

Name of the Programme: M.Sc. Part-I (Chemistry)

Course Code: CHO-522 **Title of the course:** Practical Course in Organic Chemistry-II

Number of Credits: 02

Effective from AY: 2022-23

Prerequisites for the course	Students should have studied chemistry practical courses at graduate level or must have cleared change of discipline entrance test conducted by Goa University.	
Course Objective:	To translate certain theoretical concepts learnt earlier into experimental knowledge by providing hands on experience of basic laboratory techniques required for organic syntheses.	
Content	<i>Minimum 13 experiments from the list shall be conducted.</i> 1. Introduction to laboratory equipments, apparatus and safety a. Common Hazards in Chemical Laboratory, Risk assessment b. Accidents and Emergency procedures	No of hours 04
	2. Laboratory Techniques (Any Two) a. Simple distillation i. Simple distillation of thionyl chloride under anhydrous condition ii. Simple distillation under Nitrogen atmosphere b. Fractional distillation i. Chloroform-dichloromethane mixture using water condenser. ii. Toluene and cyclohexane by fractionating column. c. Vacuum distillation under inert atmosphere Dry Distillation of DMF, <i>o</i> -dichlorobenzene, POCl ₃ d. Thin layer Chromatography i. Purification and isolation of mixture of acids by using Preparative TLC. ii. Purification and isolation of mixture of phenols by using Preparative TLC. iii. Purification and isolation of pharmaceutical drugs using Preparative TLC.	08
	3. Organic Synthesis (Any Four) a. <i>p</i> -Iodonitrobenzene by Sandmeyer reaction b. Pinacol- Pinacolone rearrangement c. Hydrogenation of Maleic acid (Hydrogen balloon) d. Preparation of nitrostyrene from aldehyde e. Preparation of α,β -dibromocinnamic acid f. Reduction of nitro compounds g. Synthesis of Urea from ammonium cyanate	16
	4. Solvent Free Organic synthesis (Any Two) a. Reduction using ball milling technique	08

	b. Oxidation of 2° alcohol using KMnO ₄ /Alumina by grinding technique. c. Synthesis of (±)-Binol from β-naphthol d. Hunsdiecker reaction of cinnamic acid derivatives e. Beckmann rearrangement of oxime derivatives	
	5. Two-step Organic Synthesis (Any Two) a. Benzamide-Benzoic acid-Ethyl Benzoate b. Phthalic anhydride – Phthalimide – Anthranilic acid. c. Methyl benzoate- <i>m</i> -nitrobenzoate- <i>m</i> -nitrobenzoic acid d. Chlorobenzene – 2, 4 – dinitrochlorobenzene – 2,4-dinitrophenol e. Acetanilide – <i>p</i> -Bromo acetanilide – <i>p</i> -Bromoaniline f. Acetophenone – Oxime – Acetanilide	16
	6. Separation, Isolation and Identification of Organic compounds (Any One) a. Separation, purification and identification of compounds of binary mixture (Solid-Solid, Solid-liquid and Liquid-liquid) using the TLC and column chromatography, chemical tests. IR spectra to be used for functional group identification.	08
Pedagogy	Students should be given suitable pre- and post-lab assignments and explanation revising the theoretical aspects of laboratory experiments prior to the conduct of each experiment.	
References / Readings	1. A. I. Vogel, A. R. Tatchell, B. S. Furniss, A. J. Hannaford, Vogel's Textbook of Practical Organic Chemistry, 5 th Ed., Prentice Hall; 2011. 2. K. Tanaka, Solvent-free Organic Synthesis, Wiley-VCH, 2 nd Ed., 2009 3. L. F. Fieser, K. L. Williamson "Organic Experiments" 7 th edition D. C. Heath, 1992. 4. K. L. Williamson, K. M. Masters, Macroscale and Microscale Organic Experiments, 6 th Edition, Cengage Learning, 2010 5. R. K. Bansal, Laboratory Manual in Organic Chemistry, New Age International, 5 th Edition, 2016. 6. S. Delvin, Green Chemistry, Sarup& Sons, 2005. 7. O. R. Rodig, C. E. Bell Jr., A. K. Clark, Organic Chemistry Laboratory Standard and Microscale Experiments, Saunders College Publishing, 3 rd edition, 2009. 8. J. Mohan, Organic Analytical Chemistry, Narosa Publishing House, 2014.	
Course outcomes	1. Students will be in a position to adopt Safe and good laboratory practices, handling laboratory glassware, equipment and chemical reagents. 2. Students will be in a position to understand and calculate stoichiometric requirements during organic syntheses. 3. Students will be in a position to perform common laboratory techniques including reflux, distillation, vacuum distillation, aqueous extraction, thin layer chromatography (TLC). 4. Students will get hands-on experience on isolation of some important natural products.	