



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

**COURSE TITLE:- EMBEDDED SYSTEMS
SEMESTER - III
W.E.F. 2024 - 2025**

**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**

Academic Council Item No: **dated 19 April 2024**

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	:	Second Year
Semester	:	Third
No. of Credits	:	04
Title of the Course	:	Embedded Systems
Course Code	:	S603PHT
Name of the Vertical in adherence to NEP 2020	:	Major
Eligibility for Admission	:	Any student admitted to Second year of M.Sc, degree programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra.
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	:	2024 - 2025

Syllabus for First Year of Master of Science in Physics

(With effect from the academic year 2024 - 2025)

SEMESTER - III

Paper No.– Physics Paper – III

Course Title: Embedded Systems

No. of Credits - 04

Type of Vertical: Major

COURSE CODE: S603PHT

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	Know the meaning of Embedded system and its applications
CLO-02	Understand	Understand importance and types of OS in embedded systems
CLO-03	Understand	Understand basics of processor/controller architectures, memory and interfaces
CLO-04	Apply	Explain how to interface various listed devices/modules with 8051
CLO-05	Apply	Explain how to interface various devices/modules with arduino

Syllabus for First Year of Master of Science in Physics**(With effect from the academic year 2024 - 2025)****SEMESTER - III****Paper No.– Physics Paper – III****Course Title: Embedded Systems****No. of Credits - 04****Type of Vertical: Major****COURSE CODE: S603PHT**

COURSE CONTENT			
Module No.	Content	Credits	No. of Lectures
Unit 1	Introduction to Embedded Systems, Basic terminologies, Understanding Embedded Systems and IoT devices, Case studies of embedded systems and IoT devices - washing machine, keyboard/mouse, medical devices, fitness trackers, automotive systems, industrial robots, air conditioning systems, drones, traffic lights, smartwatches, cycling computer, EVM, surveillance camera, wearable health monitors, barcode scanners, digital thermometers, other industrial applications Role of OS in embedded systems, General Purpose vs Real Time OS.	01	15
Unit 2	Introduction to Microcontroller and Microprocessor Architectures - CISC/RISC, Harvard/Von Neumann. Overview of various microprocessors & microcontroller families. Intro to various SBC, SoCs Introduction to Memory (RAM, ROM, EPROM, EEPROM, FLASH, secondary storage), review of memory interfacing, Basics of I/O Interfaces - Buffers, handshake etc. I/O interfaces - USB, WiFi, Bluetooth, GPIO, I2C etc. power considerations in embedded systems Review of 8051 instruction set, Working of 8051 stack, interrupts, TIMER, COUNTER, Serial PORT	01	15
Unit 3	Interfacing and Programming for 8051 Interfacing LEDs, 7-segment display, LCDs, stepper motor, Switches, Keypads, Stepper Motor, Relays, ADC and DAC Embedded C Programming for 8051 using SDCC compiler Working out a complete system with 8051	01	15
Unit 4	Embedded C for Arduino - GCC compiler, Arduino IDE and platform IO Interfacing with arduino - ADC, 2x16 LCD, DC Motor, Temperature Sensor (over I2C), UART Serial Communication with PC, Interfacing SPI Flash/EEPROM	01	15
	Total	04	60

References:

1. Ajay V. Deshmukh, “Microcontrollers, Theory and applications”, Tata McGraw-Hill–2005

Access to the Course

The course is available for all the students admitted for Master of Science in Physics.

Methods of Assessment

The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

Pattern of Evaluation

The Examination/Evaluation pattern shall be framed by the Board of Examination with its final approval from the Academic Council of the College.