GURU KASHI UNIVERSITY

Master of Science (Information Technology)
Session: 2022-2023

Department of Computer Applications

PROGRAM LEARNING OUTCOME

After completion the program the student will be able to:

1. Understand and 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 and 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.

Programme Structure

Semester-I						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
MIT101	Programming Using C	Core	4	0	0	4
MIT102	Fundamentals of Computers & Information Technologies	Core	4	0	0	4
MIT103	Database Management Systems	Technical skill	3	0	0	3
MIT104	Communication Skills-I	Compulsory Foundation	0	0	2	1
MIT105	S/w Lab-I(Database Management Systems)	Technical skill	0	0	4	2
MIT106	S/w Lab-II(Fundamentals of Computers & Information Technologies)	Technical skill	0	0	4	2
MIT107	S/w Lab-III(C programming)	Technical skill	0	0	4	2
MIT199		MOOC	-	-	-	0
Disciplinary Elective I (Any one of the following)						
MIT109	Web Designing	Disciplinary Elective I	3	0	0	3
MIT110	Fundamentals of Web Technology					
MIT111	Internet Concepts and Web Designing					
Open Elective Course(Any one of the following)						
MIT112	Human Resource Management	OEC	2	0	0	2
MIT113	Principles of Management System					
Total			**16**	**0**	**14**	**23**

Semester-II						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
MIT201	Data Structures	Core	4	0	0	4
MIT202	Digital Electronics	Core	4	0	0	4
MIT203	Object Oriented Programming using C++	Core	4	0	0	4
MIT204	Research Methodology	Research Skills	4	0	0	4
MIT205	S/w Lab-IV C++ Lab	Technical skill	0	0	4	2
MIT206	Community Based Project	Skill Based	0	0	4	2
Value added Course(for other departments also)						
MIT208	Teaching and Research Aptitude	**VAC**	2	0	0	2
Disciplinary Elective II (Any one of the following)						
MIT209	Artificial Intelligence	Disciplinary Elective II	3	0	0	3
MIT210	Machine Learning					
MIT211	Parallel Processing					
Total			**21**	**0**	**8**	**25**

Semester-III						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**Credits**
MIT301	Operating Systems	Core	4	0	0	4
MIT302	Computer Organization & Architecture	Core	4	0	0	4
MIT303	Data Communication	Technical skill	4	0	0	4
MIT304	Basics of Python	Technical skill	3	0	0	3
MIT305	S/w Lab-V(Introduction to Python Lab)	Technical skill	0	0	4	2
Disciplinary Elective III(Any one of the following)						
MIT306	Android Programming	Disciplinary Elective III	3	0	0	3
MIT307	Image Processing					
MIT308	Advanced Data Structure					
Disciplinary Elective IV(Any one of the following)						
MIT309	Data Mining	Disciplinary Elective IV	3	0	0	3
MIT310	Big Data					
MIT311	Advanced Database Management System					
MIT399		MOOC	-	-	-	-
Total			**21**	**0**	**4**	**23**

Semester-IV						
Course Code	**Course Title**	**Type of course**	**L**	**T**	**P**	**No. of Credits**
MIT401	Industrial Training/Internship(6 Months)	Research Skills	NA	NA	NA	20
Total						**20**

Evaluation Criteria for Theory Courses

A. Continuous Assessment: [25 Marks]

i. CE-I(10 Marks)
ii. CE-II(10 Marks)
iii. CE-III(5Marks)

(For each CE Conduct Surprise Test, Quiz, and Term Paper. Assignment etc.)

B. Attendance (5 marks)
C. Mid Semester Test-1: [30 Marks]
D. MST-2: [20Marks]
E. End-Term Exam: [20 Marks]

Evaluation Criteria for Practical Subjects

Total 20 Marks (Each Practical)

A. Performance of each practical (10 Marks)
B. Report (05 Marks)
C. Practical Viva (05 Marks)

Evaluation Criteria for Training/Internship/Survey Camp etc.

Total 25 Marks

A. Each Report(25 Marks) – Weekly/Monthly (25 Marks)

Evaluation Criteria for other courses has been given separately with the respective courses

Semester-I

Course Title: Programming using C
Course Code: MIT101

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

On the completion of this course the students will able to

1. Develop confidence for self-education and ability for life-long learning needed for Computer language.
2. Handle possible errors during program execution.
3. Build logic used in Programming.
4. Convert algorithms into programs using C.
5. Design and develop Computer programs, analyses, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.

Course Content

UNIT-I **14 hours**

1. Introduction: ANSI C standard, Overview of Compiler and Interpreters, Structure of C Program, Programming rules, Execution
2. Basic structure of C program: Character set, Identifiers and keywords, constants, variable, Data types, input and output, type conversion,

UNIT-II **16 hours**

1. Operators and expressions: Arithmetic, Unary, Logical and Relational operators, assignment operators, Conditional operators, type conversion. Library functions.
2. Input/ Output in C: Formatting input & output functions.
3. Decision making statements – if, else if
4. Control statements: branching, looping using For, While and Do-While statements, nested control structures, switch, break and continue statements.

Unit-III **15 hours**

1. Arrays: Definition, declaration, assignment, one dimensional and two dimensional arrays.
2. Strings: input/output of strings, string handling functions, table of strings.
3. Pointers: pointer data type, pointer declaration, initialization, accessing values using pointers.
4. Functions: prototype, definition and call, formal and actual arguments, methods of parameter passing to functions, recursion versus iteration.

Unit-IV **15 hours**

1. Files: Structures and unions: using structures and unions, comparison of structure with arrays and union opening and closing files, Basic I/O operation on files.

2. Storage Classes: automatic, external, static and register variables.

Transactional modes

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

Suggested Readings

- KanetkarY.(2005). Let us C, Seventh Edition, BPB Publications, New Delhi.
- Oualline, S. (1997). Practical C programming. " O'Reilly Media, Inc.".
- Kelly, A., & Pohl, I. (1990). A book on C: programming in C. Benjamin-Cummings Publishing Co., Inc..
- Kelly, A., & Pohl, I. (1990). A book on C: programming in C. Benjamin-Cummings Publishing Co., Inc..

Web Sources

- https://www.javatpoint.com/c-programming-language-tutorial
- https://www.tutorialspoint.com/cprogramming/index.htm
- https://www.programiz.com/c-programming
- https://www.geeksforgeeks.org/c-programming-language/

Course Title: Fundamentals of Computers & Information Technologies
Course Code:MIT102

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

On the completion of this course the students will able to :

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

Course Content

UNIT I **15 hours**

1. Information concepts and processing: Evolution of information processing, data, information language and communication.
2. Elements of computer processing system: Hardware-CPU, storage devices and media. VDU, input-output devices, data communication equipment, Software-system software, application software.

