



# MANIPAL

## ACADEMY *of* HIGHER EDUCATION

*(Deemed to be University under Section 3 of the UGC Act, 1956)*

### **Master of Engineering - ME (Cloud Computing)**

July 2022 onwards

MANIPAL SCHOOL OF INFORMATION SCIENCES  
MANIPAL ACADEMY OF HIGHER EDUCATION  
MANIPAL - 576104.KARNATAKA. INDIA.



### Program Structure

Semester 1: Course Name	Semester 2: Course name
Linux and Data Structures	Data Streaming and Visualization
DevOps for Cloud	Cloud Networks
Cloud Architecture and Management	Cloud Security Essentials
Cloud Application with JAVA and Database with Java	JAVA Web Technology and Database
Elective - I	Elective - II
Mini Project - I	Mini Project - II
Professional Skill Development - I	Professional Skill Development - II
<b>Semester III &amp; IV</b>	<b>Project Work</b>
<b>Elective-1</b>	<b>Elective-2</b>
Client Side Internet Technology	Server Side Internet Technology
Fundamentals of Machine Learning	Data Warehousing and Data Mining
Cloud Foundations and Architecting	Machine Learning for Big Data
Cloud Administration and Solution Architect	IT Project Management
	Cloud Operations
	Entrepreneurship
	Azure DevOps For Cloud
	Server Side Internet Technology



## **CDC 5104: Linux and Data Structures**

Understand structure, process and scheduling concepts of Linux operating system, Specify and analyse algorithms, design programs for implementation of linear and nonlinear data structure, Learn and design programs for sorting and searching.

## **CDC 5001: DevOps for Cloud**

Concept of automation of Product Life Cycle stages, Integration, Testing, Deployment of Product, Compare and contrast existing Software Methodologies with DevOps Life Cycle stages, Design and DevOps methodologies for Product development and Release.

Explain the concepts of Tools used in each stages of DevOps.

## **CDC 5102: Cloud Architecture and Management**

Explain the Characteristics of virtualization, web services and architecture of Cloud Computing. Infer various service models and deployment models of Cloud.

Design an Infrastructure in Cloud for High availability and Fault Tolerant Web applications

## **CDC 5101: Cloud Application with Java and Database**

Describe and Summarize the Cloud application architecture and design principles. Employ the Java programming techniques and data interface concepts for application development. Examine and Analyze the techniques to be used for High availability and Fault Tolerant Cloud applications.

## **MPT 5100: Mini Project - I**

Problem identification, literature survey, formation of detailed specifications; Design and implementation of the proposed system architecture; Demonstrate an ability to present and defend project work carried out to a panel of experts.

## **PSD 5100: Professional Skill Development - I**

Topic selection for the presentation; Report writing; slide preparation; presentation to audience.



### ELECTIVES SEMESTER I

#### **CDC 5131 - Client Side Internet Technology**

Recall the history, standards, and technology associated with Internet. Apply HTML, HTML5 Cascading Style Sheets (CSS) to develop a multimedia website for all domain needs. Apply Javascript to optimize website on client side. Use various data representation formats to store data. Describe different frameworks like bootstrap and angular.js.

#### **BDA 5103 - Fundamentals of Machine Learning**

Identify the goals, applications, types and design issues of machine learning techniques. Relate concept learning and hypothesis space. Apply PCA learning approach to reduce the dimension. Analyse different machine learning algorithms. Design ensemble methods.

#### **CDC 5132 - Cloud Foundations and Architecting**

Identify the global infrastructure components of AWS and its pricing philosophy. Explain the architectural principles of the AWS Cloud. Demonstrate fundamental services of AWS. Use AWS services to make infrastructure scalable, reliable, and highly available.

### SEMESTER II

#### **CDC 5203: Data Streaming and Visualization**

Explain the architecture and management of Data Stream Processing. Identify Data streaming services to implement real world stream processing applications. Explore web scrapping techniques and models. Demonstrate exploratory analysis and visualization of data.

#### **CDC 5201 - Cloud Networks**

Describe cloud networking components and terminologies, different networking types and OSI model. Explain the concept of data centre planning and deployment. Demonstrate the concept of storage area networks. Explain the concept of software defined radios. Explain the concept of content delivery networks.



