CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF CHEMISTRY
M.Sc. CHEMISTRY

Course Code	Course Title	Contact hrs. / wk.				Credits
		Lect.	Lab	Tut	Total	
CHE 5392	Physical Chemistry Laboratory - II		5			2

Lec = Lecture, Tut = Tutorial, Lab = Practical

This is a participatory, experimental, and employability based skill development course.

Course objective:

Objective of the course is to develop practical and laboratory skills of the student in physical chemistry.

By completing this course, students will obtain the following course/learning outcomes:

- Apply the fundamental knowledge in experimental physical chemistry to existing and emerging problem in basic science.
- Recognize the role of multidisciplinary streams starting with basic science to understand the key role of instruments in doing experimental physical chemistry.
- Develop laboratory and analytical skills required for carrying out research work.

Grading:

Laboratory Experiments – 20%
Record of observations and reporting – 10%
Viva evaluation – 10%
End Semester Assessment – 60%

CHE 5392 Physical Chemistry (Laboratory– II)

This laboratory course covers advanced physical chemistry experiments employing minor or major equipment and computational facility that are available in the Department/sister Department.*

Syllabus Modules:

General Experiments: Spectrophotometric determination of *p*Ka, Jobs plot and stoichiometry of a complex by mole ratio method, Kinetics of an enzyme-catalyzed reaction by spectrophotometer Bimolecular, Determination of excited state acidity constant, Rate constant

by Stern-Volmer graph using fluorimeter, $CuSO_4$ and Calcium oxalate TGA study, Differential scanning calorimetric study (DSC), Determination of the unit cell of a crystal, Rate constant of mutarotation of glucose and fructose by polarimetry, Determination of concentration of Na and K by AAS, Qualitative and quantitative study by Gas chromatography, Redox potentials by Cyclic voltammetry.

Computational Chemistry experiments: Franck-Condon spectral calculations, Construction of Walsh diagram, Woodward - Hoffman correlation diagrams.

Supplementary Experiments: Photometric titrations, Additive principle by spectrophotometry, Estimation of CMC of a micelle using fluorescence, Determination of dipole moment change on electronic excitation, Identifying the nature of materials based on sorption isotherms, Open-ended lab experiment.

*Minimum of twelve experiments can be selected from general and computational chemistry experiments. Additional experiments can be selected from general or supplementary experiments or any other of course instructor's choice that falls under the title of the course for which procedure is well known in the literature:

References

1. *Laboratory Manual*, 2013, Department of Chemistry, Central University of Kerala.
2. A. J. Elias, *General Chemistry Experiments*, University Press, Hyderabad, 2002.
3. F. Daniels, J. W. Williams, P. Bender, R. A. Alberty, C. D. Cornwell, J. E. Harriman, *Experimental Physical Chemistry*, McGraw-Hill, 1962.
4. R. C. Das, B. Behera, *Experimental Physical Chemistry*, Tata McGraw-Hill, 1993.
5. D. P. Shoemaker, C. Garland, J. W. Nibler, *Experiments in Physical Chemistry*, McGraw-Hill, New York, 1996.
6. D. C. Young, *Computational Chemistry*, John-Wiley and Sons, NY, 2001.
7. MOPAC 6.0 *Manual and Computer program*, QCPE Ed., 2012.
8. PCMODEL *Manual and Computer program*, Serena Software, 2011