

<b>Title of the Course: Embedded Programming</b> <b>Course Code :</b> <b>Compulsory/ Elective : Open Elective</b>		<b>L- 3</b>	<b>T-0</b>	<b>P-0</b>	<b>Cr-3</b>
<b>Pre-Requisite Courses:</b>	Basic Electronics Engineering				
<b>Textbook:</b>	1. “8051 architecture, programming and Applications”, Kenneth Ayala. 2. “8051 and Embedded systems”, Mazidi				
<b>References:</b>	1. Keil A51, BL51 and C51 manuals. 2. www.keil.com, www.8052.com				
<b>Course Objectives :</b>	To illustrate the different architectures and features of 8051 architecture.				
	To provide the knowledge of different hardware peripherals and programming of different peripherals 8051 microcontroller.				
	To empower the students for the design and development of embedded system.				
<b>Course Outcomes:</b>	<b>After the completion of this course student should be able to –</b>				
	<b>CO1 - Describe</b> the basics of 8051 architecture.				
	<b>CO2 - Apply</b> programming skills to <b>integrate</b> hardware peripherals of 8051 using assembly language programming and embedded C programming				
	<b>CO3- Develop</b> small embedded systems using 8051 controller and embedded programming.				
<b>Assessments</b>	<b>In Semester Evaluation (ISE)</b> - Class tests/Quiz/Home assignments / Mini Projects, orals any other - 20% <b>Mid Semester Evaluation (MSE)</b> – 30%. <b>End Semester Evaluation(ESE)</b> - 50%				
<b>Course Contents:</b>	<p><b>Module 1: Introduction to controller (7 Hours )</b>  <a href="#">Introduction to embedded systems</a>, <del>Comparison of microprocessor and</del>  <a href="#">Introduction to</a> micro controllers, <del>microcontroller architectures</del>, 8051 pinout, architecture, memory organization, register structure, I/O port structure, overview of internal peripherals.</p> <p><b>Module 2: Assembly language / embedded C language programming (7 Hours )</b>  <a href="#">Concept of assembly instructions</a>, <a href="#">Important instructions of 8051</a>, <a href="#">Basic assembly language programs for arithmetic / logical / data transfer operation</a>, <a href="#">subroutines</a>, <a href="#">introduction to C programming for 8051</a>, <a href="#">data types</a>, <a href="#">C programs for arithmetic / logical / data transfer operation</a>, <a href="#">subroutines</a>, <a href="#">using pointers</a>, <a href="#">Development tools for 8051 programming</a>.  <del>Instruction cycles, timing diagrams, instruction set of 8051, assembly language programs for arithmetic / logical / data transfer operation, subroutines, introduction to C programming for 8051, data types, using pointers, Development tools for 8051 programs.</del></p> <p><b>Module 3: Internal peripherals (78 Hours )</b>  Interrupts and interrupt latency, interrupts of 8051 and their programming, 8051 timers and their mode, initialization of timers, applications of timers</p> <p><b>Module 4: External peripheral interfaces (8 Hours )</b></p>				

	<p>Interfacing of led, switches-,_relay, 7 segment display, keyboard matrix, sensors, DC motor, ADC and DAC to 8051, <a href="#">LCD interface</a>, <a href="#">C programming</a> for the same, <a href="#">external memory interface to 8051</a></p> <p><b>Module 5: Communication (7 Hours )</b>  Serial port of 8051 and its initialization, multiprocessor communication, hardware control using serial communication, <a href="#">Introduction to I2C</a> and SPI bus for serial communication</p> <p><b>Module 6: Applications (3 Hours )</b>  Study of Water level controller, <a href="#">Traffic light control</a>, Frequency counter, <a href="#">Line follower</a> Robot control, <del>LCD interface</del>, <del>Introduction to embedded systems</del>, <del>Introduction to arduino board</del>.</p>	
<b>Module wise Measurable Students Learning Outcomes</b>	Module 1	Architecture of 8051
	Module 2	Assembly / C language programming for 8051
	Module 3	Initialization of internal peripherals of 8051
	Module 4	Interfacing of 8051 to external peripherals
	Module 5	Ways of communication of 8051 with outside world
	Module 6	Real time application
<b>Computer Usage / Lab Tool</b>	Use of <del>Windows operating system and</del> micro Vision IDE, downloader, hardware kits, proteus <a href="#">simulator software 8</a>	
<b>Laboratory Experiences:</b>	The student will be able to use the development software tools and related hardware kits for performing various experiments	
<b>Independent Learning Experiences:</b>	As it is an open elective course, lab session is not assigned for it. But students should <a href="#">complete perform</a> different <del>experiments-practical assignments</del> related with each module as per instructions <del>offrom</del> course coordinator. <del>Also students will be asked to attend extra lab sessions.</del>	
<b>Class Schedule:</b>	3 Lectures per week	