

	Internal Exam	Assignment	Lab Assessment	End Semester Examinations
CO 1	✓			✓
CO 2	✓		✓	✓
CO 3	✓		✓	✓
CO 4		✓	✓	✓

3. MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Discipline	COMPUTER SCIENCE				
Course Code	UK3DSCCSC202				
Course Title	MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING				
Type of Course	DSC				
Semester	III				
Academic Level	2				
Course Details	Credit	Lectures per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5 hours
Pre-requisites	Students should have an understanding of computer organization, architecture and basic digital circuit design concepts.				
Course Summary	This course will help students to understand the architecture, memory organization, interrupts, pin configurations, and instruction set of an 8086 microprocessor. It also helps to gain practical assembly language programming skills for efficient implementation.				

Detailed Syllabus:

Module	Unit	Content	Hrs (L+P)
I	The 8086 Microprocessor		15
	1.	The 8086 Internal Architecture: Execution Unit, Bus Interface Unit	
	2.	The 8086 Registers, Memory Banks: Even Bank, Odd Bank	
	3.	Pin Configuration, Signals: Minimum mode and Maximum mode	
	4.	Multiplexing of address/ data bus	
	5.	Bus cycles and Timing Diagram	
II	Instruction Set		15
	6.	Instruction set of 8086: Data Transfer Instructions, Arithmetic Instructions, Bit Manipulation, String Instructions, Branch Control Instructions, Iteration Control Instructions, Interrupt Instructions, Processor Control Instructions.	
	7.	Addressing modes of 8086.	
	8.	Interrupts: Interrupt Vector Table, Response, Types, Priority.	
	9.	Direct Memory Access, DMA Transfer modes, DMA Controller-8257.	
III	Assembly Language Programming		15
	10	Program Development Tools	
	11	Assembler Directives	
	12	Variables and Constants	
	13	Procedures and macros	
	14	Interrupts of personal computers,	
	15	Hand coding of assembly language programs, examples.	
IV	Advanced Microprocessors		15
	16	Intel Pentium Processor (Architecture and features only)	
		Advanced pentium processors: Pentium pro, Pentium II, Pentium III, Pentium 4	

		(Features only)	
	17	Intel Core i3, i5, i7, i9 series (Features only)	
V	Flexi Module: Not included for End-Semester Exams		15
	18	Microcontroller: Fundamental concepts, Architecture	
	19	Introduction to Embedded System	

CORE REFERENCES:

1. A. NagoorKani, 8086 Microprocessor and Its Applications, McGraw Hill, Second Edition.
2. N. Mathivanan, Microprocessors, PC Hardware, and Interfacing, PHI Edition.
3. Barry B. Brey, The Intel Microprocessors, 8th Edition, Pearson Education.

LAB EXERCISES

PART A

1. Basic Arithmetic Operations (Addition, Subtraction, Multiplication, and Division)
2. Data Transfer between Memory and Registers
3. Simple Programs using Iteration Control Instructions

PART B

4. Program to find the sum of numbers in an array
5. Program to Reverse word in strings
6. Program to compute the square of a number
7. Program to find the LCM of two 16-bit unsigned numbers
8. Program to search for a number in an array
9. Program to find ascending order in an array
10. Program to move a block of data from one location to another

Course Outcomes

No.	Upon completion of the course, the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Summarise the basic concepts of microprocessors	U	PSO-1
CO-2	Apply various addressing modes and instructions of the 8086 microprocessors for program development.	Ap	PSO-1, 2, 3
CO-3	Develop assembly language programs for the 8086 microprocessors to solve computational problems efficiently.	Ap	PSO-1, 2, 3

CO-4	Outline the features of advanced microprocessors	U	PSO-1, 2, 3
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R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Note: 1 or 2 COs/module

Name of the Course: MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

Credits: 3:0:1 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L) / Tutorial (T)	Practical (P)
1	Summarise the basic concepts of microprocessors	PO - 6, 7 PSO-1	U	F, C	L	-
2	Apply various addressing modes and instructions of the 8086 microprocessors for program development.	PO -1,2, 6, 7 PSO-1, 2, 3	Ap	F, C, P	L	P
3	Develop assembly language programs for the 8086 microprocessors to solve computational problems efficiently.	PO -1,2, 6, 7 PSO-1, 2, 3	Ap	F, C, P	L	P
4	Outline the features of advanced microprocessors	PO -6, 7 PSO-1	U	F, C	L	-

F-Factual, C-Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
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CO 1	1	1	-	-	-	1	1	-	2	1	-	-
CO 2	2	2	-	-	-	1	1	-	2	2	2	-
CO 3	2	2	-	-	-	2	1	-	2	2	2	-
CO 4	-	-	-	-	-	3	3	-	2	-	-	-

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

- Quiz / Assignment/ Quiz/ Discussion / Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics:

	Internal Exam	Assignment	Lab Assessment	End Semester Examinations
CO 1	✓		✓	✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓		✓	✓

4. COMPUTER GRAPHICS