



MANIPAL

ACADEMY *of* HIGHER EDUCATION

(Institution of Eminence Deemed to be University)

Master of Engineering - ME (Big Data Analytics)

Syllabus

July 2022 Onwards

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



Program Structure

I Semester	II Semester
Course Name	Course Name
Algorithms and Data Structures for Big Data	Machine Learning for Big Data
Architecture of Big Data Systems	Modern Databases for Big Data
Fundamentals of Machine Learning	Multimedia Analytics
Applied Probability and Statistics	Advanced Applications of Probability and Statistics
Elective - I	Elective - II
Mini Project - I	Mini Project - II
Professional Skill Development - I	Professional Skill Development - II
III & IV Semesters	Project Work
Elective - I	Elective - II
Course Name	Course Name
Principles of Data Visualization	Natural Language and Text Processing
Mobile Web Application Development	DevOps for Cloud
	Entrepreneurship



SEMESTER I

BDA 5101: Algorithms and Data Structures for Big Data

Analyse recursive programs, solve a general class of recurrence relations. Design programs for implementation of linked lists, stack, queues, binary search tree, sorting and searching. Design programs for dictionary, hash tables, graphs and shortest path techniques. Design string and text processing programs.

BDA 5102: Architecture of Big Data Systems

Examine different types of data and understand lambda architecture. Understanding different tools and frameworks of Hadoop eco-system. Understanding real-time data processing using Spark engine. Design applications to handle batch and streaming data using Hadoop and Spark tools.

BDA 5103: Fundamentals of Machine Learning

Identify the goals, applications, types and design issues of machine learning techniques. Relate concept learning and hypothesis space. Analyse different machine learning algorithms. Apply PCA for dimension reduction and appropriate ensemble method for the given problem.

AML 5103: Applied Probability and Statistics

Model random phenomena using random variables. Construct Bayesian models for quantifying uncertainty in practical problems. Use sample information and perform hypothesis-test analysis using an appropriate statistical technique to explain attributes of a population.

MPT 5100: Mini Project - I

Identify the real-world and social relevant problems and perform feasibility analysis for finding solution. 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.



ELECTIVES - SEMESTER I

BDA 5132: Principles of Data Visualization

Employ web scrapping techniques to extract data from websites. Illustrate data analysis techniques to prepare data for visualization. Outline different visualization techniques.

ESD 5234: Mobile Web Application Development

Discuss the challenges of mobile web application development. Apply HTML5, CSS, javascript and DOM API's in web application development. Use of programming for technologies available on smart phones. Design and develop secure mobile web applications.

SEMESTER II

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.

BDA 5202: Modern Databases for Big Data

Examine different types of data and design queries to handle different data types. Explain different data models. Explain the concepts of map reduce in handling of data. Identify proper database based on type of data to be handled.

BDA 5203: Multimedia Analytics

Summarize the basic principles of sound, speech production, perception and time, frequency domain audio processing techniques. Demonstrate different image representation methods and feature extraction methods. Demonstrate different video representation methods and feature extraction methods.



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AML 5201: Advanced Applications of Probability and Statistics

Apply linear and logistic regression models for practical problems and assess model performance. Interpret the output of principal component analysis (PCA) applied to multivariate data for dimension reduction. Identify multivariate data with mixed data type features and cluster using an appropriate technique. Understand the basics of time series modelling and apply to real-life problems.

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

BDA 5231: Natural Language and Text Processing

Understanding syntax and semantics of text. Demonstrate text processing by implementing lexical analysis, word stemming, word stop and term selection. Categorizing, tagging of words, classification and information extraction from text. Design models for sentiment and semantic analysis from text.

CDC 5001: DevOps for Cloud

Explain the concept of automation of Product Life Cycle stages. Demonstrate Continuous Integration / Continuous Testing / Continuous 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.



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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.

SEMESTERS III & IV

BDA 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.