.

UNIT III **7 Hours**

Body Language: Origin and development of body language - Tool for personality identification - Analysis of body language - Types - Desirable body language - Attitude and body language - Body language as a powerful communication.

Negotiation Techniques: Meaning - Importance - Fundamentals - Preparation -Techniques of Negotiation - Managing process of negotiation.

UNIT IV **8 Hours**

Presentation: Meaning and types of presentation - Understanding the audience -Planning - Designing - Written and oral - Making use of notes and outlines _ Techniques for delivering presentation - personal style - A postscript - model presentation.

Transactional Modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Simon Sweeney, "English for Communication", 2nd Edition, CUP, 2003.*
- *Leo Jones and Richard Alexander, "New International Business English", CUP, 2000.*
- *Essentials of Business Communication, Rajendra Pal. JS Korlahalli.*

Web Sources

- *https://haiilo.com/blog/top-5-communication-skills-and-how-to-improve-them/*
  https://corporatefinanceinstitute.com/resources/management/communication/
- *https://www.thebalancemoney.com/communication-skills-list-2063779*
- *https://www.skillsyouneed.com/ips/communication-skills.html*

Semester-III

Course Title: Research Methodology
Course Code: MIT312

L	T	P	Credits
4	0	0	4

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand key research methodology concepts and issues
2. Identify the role and importance of research in the Computer Applications
3. Analyze appropriate research problem and parameters
4. Implement the basic concepts of research and its methodologies

Course Contents

UNIT I **15 Hours**

Research: its concept, nature, scope, need and Objectives of Research, Research types, Research methodology, Research process – Flow chart, description of various steps, Selection of research problem.

UNIT II **15 Hours**

Research Design: Meaning, Objectives and Strategies of research, different research designs, important experimental designs,

Methods of Data Collection and Presentation: Types of data collection and classification, Observation method, Interview Method, Collection of data through Questionnaires, Schedules, data analysis and interpretation, editing, coding, content analysis and tabulation

UNIT III **15 Hours**

Sampling Methods:

Different methods of Sampling: Probability Sampling methods, Random Sampling, Systematic Sampling, Stratified Sampling, Cluster Sampling and Multistage Sampling. Non probability Sampling methods, Sample size.

UNIT IV **15 Hours**

Report writing and Presentation: Types of reports, Report Format – Cover page, Introductory page, Text, Bibliography, Appendices, Typing instructions, Oral Presentation

Transactional Modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Panneerselvam, R, Research Methodology, PHI, New Delhi.*
- *Cooper, D.R.,Schindler,P.S., Business Research Methods, Tata McGraw Hill*
- *Gupta S P,Statistical Methods, Sultan Chand & Sons, Delhi*
- *Ronald E Walpole, Probability and Statistics for Engineers and Scientists (International Edition), Pearson Education.*
- *Geode, Millian J. & Paul K. Hatl, Methods in Research, McGraw Hills, New Delhi*
- *Kothari C.R., Research Methodology, New Age Publisher*
- *Sekran, Uma, Business Research Method, Miley Education, Singapore*

Web Sources

- *https://www.academia.edu/*
- *https://www.studeersnel.nl*
- *https://www.scribd.com*

Course Title: Research Proposal

L	T	P	Credits
0	0	8	4

Course Code: MIT398

Learning Outcomes

After completion of the course, the learner willbe able to

1. Get deep insights to collect, review and analyze the related literature.
2. To apply the knowledge to formulate hypothesis & design research process.
3. Find the research titles which are significant, applicable and researchable.
4. Interpret the findings to design statistical strategies & write references, bibliography and webliography.

Course Content

A research proposal contains all the key elements involved in the research process and proposes a detailed information to conduct the research.
The students are supposed to prepare the research proposal of any research area of their choice following these steps:

1. Selection of topic
2. Significance of the research area
3. Formulation of hypothesis/Research questions
4. Review of related literature
5. Method & Procedure (Includes sampling & design)
6. Data collection and proposed statistical analysis
7. Delimitations
8. Reference/Bibliography

Evaluation

The students will have to complete the writing process of each topic given above within one week, which will be evaluated at the end of every week. It will consist of 8 marks each. The final proposal shall be of 15 marks, Viva 16 marks and attendance 5 marks.

Transaction Mode

Collaborative learning, Group Discussion, E team Teaching, Activities, Assessments, Collaborative teaching, Peer Teaching, Video Based Teaching, Quiz, Open talk, E team Teaching, Case analysis, Flipped Teaching

Course Title: Ethics & IPR
Course Code: MIT314

L	T	P	Credits
2	0	0	2

Total Hours: 30

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand the ethics in research, scientific conduct and Plagiarism.
2. Implement the Best Practices and Publication Ethics in Computer Science.
3. Apply various Open Access Publications Initiatives and Identify the Predatory Journals using various Software tools.
4. Identify the Conflicts of interest and file Complaints and appeals against plagiarized contents.