UNIT II **15 hours**

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

2. 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 **14 hours**

1. Computers and Communication: Single user, multi-user, work station, client server systems, Computer networks, network protocols, LAN, MAN, WAN.
2. Introducing the Internet: Description of the Internet–Working, Surfing, Internet Domain Names and Addresses

UNIT IV **16 hours**

1. Connecting LAN to Internet: Protocols, IP Address, and Web Server.
2. Internet Applications : Email , Working of email , Advantages of email, Understanding of Internet Email, Net news ,Search Engines, Introducing to Usenet ,organization of Usenet articles, reading, saving ,mailing, writing and posting of an articles.
3. WWW- World Wide Web
4. 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: Database Management Systems
Course Code: MIT103

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

On the completion of this course the students will able to

1. Develops an Entity-Relationship model based on user requirements.
2. Implements the role of the database administrator and his responsibilities.
3. Study the physical and logical database designs.
4. Apply Normalization techniques to normalize a database.
5. Declares and enforces integrity constraints on a database

Course Content

UNIT I **13 hours**

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

UNIT II **10 hours**

1. DBMS architecture, data independence, mapping between different levels.
2. Database languages: DDL, DML, DCL.
3. Database utilities, Data Models, Keys: Super, candidate, primary, foreign.

UNIT III **10 hours**

1. Entity relationship model: concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, Overview of Network and Hierarchical model.
2. Relational Data Model: concepts, constraints. Relational algebra: Basic operations, additional operations.

UNIT IV **12 hours**

1. 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, data base protection, database integrity.
2. 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

- Darrington, J., & Brower, N. (2012). Effective communication skills:" I" messages and beyond..
- 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
- https://www.youtube.com/watch?v=3EJlovevfcA

Course Title: Communication Skills-I
Course Code: MIT104

L	T	P	Credits
0	0	2	1

Total Hours: 30

Course Outcomes

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

1. Take a course overview of prerequisites to Business Communication and awareness of appropriate communication strategies.
2. Formulate an outline for effective Organizational Communication.
3. Summarize the information, ideas, concepts and opinions from a variety of sources.
4. Attain the competence in oral, written, and visual communication.
5. Learn the correct practices about the strategies of Effective Business writing.

Course Content

UNIT I **8 hours**

1. English Language: Sentence, Parts of speech, Tenses, Active passive voice, Direct/Indirect speech, Creative writing& vocabulary, Comprehension passage, Reading of Biographies of at least 10 IT business personalities.

UNIT II **7 hours**

1. Business communication: Types, Medias, Objectives, Modals, Process, Importance Understanding Barriers to communication & ways to handle and improve barriers.

2. Listening skills: Its importance as individual and as a leader or as a worker, Types of listening and Traits of a good listener, Note taking, barriers to listening & remedies to improve listening

UNIT III **7 hours**

1. Non verbal Communication- understanding what is called non verbal communication ,its importance as an individual, as a student, as a worker and as a leader, its types.
2. Presentation skills-Its Purpose in business world, How to find material for presentation, How to sequence the speech with proper introduction and conclusion, How to Prepare PPT& Complete set of required body language while delivering presentation

UNIT IV **8 hours**

1. Reading Skills- to enhance independent reading, Comprehension Passages, News / Magazine articles on stereotype topics, Poems – Abu Ben Adhem, The Tiger
2. Writing skills- Importance of reading and writing, improving writing skills through Basic cohesive paragraph writing, resume writing, Job application writing/acceptance letter

Transaction Mode

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

Suggested Readings

- Grover, S. M. (2005). Shaping effective communication skills and therapeutic relationships at work: The foundation of collaboration. Aaohn journal, 53(4), 177-182.
- Asemanyi, A. A. (2015). An Assessment of Students' Performance in Communication Skills: A Case Study of the University of Education Winneba. Journal of Education and Practice, 6(35), 1-7.

Web Sources

- https://www.javatpoint.com/spoken-english\
- https://www.tutorialspoint.com/spoken_english_errors/index.htm
- https://basicenglishspeaking.com/
- https://www.slideshare.net/sqjafery/reading-skill-writing-skill-115779671

Course Title: S/w Lab-I(Database Management Systems)

Course Code: MIT105

L	T	P	Credits
0	0	4	2

Total Hours: 60

Course Outcomes

On the completion of the course the students 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. Get practical knowledge on designing and creating relational database systems.
4. Design the concept of inbuilt functions.
5. 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: S/w Lab-II(Fundamentals of Computers & Information Technologies)

Course Code: MIT106

L	T	P	Credits
0	0	4	2

Total Hours: 60

Course Outcomes:

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

1. Compose, format and edit a word document.
2. Send email messages (with or without attachments).
3. Navigate and search through the internet.
4. Familiarizing with Open Office (Word processing, Spreadsheets and Presentation).
5. Utilize the Ms. Power point.

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: S/w Lab-III(C programming)
Course Code: MIT107

L	T	P	Credits
0	0	4	2

Total Hours: 60

Course Outcomes:

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

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

Course Content

1. Program to find sum of two numbers.
2. Program to test whether an entered number is even, odd or zero.
3. Program to test whether an entered number is prime number or not.
4. Program to print N terms of a Fibonacci Series.
5. Program to find the reverse of number.
6. Program to check whether a given Number or a given string is palindrome or not.
7. Program to reverse a given string.
8. Program to check whether a given number is prime or not.
9. Program to find the prime numbers up to N.
10. Program to print:

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11. Program to search a string in an array using read-data.
12. Program to find the frequency of vowels in a given string.
13. Program to find the frequency of each character in a given string.
14. Program to find greatest in a matrix using subroutine.
15. Program for Matrices Addition. And subtraction.
16. Program for Matrix Transpose.
17. Program to find sum of rows and column of a matrix.
18. Program to find sum of both diagonals of the matrix.

Course Title: Web Designing
Course Code: MIT109

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Learn the language of web: HTML/CSS.
2. Understand the principles of creating an effective web page
3. Summarize managing web page styles using java script and CSS.
4. Understand how the HTML, CSS and JavaScript components of Bootstrap work
5. Develop a fully functioning website and deploy on a web server.

Course Content

UNIT I **10 hours**

1. Introduction HTML Documents, various Tags, Text Elements, Tag Elements, Special Character elements Structural elements of HTML documents: Header tags, Body tags, Paragraphs, Titles, Numbered list, Non, Numbered lists, Definition lists, Formatting HTML Documents
2. Managing images in Html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images, Frames, Tables in HTML, Internal Links, External Links, Link Tags, Links with images and buttons, Links that send email messages Text fonts, Sensitive Images, Tip tables, Page

UNIT II **11 hours**

1. Cascading Style Sheets: ways of inserting a style sheet:
    - External style sheet
    - Internal style sheet
    - Inline style
2. CSS Id and Class, Inheritance in CSS

UNIT III **12 hours**

1. Bootstrap: Introduction to Bootstrap, Bootstrap 3 vs. Bootstrap 4 , Setting up Environment , Bootstrap 4 Basic Template, Containers, container-fluid, Container Padding , Grid Classes , Display Headings, More Typography Classes , Text Colors, Carousel, Cards, Buttons,Button group, Navbar , Tooltip

UNIT IV **12 hours**

1. JavaScript Introduction: JavaScript Syntax, JavaScript Variables, JavaScript Data Types, JavaScript Operators, JavaScript Comments, JavaScript if else and else if , Loop ,JavaScript Functions, JavaScript Events, Arrow Function
2. JavaScript HTML DOM: JavaScript HTML DOM methods, Finding HTML Elements, Changing HTML Elements, Adding and Deleting Elements, Changing the Value of an Attribute, Changing CSS, DOM Event Listener, Add an Event Handler to an Element JSON, Exchanging Data, Sending Data, Receiving Data, Storing Data

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: Fundamentals of Web Technology
Course Code: MIT110

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Attain the basic knowledge about HTML Tags, List and their types.
2. Create the hyper- link of documents in HTML and frames using tables.

