

5114 – MICROPROCESSOR BASED INSTRUMENTATION									
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)				
Lectures	Practical	Credits			Theory		Practical Ex.	Total	
3	2	5	25	25	3 Hrs	100	-	150	
Pre-requisite		Source	Semester	Theory	Test	Total	TW	PR	Gr Total
4142		INC		75	25	100	25	-	125

Rationale: Having studied basic concepts of Microprocessors (8085 based) and Interfacing Techniques, the student is in this subject, exposed to processors higher than the 8085 and to microcontrollers which are increasingly used in Instrumentation based systems.

COURSE CONTENTS		Hrs	Mks
1. INTRODUCTION TO ADVANCED MICROPROCESSORS		9	20
Study of Architecture of 8086 processor- Bus interface unit, segment registers, instruction queue, instruction pointer, execution unit, general purpose registers, flag register and description of different flags, stack pointer and base pointer registers, index registers. Memory segmentation in the 8086 processor based system. Comparison of the 8088, 80186, 80286, 80386, 80486 and the Pentium processors with reference to features like member of data lines, member of address lines speed and compatibility of instruction sets.			
2. INTRODUCTION TO MICROCONTROLLERS		2	5
Concept of microcontrollers. Comparison between microprocessors and microcontroller. Differences between the features of microcontrollers like 8031, 8051, 8751 and 8748.			
3. ARCHITECTURE & ORGANISATION OF 8051		17	35
Pinout diagram and internal block diagram. Central processing unit- Accumulator and PSW, other CPU registers. Memory spaces. Input/output ports. Timers/ counters. Serial port interface. Interrupt capability and control.			
4. INSTRUCTION SET		20	40
Data addressing modes- Register addressing, direct byte addressing, register indirect addressing, immediate addressing. Addressing mode combinations. Symbolic addressing. Arithmetic instructions. Logical byte operations. Program control instructions like Jumps, Calls and Returns. Operate and branch instructions. Stack operations. Data pointer and table look up instructions. Boolean processing instructions- Direct bit addressing, bit manipulation instructions.			
Total		48	100

PRACTICALS

- Writing and testing at least 6 simple programs for the 8051 using addition and logical instructions.
- Study of any 6 of the following interfaces with the 8051- Study cards based on peripheral chips like 8155, 8255, 8253, 8251, 8259, 8257 and 8279. DC meter controller card. Thumb wheel interface study card. Traffic controller study card. Stepper meter controller card. D to A converter card. A to D converter card. Temperature controller card.

REFERENCE BOOKS

- Embedded Applications- Vol-I by Intel.
- Microprocessors and Interfacing by Douglas Hall.
- Instrumentation Devices and System by Rangan, Sarma and Mani.

