Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
M.Tech. in Embedded System
(2021-2023)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers As-sessment*	END SEM University Exam	Teachers As-sessment*				
MTES102	DCC	Microcontrollers and Interfacing	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To understand the architecture of various 8-bit controllers.
2. To understand the concepts of various interfaces to the controller.
3. To obtain hands-on experience in programming microcontroller.

Course Outcomes (COs):

The student will be able to

1. Understand the architecture of 8 bit controllers.
2. Design embedded system using 8 bit microcontroller

Syllabus:

UNIT I **8 Hrs.**

INTEL 8051 microcontroller: Architecture of 8051, Memory Organization, Register banks, Bit addressing media, SFR area, addressing modes, Instruction set, Programming examples. 8051 Interrupt structure, Timer modules, Serial Features, Port structure, and Power saving modes.

UNIT II **8 Hrs.**

Interrupts and communication Protocol: Interrupts in 8051, interrupt types, steps in interrupt processing, IE special function register , IP special function register, priority of interrupts, Serial I/O Devices, RS232 specifications, SPI and I2C communication protocols.

UNIT III **7 Hrs.**

AVR microcontroller: Features and applications, Types, Architecture, Internal Architectural Block diagram of controller (Atmega 8). Functions of each pins of ATmega8, Addressing modes, Instruction set, Configuration of Timers and Counters.

UNIT IV **7 Hrs.**

Configuration of AVR and Essential Peripheral circuits: Crystal Circuit, Power supply, Oscillator Circuit Initial programming configurations of Atmega8: port, counter, timer. Boot-Loader Circuit, ISP of Atmega 8 and Atmega328.

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UNIT V **8 Hrs.**

Microcontroller interfacing: Interfacing with LEDs, Seven Segment, Sensors, basic concepts and interfacing of LCD, ADC, DAC, Relays and External Memory Interface.

Text Books:

1. M.A. Mazidi & J.G. Mazidi, "The 8051 Micro Controller & Embedded Systems", Pearson Education. Asia (2000).
2. Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi, "AVR Microcontroller and Embedded Systems: Using Assembly and C", Pearson New International Edition.
3. Kenneth J. Ayala, " The 8051 Microcontroller", Thomson Delmar Learning, third edition, 2005

References:

1. "8-bit Embedded Controllers Handbook", INTEL Corporation 1990.
2. Jonathan W. Valvano, "Embedded Microcomputer systems, Real Time Interfacing", 3rd edition, Cengage learning, 2011.

List of Experiments:

1. Write a program using Data Transfer Instructions
2. Write a program using Arithmetic Instructions
3. Write a program using Logical Instructions
4. Write a program using Jump Instructions
5. Write a program using Loops for Delay
6. Write a program for LED interfacing
7. Write a program for RGB LED for Glowing Alternate patterns
8. Write a program to Display numbers and alphabets on 7 segment display
9. Write a program to generate waves with different duty cycles
10. Write a program to handle Interrupts.
11. Write a program for understanding communication protocols

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