3. Design the forms with various attributes like Buttons, Text Area.
4. Develop a web site with the use of HTML tags and CSS.
5. Formulate a domain name for website and upload website on a Remote Server.

Course Content

UNIT I **11 hours**

1. HTML: Introduction, HTML Tags, Commonly used HTML Commands, Structure of HTML Program, Formatting, Text Styles, and Text Effects
2. HTML: HTML Lists, Types of lists, adding graphics to HTML Document

UNIT II **10 hours**

1. HTML: Creating tables, Linking documents, Frames
2. HTML Forms: Properties and Methods, Button, Text, Text Area, Checkboxes, radio buttons, select and option elements

UNIT III **12 hours**

1. Web Development: Web site, Web page, Static Website and Dynamic Website
2. HTML: Web Server, Web Client/ Browser
3. DHTML: Cascading Style Sheets, Class, External Style Sheets

UNIT IV **12 hours**

1. Introduction to JavaScript:How& Where to put the JavaScript Code, JavaScript Statements, Comments,Variables, Operators, Control Statements, Loops, Popup Boxes, Functions.
2. Purchasing a Domain Name & Web Space: Domain Name & Web Space, Getting a Domain Name & Web Space (Purchaseor Free), Uploading the Website to Remote Server.
3. Internet: Basic Concepts, Communicating on the Internet, Internet Domains, Establishing connectivity to the Internet, Client IP Address, IP Address.

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_desig
  n.asp

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

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

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

Course Content

UNIT I **10 hours**

1. Introduction The World Wide Web (WWW) , History, Hypertext and Hypertext Markup Language, Microsoft Front Page, HTML Documents, various Tags.
2. 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, Definition lists.
3. Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed).

UNIT II **10 hours**

1. Managing images in Html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images, Frames.
2. Tables in HTML documents Hypertext and Link in HTML Documents, URL/FTP/HTTP
3. Types of links: Internal Links, External Links, Link Tags, Links with images and buttons, Links that send email messages

UNIT III **12 hours**

1. Special effects in HTML documents: Text fonts, Sensitive Images, Tip tables, Page background (Variable, Fixed), Rotating messages (Marquee)
2. Managing forms: Interactive forms, creating data entry forms

3. Cascading Style Sheets: ways of inserting a style sheet:
   - External style sheet
   - Internal style sheet
   - Inline style
4. CSS Id and Class, Inheritance in CSS

UNIT IV **13 hours**

1. Scripting and websites: Java scripting
2. 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.X. 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: Human Resource Management
Course Code: MIT112

L	T	P	Credits
2	0	0	2

Total Hours: 30

Course Outcomes:

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

1. To enable the students to understand the HR Management and system at various levels in general and in certain specific industries or organizations.
2. To help the students focus on and analyse the issues and strategies required to select and develop manpower resources
3. To develop relevant skills necessary for application in HR related issues
4. To Enable the students to integrate the understanding of various HR concepts along with the domain concept in order to take correct business decisions
5. Demonstrate competence in development and problem-solving in the area of HR Management

Course Content

UNIT I **7 hours**

1. Human Resource Management- Introduction, Functions, Scope, Policies & Roles, Recent developments in HRM

UNIT II **8 hours**

1. Job Analysis- Job Description, Job Specification, Human Resource Planning, Recruitment, Selection, Induction, Placement

UNIT III **8 hours**

1. Human Resource Development-Training, Executive Development, Internal Mobility, Career & Succession Planning, Separation, HRD Interventions

UNIT IV **7 hours**

1. Job Evaluation, Performance & Potential Appraisal, Compensation Administration, Incentives & Employee Benefits

Transactional modes

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

Suggested Readings

- Bernardin, H. J., & Russell, J. E. (2006). Human resource management (p. 736). New York: Tata McGraw-Hill.
- Wood, S. (1999). Human resource management and performance. International journal of management reviews, 1(4), 367-413.

Web Sources

- https://www.tutorialspoint.com/human_resource_management/index.htm
- https://www.w3schools.blog/hr-tutorial
- https://www.slideshare.net/search?searchfrom=header&q=job+analysis

- https://www.simplilearn.com/functions-of-hrm-article

Course Title: Principles of Management System
Course Code: MIT113

L	T	P	Credits
2	0	0	2

Total Hours: 30

Course Outcomes:

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

1. Apply the processes of constructing the different types of information systems.
2. Classify the concepts related to Business Applications.
3. Design and Develop Information Systems in real world business environment.
4. Implement the principles and tools of systems analysis and design.
5. Formulate and exercise the applications of computing era.

Course Content

UNIT I **7 hours**

1. Introduction: Definition of Management, its nature and purpose, Management: Science or art, Function of managers, Levels of management, Fayol's general principles of management.
2. Management and society: social responsibility of managers.
3. Planning: nature and purpose of planning, Planning versus forecasting, types of plans, steps in planning, the planning process.

UNIT II **7 hours**

1. Decision making: characteristics and importance, Programmed and non-Programmed decisions, Steps in the process of decision making.
2. Organizing: nature and purpose of organizing, formal and informal and informal organization, Organizational levels and span of management.
3. Human resource management and selection: definition of staffing, the systems approach to HRM, Recruitment and selection: sources of manpower supply, Selection process & techniques.

UNIT III **8 hours**

1. Motivation and motivators, type of motivation. Theories of motivation: Maslow's hierarchy of needs theory, Herzberg's Hygiene theory, McClelland's needs theory.
2. Leadership: definition and characteristics, Leadership theories: trait approaches to leadership, behavioural approach, situational or contingency approach to leadership. Leadership styles.

UNIT IV **8 hours**

1. Communication: meaning, characteristics and importance, Elements of communication, the communication process, Types of communications,

barriers and breakdowns in communication, making communication effective.

2. The system and process of controlling: characteristics and importance of control, the basic control process, requirements for an effective control system.

Transaction Mode

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

Suggested Readings

- Maheshwari, S. N., Maheshwari, S. K., & Maheshwari, M. S. K. (2021). Principles of Management Accounting. Sultan Chand & Sons.

