

Course Code	:	EEPC301
Course Title	:	MICROCONTROLLER AND IT'S APPLICATIONS
Number of Credits	:	3 (L: 3, T: 0, P: 0)
Prerequisites	:	NIL
Course Category	:	PC

Course Objective

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences –

- Maintain different types of microcontroller-based systems.

Contents (Theory):		Hrs./Unit
Unit : 1	<u>Introduction to Microcontrollers</u> 1.1. Basic concept of 8085 microprocessor architecture with functional block diagram. 1.2. Evolution of Microcontrollers. 1.3. Block diagram of Microcomputer, elements of Microcomputer, types of buses. 1.4. Von Neuman and Harvard Architecture. 1.5. Compare Microprocessor and Microcontrollers. 1.6. Need of Microcontroller. 1.7. Family of Microcontrollers and their specifications. 1.8. Versions of Microcontroller 8951, 89C1051, 89C2051, 89C4051 with their specifications and comparison.	07
Unit : 2	<u>Architecture of Microcontroller 8051</u> 2.1 Block diagram of 8051, function of each block. 2.2 Pin diagram, function of each pin. 2.3 Concept of Internal memory and External memory (RAM and ROM). 2.4 Internal RAM structure. 2.5 Reset and clock circuit. 2.6 Various registers and SFRs of 8051	08
Unit: 3	<u>8051 Instruction Set and Programs</u> 3.1 Overview of 8051 instruction set. 3.2 Various addressing modes. 3.3 Classification of instructions. 3.4 Data transfer instructions. 3.5 Arithmetic and Logical instructions. 3.6 Branching instructions. 3.7 Bit manipulation instructions. 3.8 Stack, subroutine and interrupt related instructions. 3.9 Programs based on above instructions such as Addition, Subtraction, Multi-byte addition, Multiplication of two numbers, BCD to Hex conversion, Hex to BCD conversion, HEX to ASCII conversion etc.	08

Unit: 4	<u>Assembly Language Programming</u> 4.1 Software development steps. 4.2 Software development tools like Editor, Assembler, Linker, Loader and Hex converters. 4.3 Role of various files created at various levels in running an Assembly program using simulators like RIDE or KEIL. 4.4 Various directives of Assembly language programming. 4.5 Programs using directives.	11
Unit: 5	<u>8051 Internal Peripherals and Related Programs</u> 5.1 I/O ports- List, diagram, read write operation, instructions and related SFRs. 5.2 Timers/counters – list, related SFRs, programming modes, operations with diagram. 5.3 Serial communication- Basics of serial communication, baud rate, related SFRs, programming modes, operations with diagram. 5.4 Interrupts- related SFRs, types, operations with diagram. Power saving operation- modes, related SFR. 5.5 Some applications of microcontroller a. Measurement of voltage, current, frequency. b. Generation of square, triangular and staircase waveform. c. Over current Relay operation. d. Speed control of D.C. motor.	11
	Total	45

References:

1. Mazidi, Mohmad Ali; Mazidi, Janice Gelispe; MckinlayRoline D., The 8051 Microcontroller and Embedded system, Pearson Education, Delhi, ISBN 978-8177589030
2. Pal, Ajit, Microcontroller Principle and Application, PHI Learning, New Delhi, ISBN13:978-81-203-4392-4
3. Kenneth, Ayala, 8051 Microcontroller Architecture Programming and Application, PHI Learning, New Delhi, ISBN: 978-1401861582
4. Deshmukh, Ajay, Microcontroller Theory and Application, McGraw Hill., New Delhi, ISBN- 9780070585959
5. Kamal, Raj, Microcontroller Architecture Programming, Interfacing and System Design, Pearson Education India, Delhi, ISBN: 9788131759905
6. Mathur; Panda, Microprocessors and Microcontrollers, PHI Learning, New Delhi, ISBN:978-81- 203-5231-5
7. Krishna Kant, Microprocessors and Microcontrollers: Architecture programming and System Design, PHI Learning, New Delhi, ISBN:978-81-203-4853-0

Course Outcomes

The theory and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

- a) Interpret the salient features of various types of microcontrollers.
- b) Interpret the salient features of architype of types microcontrollers IC 8051.
- c) Maintain the program features of the Microcontroller based application.
- d) Develop assembly language program.
- e) Develop programs to interface 8051 microcontrollers with LED/SWITCH/MOTOR.

Internal Assessment (40 Marks)

Mid Semester Class Test:20 Marks	Quizzes, viva-voce, Assignment: 10 Marks	Attendance: 10
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External Assessment (End Semester Examination:60 Marks)

GROUP	UNIT
A	1,2
B	3,4
C	5

Course Code	:	EEPC 303
Course Title	:	MICROCONTROLLER AND IT'S APPLICATIONS LABORATORY
Number of Credits	:	1 (L: 0, T: 0, P: 2)
Prerequisites	:	NIL
Course Category	:	PC

Course Objective

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Maintain microcontroller-based systems.

