UNIVERSITY OF MADRAS

M.Sc. DEGREE PROGRAMME IN PHYSICS

SYLLABUS WITH EFFECT FROM 2023-2024

Paper 12 - PRACTICAL III	**II YEAR - THIRD SEMESTER**

Subject Code	Subject Name	Category	L	T	P	Credits	Inst. Hours	Marks
529C3D	**PRACTICAL III**	Core				3	6	75

Pre-Requisites

Knowledge and handling of general and experiments of Physics, as well as fundamentals of digital principles,

Learning Objectives

- To understand the theory and working of Microprocessor, Microcontroller and their applications
- To use microprocessor and Microcontroller in different applications

Course Details

(Minimum of Twelve Experiments from the list)

1. Determination of Thickness of air film. - Solar spectrum – Hartmann's formula. Edser and Butler fringes.
2. Determination of Solar constant
3. Determination of velocity and compressibility of a liquid using Ultrasonics Interferometer
4. Arc spectrum – Iron.
5. Determination of Diffraction pattern of light with circular aperture using Diode/He-Ne laser.
6. Measurement of Magnetic Susceptibility - Guoy's method
7. GM counter – Feather's analysis: Range of Beta rays
8. Study the beam divergence, spot size and intensity profile of Diode/He-Ne laser.
9. Determination of Refractive index of liquids using diode Laser/ He – Ne Laser
10. Molecular spectra – CN bands
11. Determination of Planck Constant – LED Method
12. Construction of Op-Amp- 4 bit Digital to Analog converter (Binary Weighted and R/2R ladder type)
13. Construction of square wave generator using IC 555 – Study of VCO
14. Study of Binary to Gray and Gray to Binary code conversion.
15. Construction of Encoder and Decoder circuits using ICs.
16. Study of synchronous parallel 4-bit binary up/down counter using IC 74193
17. Study of asynchronous parallel 4-bit binary up/down counter using IC 7493
18. Study of Modulus Counter

19. Construction of Multiplexer and Demultiplexer using ICs.
20. 8-bit addition and subtraction, multiplication and division using microprocessor 8085
21. Sum of a set of N data (8-bit number), picking up the smallest and largest number in an array. Sorting in ascending and descending orderusing microprocessor 8085
22. Code conversion (8-bit number): a) Binary to BCD b) BCD to binaryusing microprocessor 8085
23. Addition of multi byte numbers, Factorialusing microprocessor 8085

24. Clock program- 12/24 hours-Real time application – Six Digits Hexa Decimal and Decimal Counters using microprocessor 8085
25. Interfacing of LED – Binary up/down counter, BCD up/down counter and N/2N up/down counter using microprocessor 8085
26. Interfacing of seven segment display using microprocessor 8085
27. Interfacing of 8-bit R / 2R ladder DAC (IC 741) – Wave form generation – Square, Rectangular, Triangular, Saw tooth and Sine waves using microprocessor 8085
28. Interfacing of DC stepper motor – Clockwise, Anti-clockwise, Angular movement and Wiper action using microprocessor 8085
29. Interfacing of Temperature Controller and Measurementusing microprocessor 8085
30. Interfacing of Traffic light controller using microprocessor 8085

TEXT BOOKS	1. Practical Physics, Gupta and Kumar, Pragati Prakasan 2. Op-Amp and linear integrated circuit, Ramakanth A Gaykwad, Eastern Economy Edition. 3. Electronic lab manual Vol I, K ANavas, Rajath Publishing 4. Douglas V. Hall, Microprocessors and Interfacing programming and Hardware, Tata Mc Graw Hill Publications (2008) 5. V. Vijayendran, 2005, Fundamentals of Microprocessor-8085", 3rd Edition S.Visvanathan Pvt, Ltd.
REFERENCE BOOKS	1. Advanced Practical Physics, S.P Singh, Pragati Prakasan 2. A course on experiment with He-Ne Laser, R. S. Sirohi, John Wiley & Sons (Asia) Pvt. ltd 3. Electronic lab manual Vol II, Kuriachan T.D, Syam Mohan, Ayodhya Publishing 4. Electronic Laboratory Primer a design approach, S. Poornachandra, B. Sasikala, Wheeler Publishing, New Delhi 5. Microprocessor and Its Application - S. Malarvizhi, Anuradha Agencies Publications

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COURSE OUTCOMES:

At the end of the course, the student will be able to:

CO1	Develop the programming skills of Microprocessor	**K5**
CO2	Appreciate the applications of Microprocessor programming	**K3**
CO3	Understand the structure and working of 8085 microprocessor and apply it.	**K1, K3**
CO4	Acquire knowledge about the interfacing peripherals with 8085 microprocessor.	**K1, K4**
CO5	Acquire knowledge about the interfacing 8051 microcontroller with various peripherals.	**K1,K4**
K1 - Remember; K2 – Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;		

MAPPING WITH PROGRAM OUTCOMES:

Map course outcomes **(CO)** for each course with program outcomes **(PO)** and program specific outcomes **(PSO)** in the 3-point scale of STRONG (3), MEDIUM (2) and LOW (1)**.**

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	2	2	3	3	2	2	1	3	2
CO2	2	1	3	3	3	2	2	1	3	2
CO3	3	3	1	3	3	2	2	1	3	2
CO4	3	3	3	3	3	2	2	1	3	2
CO5	3	3	3	3	3	2	2	1	3	2

	PSO1	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**	**PSO8**	**PSO9**	**PSO10**
CO1	2	2	2	3	3	2	2	1	3	2
CO2	2	1	3	3	3	2	2	1	3	2
CO3	3	3	1	3	3	2	2	1	3	2
CO4	3	3	3	3	3	2	2	1	3	2
CO5	3	3	3	3	3	2	2	1	3	2

METHOD OF EVALUATION:

Continuous Internal Assessment	**End Semester Examination**	**Total**	**Grade**
25	**75**	**100**	