

Course code	Course name	L-T-P-Credits	Year of Introduction
AE461	ARM SYSTEM ARCHITECTURE	3-0-0-3	2016
Prerequisite : Nil			
Course objectives			
<ul style="list-style-type: none"> To introduce the concepts of embedded processors and ARM based development. 			
Syllabus			
Embedded Computers - Embedded System Design - ARM Architecture - Instruction Set - ARM Processor –Assembly programming - Component Interfacing - ARM interfacing programs - Peripherals In ARM Processors - Peripherals and their control - ARM tools and Peripherals - Arm Procedure Call Standard - Example C program.			
Expected outcome			
<ul style="list-style-type: none"> At the end of the semester students must be able to obtain comprehensive knowledge in embedded processors and ARM based system. 			
Text Books			
<ol style="list-style-type: none"> Steve Furber, “<i>ARM system on Chip Architecture</i>”, 2nd Edition, Addison Wesley Publishers, 2013 Wayne Wolf, “<i>Computers as Components Principles of Embedded Computing System Design</i>”, Morgan Kaufman Publishers, 2001 			
Reference Books:			
<ol style="list-style-type: none"> David Seal, “<i>ARM Architecture Reference Manual</i>”, 2nd Edition, Addison Wesley Publishers, 2001 Frank Vahid and Tony. D.Givargis, “<i>Embedded System Design - A Unified Hardware/Software Introduction</i>”, John Wiley Sons, 2000. 			
Course Plan			
Module	Contents	Hours	Semester Exam Marks
I	Embedded Computers – Characteristics of Embedded Computing Applications–Challenges in Embedded Computing. Embedded System Design –Process Requirements – Specification	6	15%
II	ARM Architecture: The ARM Instruction Set Architecture. Bus structure and the peripherals. Register set, Exception modes, Software Interrupt.	6	15%
FIRST INTERNAL EXAMINATION			
III	ARM Processor – Memory organization and processor initialization [start up code]. Load store instruction set. Assembly programming using Assemblers, Linkers, Loaders and Debuggers. Component Interfacing – Designing with Microprocessor Development and Debugging – Design Example Alarm Clock	8	15%
IV	ARM interfacing programs: GPIO, Timers, Counters, PWM, ADC. Application coding examples: Measurement and control of time, frequency velocity acceleration, power	8	15%

	control and touch monitoring		
SECOND INTERNAL EXAMINATION			
V	Peripherals In ARM Processors: ARM / THUMB architecture. Program structure to Supervisor, Kernel, and User modes. Peripherals and their control: GPIO, Timers, Counters, PWM, ADC and serial communication channels.	7	20%
VI	ARM tools and Peripherals: ARM Development Environment, Arm Procedure Call Standard (APCS), Example C program.	7	20%
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN:

Maximum Marks:100

Exam Duration: 3 Hours

Part A

Answer any two out of three questions uniformly covering Modules 1 and 2 together. Each question carries 15 marks and may have not more than four sub divisions.

(15 x 2 = 30 marks)

Part B

Answer any two out of three questions uniformly covering Modules 3 and 4 together. Each question carries 15 marks and may have not more than four sub divisions.

(15 x 2 = 30 marks)

Part C

Answer any two out of three questions uniformly covering Modules 5 and 6 together. Each question carries 15 marks and may have not more than four sub divisions.

(20 x 2 = 40 marks)