

RAMAKRISHNA MISSION VIDYAMANDIRA
CBCS Syllabus B.Sc. Computer Science Honours

Semester-V

Course Code: CMSA CC 12 Credit: 6

Course Type: Core Course

Course Outcome:

- i) Understanding fundamentals of Analog electronics.
- ii) Understanding properties and working of processor using 8085.
- iii) Developing knowledge of assembly language programming using microprocessor kit.
- iv) Understanding embedded system through open source microcontroller based kit.
- v) Working with IDE of microcontroller based prototyping platform.
- vi) Obtain fundamental understanding of Internet of Things (IoT).

CMSA CC 12 T: Microprocessor, Microcontroller and IoT

Credit: 4

Marks: 50

Introduction to Microcomputer based system: Evolution of Microprocessor and Microcontrollers and their advantages and disadvantages, Architecture of 8 bit and 16 bit microprocessor and Preliminary concepts of 32 bit and 64 bit architecture. [4 L]

Architecture of 8085 Microprocessor: Hardware and Programming Model, Address/data bus DE multiplexing, Status Signals and the control signals.
Instruction format, Instruction set of 8085 microprocessor, Addressing modes, Instruction Cycle and Timing diagram of the instructions. [8 L]

Interrupts of 8085 processor: Software and Hardware interrupt, I/O Device Interfacing-I/O Mapped I/O and Memory Mapped I/O, Serial I/O using SID and SOD pins and RIM, SIM Instructions and Parallel data transfer. [8 L]

Interfacing concepts: Memory Interfacing, Concept of Foldback Memory.
I/O Interfacing, Peripheral Interfacing, Keyboard Interfacing, Display Interfacing (Case Studies 8155, 8255, 8279), Concepts of DMA (Case Study 8237). [10 L]

8086 Microprocessor: Basic Architecture, Addressing Modes, Register Supports for virtual Memory. [6 L]

Introduction to IoT: Sensing, Actuation, Networking basics, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, IoT Definition, Characteristics. IoT

Functional Blocks, Physical design of IoT, Logical design of IoT, Communication models & APIs. [6]

M2M to IoT: The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, Differing Characteristics. Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT. [8]

Introduction to Microcontroller Based Prototyping Platform: Understanding embedded system, Device platforms and features, working with displays and other sensors, Communication basics, interfacing using high level programming languages. [10 L]

CMSA CC 12 P: 8085 Microprocessor and Arduino

Credit: 2

Marks: 25

Experiment with 8085A based microcomputing kits: Data movement between register – register, register-memory, memory-memory, Arithmetic and logic operations, Jump and Branch instructions, sorting searching, block transfer. [25 L]

Experiment with Arduino: Installing and configuring Arduino IDE, Working with ports, displays, working with I/O functions, working with DC motor, working with communication sensor. [15 L]

Recommended Books:

1. Circuit Theory by A. Chakraborty, Dhanpat Rai & Co. (Pvt.) Ltd.
 2. Foundations of Electronics by Chattopadhyay and Rakshit, New Age.
 3. Fundamental Principle of Electronics by B. Ghosh, Books & Allied.
 4. Basic Electronics by Theraja, S. Chand.
 5. Make: Getting Started With Arduino - The Open Source Electronics Prototyping Platform by Massimo Banzi, SPD.
 6. Microprocessor Architecture, Programming and Applications with the 8085 by Gaonkar, 6th Edition, Penram.
 7. Fundamentals of Microprocessors and Microcontrollers by B. Ram, Dhanpat Rai & Co. (Pvt.) Ltd.
 8. Arduino Tutorial Documentation, <https://www.arduino.cc/en/Tutorial/HomePage>.
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