



SECOND YEAR OF BACHELOR OF SCIENCE MINOR PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

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

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

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	:	Bachelor of Science
Name of the Department	:	Physics
Name of the Class	:	Second Year
Semester	:	Third
Paper	:	I
No. of Credits	:	02
Title of the Course	:	Introduction To The Internet Of Things
Course Code	:	S308PHT
Name of the Vertical in adherence to NEP 2020	:	Minor
Eligibility for Admission	:	
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	UG
Pattern of Marks Distribution for TE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2024-2025
Ordinances /Regulations (if any)	:	

Syllabus for Second Year of Bachelor of Science

(With effect from the academic year 2024-2025)

SEMESTER - III

Paper No.– Minor(CS) – II

Course Title: Introduction to Internet of Things

No. of Credits - 02

Type of Vertical: Minor

COURSE CODE: S308PHP

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	To understand SoC / SBC / prototyping platforms.
CLO-02	Understand	To understand basic concepts in IoT.
CLO-03	Understand	To understand the IoT protocols and security issues
CLO-04	Understand	To understand the structure /features of RPi & Arduino.
CLO-05	Apply	To perform interfacing of various devices/sensors/actuators with RPi
CLO-06	Apply	To perform interfacing of various devices/sensors/actuators with Arduino
	Create	To perform setup, basic interfacing and programming of RPi/Arduino for a specific project

COURSE CONTENT			
Module	Content	Credits	No. of Lectures
1	<p style="text-align: center;"><u>Theory</u></p> <p style="text-align: center;">Chapter - I</p> <p>Raspberry Pi and Arduino: Basic Concepts – SoC, SBC, <i>electronic prototyping platforms</i>, SoC products, FPGA, GPU, APU, Compute Units. Basics of Raspberry Pi/Arduino: Introduction, Features & H/W interfaces, Setup, programming, Introduction to Arduino, features & H/W, Arduino IDE, libraries, basics of embedded C, basic interfacing – LED, Switches, Sensors and Actuators: Overview of working, types, interfacing with RPi /Arduino.</p> <p style="text-align: center;">Chapter - II</p> <p>Introduction to IoT: What is IoT? IoT examples, Simple IoT LED Program. IoT Architectures and Protocols Introduction to IoT Platforms: Clayster, Thinger.io, SenseIoT, carriots and Node RED. Real time examples of IoT IoT Security: HTTP, UPnp, CoAP, MQTT, XMPP. IoT Security and Interoperability: Risks, Modes of Attacks, Tools for Security and Interoperability.</p>	01	15
2	<p style="text-align: center;"><u>Practicals</u></p> <ol style="list-style-type: none"> 1. Raspberry Pi: H/W setup, Installation, Commands and raspbian 2. GPIO: Interfacing LED, LED Grid Module, switches, keyboard & LCD 3. SPI: Camera Connection and capturing Images using SPI 4. RTC using PWM. 5. Stepper Motor Control: PWM to manage stepper motor speed. 6. Create a simple Web server using Raspberry Pi 7. Arduino: Hands-on, setup, using the IDE 8. Arduino: Playing with LEDs, Digital / analog i/p. 9. Arduino: Interfacing various sensors 10. Arduino: Controlling various actuators 	01	30
	Total	02	45

References:

- Simon Monk - Programming the Raspberry Pi: Getting Started with Python
- Massimo Banzi - Getting Started with Arduino
- Eben Upton and Gareth Halfacree - Raspberry Pi User Guide
- Alex Bradbury and Ben Everard - Learning Python with Raspberry Pi
- Michael Margolis - Arduino Cookbook
- Peter Waher - Learning Internet of Things
- Warren Gay - Mastering the Raspberry Pi
- Nitesh Dhanjani - Abusing the Internet of Things
- <https://www.instructables.com/Skills-Infusion/>

Required Previous Knowledge

Basic Computer Knowledge would be beneficial but not essential.

Access to the Course

The course is available for all the students admitted for Bachelor of Computer Science as a Minor. Students seeking admission to other disciplines may select the course as a minor considering the terms and conditions laid down by the University of Mumbai, the Government of Maharashtra, and the college, from time to time.

Forms of Assessment

The assessment of the course will be of Diagnostic, Formative and Summative type. At the beginning of the course diagnostic assessment will be carried out. The formative assessment will be used for the Continuous Internal Evaluation whereas the summative assessment will be conducted at the end of the term. The weightage for formative and summative assessment will be 60:40. The detailed pattern is as given below.

Term End Evaluation (30 Marks)

Question Paper Pattern

Time: 1 hr 15 min

Question No.	Unit/s	Question Pattern	Marks
Q.1	All	Fill in the Blanks	
Q.2	All	Theory questions (any five out of eight)	
Q.3	All	Find the output (any five out of eight)	
Q.4	All	Programming exercises (any five out of eight)	
Total			30

Internal Evaluation (20 Marks)

Sr. No.	Description	Marks
1	Mid Term Examination	
2	Classroom Performance based on self-study	
3	Assignments	
	Total	20

Grading Scale

The grading scale used is O to F. Grade O is the highest passing grade on the grading scale, and grade F is a fail. The Board of Examinations of the college reserves the right to change the grading scale.