# NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

| COURSE OUTLINE | | | |
|---|---|---|---|
| **Course Title** | ADVANCED PHYSICS LABORATORY | | |
| **Course Code** | PH669 | **No. of Credits** | 2 |
| **Department** | Physics | **Faculty** | Dr. B. Karthikeyan |
| **Pre-requisites Course Code** | Nil | | |
| **Course Coordinator(s) (if, applicable)** | **Dr. N. Baskaran** | | |
| **Other Course Teacher(s)/Tutor(s) E-mail** | - | **Telephone No.** | 0431250-3612 |
| **Course Type** | ☐ X Core course | ☐ | ~~Elective course~~ |

## COURSE OVERVIEW

ADVANCED PHYSICS LABORATORY is offered in the fourth semester to M.Sc students, III semester students.  The subject has 2 credit weightage.

## COURSE OBJECTIVES

➢ The course is intended to provide through hands on experience on Automation, LAB view programming, MATLAB programing.
➢ Advanced sophisticated experiments and equipment's operational learning

## COURSE OUTCOMES (CO)

| Course Outcomes | Aligned Programme Outcomes (PO) |
|---|---|
| By successful completion of this course, the student will<br>1. Have a practical understanding of MATLAB and LAB view<br>2. To introduce the basic concepts of various advanced experimental techniques used in research through hands on experience.<br>3. Research related experiments will be learned<br>4. Have experience on advanced Laboratory experience through analyzing the data.<br>5. Data analyzing and connecting it with theory will make students towards research. | ➢ Obtain in-depth knowledge on Experimental skills<br><br>➢ Carry out independent practical experience<br><br>➢ Interact with research problems in related areas |

## COURSE TEACHING AND LEARNING ACTIVITIES

| S.No. | Week | Topics/Experiments | Mode of Delivery |
|---|---|---|---|
| | | 1. MATLAB-1: Matrix operations<br>2. MATLAB-2: Digital Signal Processing M.Sc. (Physics) Department of Physics 21<br>3. MATLAB-3: Solving Ordinary Differential Equations<br>4. Microprocessor-1: Stepper Motor Interface<br>5. Microprocessor-2: Traffic Control<br>6. Microprocessor-3: Interfacing Display<br>7. Microprocessor-4: Interfacing with Voltmeter<br>8. Labview-1: Operational Amplifier Circuits<br>9. Labview-2: Simulation of Diode characteristics<br>10. Labview-3: Design of Op-Amp AC Characteristics<br>11. Labview-4: Construction of OPAMP<br>12. Labview-5: Design of 555 Timer Chip Astable Circuit<br>13. X-Ray Diffraction – Determination of lattice parameters of a crystalline solid<br>14. UV-Vis Spectrophotometer – Determination of absorption coefficient and bandgap<br>15. FTIR Spectrometer – Determination of vibration levels in a compound<br>16. Superconductivity – Determination of transition temperature<br>17. Contact Angle Measurement<br>18. G.M. Counter<br>19. Thin Film Deposition and Measurement of Electrical Conductivity – Four Probe Method<br>20. Ellipsometer – Determination of n and k of a material. | All Practical should be done by the students by hands on experience. |

## COURSE ASSESSMENT METHODS

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|-------|-------------------|-----------|----------|-------------|
| 1. | Lab records | Each observation and record will be evaluated for maximum of 10 marks and is considered for as internal | | 50 % |
| 2. | Final Examination | Exam will be done for 50 marks which consists of 10 marks as a viva voce examination | | 50 % |
| | | | Total | 100 % |

### ESSENTIAL READINGS :

1. L.A. Leventhal, Micro Computer Experimentation with the Intel SDK-85 (1980).
2. Learning MATLAB – The MathWorks, Inc (1999).
3. Kenneth L. Ashley, Analog Electronics with LabVIEW, Pearson Education (2003).

## COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

- Performance in the assessment methods
- Questionnaire about the effectiveness of the delivery method, topics and the knowledge gained

## COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

1. 75 % attendance is mandatory.

2. Those who indulge in malpractice such as copying, plagiarism shall have to redo the course.

3. A student has to score a minimum of 50% marks to get a pass.

4. Any misbehavior, indiscipline in the classroom/laboratory/exam hall will be dealt with seriously. In the worst case, the departmental disciplinary committee is empowered to debar the student from the course.

5. Those who are absent for End semester examinations on genuine grounds, shall be given an opportunity only once to appear for reassessment examination.

6. For the students whose attendance percentage falls between 65-74% has to appear for the extra classes at the end of the semester i.e before End semester exam.

7. Those who fail in the course has to appear for the reassesment exam.

Those who indulge in malpractice such as copying, plagiarism shall have to redo the course.

**ADDITIONAL COURSE INFORMATION**

**FOR SENATE'S CONSIDERATION**

Course Faculty Dr. B. Karthikeyan\_\_\_\_\_     CC-Chairperson N·Bash\_\_\_\_

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