# MANIPAL SCHOOL OF INFORMATION SCIENCES

MANIPAL

(A constituent unit of MAHE, Manipal)

## **CDC 5205: Cloud Security Essentials**

Identify fundamentals of cloud computing architectures based on current standards, protocols, and best practices. Identify the known threats, risks, vulnerabilities and privacy issues associated with Cloud and evolve appropriate safeguards and countermeasures. Design Cloud security architectures that assures secure isolation of compute, network and storage infrastructures, comprehensive data protection, end-to-end identity and access management, monitoring and auditing processes and compliance with industry and regulatory mandates. Cloud computing security guidelines set forth by ISO, NIST, ENISA and Cloud Security Alliance (CSA).

## **CDC 5204: JAVA Web Technology and Database**

Understand the concepts of DBMS, Relational data model, steps involved in design the RDBMS system and No SQL system. Demonstrate the design concepts and implement the database using the concepts if ER Diagram, logical design, SQL query execution and Query optimization techniques. Understand the principles of Distributed Databases, concept of No SQL and related classifications and categories

## **MPT 5200: Mini project II**

Identify the real-world and social relevant problems and perform feasibility analysis for finding solutions. Develop solutions to the identified problems by applying research methodology and development life cycle with appropriate documentation by incorporating ethical standards. Work effectively as a member in a team and communicate technical information effectively.

## **PSD 5200: Professional Skill Development II**

Develop the skills needed for approaching technical and HR interviews. Use mathematical, reasoning, and domain specific skills to solve objective questionnaires in time. Demonstrate depth of knowledge in the chosen field of study.

### **ELECTIVES - SEMESTER II**

## **CDC 5233: Server Side Internet Technology**

Outline different types of servers and architecture. Explore different serverside scripting languages. Deploy web application using cost optimised approach.



# MANIPAL SCHOOL OF INFORMATION SCIENCES

MANIPAL

*(A constituent unit of MAHE, Manipal)*

## **CDC 5232: Data Warehousing and Data Mining**

Understand the functionality of the various data mining and data warehousing component. Explain the analysing techniques of various data. Describe different methodologies used in data mining and data ware housing. Compare different approaches of data ware housing and data mining with various technologies.

## **BDA 5201 Machine Learning for Big Data**

Demonstrate Artificial Neural Network, Clustering, Support Vector Machine, Deep Neural Network and Reinforcement Learning models. Compare and contrast single layer, multilayer and deep neural networks in terms of accuracy in classification. Design different types of artificial neural network models, clustering models, deep neural network models, reinforcement learning models.

## **ESD 5232 - IT Project Management**

Illustrate the importance of project planning. Discuss and demonstrate various tools applicable for different phases of the software project. Illustrate the importance of Change management.

## **CDC 5231: Cloud Operations**

Make architectural decisions based on AWS architectural principles and best practices. Use the AWS Well-Architected Framework to improve architectures that use AWS solutions. Understand AWS infrastructure as it relates to system operations, such as global infrastructure, core services, and account security. Understand AWS infrastructure as it relates to system operations, such as global infrastructure, core services, and account security.

## **ENP 5230: Entrepreneurship**

Explain the importance of entrepreneurship and entrepreneurial development model, social responsibilities of business. Describe Entrepreneurial Traits and Factors affecting Entrepreneurship process. Discuss Business Start-up Process. Summarize a business and marketing plan for entrepreneurs.

## **CDC 5233: Server Side Internet Technology**

Outline different types of servers and architecture. Explore different serverside scripting languages. Deploy web application using cost optimised approach.



# MANIPAL SCHOOL OF INFORMATION SCIENCES

MANIPAL

*(A constituent unit of MAHE, Manipal)*

## SEMESTERS III & IV

### **CDC 6098: Project Work**

Undertake innovative industry/research oriented projects and perform feasibility analysis for finding solutions. Implement and test the proposed design using appropriate framework, programming language and tools. Demonstrate an ability to present and defend project work carried out to a panel of experts.