



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

SECOND SEMESTER 2020-21
COURSE HANDOUT

Date: 18.01.2021

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 : CHEM F341
Course Title : Chemical Experimentation II
Instructor-in-Charge : Madhushree Sarkar
Instructor(s) : Inamur R. Laskar, Surojit Pande, Bibhas R. Sarkar, Mrinmoyee Basu, Prashant U. Manohar

Tutorial/Practical Instructors: Aishwarya Ramesh, Dhritabrata Pal, Divya Rathore, Jagrity Chaudhary, Mamta Devi Sharma, Raichure Pramod Chandrakant, Soumana Joarder, Sumit Kumar Agarwal, Nidhi Deswal, Manisha, Aarzoo, Vishakha, Shivani B. Thakkar

1. Course Description: The main aim of the course is to build laboratory skills and to provide hands-on experience of various theories by exposure to different kind of experiments covering principles and theories in chemistry. The course folds in experiments with macroscopic methodologies, validation of various chemical theories, as well as electronic structure calculation using sophisticated models. The course is normally available to students of third year and higher levels.

2. Scope and Objective of the Course: The main objective of the course is to expose the students to various experimental methods commonly used in Chemistry. The students will carry out a set of experiments in the areas of analytical chemistry, inorganic chemistry, nano-chemistry, electrochemistry, physical chemistry, and theoretical/computational chemistry.

Techniques to experience: Includes but not limited to Inorganic synthesis techniques, Separation techniques based on phasic composition, Analytical techniques such as UV-Vis spectroscopy, FTIR spectroscopy, Spectrofluorimetry, Viscometry, Potentiometry, Conductometry, Gravimetry, Titrimetry, Basic computation techniques towards understanding of electronic structure and molecular dynamics simulation.

3. Text Books: Quantitative inorganic analysis by A. I. Vogel

4. Further reading: Laboratory Manual

5. Reference Book: P. W. Atkins' Physical Chemistry Book.

6. Course Plan:

Topic	Experiment
Computational chemistry	Computation of electronic structure of molecules
	Ground and excited state conformational analysis



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<i>Materials science and Catalysis</i>	Syntheses and characterization of size-dependent nanomaterials (Au), application of nanomaterials in catalysis
<i>Electrochemistry</i>	Illustrating the Nernst equation for an electrochemical reaction using hand-held potentiostat & quantitative determination of ascorbic acid from citrus fruits by cyclic voltammetry
<i>Colloidal and Surface chemistry</i>	Determination of critical micellization concentration (cmc) of sodium dodecyl sulphate (SDS) using conductometer and spectrofluorimeter
<i>Chemical kinetics</i>	Reaction rate and activation energy of the acidolysis of ethyl acetate
<i>Thermodynamics</i>	Study the phase behavior in a ternary liquid system
<i>Thermodynamics</i>	Determination of the mixing enthalpy of binary fluid mixtures (Acetone and water)
<i>Colligative property</i>	Demonstration of dependence of osmotic pressure on molar concentration
<i>Colligative property</i>	Study the depression of freezing point of a solution

7. Evaluation Scheme:

Component	Duration	Weightage (%)	Mode
Laboratory Work & Reports		80 % (160 Marks)	Continuous
End semester evaluation	-	20 % (40 Marks)	Quiz



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8. Make-up policy: According to general guidelines of the institute.

9. Notice: All notices concerning the course will be displayed in the **Nalanda**.

10. Laboratory safety: II Semester 2020-21 will be in online mode. While performing experiments, it is **MANDATORY** to wear personal protective equipments (PPE) in wet laboratory, such as ***Lab-coat, Covered shoes, and Safety goggles (as applicable)***.

Madhushree Sarkar

Instructor-in-charge, CHEM F341