Course Contents

UNIT I **15 Hours**

Ethics: definition, moral philosophy, nature of moral judgements and reactions, scope, Ethics with respect to science and research, Intellectual honesty and research integrity Scientific.

Misconducts: Falsification, Fabrication, and Plagiarism (FFP) Redundant publications: duplicate and overlapping publications, salami slicing, Selective reporting and misrepresentation of data,

Publication ethics: definition, introduction and importance

UNIT II **15 Hours**

Introduction to Intellectual Property rights: Concept & theories, Kinds of intellectual Property Rights, Advantages & Disadvantages of IPR, Development of IPR in India, Role & Liabilities of IPRs in India. Rights of trademark-kind of signs used as trademark-types, purpose & functions of a trademark, trademark protection, trademark registration, selecting and evaluating trade mark, trade mark registration process.

Transactional Modes

Lecture Method, E-Team Teaching, Video based learning, Demonstration, Peer Discussion, Open talk, Cooperative Teaching, Flipped Teaching, Collaborative Learning**.**

Suggested Readings

- *Muralidhar Kambadur, Ghosh Amit, Singhvi Ashok Kumar. (2019). ETHICS in Science Education Research and Governance, Indian National Science Academy New Delhi, India*
- *Gupta Sudhir, Kamboj Sushil.(2020). Research and Publication Ethics. Alexis Press LLC.*
- *Paul Oliver.(2010). The Student's Guide to Research Ethics, Open University Press.*

Web Sources

- *https://en.wikipedia.org/wiki/Ethics*
- *https://psychologydictionary.org/publication-ethics/*
- *https://blog.ipleaders.in/ipr-description/*

Course Title: Proficiency in Teaching
Course code: MIT397

L	T	P	Credits
2	0	0	2

Total Hours: 30

Learning Outcomes

After completion of this course, the learner will be able to:

1. Design the learner-centered instructional plans and learning outcomes.
2. Apply innovative teaching strategies and technologies to engage learners.
3. Analyze the different assessment methods to evaluate student learning.
4. Reflect on teaching experiences and continuously improve teaching practices.
5. Develop effective communication and classroom management skills.

Course content

UNIT I **10 Hours**

Overview of the course and its objectives – Specify 1-2 theories or give overview of theories of learning for teaching - Understanding the role of the teacher and student in the learning process - Writing clear and measurable learning outcomes -

Meaning Nature, definition, scope, and importance Pedagogy, Andragogy, and Heutagogy – Skills-based approach to teaching (Teaching skills), Micro-teaching, Macro teaching. Methods and approaches of teaching - CAM, Structure-function approach, Synthetic and Analytic approach, Jurisprudential inquiry model

UNIT II **6 Hours**

Understanding the diverse needs and backgrounds of learners - Creating an inclusive and supportive learning environment - Facilitating active learning and student engagement strategies

Lectures, discussions, and demonstrations - Group work, collaborative learning, and cooperative learning - Problem-based learning, case studies, and simulations

UNIT III **7 Hours**

Integrating technology tools into instruction – Online, blended learning, flipped learning, and M-learning approaches - Using educational software and platforms effectively

Formative and summative assessment methods – Difference between Assessment, Evaluation and Measurement, E-assessment tools,

UNIT IV **7 Hours**

The importance of reflective practice in teaching - Self-assessment and evaluation of teaching effectiveness –Need for Professional development - Teaching in multicultural and international classrooms - Culturally responsive teaching practices

Meaning, Definition of teaching model - Assumptions, Importance, Role, and type of teaching models. Historical teaching model, Philosophical model of teaching

Transaction Mode

Discussions, Case Studies, Microteaching, Classroom Observations, Peer Teaching: Video Analysis, Role-Playing, Lecture-cum-demonstration, Classroom Simulations, Reflective Journals/Blogs, Teaching Portfolios and Technology Integration, Flipped Teaching

