

**22UCSL404    Programming Computer Peripherals and    (0-0-2) 1**  
**Interfacing Laboratory**

Contact Hours: 26

**Course Learning Objectives (CLOs):** This laboratory course focuses on the following learning perspectives:

- Understand the internal architecture, instruction set of ARM7 microcontroller, assembling process & implement small programs.
- Design & develop Assembly Language Program /& C program for a given real time application.
- Understand the use of interrupts & other advanced concepts related to ARM7
- Demonstrate working knowledge of the necessary steps and methods used to interface ARM7 to devices such as motors, LCD, ADC, and DAC etc.

**Course Outcomes (COs):**

Description of the Course Outcome: At the end of the course the student will be able to:		Mapping to POs(1-12) / PSOs (13-16)		
		Substantial Level (3)	Moderate Level (2)	Slight Level (1)
<b>CO-1</b>	<b>Execute</b> assembly level codes for a given specific problem using ARM processor.	-	2, 4	3,15
<b>CO-2</b>	<b>Execute</b> embedded C programs for a given specific problem using ARM processor.	-	4,14	15,16
<b>CO-3</b>	<b>Implement</b> programs for interfacing with real world devices such as LCD's Keyboards, DAC, ADC, Relays Motors and Serial Interface - RTC, USB, UART, I2C.	13	4,5,16	3,12

POs/PSOs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Mapping Level</b>	-	2.0	1.0	2.0	2.0	-	-	-	-	-	-	1.0	3.0	2.0	1.0	1.5

**Course Contents:**

**PART A:** Conduct the following experiments to learn ALP using ARM:

- Arithmetic and logical operations
- Interrupts related operations
- Timer related applications.

## **SDMCET: Syllabus**

**PART B:** Conduct interfacing experiments to learn embedded C for ARM:

- LCD- interfacing
- Stepper Motor Interfacing
- Real time sensors Interfacing
- 7-segment LED interface
- Serial Interface (USB, UART, I2C)
- Timer /Counters
- Interrupt Controller

### **Reference Books:**

- 1) William Hohl, "ARM Assembly Language", CRC Press.
- 2) Steve Furber, "ARM System-on-chip Architecture", Pearson Education, 2012
- 3) James K. Peckol, "Embedded Systems: A Contemporary Design Tool", 2008
- 4) Jonathan W. Valvano, Brookes & Cole, "Embedded Microcomputer Systems, Real Time Interfacing", 1999
- 5) LPC 2148 User Manual.