Web Sources

- https://www.studocu.com/row/document/kca-university/principles-of-management/pom-324-work/48072136?origin=viewer-exit-popup
- https://kanchiuniv.ac.in/coursematerials/T1MC1%20Pronciples%20of%20management.pdf
- https://www.slideshare.net/ersmbalu/principles-of-management-lecture-notes
- http://dacc.edu.in/wp-content/uploads/2021/02/NOTES-102-Principles-of-Management-.pdf

Semester II

Course Title: Data Structures
Course Code: MIT201

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

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

1. Analyze algorithms and algorithm complexity.
2. Learn & implement searching and sorting techniques.
3. Attain knowledge of tree and graph concepts.
4. Implement link list and its applications in data structures.
5. Apply the different liner data structures like stack and queue to various computing problems.

Course Content

UNIT I **15 hours**

1. Basic concept and notations: data structures and data structures operations, mathematical notation and functions, algorithmic complexity, Big 'O' notations and time space trade off.
2. 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**

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

UNIT III **14 hours**

1. Queue: Queues and Dequeues, Priority Queues, Operations on queues.
2. 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**

1. Searching and Sorting: Linear and binary search, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Radix Sort and Quick Sort 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: Digital Electronics
Course Code: MIT202

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

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

1. Solve the conversions of various number systems.
2. Learn the basic 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.
5. Understand the basic digital circuits and to verify their operations.

Course Content

UNIT I **15 hours**

1. Information Representation: Number systems, Integer and floating point representation, character codes (ASCII, EBCDIC).
2. Digital IC's: Logic gates, flip-flops, clocks and timers, shift registers, counters.

UNIT II **14 hours**

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

UNIT III **16 hours**

1. 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 **15 hours**

1. Logical Families: TTL, STTL, CMOS logic families.
2. 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:Object Oriented Programming using C++

Course Code: MIT203

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes

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

1. Learn how C++ is more enhances language than C.
2. Compare between procedural and Object Oriented paradigms.
3. Evaluate the concept of array and string.
4. Implement copy constructor and class member function.
5. Analyze inheritance with the understanding of early binding and late binding.

Course Content

UNIT I **16 hours**

1. Introduction to C++, C++ standard library, Basics of a C++ Environment, Object Oriented Concepts, Introduction to objects and object oriented programming, Abstraction, Encapsulation, Access Modifiers: controlling access to a class, method or variable (public, protected, private).
2. Classes and Data Abstraction: Introduction, structure definition, accessing members of a structure, class scope and accessing class members, separating interface from implementation, controlling access function and utility functions, Constructors, Destructors, friend function and friend classes, using “this” pointer, static class member, function overloading.

UNIT II **14 hours**

1. Operator Overloading: Introduction, fundamentals of operator overloading, restriction on operators overloading, operator function as

class members vs. as friend functions, overloading unary operator, overloading binary operators.

2. Inheritance :Introduction , inheritance: base class, protected members, casting base class pointer to derived- class pointers, using member functions, Types of Inheritance, public, protected and private inheritance, using constructors and destructors in derived classes, implicit derived class object to base class object conversion , composition Vs. inheritance.

UNIT III **15 hours**

1. Virtual Functions and Polymorphism: Introduction to virtual function, abstract base class and concrete class, polymorphism, dynamic binding, virtual destructor, Implementation in C++ using virtual function.
2. Files and I/O Streams: Files and streams, creating a sequential access file, reading data from A Sequential access file, updating Sequential Access file, Random Access File , Creating A Random Access File, Writing data Randomly To a random Access file, Reading Data Sequentially from A Random Access File.

UNIT IV **15 hours**

1. Exception Handling: Introduction, Basic of C++ Exception Handling: Try, Catch, Throwing, Catching and Re–throwing an Exception, Exception specification, Processing Unexpected Exception.

Transaction Mode

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

Suggested Readings

- Pohl, I. (1993). Object-oriented programming using C++. Benjamin-Cummings Publishing Co., Inc..
- Wiener, R. S., & Pinson, L. J. (1988). An introduction to object-oriented programming and C++. Addison-Wesley Longman Publishing Co., Inc..
- Young, D. A. (1995). Object Oriented Programming with C++ and OSF/Motif. Prentice-Hall, Inc..
- Coad, P., & Yourdon, E. (1991). Object-oriented analysis. Yourdon press.

Web Sources

- https://www.w3schools.com/cpp/cpp_operators.asp
- https://www.w3schools.com/cpp/cpp_oop.asp
- https://www.simplilearn.com/tutorials/cpp-tutorial/oops-concepts-in-cpp
- https://www.programiz.com/cpp-programming/oop
- https://www.softwaretestinghelp.com/object-oriented-programming-

in-cpp/

- https://www.scaler.com/topics/cpp/

Course Title: Research Methodology
Course Code: MIT204

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes :

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

1. Recognize the function and significance of research in computer applications.
2. Understand the fundamentals of research methodology and the issues that affect it.
3. Identify the concepts and procedures of sampling, data collection, analysis and reporting
4. Analyze appropriate research problem and parameters.
5. Put basic research principles and procedures into practice.

Course Content

UNIT I **14 hours**

1. Introduction : Objectives of Research, Research Types, Research Methodology, Research Process – Flow chart, description of various steps, Selection of research problem.
2. Research Design: Meaning, Objectives and Strategies of research, different research designs, important experimental designs, completely randomized, randomized block, Latin Square, Factorial Experimental Design.

UNIT II **15 hours**

1. Methods of Data Collection: Types of data collection and classification, Observation method, Interview Method, Collection of data through Questionnaires, Schedules.
2. Processing and Analysis of Data:Editing, Coding, Classification of data, Statistical measures and their significance: Central tendencies, Variation, Skewness, Kurtosis. Correlation and Regression, Multiple Regression, Time Series Analysis, Parametric tests (t, z and F), Chi Square test. Analysis of Variance, One - way ANOVA Factor Analysis, Centroid Method, Computer simulations using MATLAB/SPSS.

UNIT III **15 hours**

1. Probability Distributions: Binomial, Poisson, Exponential, Normal distributions, Frequency distribution, Cumulative Frequency distribution, Relative Frequency distribution. SamplingMethods:DifferentmethodsofSampling:ProbabilitySampling methods,RandomSampling,SystematicSampling,StratifiedSampling,

ClusterSamplingandMultistageSampling. Non-Probability Sampling methods, Sample size.

UNIT IV **16 hours**

1. Testing of Hypotheses: Testing of Hypotheses concerning Mean(s), Testing of Hypotheses concerning Proportion(s),Testing of Hypotheses concerning Variance(s)
2. ReportWritingandPresentation:Typesofreports,ReportFormat– Coverpage,Introductorypage,Text,Bibliography,Appendices,Typingin structions,OralPresentation.

Transaction Mode

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

Suggested Readings

- Montgomery, D. C.(2017). *Design and analysis of experiments*. John wiley& sons.Montgomery, D. C., &Runger, G. C. (2007). *Applied statistics and probability for engineers, (With CD)*. John wiley& sons.
- Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
- Krishnaswamy, K. N., Sivakumar, A. I., &Mathirajan, M. (2006). *Management research methodology: Integration of principles, methods and techniques*. Pearson Education India.

