DEPARTMENT OF CHEMISTRY
SRM UNIVERSITY
KATTANKULATHUR

SRM UNIVERSITY

LESSON PLAN
Academic year: 2017-18, Odd semester

Program : M.Sc. (Chemistry)
Course Title : **Organic Chemistry I-Structure & Reactivity**
Course Code : **17PCY103**

Total No. of periods: 60
Semester: **I**

UNIT & TITLE	TOPICS	LECTURE	REFERENCES
UNIT-I: **Principles of structure and reactivity**	Review of basic principles of Organic Chemistry including stereochemistry	1	1. P. Sykes, A guide book to Mechanism in organic chemistry, 6th edition, 1997 2. M. B. Smith and J. March "March's Advanced Organic Chemistry 5th edition, 2001. 3. F. A. Carey and R. J. Sundberg, "Advanced Organic Chemistry" 2004. 4. J. Clayden, N. Greeves, S. Warren and P. Wothers, " Organic Chemistry" Oxford University Press, 2001.
	Important properties of organic Molecules, inductive effect, mesomeric effect, resonance effect, steric effect,	2,3	
	Aromaticity, anti-aromaticity, Huckel's rule, y-aromaticity, homoaromaticity, neutral and charged aromatic system, annulenes, and fused rings system, heteroannulenes, fullerenes, C-60, Cryptates, aromaticity of heterocycles.	4,5	
	Structure and reactivity, types of mechanisms, thermodynamic and kinetic requirements, Hammond postulate, Curtin-Hammett principle, transition states and intermediates, methods of determining mechanisms, isotopic effects,	6,7,8	
	Generation, structure, stability and reactivity of carbocations, carbanions, free radicals, carbenes, nitrenes, and benzyne, non-classical carbocations	9,10,11	
	The Hammett equations and their linear free energy relationship (sigma-rho) relationship, Taft equation.	12	
UNIT-II: **Stereochemistry**	Conformational analysis of cyclic and acyclic system	13, 14, 15	1. E. L. Elie, Stereochemistry of carbon Compounds" Tata-McGraw, 2000. 2. P. S. Kalsi, "Stereochemistry; Conformation and mechanism" 7th edition, 2008. 3. D. Nasipuri, stereochemistry of Organic Compounds", 3rd edition, 2011.
	Evaluation of non-bonded interaction, effect of conformation on reactivity	16, 17	
	Elements of Symmetry, Chirality, molecules with more than chiral center, projection formulae, (i) Fisher, (ii) Sawhorse, (iii) Newman, (iv) Flying Wedge	18, 19, 20	
	Thero and Erythro isomers, methods of resolution optical purity, enantiotopic and diasterotopic	21, 22	

	atoms, groups and faces		4. E. L. Eliel, S. H. Wilen, "Stereochemistry of Organic Compounds" Wiley student edition.
	Stereospecific and steroselective reactions, optical activity in the absence of chiral atom.	23, 24	
UNIT-III: **Nucleophilic additions to carbonyl compounds**	Nucleophile addition to carbonyl compounds, stereochemistry of nucleophilic additions, Cram's rule, chemistry of imines,	25, 26	1. P. Sykes, A guide book to Mechanism in organic chemistry, 6th edition, 1997. 2. M. B. Smith and J. Marc "March's Advanced Organic Chemistry 5th edition, 2001. 3. F. A. Carey and R. J. Sundberg, "Advanced Organic Chemistry" 2004. 4. S. M. Mukherjee and S. P. Singh, "Reactionn Mechanism in Organic Chemistry" 1st edition 1990.
	Condensation reactions of carbonyl compounds, aldol condensation: acid and base catalyzed aldol condensation, crossed aldol condensation, Claisen-Schmidt condensation, directed aldol condensation, Mukaiyama condensation,	27, 28, 29	
	Claisen ester condensation, Dickmann reaction, Stobbe condensation, Knoevenagel condensation,	30, 31	
	1, 4 conjugate addition (Michael addition and its stereochemistry), Robinson Annulation, Wittig reaction, Mannich reaction	32	
	Nucleophilic addition to isocyanates and isothiocyanates,	33, 34	
	Esterification reactions and ester hydrolysis	35, 36	
UNIT-IV: **Aliphatic and aromatic nucleophilic substitution**	Nucleophilic substitution reactions, SN1 SN2, SNi and neighboring group mechanisms,	37, 38	1. M. B. Smith and J. March "March's Advanced Organic Chemistry 5th edition, 2001. 2. F. A. Carey and R. J. Sundberg, "Advanced Organic Chemistry" 2004. 3. S. M. Mukherjee and S. P. Singh, " Reactionn Mechanism in Organic Chemistry" 1st edition 1990. 4. P. Sykes, A guide book to Mechanism in organic chemistry, 6th edition, 1997.
	Nucleophilic substitution at allylic, aliphatic, trigonal and vinyl carbons	39,40	
	Effect of substrate, nucleophile, leaving group and medium	41,42	
	Stereochemistry of nucleophilic substitution, ambident nucleophiles	43	
	Aromatic nucleophilic substitution, SNAr, SN1, and benzyne mechanism	44, 45	
	Sommelet-Hauser, Von Ritcher and smiles rearrangement, Brcherer and Rosenmund reactions.	46, 47	
UNIT-V:	Aromatic electrophilic substitutions, mechanism and reactivity, selectivity and orientation	48	1. F. A. Carey and R. J. Sundberg, "Advanced Organic Chemistry" 2004.
	Application of the Hammet and Taft equations, The effect of living group, linear free energy	49, 50	

Aromatic and aliphatic electrophilic substitutions	relationships		2. M. B. Smith and J. March "March's Advanced Organic Chemistry 5th edition, 2001. 3. P. Sykes, A guide book to Mechanism in organic chemistry, 6th edition, 1997. 4. T. H. Lowrey and K. S. Richardson, "Mechanism and theory in Organic Chemistry" 3rd edition 1998.
	Nitration and nitrosation and diazonium coupling, sulphonation, chlorination, bromination,	51, 52	
	Friedel-craft alkylation, acylation, and arylation,	53, 54	
	Aliphatic substitutions mechanism, SE2, SEi, SE1, addition-elimination and cyclic mechanism	55, 56	
	Hydrogen exchange, keto-enol tautomerism, halogenations of ketones, aldehydes and carxolyilic acids	57	
	Aliphatic diazonium coupling, diazo compounds, sulphonation, sulphenylation, acylation	58	
	Stork enamines, carbine and nitrene insertions, Kolbe-Schmidt reaction.	59, 60	

Faculty Detail

Name of the Faculty: **Dr. Priyadip Das**
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Signature of the Faculty

26/7/17

Signature of the HOD