

**COURSE NAME : DIPLOMA IN ELECTRICAL POWER SYSTEM**  
**COURSE CODE : EP/EE**  
**SEMESTER : SIXTH**  
**SUBJECT TITLE : MICROPROCESSORS AND MICROCONTROLLERS (ELECTIVE II FOR EP AND ELECTIVE-III FOR EE)**  
**SUBJECT CODE : 9147**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
03	--	02	03	80	20	--	25#	25@	150

**Rationale:**

Today microprocessors and microcontrollers have become an integral part of all automatic and semi automatic machines. Therefore there is a growing need of engineers / technicians in this field. Hence, it is necessary to study microcontroller basics, hardware and its programming.

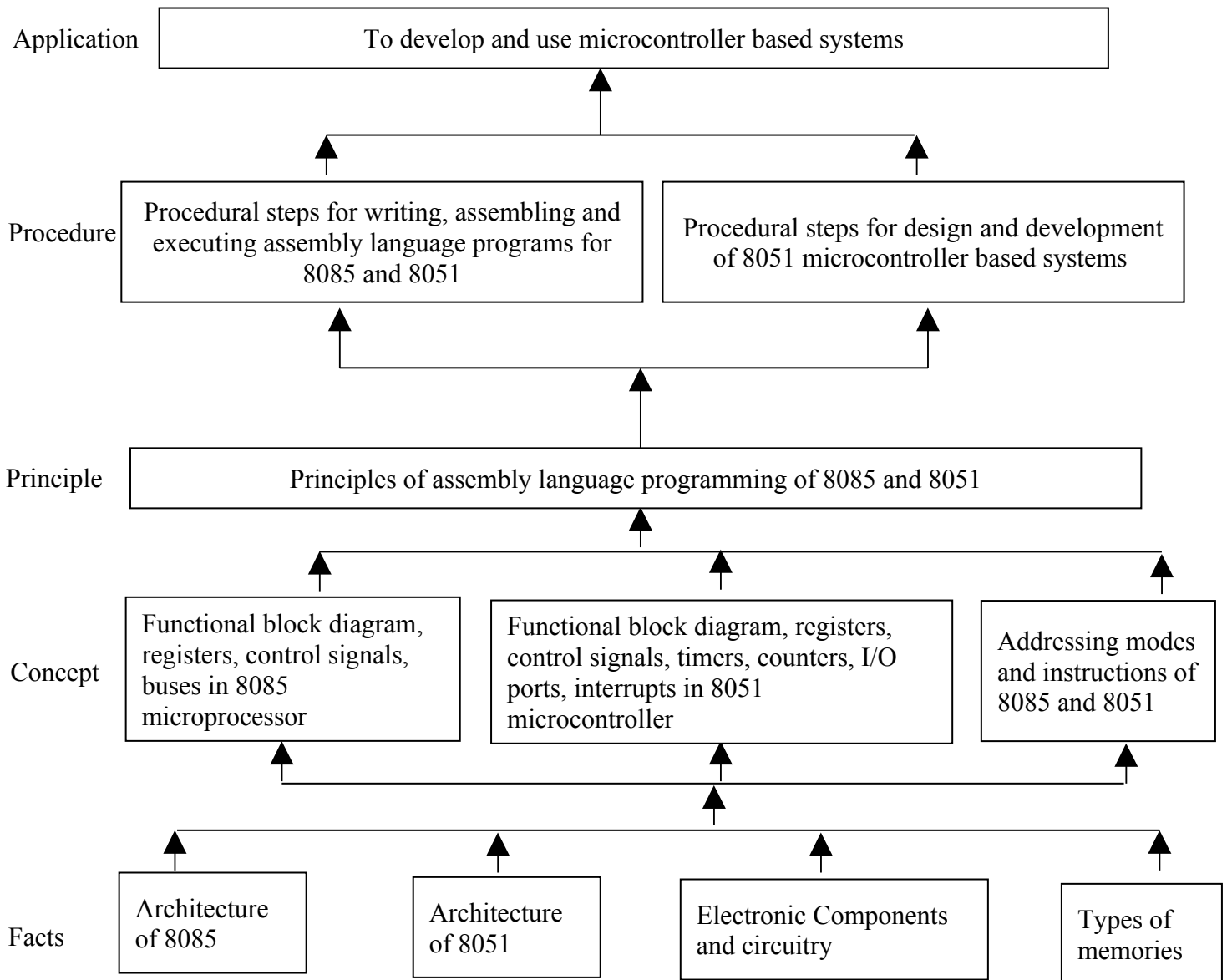
This subject covers microprocessor 8085 and microcontroller 8051 architecture, its instruction set, programming and applications. After completing this subject the student can write and execute programs for microcontroller and microprocessor based applications.