Web Sources

- https://www.geeksforgeeks.org/introduction-to-research-methodology/
- https://www.slideshare.net/rijalcpr/research-methodology-23101947
- https://www.simplilearn.com/what-is-data-collection-article#:~:text=The%20main%20techniques%20for%20gathering,questionnaires%2C%20schedules%2C%20and%20surveys
- https://www.scribbr.com/statistics/hypothesis-testing/

Course Title: S/w Lab-IV C++ Lab
Course Code: MIT205

L	T	P	Credits
0	0	4	2

Total Hours: 60

Course Outcomes:

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

1. Apply the major object oriented concept to implement object oriented

programs.
2. Examine problem solving with concept of array and string.
3. Analyze a problem and construct a C++ program that solves it.
4. Implementation of constructors with classes.
5. Apply fundamental algorithmic problems including inheritance, and polymorphism.

Course Content:

1. Program to show the of use cin, cout
2. Program to implement the operators
3. Program based on decision making statement (if else)
4. Program based on the loops(while, do while)
5. Program based on loops(for),switch statement
6. Program based on structures and enumerated data types
7. Program based functions, overloaded functions
8. Program to show usage of storage classes.
9. Program to show usage of function overloading, default arguments
10. Program to show usage of classes, objects
11. Program to show usage of constructors, destructors
12. Program to manipulate arrays and array of objects
13. Program to manipulate strings.
14. Program to show usage of inheritance of various types (multiple, multilevel etc.)
15. Program to show usage of unary operator overloading
16. Program to show usage of binary operator overloading
17. Program for conversion from basic to user defined data type
18. Program for conversion from user defined to basic
19. Program to show usage of basics of pointers
20. Program to show usage of pointers and arrays.
21. Program to show usage of pointers, function arguments
22. Program to show usage of new, delete, memory management
23. Program to show usage of virtual function
24. Program to show usage of friend, static function
25. Program to show usage of overloaded assignment operator, this pointer
26. Program to read & write contents of a text file
27. Program to show usage of file pointers.
28. Program to show usage of command line arguments
29. Program to show usage of overloading of right & left shift operators.
30. Program to show usage of exception handling mechanism
31. Program to show usage of uncaught_exception(), the exception and bad_exception classes
32. Program to show usage of templates
33. Program to show usage of generic classes

34. Implementation of File handling
35. Implementation of Wrapper classes

Course Title: Community Based Project
Course Code: MIT206

L	T	P	Credits
0	0	4	2

Course Outcomes: **Total Hours:60**

On the completion of the course the students will be able to
1. Apply community development principles.
2. Demonstrate research skills.
3. Develop community engagement strategies.
4. Identify and analyze community needs.
5. Create and implement a community-based project.

Course Content

UNIT I **8 hours**

UNIT II **7 hours**

UNIT III **7 hours**

UNIT IV **8 hours**

Course Title: Teaching and Research Aptitude
Course Code: MIT208

L	T	P	Credits
2	0	0	2

Total Hours: 30

Course Outcomes:
On the completion of the course the students will be able to
1. Develop skill to meet the competitive examinations for better job opportunity.
2. Enrich their knowledge and to develop their logical reasoning thinking ability.
3. Analyze the Problems logically and approach the problems in a different manner.
4. Solve the problems easily by using Short-cut method with time management which will be helpful to them to clear the competitive exams for better job opportunity.
5. Acquire satisfactory competency in use of reasoning.

Course Content

UNIT I **12 hours**

1. Quantitative Ability (Basic Mathematics): Number Systems, LCM and HCF, Decimal Fractions, Simplification, Square Roots and Cube Roots ,Average , Problems on Ages ,Surds & Indices ,Percentages ,Problems on Numbers

UNIT II **13 hours**

1. Quantitative Ability (Applied & Engineering Mathematics): Logarithm, Permutation and Combinations, Probability, Profit and Loss, Simple and Compound Interest, Time, Speed and Distance, Time & Work, Ratio and Proportion ,Area ,Mixtures and Allegation.

UNIT III **12 hours**

1. Data Interpretation: Data Interpretation, Tables, Column Graphs, Bar Graphs, Line Charts, Pie Chart, Venn Diagrams.

UNIT IV **13 hours**

1. Logical Reasoning (Deductive Reasoning): Analogy, Blood Relation, Directional Sense, Number and Letter Series, Coding – Decoding, Calendars, Clocks, Venn Diagrams, Seating Arrangement, Syllogism, Mathematical Operations

Transaction Mode

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

Suggested Readings

- Aggarwal, R. S. (2000). *A Modern Approach to Vernbal & Non Verbal Reasoning*. S. Chand.
- Carter, P. (2007). *IQ and aptitude tests*. Kogan Page Publishers.

Web Sources

1. https://www.upscstudymaterials.com/teaching-and-research-aptitude.html
2. https://www.upscstudymaterials.com/teaching-and-research-aptitude.html
3. https://testbook.com/ugc-net/general-paper-research-and-teaching-aptitude
4. https://www.academia.edu/39666971/Paper_I_General_Paper_on_Teaching_and_Research_Aptitude
5.

Course Title: Artificial Intelligence
Course Code: MIT209

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

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

Course Content

UNIT I **10 hours**

1. 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 **12 hours**

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

UNIT III **11 hours**

1. 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 **12 hours**

1. 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..
- Winston, P. H. (1984). 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: Machine Learning
Course Code: MIT210

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

On the completion of the course the students 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. Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theory.

5. Apply Multi-Layer Perceptions and Back Propagation learning.

Course Content

UNIT I **10 hours**

1. 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**

1. 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**

1. 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
2. Instance-based Learning: Nearest neighbor classification, k-nearest neighbor, nearest neighbor error probability

UNIT IV **12 hours**

1. 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

Course Outcomes:

On the completion of the course the students 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. Identify the basic “bottlenecks” encountered in parallel computing, e.g., I/O bottlenecks.
4. Measure runtime performance of parallel programs and improve performance bottlenecks.
5. Compare the various models of parallelism (e.g., shared versus distributed memory models) and their strengths and limitations.

Course Content

UNIT I **10 hours**

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

UNIT II **12 hours**

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

UNIT III **12 hours**

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

UNIT IV **11 hours**

1. Parallel Programming: Shared memory programming, distributed memory programming, object oriented programming, data parallel programming, functional programming.
2. 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

Semester III

Course Title: Operating Systems
Course Code: MIT301

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

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

1. Know the functioning of the Operating System and various types of OS.
2. Analyze the various device and resource management techniques for timesharing and distributed systems.
3. Examine the mutual exclusion, deadlock detection and agreement protocols of distributed operating system.
4. Understands the use of different process scheduling algorithm and synchronization techniques to avoid deadlock.
5. Learn different memory management techniques like paging, segmentation and demand paging etc.

Course Content

UNIT I **15 hours**

1. Introduction: Operating System, Role as resource manager, Operating system strategies, Factors in operating system design, operating system functions and services.

