



**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani**  
**Pilani Campus**  
**AUGS/ AGSR Division**

**SECOND SEMESTER 2020-21**  
**COURSE HANDOUT**

**Date: 15.01.2021**

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

**Course No** : PHY F344  
**Course Title** : Advanced Physics Laboratory  
**Instructor-in-charge** : RAJ KUMAR GUPTA

**Instructors:** Anshuman Dalvi, Debashis Bandyopadhyay, Manjuladevi V., Raj Kumar Gupta, Subhashish Gangopadhyay, Shivaraja S.J., Amrit Kumar, Shrishti Sharma, Sushil.

- 1. Course Description:** This Course will cover some research level experimental skills as well as knowledge about physical properties of different types of materials.
- 2. Scope and Objective of the course:** The aim of the course is to provide the students with experimental skills in performing measurements in different areas of Physics with a scope to get exposed to the different specialized research fields in experimental physics (for example, condensed matter physics, surface science, Liquid crystals, nanotechnology etc).
- 3. Text Books:** No particular Text book
- 4. Reference Books:** Experimental Manuals, literature and Lecture notes.
- 5. Course Plan:**

Laboratory

Faculty Instructor	Expt. No.	Experiments
Anshuman Dalvi	A. I	Superionic transition in AgI and impedance spectroscopy
	A. II	X-ray diffraction study of crystalline, amorphous systems
	A. III	Differential Thermal Analysis
Debashis Bandyopadhyay	B. I	Microwave Experiment I
	B. II	Microwave Experiment II
	B.III	Microwave Experiment III
Manjuladevi. V	C.I	Fabrication and characterization of Liquid Crystal (LC) Display prototype cells
	C.II	Dielectric measurement of LC materials
	C.III	Electro-optic switching measurement of LC materials
Raj Kumar Gupta	D. I	Thin film characterization using ellipsometer
	D. II	Atomic Force Microscopy & Force-Distance Spectroscopy
	D. III	Detection and estimation of contaminants in water
Subhashish Gangopadhyay	E. I	Thin film deposition (metal)
	E. II	Electrical resistivity measurements
	E.III	AC magnetic susceptibility measurements



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**6. Learning outcome:** The MSc Physics students will be given exposure to high end research level experiments with five different themes in frontline areas. There are material aspects for understanding their fundamental physical properties essential for device fabrication. The microwave lab enriches the students with fundamental aspects of electromagnetic waves. The liquid crystal lab deals with understanding physics involved in LCDs. The surface science lab teaches the essentials of thin film based devices e.g sensor. The nanoscience lab deals with measurement and understanding of physical properties at lower dimension.

**7. Evaluation Scheme:**

Components	Duration	Weightage (%)	Date and Time
Attendance, day to day performance, records, short quizzes, tutorial tests on lecture classes	2 hours	50	----
Mid semester Test	1 hours	20	****
Comprehensive Exam.	1.5 hours	30	****

**8. Chamber Consultation Hour:** Laboratory hours.

**9. Notices:** All notices will be displayed on the google classroom, Nalanda site, notice boards of FD3 and Physics.

**10. Make-up policy:** Make-up for any of the component will be granted only on genuine grounds of sickness (**to be supported by medical certificate and not prescription**). Prior- permission is necessary for leaving the station on the test date.

Raj Kumar Gupta  
Instructor-in-charge  
PHY F344