Nirma University
School of Technology, Institute of Technology
B. Tech (Instrumentation and Control Engineering)

L	T	P	C
2	0	2	3

Course Code	**2ICDE52**
Course Title	**Advanced Microprocessors and its Applications**

Course Learning Outcome:

At the end of the course, students will be able to –
- illustrate the architecture of ARM microprocessor
- program ARM microprocessor using various programming techniques
- design ARM processor based embedded applications

Syllabus	Teaching Hours

UNIT 1: Introduction — 04

The RISC design philosophy, the ARM design philosophy, embedded system hardware, embedded system software.

UNIT 2: ARM Processor Fundamentals — 06

Registers, Current Program Status Register (CPSR), pipeline, exceptions, interrupts, and the vector table, core extensions, architecture revisions, ARM processor families, block diagram of ARM processor, pin layout for ARM processor.

UNIT 3: Introduction to the ARM Processor Instruction Set — 05

Data processing instructions, branch instructions, load-store instructions, software interrupt instruction, program status register instructions, loading constants, ARMv5E extensions, conditional execution.

UNIT 4: C Programming and Assembly Programming Overview — 05

Writing C programs, function creation, writing assembly code, profiling and cycle counting, instruction scheduling, register allocation, conditional execution, looping constructs, ARM peripheral programming ,Fast and Slow GPIO programming.

UNIT 5: ARM Processor Modules — 05

D/A converter module, A/D converter module, SPI module, I2C module, PWM module, ARM cortex series programming.

UNIT 6: Applications of the ARM controller 05

Interfacing and programming for LED's, push buttons, switches, buzzer, LCD, keyboard, DC motor, stepper motor, servo motor, relay, opto-isolator, temperature sensor, IR sensor, ultrasonic sensor, designing of embedded systems using ARM microcontroller.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will consist of minimum 10 experiments based on the above syllabus.

References:

1. Andrew Sloss, ARM System Developer's Guide, Morgan Kaufman Publication.
2. Tervor Martin, The Insider's Guide to the Philips ARM7 Based Microcontrollers, Hitex Publication
3. Steve Furber, ARM System on Chip Architecture, Addison-Wesley Professional Publication.
4. Dr. Mark Fish , ARM® Cortex® M4 Cookbook, Packt publication.
5. User manual of LPC21xx series ARM processor.