UNIT II **14 hours**

1. Process Management: The system view of processes, Process descriptor, Process state diagram, Resource abstraction, Process hierarchy, Process scheduling strategies, Process synchronization, Deadlock handling.

UNIT III **16 hours**

1. Memory Management: Factors in memory design, Memory hierarchies, Memory manager strategy, Memory allocation strategies, Paging, Demand paging and Segmentation techniques
2. Device Management: Device management approaches, Device allocation considerations, Disk scheduling.

UNIT IV **15 hours**

1. Information Management: File system, its layered structure and general model, Allocation methods, free space management.

Transaction Mode

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

Suggested Readings

- Silberschatz G.(2000) *Operating system concepts.*
- Milan Milenkovic.*Operating system.*
- DeitalH.M(2001).*An introduction to operating system* **(**Addison Wesley).

Web Sources

- https://www.tutorialspoint.com/operating_system/index.htm
- https://www.geeksforgeeks.org/operating-systems/
- https://www.javatpoint.com/operating-system
- https://www.scaler.com/topics/operating-system/
- https://www.guru99.com/os-tutorial.html
- https://www.w3schools.in/operating-system/intro
- https://www.mygreatlearning.com/operating-system/tutorials
- https://prepinsta.com/operating-systems/

Course Title:Computer Organization & Architecture

Course Code: MIT302

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

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

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

Course Content

UNIT I **14 hours**

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

UNIT II **15 hours**

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

Instruction cycle, addressing modes.

UNIT III **16 hours**

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

UNIT IV **15 hours**

1. 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.Tannenbaum. (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: Data Communication
Course Code: MIT303

L	T	P	Credits
4	0	0	4

Total Hours: 60

Course Outcomes:

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

1. Understand the concepts of data communication within the network environment.

2. Learn the conflicting issues and resolution techniques of data transmission.
3. Learn the general principles of circuit and packet switching.
4. Recognize the functioning of Data Link Layer, Physical Layer & Network Layer.
5. Analyze the services and features of various protocols layers in data networks.

Course Content

UNIT I **16 hours**

1. Introduction to Data Communication, Analog vs Digital Communication; Fourier Analysis, Band Width Limitation, Data rate of a channel, Error Detection and Correction: Nature of errors, Parity Check, CRC, Hamming Code, Modulation techniques :AM, PM, FM, Synchronous and Asynchronous Modulation, Multiplexing : SDM, FDM, TDM, STDM.

UNIT II **14 hours**

1. Introduction to Computer networks and applications; Network structure and Architecture, OSI reference model, Network standardization,
2. Physical Layer: Circuit switching, Packet Switching, Message Switching, Terminal Handling, Telephone system, modems, congestion, Multi channel Access, Transmission media

UNIT III **15 hours**

1. The Data Link Layer : Design Issues, Elementary Data Link Protocols, Sliding Windows Protocol, Protocol performance, Protocol Specification & verification, DLL in X.25, HDLC/SDLC.

UNIT IV **15 hours**

1. The Network Layer: Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet working, Example of Network layer in ARPANET, X.25 Protocol. Application Layer

Transaction Mode

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

Suggested Readings

- Tanenbaum Andrew S. (2010).*Computer Networks*, 3rd Edition, Pearson Prentice Ltd.
- Behruoz A Forouzan.(2009).*Data Communication and Networking,*4th Edition, Tata.
- McGraw Hill, Larry L.Peterson.(2008).*Computer Networks,* A System Approach, 4th Edition, Elsevier Publication .

Web Sources

- https://www.tutorialspoint.com/data_communication_computer_network/index.htm
- https://www.geeksforgeeks.org/data-communication-definition-components-types-channels/
- https://ecomputernotes.com/computernetworkingnotes/communication-networks/what-is-data-communication
- https://www.javatpoint.com/computer-network-transmission-modes

Course Title: Basics of Python
Course Code:MIT304

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Understand computer architecture and data representations (variables, representation of numbers and character strings).
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.
5. Identify and repair coding errors in a program.

Course Content

UNIT I **10 hours**

1. Introduction to Python Getting Started: Introduction to Python- an interpreted high level language, interactive mode and script mode.
2. 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
3. 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 **12 hours**

1. 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.
2. Defining functions, invoking functions, passing parameters, scope of variables, void functions and functions returning values, flow of execution

UNIT III **12 hours**

1. 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
2. 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 **11 hours**

1. 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()
2. Tuples: Immutable concept, creating, initializing and accessing the elements in a tuple; Tuple functions: cmp(), len(), max(), min(), tuple()
3. Input and Output: Output Formatting, Reading and Writing Files
4. 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: S/w Lab-V(Introduction to Python Lab)
Course Code: MIT305

L	T	P	Credits
0	0	4	2

Total Hours: 60

Course Outcomes:

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

1. Develop solutions for a range of problems using functional/object oriented approach.
2. Implement the basic conditional and looping constructs.
3. Write the code to implement Data Structure Lists.
4. Understand the basic concepts scripting and the contributions of scripting language.
5. Develop solutions of real time problems.

Course Content

1. PROGRAM 1: Hello World
2. PROGRAM 2: Add numbers and Concatenate strings
3. PROGRAM 3: Input from user
4. PROGRAM 4: Loops
5. PROGRAM 5: If-Else - Conditional Checking
6. PROGRAM 6: Functions
7. PROGRAM 7: Math library
8. PROGRAM 8: Strings
9. PROGRAM 9: Exceptional Handling
10. PROGRAM 10: Random Numbers/String
11. PROGRAM 11: Demo of Data Structure - List
12. PROGRAM 12: Demo of Data Structure - Dictionary
13. PROGRAM 13: Demo of Data Structure - Touple
14. PROGRAM 14: Command Line Argument

Course Title: Android Programming
Course Code: MIT306

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

Course Content

1. Apply knowledge of fundamentals Java for android application development.
2. Implement the Apple and Window mobile OS Architecture.
3. Learn the activity life cycle.
4. Design the android application Using UI resources, string resources, Image resources.
5. Define event handling.

UNIT I **10 hours**

1. Android Basics
2. Fundamentals of Java for Android Application Development, Introduction to Mobility, Mobile Platform, App development approaches, Android Platform Architecture, Development Environment for Android, Android app project structure, Logical components of Android app, Android Tool Repository, Introduction of Apple and Window mobile OS Architecture

UNIT II **12 hours**

1. UI Components & Event Listeners
2. Activity life cycle, UI resources, String resources, Image resources, Common attributes of View, Event handling associated with Button, Edit Text, Checkbox, List View, Image View, Alert Dialog, Navigation between Activities, Fragments, Life cycle of Fragment, Interaction between Fragments, Action Bar, Menu, Introduction to Material Design Pattern, Layouts, Recycler View, Fragments, Intents

UNIT III **12 hours**

1. Data Storage Management
2. Internal and External File storage Operation, Shared Preference, SQLite database, Remote database operations, Notification, Thread, AsynTask, JSON data access.

