

ARM SYSTEM DEVELOPMENT

Course Code	19EC4601E	Year	III	Semester	II
Course Category	Program Elective II	Branch	ECE	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites	Nil
Continuous Internal Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to

CO1	Illustrate the features of embedded systems, architecture of ARM7 and applications (L4).
CO2	Classify between ARM and THUMB instruction set and achieving competency in assembly programming of ARM. (L2).
CO3	Articulate the exception, interrupts and interrupt handling schemes (L3).
CO4	Interpret the architectural features of LPC2148 microcontrollers (L2).
CO5	Demonstrate the hardware and interfacing peripheral devices to LPC2148 (L3)

Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2						2	3	2
CO2	3	3	2		2	2						2	3	2
CO3	3	2	2			2						2	3	2
CO4	2					2						2	3	2
CO5	2	3	3	2	2	2	2	2				2	3	3
Average* (Rounded to nearest integer)	3	2	2	1	1	2	1	1				2	3	3

Syllabus

Unit No.	Contents	Mapped CO
I	Introduction to ARM 7 Architecture: The RISC design philosophy, ARM design philosophy, embedded system hardware- AMBA bus protocol, embedded system software- applications. ARM core data flow model, Registers, CPSR-Processor modes.	CO1
II	ARM Instructions set: Fundamentals of ARM instructions, Barrel shifter, Classification and explanation of instructions with examples-Data processing, Branch, Load-store, SWI and Program Status Register instruction, Introduction to THUMB, Differences between ARM and THUMB, Register usage in Thumb.	CO2
III	Exception handling: ARM processor exceptions and modes, vector table, exception priorities, link register offsets. Interrupts- assigning interrupts, interrupt latency, IRQ and FIQ exceptions with example- code for enabling and disabling IRQ and FIQ exceptions, Comparison between exception and interrupts. Interrupt handling schemes- nested interrupt handler, non-nested interrupt handler. Basic interrupt stack design	CO3

IV	Introduction to ARM7 microcontroller: LPC2148 ARM 7 microcontroller, Features of LPC2148, Architecture of LPC2148, Addressing mode, Memory organization, ARM register model, programmer model, oscillator, PLL, CPSR, SPSR, 3stage pipelining.	CO4
V	Interfacing with ARM: LED, GPIO programming with embedded C, LCD interfacing, programming of LCD, ADC, Interfacing of LM35 temperature sensor, DAC, Timers, UART programming, transfer of a character and receive of a character program.	CO5

Learning Resources

Text Books

1. Andrew N. SLOSS, "ARM System Developer's guide", ELSEVIER Publications, 2016
2. Steve Furber, "ARM System-on-chip Architecture", Pearson Education, 2012

Reference Books

1. In Sider 's Guide To Philips Arm7 Based Microcontroller ,Shitex.co.uk
2. ARM Assembly Language – William Hohl, CRC Press