Practicals

List of Practical:(at least EIGHT are to be done)	
1.	Interpret details of Hardware kit for Microcontroller and practice to write and execute programs.
2.	Identify different menus available in a simulator software RIDE/KEIL and demonstrate their use.
3.	Develop and execute Assembly language programs using Arithmetic Instructions and demonstrate outcome for a given input data.
4.	Develop and execute Assembly language programs using Logical Instructions and demonstrate outcome for a given input.
5.	Develop and execute an Assembly language program for Addition of series of 8 bit nos, 16 bit result and demonstrate outcome for a given input data.
6.	Develop and execute Assembly language program for addition/subtraction of 16 bit no/multibyte nos. and demonstrate outcome for a given input data.
7.	Develop and execute Assembly language program for Block transfer from and to Internal/External memory using directives and demonstrate outcome for a given input data.
8.	Develop and execute Assembly language program Largest/smallest of given series of no. from Internal/External memory and demonstrate outcome for a given input data.
9.	Develop and execute Assembly language program arrange no in ascending/descending order from Internal/External memory and demonstrate outcome for a given input data.
10.	Develop and execute Assembly language program for LED blinking/LED sequences using delay/timer mode.
11.	Develop and execute Assembly language program to interface LED with microcontroller
12.	Using 8051, develop, run and test Over voltage/under voltage or over current/under current relay circuit with suitable hardware circuit.
13.	Using 8051, Develop, run and test Speed Control of a D.C. motor and note speed vs. Load characteristics at open loop condition.
14.	Using 8051, develop, run and test the operation of a stepper motor with a fixed number of steps and determine the angular displacement per step by measuring the total angular rotation.
15.	Using 8051, develop, run and test Traffic light Control using 8051.
16.	Measurement of ac voltage, current, frequency and phase angle difference (either between two voltages or between voltage and current) using suitable PT, CT, Zero crossing detectors, A/D converters etc. using 8051.

Course Outcomes

The theory, practical experiences and relevant soft skills associated with the course are to be taught and implemented so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

- Interpret the salient features of various types of microcontrollers.
- Interpret the salient features of architype of types microcontrollers IC 8051.
- Maintain the program features of the Microcontroller based application
- Develop assembly language program.

e) Develop program to interface 8051 microcontrollers with LED/SWITCH/MOTOR.

E X A M I N A T I O N S C H E M E (S E S S I O N A L)

1. **Continuous Internal Assessment of 60 marks** is to be carried out by the teachers throughout the fourth Semester. **Distribution of marks:** Continuous evaluation:50 Marks; Class Attendance: 10 Marks
2. **External Assessment (end Semester examination) of 40 marks** shall be held at the end of the fourth Semester on the entire syllabus. Assignment on the day of Viva-voce and practical report submission:20; Viva-voce:20

Course Code	:	EEPC 305
Course Title		BUILDING ELECTRIFICATION
Number of Credits	:	3 (L: 3, T: 0, P: 0)
Prerequisites	:	NIL
Course Category	:	PC

Course objectives:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Design electrical installation systems in building complexes.

Contents (Theory):		Hrs/Unit
Unit : 1	<p>1.1 Indian Electricity Rules (1956): Rule 28: Voltage level definitions. Rule 30: Service lines & apparatus on consumer premises. Rule 31: Cut-out on consumer's premises. Rule 46: Periodical inspection & testing of consumer's installation. Rule 47: Testing of consumer's installation. Rule 54: Declared voltage of supply to consumer. Rule 55: Declared frequency of supply to consumer. Rule 56: Sealing of meters & cut-outs. Rule 77: Clearances above ground of the lowest conductor. Rule 79: Clearances between conductors & trolley wires. Rule 87: Lines crossing or approaching each other. Rule 88: Guarding</p> <p>1.2 Classification of electrical accessories- controlling, holding, safety, outlet BIS symbols of following electrical accessories.</p> <p>1.2.1 Switch – Their types according to construction such as surface switch, flush switch, and pull switch, rotary switch, knife switch, pendent switch, Main-switch (ICDP, ICTP). Their types according to working such as single pole, double pole, two-way, two-way centre off, intermediate, series parallel switch</p> <p>1.2.2 Holders- Their types such as bayonet cap lamp holder, pendent holder, batten lamp holder, angle holder, bracket holder, tube light holder, screw type Edison and goliath Edison lamp holder, swivel lamp holder.</p> <p>1.2.3 Socket outlets and plugs- two pin, three-pin, multi pin sockets, two-pin and three-pin plug.</p> <p>1.2.4 Others- Iron connector, adaptor, and ceiling rose, distribution box, neutral link, bus-bar chamber.</p> <p>Wooden/ mica boards, Moulded/ MS Concealed boxes of different sizes. Modular accessories.</p>	06