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SUGGESTED READINGS

- *Ali, L. (2012). Teacher education. New Delhi: APH Publishing Corporation.*
- *Anandan, K. (2010). Instructional technology in teacher education. New Delhi: APH Publishing Corporation.*
- *Bruce R Joyce and Marsha Weil, Models of Teaching, Prentice Hall of India Pvt Ltd, 1985.*
- *Chalan, K. S. (2007). Introduction to educational planning and management. New Delhi: Anmol Publications Pvt. Ltd.*
- *Chand, T. (2008). Principles of teaching. New Delhi: Anmol Publications Pvt. Ltd.*
- *Chiniwar, P. S. (2014). The technology of teaching. New Delhi: Anmol Publications Pvt. Ltd.*
- *Curzon, L. B., & Tummons, J. (2004). Teaching in future education. U.S.A: Bloomsbury Academic Publications.*
- *Das, R.C. (1993): Educational Technology – A Basic Text, Sterling Publishers Pvt. Ltd.*
- *Evaut, M. The International Encyclopedia of Educational Technology.*
- *Gage N L, Handbook of Research on Teaching, Rand McNally and Co., Chicago, 1968.*
- *Graeme, K. (1969): Blackboard to Computers: A Guide to Educational Aids, London, Ward Lock.*
- *Haas, K.B. and Packer, H.Q. (1990): Preparation and Use of Audio Visual Aids, 3rd Edition, Prentice Hall, Inc.*
- *Haseen Taj (2006): modern Educational Technology, Agra: H.P Bhargava Book House.*
- *Jarvis, M. (2015). Brilliant ideas for ICT in the classroom. New York: Routledge Publications.*

Course Title: Computer Lab
Course Code: MIT316

L	T	P	Credits
0	0	4	2

Total Hours: 60

Learning Outcomes After completion of this course, the learner will be able to:

1. Understand generating charts and graphs in Microsoft Excel.
2. Learn how to perform presentation skills.
3. Utilize the MS PowerPoint with custom animation and slide orientation.
4. Demonstrate the mechanics and uses of Word tables to organize and present data.

Course Contents

UNIT I

Generating Charts/Graphs in Microsoft Excel, PowerPoint Presentation, creating a new document with templates & Wizard, Word basics, Thesis Writing Formats & Scientific editing tools. Style Formats (MLA & APA)

UNIT II

Using Words Drawing Features, Inserting Tables – (Adding, deleting, modifying rows and columns - merging & splitting cells), Using formulas in tables, Converting text to table and vice-versa, Mail Merge tool. Managing Workbooks, Working with Worksheets

Suggested Readings

- *Leon & Leon, Introduction to Computers, Vikas Publishing House, New Delhi*
- *Saxena S., MS Office Xp for Everyone, Vikas Publishing House, New Delhi, 2007*
- *June Jamrich Parsons,Computer Concepts, Thomson Learning, 7th Edition, Bombay*
- *Reference Books:*
- *White,Data Communications & Computer Network, Thomson Learning, Bombay*
- *Comer, Computer networks and Internet", Pearson Education, 4e*

Web Sources

- *https://www.researchgate.net*
- *https://www.youtube.com/playlist?list=PLWPirh4EWFpF_2T13UeEgZWZHc8nHBuXp*

Course Title: Service Learning
Course Code: MIT396

L	T	P	Credits
0	0	4	2

Learning Outcomes

On the completion of the course, the students will be able to

1. Participate in community activities to establish connections and build relationships.
2. Evaluate community needs through conversations with community members.
3. Develop and implement initiatives that address community needs.
4. Reflect on personal growth, community impact and ethical considerations related to service activities.

Course Content

This course aims to engross students in meaningful service-learning activities that foster community linking. Students will actively participate in community-based projects, collaborate with community members and organizations and reflect on the impact of their service activities. Through this experiential learning approach, students will develop a deep understanding of community needs, build relationships with diverse stakeholders and contribute to community development.

In this course, students are expected to be present in the community throughout the semester and reflect on their experiences regularly after working with them. The students will use experiential learning for providing service learning. They will be able to analyse and have understanding of the key theoretical, methodological and applied issues.

Select 10 community related activities which are to be performed in nearby villages. Students in groups of 8-10 shall work on one activity.

Evaluation Criteria

1. Every activity shall be evaluated on the same day out of 10 marks.
2. Total 10 activities out of 100 shall be evaluated and submitted to Examination branch.

Activity Evaluation

1. Type of activity- 2 marks
2. Participation of student- 2 marks

3. Engagement in the activity- 2 marks
4. Outcome of the activities- 2 marks
5. Attendance- 2 marks

Transaction Mode

Problem-solving learning, Blended learning, Gamification, Cooperative learning, Inquiry-based learning, Visualization, Group discussion, Experiential learning, Active participation

Suggest Reading

- *"Service-Learning in Higher Education: Concepts and Practices" by Barbara Jacoby.*
- *"Learning Through Serving: A Student Guidebook for Service-Learning and Civic Engagement Across Academic Disciplines and Cultural Communities" by Christine M. Cress, Peter J. Collier, and Vicki L. Reitenauer.*
- *"Reflection: Turning Experience into Learning" by David Boud, Rosemary Keogh, and David Walker.*

"The Community Engagement Professional in Higher Education: A Competency Model for an Emerging Field" by Lina D. Dostilio.