FIRST-YEAR OF MASTER OF SCIENCE PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE:-ADVANCED ELECTRONICS
SEMESTER-II
W.E.F. 2023-2024

RECOMMENDED BY THE BOARD OF STUDIES IN PHYSICS
AND
APPROVED BY THE ACADEMIC COUNCIL
Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and
Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal.Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College, Devrukh (An Autonomous College Affiliated with University of Mumbai)

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Academic Council Item No: **03 dated 8 July 2023**

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Master of Science
Name of the Department	:	Physics
Name of the Class	:	First Year
Semester	:	Second
No. of Credits	:	04
Title of the Course	:	Advanced Electronics
Course Code	:	S510PHT
Name of the Vertical in adherence to NEP 2020	:	Major
Eligibility for Admission	:	BSc in Physics
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	PG
Pattern of Marks Distribution for SEE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2023-2024

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Syllabus for First Year of Master of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER-II **Paper No.– Physics Paper – I**

Course Title: Advanced Electronics **No. of Credits - 04**

Type of Vertical: Major **COURSE CODE: S510PHT**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…		
Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Various formulae and steps involved in the methods
CLO-02	Understand	History of Microcontrollers and Microprocessors, Embedded versus External Memory Devices, 8–bit and 16–Microcontrollers, CISC and RISC Processors, Harvard and Von Neumann Architectures,
CLO-03	Apply	Apply various available methods to problems
CLO-04	Analyze	The basic concepts behind the mathematical methods
CLO-05	Evaluate	How to use a particular mathematical technique for solving the problem
CLO-06	Create	Select proper mathematical technique for a given problem

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Syllabus for First Year of Master of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER - II   **Paper No–Physics Paper–I**

Course Title: Advanced Electronics   **No. of Credits - 04**

Type of Vertical: Major   **COURSE CODE: S510PHT**

COURSE CONTENT			
Module No.	**Content**	**Credits**	**No. of Lectures**
Unit 1	**Microprocessors:** Counters and Time Delays, Stack and Sub-routines. **Introduction to Microcontrollers**: Introduction, Microcontrollers and Microprocessors, History of Microcontrollers and Microprocessors, Embedded versus External Memory Devices, 8–bit and 16– bit Microcontrollers, CISC and RISC Processors, Harvard and Von Neumann Architectures, Commercial Microcontroller Devices. **8051 Microcontrollers**: Introduction, MCS–51 Architecture, Registers in MCS-51, 8051 Pin Description, Connections,8051 Parallel I/O Ports and Memory Organization. **8051 Instruction set and Programming**: MCS- 51 Addressing Modes and Instruction set. 8051 Instructions and Simple programs using Stack Pointer. Reference: - RSG, AVD	**01**	**15**
Unit 2	**Power Supplies**: Linear Power supply, Switch Mode Power supply, Uninterrupted Power Supply,Step up and Step-down Switching VoltageRegulators. **Inverters:** Principle of voltage driven inversion, Principle of current driven inversion, sine wave inverter, square wave inverter. **Signal Conditioning:** Operational Amplifier, Instrumentation Amplifier using IC, Precision Rectifier, Voltage to Current Converter, Current toVoltage Converter, Op-Amp Based Butterworth Higher Order Active Filters and Multiple Feedback Filters, Voltage Controlled Oscillator, Analog Multiplexer, Sample and Hold circuits, Analog to Digital Converters, Digital to Analog Converters. Reference: - AJ, RAG, CD	**01**	**15**
Unit 3	**Data Transmission Systems**: Analog and Digital Transmissions, Pulse Amplitude Modulation, Pulse Width Modulation, Time Division Multiplexing, Pulse Modulation, Digital Modulation, Pulse Code Format, Modems.	**01**	**15**

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	Optical Fiber: Introduction to optical fibers, wave propagation and total internal reflection in optical fiber, structure of optical fiber, Types of optical fiber, numerical aperture, acceptance angle, single and multimode optical fibers, optical fiber materials and fabrication, attenuation, dispersion, splicing and fiber connectors, fiber optic communication system, fiber sensor, optical sources and optical detectors for optical fiber. Reference: - BS, HSK		
Unit 4	**Instrumentation Circuits and Designs**: Microprocessors/ Microcontrollers based D C motor speed controller, Microprocessors/Microcontrollers based temperature controller, electronic weighing single pan balance using strain gauge/ load cell, Optical analog communication system using fiber link, electronic intensity meter using optical sensor, IR remote controlled ON/OFF switch. Reference: - AVD, MMM, KJA	**01**	**15**
	Total	**04**	**60**

Main references:

a. AVD: -Microcontrollers (Theory and Applications) by Ajay V. Deshmukh, TMH.

b. RSG: - Microprocessor Architecture, Programming and Applications with the8085 R. S. Gaonkar, 4th Edition. Penram International.

c. RAG: - Op-Amps and Linear Integrated Circuits - R. A. Gayakwad , 3rd EditionPrentice Hall India.

d. AJ: - Power Electronics and its applications, Alok Jain, 2nd Edition, PenramInternational India.

e. CD: -Operational Amplifiers and Linear Integrated Circuits, Robert F. Coughlinand Frederic F. Driscoll, 6th Edition, Pearson Education Asia.

f. BS: -A text book of optics; Brijlal Subrhamanyam.

g. HSK: - Electronic Instrumentation, H.S. Kalsi, Tata-McGraw. Hill, 1999.

h. MMM: - The 8051 Microcontroller & Embedded Systems by M.A. Mazidi, J.G.Mazidi and R.D. Mckinlay.

i. KJA: - The 8051 Microcontroller: K.J.Ayala: Penram International.

Additional References

1. RK: - The 8051 Microcontroller and Embedded Systems, Dr. Rajiv Kapadia,Jaico Publishing House.

2. MP: - Programming & customizing the 8051 Mocrocontroller : Myke Predko,TMH.

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