**Objectives:**

The student will be able to

1. Describe architecture and operation of microprocessor 8085.
2. Develop assembly language programs using instruction set of 8085.
3. Describe architecture and operation of microcontroller 8051.
4. Develop assembly language programs using instruction set of 8051.
5. Design and develop microcontroller based systems.
6. Explain various applications of microcontrollers.

### Learning Structures:



## Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<b>Microprocessor 8085</b> 1.1 Evolution of microprocessors 1.2 Architecture of 8085 1.3 Pin diagram 1.4 Control signals 1.5 Mmultiplexing of address & Data Bus	06	10
02	<b>8085 Assembly Language Programming</b> 2.1 Programming Model of 8085 2.2 Addressing Modes 2.3 Instruction classification, Instruction format 2.4 Instruction set 2.5 Stacks & subroutines 2.6 Assembly Language programming	08	14
03	<b>Microcontroller Basics</b> 3.1 Introduction and applications 3.2 Comparison between microcontrollers and microprocessors 3.3 Evolution of microcontrollers 3.4 Commercial microcontroller devices	02	04
04	<b>8051 Architecture</b> 4.1 Block diagram of 8051 microcontroller 4.2 Registers in 8051 4.3 General purpose or working registers 4.4 Stack Pointer and Program counter 4.5 Special function registers (SFR) 4.6 Program Status word 4.7 Data pointer (DPTR) 4.8 Timer resisters 4.9 Ports 4.10 Control registers	05	08
05	<b>8051 connections, I/O ports and memory organization</b> 5.1 8051 pin description 5.2 8051 connections 5.3 Parallel I/O ports 5.4 Memory organization	05	08
06	<b>8051 addressing modes and instructions</b> 6.1 8051 addressing modes 6.2 8051 instruction set 6.3 8051 assembler and assembling 8051 program 6.4 Software simulators of 8051 6.5 8051 instructions and simple programs	08	12
07	<b>8051 interrupts, timer/counters and serial communication</b> 7.1 Interrupts in 8051 7.2 Initializing 8051 interrupts 7.3 Interrupt priorities 7.4 Timers and counters, timer counter modes 7.5 Serial communication, serial communication modes	06	10

<b>08</b>	<b>Applications of microcontrollers</b>	<b>08</b>	<b>14</b>
	8.1 Square wave and rectangular wave generation 8.2 Pulse generation 8.3 Pulse width modulation 8.4 Frequency counter 8.5 Interfacing small keyboards 8.6 Interfacing LCD display, 8.7 Interfacing D/A and A/D converters 8.8 Interfacing relay 8.9 Interfacing stepper motor 8.10 Interfacing DC motor.		
<b>Total</b>		<b>48</b>	<b>80</b>

**Practical:**

Intellectual Skills:

1. Logical development
2. Programming skills

Motor Skills:

1. Data entry, Error Correction and Execution of assembly language programmes
2. Connection Skills

**List of Practicals:**

Using microprocessor 8085 kit:

1. Demonstration and study of microprocessor kit
2. Program for addition of and subtraction of two hexadecimal numbers
3. Program for finding largest / smallest number
4. Program for arranging numbers in ascending / descending order
5. Program for 16 bit addition
6. Program for data masking
7. Program for multiplication of two eight bit numbers
8. Program using JMP Instruction
9. Two programs using loop & Counter

Using microcontroller 8051 kit:

1. Demonstration and study of microcontroller kit
2. Demonstration and use of software simulator / assembler
3. Programming examples (any two) – Data transfer instructions
4. Programming examples (any two) – Logical Operations
5. Programming examples (any two) – Jump and Call instructions
6. Demonstration and testing of the following applications (Any four)
  - Keyboard Interface
  - LCD display Interface
  - D/A or A/D converter Interface
  - Relay Interface
  - Stepper motor control
  - DC motor control
  - Any other practical application using microcontroller 8051

**Learning Resources:****Books:**

<b>Sr. No.</b>	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
01	Ajay V Deshmukh	Microcontrollers theory and applications	TMH, New Delhi
02	Kenneth J Ayala,	8051 microcontrollers architecture, Programming and Applications	International Thomson publishing, India
03	B. Ram	Microprocessor & Microcomputer	S. Chand publications
04	Ramesh Gaonkar	Microprocessor Architecture, Programming, and Applications with the 8085	Penram International Publishing (India) Pvt. Ltd.