UNIT IV **11 hours**

1. Graphics Animations & Multimedia
2. Graphics and Animation, Multimedia, Audio, Video, Camera

Transaction Mode

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

Suggested Readings

- Murach, J. (2015). Murach's Android Programming. Mike Murach & Associates.
- DiMarzio, J. (2016).
- Beginning Android Programming with Android Studio. John Wiley & Sons.
- Beginning Android™ Application Development, Published by Wiley
- Murphy, M. L. (2010). Android programming tutorials. Commons Ware.

Web Sources

- https://www.tutorialspoint.com/android/index.htm
- https://www.javatpoint.com/android-ui-widgets-tutorial
- https://www.geeksforgeeks.org/android-ui-layouts/
- https://youtu.be/fis26HvvDII
- https://youtu.be/EplH-amHTtE
- https://www.guru99.com/android-tutorial.html

Course Title: Image Processing
Course Code: MIT307

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Review the fundamental concepts of a digital image processing system
2. Analyze images in the frequency domain using various transforms.
3. Evaluate the techniques for image enhancement and image restoration.
4. Categorize various compression techniques.
5. Interpret Image compression standards

Course Content

UNIT I **10 hours**

1. Fundamentals :Need for DIP- Fundamental steps in DIP – Elements of visual perception -Image sensing and Acquisition – Image Sampling and Quantization – Imaging geometry, discrete image mathematical characterization.

UNIT II **12 hours**

1. Image Transforms:Two dimensional Fourier Transform- Properties – Fast Fourier Transform – Inverse FFT,Discrete cosine transform and KL transform.-Discrete Short time Fourier Transform- Wavelet Transform- Discrete wavelet Transform- and its application in Compression.
2. Image Enhancement :Spatial Domain: Basic relationship between pixels- Basic Gray level Transformations – Histogram Processing – Smoothing spatial filters- Sharpening spatial filters.

UNIT III **12 hours**

1. Frequency Domain: Smoothing frequency domain filters- sharpening frequency domain filters Homomorphic filtering.
2. Image Restoration:Overview of Degradation models –Unconstrained and constrained restorations-Inverse Filtering ,WienerFilter.

UNIT IV **11 hours**

1. Feature Extraction: Detection of discontinuities – Edge linking and Boundary detection- Thresholding- -Edge based segmentation-Region based Segmentation- matching-Advanced optimal border and surface detection- Use of motion in segmentation. Image Morphology – Boundary descriptors- Regional descriptors.
2. Image Reconstruction from Projections: Need- Radon Transform – Back projection operator- Projection Theorem- Inverse Radon Transform.

Transaction Mode

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

Suggested Readings

- Niblack, W. (1985). An introduction to digital image processing. Strandberg Publishing Company.
- Acharya, T., & Ray, A. K. (2005). Image processing: principles and applications. John Wiley & Sons.

Web Sources

- https://www.simplilearn.com/image-processing-article#:~:text=Image%20processing%20is%20the%20process,certain%20predetermined%20signal%20processing%20methods.
- https://www.geeksforgeeks.org/digital-image-processing-basics/

- https://www.javatpoint.com/digital-image-processing-tutorial
- https://www.tutorialspoint.com/dip/index.htm
- https://www.mygreatlearning.com/blog/introduction-to-image-processing-what-is-image-processing/
- https://www.britannica.com/technology/optical-scanner

Course Title: Advance Data Structure
Course Code: MIT308

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes

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

1. Restate the fundamentals of basic data structures.
2. Implement the basic algorithms for sorting and searching.
3. Experiment the details of stack, queue and linked list operation.
4. Interpret the knowledge of tree and graphs concepts.
5. Apply algorithms and data structures in various real-life software problems.

Course Content

UNIT I **10 hours**

1. Introduction to Data Structures & Algorithms Introduction of Data structures, Abstract Data Types, Performance Analysis: Space Complexity, Time Complexity, Asymptotic Notations (Big O, Omega, Theta), Performance measurement, Divide and Conquer, Back Tracking Method, Dynamic programming.
2. Sorting and searching algorithms Bubble sort, Insertion sort, Radix Sort, Quick sort, Merge sort, Heap sort, Selection sort, shell Sort, Linear Search, Sequential search, Binary search .

UNIT II **12 hours**

1. Hashing Different Hashing Techniques, Address calculation Techniques, Common hashing functions, Collision resolution techniques: Linear probe, Quadratic probe, Key offset. Rehashing, Double hashing,, Link list addressing.

UNIT III **12 hours**

1. Linear Data Structures Stack Definition, Operations, Implementation of Stacks (Array and Linked list) and applications-Evaluation of postfix expression, Balancing of parenthesis
2. Queue: Definition, Operations, Implementation of simple queue (Array and Linked list) and applications of queue-BFS.
3. Types of queues: Circular, Double ended, Priority, Implementation using linked list Types of Linked List: Singly, Doubly and Circular Linked list Definition, Operations (Insert, delete, traverse, count, search)

UNIT IV **11 hours**

1. Non-linear Data Structures Tree Definition and concepts, General Tree-Definition, Insertion and Deletion into general tree,
2. Binary Tree- Definition, Insertion and Deletion into binary tree, Traversal of a binary tree, Reconstruction of a binary tree from traversal, Conversion of general tree into binary tree, Huffman tree, Expression tree, Binary threaded three Binary Search Tree- Definition, Operation, Implementation AVL tree- Definition, AVL tree rotation with examples, Heaps-Definition, Operations (insertion, delete, build) M way Tree-Introduction, B tree-definition and examples and B * 14
3. Graphs Definition, Types, Operations, Representation, Networks, Traversals of graph, Minimum spanning tree, Kruskal's Algorithm, Prim's Algorithm,Warshall's Algorithm, Shortest path algorithm-Dijsktra's algorithm

Transactional modes

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

Suggested Readings

- Lipschutz, S. (2011). Data Structures with C (Schaum's Outline Series)
- Langsam, Y., Augenstein, M., & Tenenbaum, A. M. (1996). *Data Structures using C and C++* (Vol. 2). New Jersey: Prentice Hall.
- Samanta, D. (2001). *Classic data structures* (Vol. 2). Prentice Hall India.
- Narahari, Y. (2000). Data structures and algorithms. *Retrieved November*, *15*.2019.

Web Sources

- https://msatechnosoft.in/blog/searching-sorting-data-structure-algorithms/
- https://www.knowledgehut.com/blog/programming/hashing-in-data-structure
- https://www.programiz.com/dsa/types-of-queue
- https://www.geeksforgeeks.org/graph-data-structure-and-algorithms/

Course Title: Data Mining
Course Code: MIT309

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Extract knowledge using data mining techniques.
2. Identify the various Data warehouse Models & Architecture
3. Analyze the Association rules of Data Mining.
4. Learn various Classification & Prediction Data Mining Techniques.
5. Explore recent trends in data mining such as web mining, spatial-temporal mining

Course Content

UNIT I **10 hours**

1. Introduction to data mining Data mining primitives, Techniques:- Clustering, classification, association rules, linear and multiple regression, Feature selection, Mining text databases, multimedia databases, Mining Frequent Pattern

UNIT II **12 hours**

1. Basic concept, market basket analysis ,frequent pattern mining, frequent itemset mining methods, mining frequent itemset using candidate generation, mining frequent itemset without candidate generation methods, mining various kind of association rules.

