

Anekant Education Society's

Tuljaram Chaturchand College of Arts, Science & Commerce, Baramati.

(Autonomous)

**Certificate Course for UG/PG 2023-24**

This is to inform all the regular students of T.Y.B.Sc, M.Sc-I & M.Sc-II (Regular ) (Pattern 2019 &2022) that the admission procedure of certificate courses has started for the academic year 2023-24. The concerned students must visit college website for confirming their admission on or before 17<sup>th</sup> February 2024.

**For T.Y.B.Sc Students it is mandatory to complete FIVE certificate courses for B.Sc degree.**

Link for registration:

[https://www.tccollege.org/Forms/Pay\\_OnlineCertificate.aspx](https://www.tccollege.org/Forms/Pay_OnlineCertificate.aspx)



Mr. S. M. Thorat

Co-ordinator



Head

Department of Physics



**Course Description:** This course provides an overview of the fundamental principles and techniques of research. Students will explore various research methodologies, develop critical thinking skills, and gain hands-on experience in designing and conducting research projects.

**Course Objectives:** Upon completion of this course, students should be able to:

1. Understand the importance of research in various disciplines.
2. Identify and differentiate between different research methodologies.
3. Critically evaluate research literature and sources.
4. Develop a research question and hypothesis.
5. Design a research study and choose appropriate methods.
6. Collect and analyze data using quantitative and qualitative approaches.
7. Interpret research findings and draw conclusions.
8. Communicate research results effectively through written and oral presentations.

### **Unit 1: Research Design And Data Analysis**

Formulating research questions and hypotheses, experimental skills, need of data analysis, introduction to statistical analysis, qualitative data analysis technique, data interpretation and drawing conclusions, research presentations and effective communication, peer review and feedback, final project presentations.

### **Unit 2: Advanced Characterisation Techniques**

X-ray diffraction technique (XRD), UV-Visible Infra Red Spectroscopy (UV-Vis), Fourier Transformed Infra Red Spectroscopy (FT-IR), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Electrical Conductivity, Magnetic Properties.

#### **❖ List of Practicals:**

- 1) Introduction to Origin software and Xpert- High score for graph plotting and analysis.
- 2) Spray Pyrolysis technique for synthesis of thin films.
- 3) To study and use of photocatalytic reactor.
- 4) Introduction of muffle furnace for annealing and sintering purpose.
- 5) To Study Vacuum Deposition technique for synthesis of thin film.
- 6) To study spin coating method for synthesis of thin film.

