Devi Ahilya University, Indore, India Institute of Engineering & Technology				ME – I Year (Spl Digital Communication) Semester- A			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
DCR1C2 **Embedded System using ARM Microcontroller**	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	3	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

Objectives: The objective of this course is to teach students design and interfacing of ARM microcontroller-based embedded systems. High -level languages are used to interface the ARM microcontrollers to various applications. There are extensive hands-on labs/projects.
Prerequisite: Knowledge of Microprocessor and C++ Programming.

COURSE CONTENTS

UNIT-I

Introduction: Definition of Embedded System, Embedded Systems Vs General Computing Systems, Major Application Areas, Purpose of Embedded Systems,Characteristics and Quality Attributes of Embedded Systems, Core of the Embedded System: General Purpose and Domain Specific Processors, Embedded system architecture: RISC and CISC, RISC:Introduction of ARM Processors, Evolution of ARM, ARM design philosophy, ARM Processor fundamentals: Data flow model, Registers, Program Status Register, Pipeline, Interrupts and Vector Table, ARM Processor Families and Nomenclature.

UNIT -II

ARM Basic Instruction Set: Introduction to 32 bit programming, Instruction Set Architecture of ARM, Addressing modes, Data Processing Instructions, Branch Instructions, Load and Store Instructions, Conditional Instructions, PSR Instructions, Stack Instructions.

UNIT -III

ARM Thumb Instruction Set: Overview, Branch instructions, Data processing instructions, Status register access instructions, Single register load and store instructions, Multiple register load and store instructions, Semaphore instructions, Coprocessor instructions, Stack Instructions, Interrupt Instructions.

UNIT -IV

ARM Programming- Assembly Language Programming: Directives-AREA, ENTRY, END etc., Assembly code using instruction scheduling, Register Allocation, Conditional Execution and Loops.C programming for ARM: Simple C program using function, pointers, structures, etc, Exception Handling,Interrupts, Interrupt Handling Schemes

UNIT -V

Interfacing and applications programs for LCD display, PWM ,ADC, DAC application, measurement and control of physical parameter as temperature , stepper motor control, DC motor control etc.

Books Recommended:

[1]. "ARM System Developer's Guide Designing and Optimizing System Software" by Andrew N. Sloss, Elsevier publication, 2004.
[2]. Arm System-On-Chip Architecture, 2/E , by Par Furber, Pearson Education Limited, 2000.
[3]. "EMBEDDED SYSTEM DESIGN", By Par Santanu Chatttopadhyay, PHI Learning Private Ltd., 2013.
[4]. "Embedded Microcomputer Systems, Real Time Interfacing, by Jonathan W. Valvano – Brookes /Cole, 1999, Thomas Learning.