Annexure 1

Detailed Syllabus of Course

S. No	Module Title	Topics	Duration (Hours)		Learning Outcome
			Theory	Lab	
1.	**Introduction to Embedded Systems**	Introduction to embedded systems, Application Areas, Categories of embedded systems, Overview of embedded system architecture, Specialties of embedded systems, recent trends in embedded systems, Architecture of embedded systems, Hardware architecture, Software architecture, Application Software, Communication Software, Development and debugging Tools.	5	1	• Understand the basics of Embedded Systems • Working of Microcontroller based boards • Recent Trends in Embedded Systems

2	**Embedded C**	Introduction to 'C' programming, Storage Classes, Data Types, Controlling program flow, bitwise operations Arrays, Functions, Memory Management, Pointers, Variable arguments in Functions, Arrays and Pointers, Pointer to Functions and advanced topics on Pointers, Structures	6	12	• Programming in Embedded C • Concepts of Pointers, Structures and bitwise operators in context of Embedded Systems
3	**ARM /Cortex Introduction and Architecture**	Introduction to ARM Architecture, Overview of ARM, Overview of Cortex Architecture, Cortex M3 based controller architecture, Memory mapping, Introduction to Keil, Simulation	6	10	• ARM architecture and its peripherals • Working in keil environment and simulation

4	**Programming ARM Cortex Peripherals (GPIO, Timers, Serial Port and Interrupts)**	Introduction to Timers and interface with ARM/Cortex microcontroller, Introduction to Interrupts and interface with ARM/Cortex microcontroller, Introduction to Serial Port and interface with ARM/Cortex microcontroller, Cortex M3 interrupt handling – NVIC	6	20	• Participants will learn how to read the datasheet of a particular ARM based development board • Program various peripherals in keil using Embedded C
5	**Interfacing external peripherals to ARM Based Microcontroller Board**	Introduction to external peripherals, Interfacing ARM/Cortex microcontroller with LCD, Interfacing ARM/Cortex microcontroller with key board, Interfacing ARM/Cortex microcontroller with stepper motor	4	9	• Monitoring and controlling various devices through an ARM based development board

6	**Porting on ARM/Cortex**	Types of Bootloaders, Linux boot sequence, Building Kernel, Cross Compilation Building Boot image, Buildroot, Busybox, Kernel Compilation for ARM, Porting of OS to ARM	3	8	• Port the OS with applications on ARM • Cross compilation • Optimizing Root File System
Total			**90 Hours(Theory-30, Lab-60)**		