



MANIPAL

ACADEMY *of* HIGHER EDUCATION

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

Master of Engineering - ME (Embedded Systems)

July 2021 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
Advanced Computer Architecture	Digital Signal Processing
Data Structures and Algorithms	Device Drivers
Microcontrollers and its Applications	Embedded Systems
Real Time Operating Systems	Embedded Software Design
Elective - I	Elective - II
Mini Project - I	Mini Project - II
Professional Skill Development - I	Professional Skill Development - II
Semester III & IV	Project Work
Elective-1	Elective-2
Computer Networks	IT Project Management
Internet of Things	Mobile Application Development using Android
Database Programming in Java	Multicore Program Optimization
	Web Application Development
	Big Data and Data Visualization
	Entrepreneurship
	High Level Digital Design

SEMESTER I

ESD 5102 - Data Structures and Algorithms

Specify and analyze algorithms. Learn and design programs for implementation of linear and nonlinear data structures. Learn and design programs for sorting, searching, graphs and trees. Illustrate application of divide, conquer technique, dynamic programming, and greedy technique, and back tracking.

ESD 5103 - Microcontrollers and Its Applications

Employ the knowledge of Microcontrollers to build embedded systems. Explain the concept of Programming Microcontrollers using Assembly and Embedded C. Design Embedded Systems by interfacing Sensors and Actuators.

ESD 5104 - Real Time Operating Systems

Explain the concept of various types of process algorithms and managing using system calls. Illustrate the various techniques for synchronization along with deadlock and memory management. Evaluating and analyzing the various deadline based process in real time systems

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.

PSD 5100: Professional Skill Development - I

Identify and synthesize important themes in the field of engineering which transform socio-economic ecosystem. Develop competence to communicate effectively in oral and written forms. Effective management of time, involve in reflective learning and adhere to the professional code of conduct.

ELECTIVES - SEMESTER I

ESD 5131: Computer Networks

Identify the goals and applications of computer networks, able to explain the classification of networks and reference models. Describe the functions of communication devices, IP addressing techniques. Demonstrate routing algorithms, congestion control mechanisms and transport layer protocols. Examine application, multicasting and management protocols functions.

ESD 5132: Internet of Things

Describe the developmental aspects of the application in IoT. Demonstrate the usage of networking protocols across IoT stack. Demonstrate the fundamental concepts in Client Server architecture and database implementation and usage with Python API's

ESD 5133 - Database Programming in Java

Explain the object oriented programming concepts. Appreciate the various techniques used to develop a user interface (UI) application. Explain the concepts of JDBC and SQL.

SEMESTER II

ESD 5001 - Digital Signal Processing

Analyze Fast Fourier Transform (FFT) algorithms. Describe the structures for IIR and FIR filters. Interpret Multi-rate Signal Processing and Adaptive Filters. Explain architecture, memory management and pipelining concepts of General and TMS320C67XX Digital Signal Processor.

ESD 5201 - Device Drivers

Explain the broad concept of device drivers and build character drivers. Describe design of kernel modules and debugging these modules. Handle concurrency, race condition and understand the importance of time while designing a device driver. Allocate dynamic memory and communicating with devices through I/O ports. Demonstrate and design USB drivers on a kit.

ESD 5202 - Embedded Systems

Employ the knowledge of Microcontrollers to build Embedded systems. Explain the concept of Programming ARM Microcontrollers using Assembly and Embedded C. Design a Real time Embedded Systems by interfacing Sensors, Actuators and porting Real time operating systems.

ESD 5203 - Embedded Software Design

To build and analyze models for embedded application using the concept of UML. To work with UML tools and represent the model using suitable diagrams. To write applications using the OOP concepts. To write applications using JAVA constructs for general purpose and embedded systems

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.

ELECTIVE 2

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.

ESD 5233 - Mobile Application Development using Android

Explain android architecture and framework. Discuss major building blocks of an android application. Write android applications using various UI components and data handling using SQLite. Understand advanced topics such as LBS, Mapping, Network connectivity, background threads, adapters.

ESD 5235 - Multicore Program Optimization

Distinguish between single core, multicore architectures, various architectures, trends, various levels of parallelisms. Illustrate Various cache coherence, issues, memory consistency models, various protocols, working principles, performances. Analyze Justification of primitives, optimizations, applications.

BDA 5232 - Big Data and Data Visualization

Understand the architecture of distributed systems and distributed computing. Identify the characteristics of datasets and compare the trivial data and big data for various applications. Explain concept learning task and hypothesis space, distinguish between general and specific hypotheses, identify the maximally specific hypotheses, Describe version spaces and candidate elimination algorithm. To solve problems associated with batch learning and online learning, and the big data characteristics such as high dimensionality, dynamically growing data and in particular scalability issues. Practical experience building and evaluating visualization systems.

VLS 5001: High Level Digital Design

Describe digital design and apply digital logic to solve real life problems. Apply sequential logic circuits and timing analysis. Describe FPGA, FIFO, and AMBA bus designs

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

ESD 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.