

Programme: M. Sc. (Chemistry)

Course Code: OCO-508

Title of the Course: Selected Experiments in Organic Chemistry-I

Number of Credits: 4

Effective from AY: 2019-20

<u>Prerequisites for the course:</u>	Should have studied the relevant theory and practical courses in Organic Chemistry at M Sc Part-I levels.	
<u>Course Objective:</u>	To translate certain theoretical concepts learnt earlier into experimental knowledge by providing hands on experience of basic laboratory techniques required for organic syntheses.	
<u>Course Outcome</u>	Students shall gain the understanding of: 1. Stoichiometric requirements during organic syntheses. 2. Safe and Good laboratory practices, handling laboratory glassware, equipment and chemical reagents. 3. Common laboratory techniques including reflux, distillation, steam distillation, vacuum distillation, aqueous extraction, thin layer chromatography (TLC), reactions under dry conditions, use of microwave, photochemistry, low temperature synthesis etc. 4. Use of organic spectroscopic techniques in monitoring the organic syntheses.	
<u>Content:</u>	(Group A: minimum 8 experiments) 1. Dimedone from mesityl oxide (Dieckmann condensation). 2. 1,2,3,4-tetrahydrocarbazole from cyclohexanone (Fisher indolisation reaction). 3. o-Chlorobenzylidene rhodanine (Perkin reaction). 4. Diels- Alder reaction of anthracene and maleic anhydride using microwave irradiation. 5. Oxidation of a primary / secondary alcohol to carbonyl compound by polymer supported chromic acid (Amberlyst A - 26, chromate form). 6. Phenytoin from benzil and urea. 7. Use of protecting groups: Synthesis of 1,1-diphenylbut-1-en-3-one 1) Ethyl acetoacetate ethylene acetal. 2) 1,1-Diphenyl -1-hydroxy-3- butanone ethylene acetal. 3) 1,1-Diphenyl -1-hydroxy- 3-butanone. 4) 1,1-Diphenylbut-1-en- 3 -one. 8. Isoborneol from camphor (NaBH ₄ reduction) 9. 3 -Methyl -2-phenyl-2-butanol from 2-bromopropane and acetophenone 10. Friedel- Crafts acylation of anisole.	48 hours

	<p>11. Diethyl 4- butyl malonate by malonic ester condensation</p> <p>(GROUP B: minimum 8 experiments)</p> <ol style="list-style-type: none"> 1. Epoxidation of cholesterol or related compounds 2. 2,2 - dichloro bicyclo (4.1.0) heptane from cyclohexene and dichloro cabene using PTC. 3. Reduction of Nitrobenzene to aniline by Sn / HCl. 4. 2 - methyl benzimidazole from o-phenylene diamine. 5. Benzophenone oxime to benzanilide (Beckmann rearrangement). 6. Ferric chloride oxidative coupling of 2-naphthol: 2,2'- dihydroxy dinaphthyl 7. Dicoumarol from coumarin derivative. 8. LAH reduction of Anthranilic acid. 9. Norborneol to norcarnphor using chromiurn trioxide/sulfuric acid 10. Halogenation using NBS: preparation of 9-bromoanthracene (or benzylic bromides) 11. Benzhydrol from benzaldehyde (Grignard reaction) 12. Ethyl n-butyl acetoacetate by acetoacetic ester condensation <p>Note: Students are expected to use techniques like TLC, IR, GC for monitoring/ establishing purity, identity of the synthesized compounds.</p>	48 hours
Pedagogy:	<p>Lectures/ pre-lab and post-lab exercises/ laboratory work /assignments/ presentations/ self-study/ Case Studies etc. or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.</p> <p>The students are required to undertake pre-lab. and post – lab. assignment as instructed by the concerned teacher and the same may be evaluated by according suitable weightage as an ISA component while prescribing the mode of assessment.</p>	
References/Readings	<ol style="list-style-type: none"> 1. N.K. Vishnoi, Advanced Practical Organic Chemistry – 3rd Ed, Vikas Publishing, 2009. 2. A. I. Vogel, Elementary practical organic chemistry: Part 1- Small scale preparations, 2nd Edition, Pearson, 2010. 3. A. I. Vogel, Elementary Practical Organic Chemistry: Part 2 - Qualitative Organic Analysis, 2nd Edition, Pearson, 2010. 4. A. I. Vogel, Elementary practical organic chemistry: Part 3- Quantitative organic analysis, 2nd Edition, Pearson, 2010. 	

	<ol style="list-style-type: none"> 5. F G Mann and B C Saunders, Practical organic chemistry, 4th Ed., Pearson, 2009. 6. A.R. Tatchell, B.S. Furnis, A.J. Hannaford, P.W.G. Smith, Vogel's Textbook of Practical Organic Chemistry, 5th Ed., Longman, 1989. 7. John C. Gilbert, Stephen F. Martin, Experimental Organic Chemistry: A Miniscale and Microscale Approach, 5th Ed., Brooks Cole, 2011. 8. Kenneth L. Williamson, Katherine M. Masters, Macroscale and Microscale Organic Experiments, 6th Ed., Brooks Cole, 2011. 9. Donald L. Pavia, Gary M. Lampman, George S. Kriz, Randall G. Engel, Microscale and Macroscale Techniques in the Organic Laboratory, Thomson, 2002. 10. B. N. Campbell, Jr., M. M. Ali, Organic Chemistry Experiments, Brooks Cole, 1994. 11. D. L. Pavia, G. M. Lampman and G. S. Kriz, Introduction to Organic Laboratory Techniques: A Contemporary Approach, W. B. Saunders, 1976. 12. J W. Lehman, Operational Organic Chemistry - A laboratory course, 4th Ed, Allyn and Bacon, 2008. 13. Koichi Tanaka, Solvent Free Organic Synthesis, WILEY - VCH, 2003. 14. D. W. Mayo, R. M. Pike and S. S. Butcher, Microscale organic laboratory, John Wiley and Sons, N. York, 1989 15. H. Dupont Durst, George W. Gokel, Experimental organic chemistry, McGraw-Hill, 1987. 	
--	---	--