UNIT III **12 hours**

1. What is cluster analysis, types of cluster analysis ,a categorization of major clustering method ,partition, hierarchical ,density based, grid based method, outlier analysis

UNIT IV **11 hours**

1. data pre-processing: data summarization, data cleaning ,data reduction. Text Mining, Mining Spatial ,Data Mining Application

Transaction Mode

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

Suggested Readings

- Cabena, P., Hadjinian, P., Stadler, R., Verhees, J., & Zanasi, A. (1998). Discovering data mining: from concept to implementation. Prentice-Hall, Inc..
- Jiawei Han and MichelineKamber,((2006). *Data Mining: Concepts and Techniques*(2nd ed.),

Web Sources

- https://www.javatpoint.com/data-mining-techniques
- https://www.javatpoint.com/data-mining-cluster-analysis

- https://www.tutorialspoint.com/data_mining/dm_classification_prediction.htm
- https://www.tutorialspoint.com/data_mining/dm_applications_trends.htm
- https://www.geeksforgeeks.org/data-mining/
- https://www.guru99.com/data-mining-tutorial.html
- https://www.mygreatlearning.com/blog/data-mining-tutorial/

Course Title: Big Data
Course Code: MIT310

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Recognize basic concept of Big Data.
2. Compare conventional and modern analytical tools.
3. Understand basic concepts of Statistics.
4. Access and Process Data on Distributed File System.
5. Learn various Filtering Stream algorithms.

Course Content

UNIT I **10 hours**

1. Introduction to Big Data :Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error

UNIT II **12 hours**

1. Mining Data Streams: Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – EstimatingMoments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP)Applications –- Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III **12 hours**

1. Hadoop Environment :History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS- Hadoop file systems- Java interfaces to HDFS- Basics-Developing a Map Reduce Application- How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-

Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features - Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation – Hadoop Configuration-Security in Hadoop

UNIT IV **11 hours**

1. Data Analysis Systems and Visualization :Link Analysis – PageRank - Efficient Computation of PageRank- Topic-Sensitive PageRank – Link Spam- Recommendation Systems- A Model for Recommendation Systems- Content-Based Recommendations - Collaborative Filtering- Dimensionality Reduction- Visualizations - Visual data analysis techniques-interaction techniques- Systems and applications.

Transaction Mode

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

Suggested Readings

- Chris Eaton, Dirk deroos et al. (2012). *Understanding Big data* , McGraw Hill
- Ven, I. V. D. (2019). Big books in times of big data. Leiden University Press.
- Erl, T., Khattak, W., & Buhler, P. (2016). Big data fundamentals: concepts, drivers & techniques. Prentice Hall Press.
- Yucesoy, B., Wang, X., Huang, J., & Barabási, A. L. (2018). Success in books: a big data approach to bestsellers. EPJ Data Science.

Web Sources

- https://www.guru99.com/bigdata-tutorials.html
- https://www.javatpoint.com/what-is-big-data
- https://www.simplilearn.com/tutorials/big-data-tutorial
- https://data-flair.training/blogs/big-data-tutorials-home/
- https://www.tutorialspoint.com/big_data_tutorials.htm
- https://www.edureka.co/blog/big-data-tutorial
- https://www.javatpoint.com/hadoop-tutorial
- https://medium.com/@patelharshali136/hadoop-tutorial-for-beginners-learn-hadoop-from-a-to-z-e4f849ee83eb
-

Course Title: Advanced Database Management System

Course Code: MIT311

L	T	P	Credits
3	0	0	3

Total Hours: 45

Course Outcomes:

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

1. Interpret the basic concepts and explore the applications of database systems.
2. Describe the basics of SQL and construct queries using SQL.
3. Make familiar with a commercial relational database system (Oracle) by writing SQL using the system.
4. Analyze relational database theory, and be able to write relational algebra expressions for queries.
5. Grasp the design principles for logical design of databases, including the E-R method and normalization approach.

Course Content

UNIT I **10 hours**

1. Introduction: Overview of Database Management System: Components of DBMS, Application of DBMS, Advantages of DBMS over file processing systems, Types of DBMS, DBMS Architecture, DBMS Schema, Three Schema Architecture, and DBMS Languages. Responsibility of Database Administrator.
2. Database Design: E-R Diagram (Entity Relationship), Components of ER model,DBMS Generalization, Specialization and Aggregation.

UNIT II **12 hours**

1. DBMS Relational Model: Codd's rule of DBMS, Relational DBMS concepts, Relational Integrity constraints, DBMS Keys, Covert ER model to Relational Model, Difference between DBMS and RDBMS, Relational Algebra(set operations, select, project, join, division), DBMS joins.
2. Normalization: Functional dependencies & Normalization, 1st, 2nd, 3rd and BCNF.

UNIT III **12 hours**

1. DBMS Transaction: Overview of transactions in DBMS, ACID properties, concurrent execution and its problems, DBMS Schedule, DBMS Security.
2. Parallel and Distributed Databases and Client-Server Architecture: Architecture for parallel database; Distributed database concepts, Data fragmentation, Replication, and allocation techniques, Overview of Client-Server Architecture.

UNIT IV **11 hours**

1. Enhanced Data Models for Advanced Applications: Active database concepts, temporal database concepts, Spatial databases, Deductive databases;
2. Emerging Database Technologies: Mobile databases, Multimedia Databases.
3. SQL: Introduction and Basic commands of SQL.

Transactional modes

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

Suggested Readings

- Ramez, E. (2007). *Fundamentals of Database Systems: For VTU*. Pearson Education India.
- Date, C. J. (1975). *An introduction to database systems*. Pearson Education India.
- Silberschatz, A., Korth, H. F., &Sudarshan, S. (2002). Database system concepts (Vol. 5). New York: McGraw-Hill.
- Date, C. J. (1975). *An introduction to database systems*. Pearson Education India.

Web Sources

- https://www.educba.com/types-of-dbms/
- https://www.geeksforgeeks.org/normal-forms-in-dbms/
- https://www.tutorialspoint.com/sql/sql-overview.htm
- https://www.tutorialspoint.com/dbms/dbms_transaction.htm

Course Title:Industrial Training/Internship(6 Months)
Course Code: MIT401

L	T	P	Credits
0	0	0	20

Course Outcomes:

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

1. Participate in the projects in industries during his or her industrial training.
2. Describe use of advanced tools and techniques encountered during industrial training and visit.
3. Interact with industrial personnel and follow engineering practices and discipline prescribed in industry.
4. Develop awareness about general workplace behavior and build interpersonal and team skills.
5. Prepare professional work reports and presentations.