

॥ विद्या विनयेन शोभते ॥



Janardan Bhagat Shikshan Prasarak Sanstha's

CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Re-accredited A++ Grade by NAAC (Fourth Cycle-CGPA-3.52)

'College with Potential for Excellence' Status Awarded by UGC

'Best College Award' by University of Mumbai

As per National Education Policy - 2020

Title of the Programme

B. Sc. in Physics

(Faculty of Science)

Certificate Course in Fundamentals in Arduino

Syllabus

(Approved in Academic council meeting held on 27th July 2023)

T.Y. B. Sc. (Physics)

Revised Syllabus

(With effect from the academic year 2025-26)

Class: T.Y.B.Sc

Certificate in Fundamentals in Arduino :

60 (Theory) + 30 (practical) + (10)Attendance = 100 marks

| Theory (60) | Practical (30) |
|--|---|
| Two Sub-questions Multiple choice questions Each question carries 1 mark. Total marks = 60 Duration = 2 hour | Experiments : 1 practical out of 4 practicals Total marks = 30 Duration = 1 hour |

| Class | Distinction | I | II | Pass Class |
|-------------------|--------------------|----------|----------------|-------------------|
| Percentage | Above 75 | Above 60 | 45 to below 60 | 35 to below 45 |

Eligibility: Enrollment for T.Y.B.Sc. Physics

No. of Lectures: 22 per year

No. of Practicals: 8 hours per year

Duration: One Year

Preamble of the Syllabus:

The curriculum is framed to equip students to grasp the basic concepts of physics and in addition have a broader vision. A dynamic curriculum accommodates fast faced developments in the knowledge of the subject concerned by introducing innovative concepts, multidisciplinary profile and standard education. The programme also aims to provide an intellectually stimulating environment to develop skills and enthusiasm of students to the best of their potential. It also helps in giving need-based education in physics of the highest quality at the undergraduate level.

In this programme, we aim to provide a solid foundation in all aspects of physics and to show a broad spectrum of modern trends in physics and to develop experimental, computational and mathematical skills of students. The syllabus is framed in such a way that it bridges the gap between the plus two and the postgraduate level of physics by providing a completer and more logical framework in almost all areas of basic physics, to enable the young generation of students to acquire skill, training and knowledge in order to enhance their thinking, comprehension and application abilities and prepare them to compete, succeed and excel globally.

This course is set up student -centric, interactive and outcome-oriented with well-defined aims, objectives and goals to achieve.

Course Outcome:

On successful completion of this course students will be able to:

1. Explain basic components used with Arduino kit like breadboard, various basic electrical Components & Arduino.
2. Acquire basic electrical circuits, basic Arduino programs using simulations.
3. Design the basic Arduino programs for practical applications.
4. Acquire hands-on experience in the usage of breadboard, various basic electrical Components.
5. Design and trouble shoots the basic electrical circuits, basic Arduino programs using simulations.
6. Design the basic Arduino programs for practical applications and execute it.
7. Explain various Sensors, program code of Arduino.
8. Acquire basic working knowledge of program code of Arduino UNO.
9. Design program code in practical life using various basic sensors, various electronic outputs devices.

| Course Descriptions | |
|----------------------------|--|
| Course Name | Certificate Course in Fundamentals in Arduino |
| Course Code | USCCFA |
| Eligibility for the Course | 12 th Science of all recognized Board |
| Hours | 30 hours |

Theory

| Unit | Course Description | Hours |
|------|--|-------|
| 1.1 | Introduction of 8085 Microprocessor : 8085 Microprocessor , Architecture, Block diagram, parts of microprocessor, Bus organisation | 6 |
| 1.2 | Introduction of Arduino : What is Microcontroller ? Arduino ,Pinout of Arduino UNO, ATmega328p microcontroller, Advantages , Applications. | 6 |
| 1.3 | Arduino Coding Basics Brackets, Line comments, Coding Screen, Setup, Loop, Pinmode(), digitalread (), ,digitalWrite (), delay , Arduino Syntax , Function, Tools Tab, Semicolon, Program Flow, Flow chart | 4 |

| | | |
|------------|--|----------|
| 1.4 | Use of Simulator Arduino IDE, How to access simulator?, Tinkercad, Features of Tinkercad, Code example to blink an LED , push button, buzzer, pot Analog , Touch sensor ,ultrasonic sensor | 6 |
|------------|--|----------|

Practicals

| Sr. No. | Practical names | Duration |
|----------------|------------------------|-----------------|
| 1. | Blinking an LED | 8 hours |
| 2. | Buzzer | |
| 3. | Pot Analog | |
| 4. | Push button switch | |
| 5. | Touch Sensor | |
| 6. | Ultrasonic ranger | |

Reference:

1. Hans-Petter Halvorsen : Introduction to Arduino
2. Brian w. Evans :arduino programming notebook
3. Alan G. Smith : Introduction to Arduino A piece of cake!
4. Simon Monk, Programming Arduino: Getting Started with Sketches, Second Edition (Tab) 2nd Ed
5. Damon Parke : Arduino Programming: The Ultimate Guide For Making The Best Of Your Arduino Programming Projects Kindle Edition
6. <https://www.tinkercad.com/blog/official-guide-to-tinkercad-circuits>

1. Minimum **4** experiments should be completed in the course .

Course Coordinator

Head of Department

Principal
C K Thakur ACS College,
New Panvel (Autonomous)