GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Engineering		Branch	Mechatronics Engineering	
Semester	VI		Version	1.0.0.0	
Effective from Academic Year	2020-21		Effective for the batch Admitted in		July 2018
Subject code	1MC2601	Subject Name	Microcontrollers		

Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:
Concepts of Digital Electronics

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes: CO1. To understand architecture of 8051 microcontroller CO2. To apply architecture knowledge in interfacing various peripherals CO3. To develop programs for interfacing of various peripherals CO4. To implement small system using hardware and software concepts CO5. To Verify the knowledge gained in the course The practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate course learning outcomes.

Course Content

Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
UNIT – 1 8051 Architecture	1.1 function of each block of 8051 microcontroller 1.2 Program Status Word of 8051 1.3 Pin Diagram of 8051 1.4 Clock, Reset and Machine Cycle of 8051 1.5 Internal RAM Organization of 8051 1.6 Special Function Registers of 8051	1a. Describe function of each block of 8051 microcontroller 1b. Explain function of each pin of 8051 1c. Differentiate clock, reset and machine cycle of 8051 1d. Sketch internal memory organization of 8051	14	10
UNIT – 2 8051 Instruction Set	2.1 Addressing Modes 2.2 Data Transfer and Data Exchange Instructions 2.3 Stack Operation 2.4 Arithmetic Instructions 2.5 Bit and Byte Level Logical	2a. Classify addressing modes of 8051 with example 2b.Differentiate Stack, Stack Pointer and its operation 2c. Classify Bit Level and Byte Level instructions	12	9

	Instructions 2.6 Rotate and Swap Instructions 2.7 Branch Instructions 2.8 CALL and RET instructions			
UNIT – 3 8051 Programming	3.1 Programs based on Data Transfer Instructions 3.2 Programs based on Data Exchange Instructions 3.3 Programs based on Arithmetic Instructions 3.4 Programs based on Logical Instructions 3.5 Programs based on Jump Instructions	3a. Develop simple programs to perform Data moves and data exchange 3b. Develop simple programs to perform arithmetic operations 3c. Develop simple programs to perform logical operations 3d. Develop simple programs to perform branch operations	10	8
UNIT – 4 8051 Special Function Register	4.1 Timers/Counters Registers (TMOD, TCON) 4.2 Modes of Timers/Counters 4.3 Program to Generate Square Wave using Timer/Counter 4.4 Program to Generate Delay using Timer/Counter 4.5 Serial Data Communication (SCON) 4.6 Types of Interrupt (IE, IP)	4a. Describe format of TCON and TMOD 4b. Describe modes of Timer/ Counters 4c. Develop program to generate square wave 4d. Describe format of SCON 4e. Describe format of IE and IP 4f. Classify types of interrupts with their vector address	12	9
UNIT – 5 8051 Applications	5.1 External Memory Interfacing 5.2 LED Interfacing 5.3 Seven Segment Interfacing 5.4 LCD Interfacing 5.5 ADC 0804 Interfacing 5.6 Relay Interfacing 5.7 Stepper Motor Interfacing 5.8 DC Motor Interfacing	5a. Interface External memory with 8051 5b. Interface Display Devices with 8051 5c. Interface ADC with 8051 5d. Interface Motors with 8051	12	9

List of Practical		
No.	Unit	Name of Practical
1	1	Identify different modules of 8051 Simulation tool
2	2	Execute assembly language programs based on Internal Data transfer Instructions
3	2	Execute assembly language programs based on External Data transfer Instructions with memory
4	3	Develop and execute assembly language programs based on Arithmetic Instructions
5	3	Develop and execute assembly language programs based on Logical Instructions
6	3	Develop and execute assembly language programs based on Branch Instructions
7	4	Develop and execute C programs to generate square wave using Timer/Counter
8	5	Interface LED with 8051
9	5	Interface LCD Module with 8051
10	5	Interface ADC 0804 with 8051

11	5	Interface a relay with 8051
12	5	Interface a Stepper Motor with 8051
13	5	Interface a DC Motor with 8051

List of Instruments / Equipment / Trainer Board	
1	Microcontroller 8051 trainer Kit
2	8051 Simulator tool like EdSim51, Keil, Top View
3	Computer System- Pentium-IV and latest version
4	Interfacing Cards-Seven Segment Display, LCD
5	Application Board- External Memory Interface, DC Motor, Stepper Motor

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	The 8051 microcontroller and embedded systems	Mazidi, Muhammad Ali; Mazidi, Janice Gillispie; McKinlayRolin D.	PHI Learning, New Delhi
2	The 8051 Microcontroller: Architecture, Programming, and Applications	Ayala, Kenneth J.	Thomson Delmar Learning
3	Microcontrollers : Principles And Applications	Pal, Ajit	PHI Learning ,New Delhi

Link of Learning Web Resource	
1	www.academia.edu
2	www.nptel.iitm.ac.in
3	http://www.8051projects.net/download-c4-8051-projects.html