Name of Institute: Indus Institute of Sciences, Humanities & Liberal Studies (IISHLS)
Name of Faculty: Dr. Chetana Deoghare

Course code: MCH0202
Course name: Organic Chemistry-II
Pre-requisites: B. Sc. Chemistry

Credit points:

L	T	P	C
4	0	0	4

Offered Semester: II

Course Coordinator (week's XX - XX)
Full Name: Dr. Chetana Deoghare
Department with sitting location: Science and Humanities Department,
4th Floor, Bhanvar Building, Class Room No. 11.
Telephone: EXT: 3414
Email: chetanadeoghare.gd@indusuni.ac.in
Consultation times: Friday 3.20 pm to 4.15 pm

Course Lecturer (week's xx - XX)
Full name: Dr. Chetana Deoghare
Department with sitting location: Science and Humanities Department,
4th Floor, Bhanvar Building, Class Room No. 11.

Telephone: EXT: 3414
Email: chetanadeoghare.gd@indusuni.ac.in
Consultation times: Friday 3.20 pm to 4.15 pm

Students will be contacted throughout the session via mail with important information relating to this Course.

Course Objectives

By participating in and understanding all facets of this Course a student will:

1. To understand the concept of oxidation and reduction reagents in organic synthesis and its uses in laboratory experiments.
2. To understand the basics of photochemistry, photochemical reactions and photochemistry of carbonyl compounds.
3. To aware about various aromatic hetero cycles and their synthesis chemistry.
4. To understand the industrial uses of Pyridine, Pyrrole, Imidazole, Triazoles and Tettrazole.
5. To study the various Organic name reactions and their applications.

Course Outcomes (CO)

After completion of this course the student should be able to

CO1. Define the mechanism of various catalytic reactions and learn use of various synthetic reagents for oxidation and reduction reactions. [BT1]

CO2. Understand the concept of photochemistry and photochemical reactions of carbonyl compounds, alkenes, dienes, and aromatic compounds. [BT2]

CO3. Classify the various heterocyclic compounds and understand their importance in medicinal chemistry. [BT4]

CO4. Explain the photo rearrangement Barton reaction and applications of photochemical reactions in day to day life. [BT2]

CO5. Apply the various name reactions of organic chemistry in pharmaceutical industry or research and development purpose. [BT3]

CO6. Describe the chemistry of heterocyclic compounds with one or two hetero atoms and the concept of condensed five and six member heterocyclic. [BT1]

Course Outline

(Key in topics to be dealt)

- **Reagents in Organic Synthesis (Oxidation & Reduction)**
- **Some Miscellaneous Reagents in Organic Synthesis**
- **Photochemical Reactions**
- **Photochemistry of Carbonyl Compounds**
- **Nomenclature of Hetero Cycles**
- **Aromatic Hetero Cycles and Heterocyclic Synthesis**
- **Organic Name Reactions and their Applications**

Method of delivery

(Face to Face lectures, Active Learning Techniques, Power Point Presentations)

Study time

(How many hours per week including class attendance)

CO-PO Mapping (PO: Program Outcomes)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention (For reference)

(Blooms taxonomy has been given for reference)

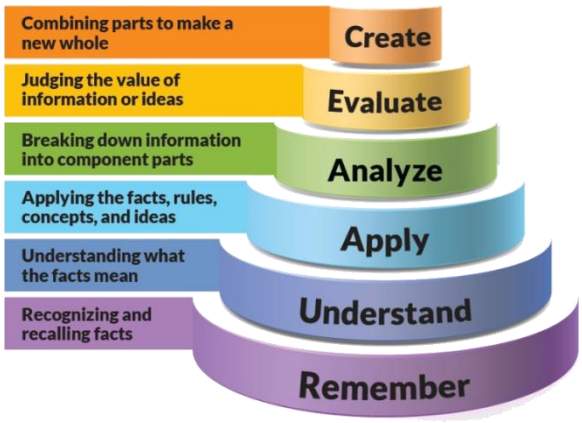


Figure 1: Blooms Taxonomy

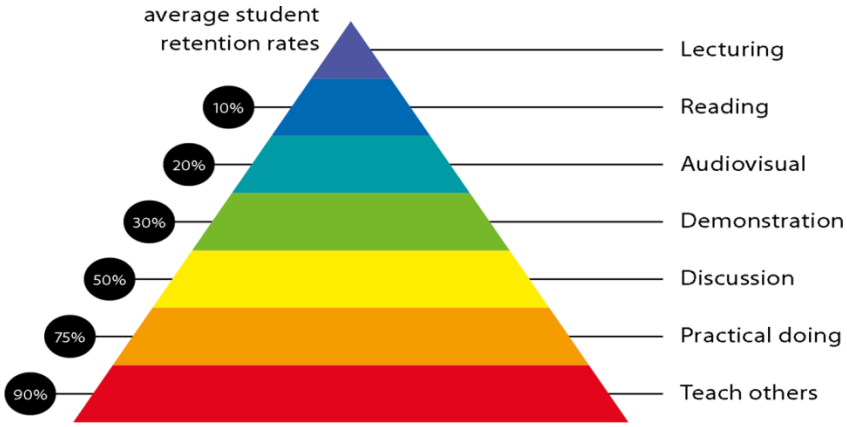


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Department of Chemistry Post Graduate Capabilities
Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.	**1 Professional knowledge, grounding & awareness:-** Student's will gain knowledge about chemistry subject in the both areas i.e. theory as well as practical's. Professionally students will know how chemistry is important in our daily life as well as to build up any industry. Students will be having knowledge/ awareness about chemicals' such as how to use them and how hazardous they are for the environment.

Independent learners Engage with new ideas and ways of thinking and critically analyse issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.	**2 Information literacy, gathering & processing:-** Student's will be able identify the problems happening in the society as well as in the industry such as Photochemistry, uses of Aromatic heterocyclic compounds and their reactions, Organic waste coming from the industries etc. with this basic information they will be having ability to gather the possible solutions.
Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.	**4 Problem solving skills:** Organic Chemistry education provides students with the tools to solve many problems based on Chemistry. This means that students should be able to apply the scientific method: define a problem clearly, develop testable hypotheses, design and execute experiments, analyse data using appropriate statistical methods, and draw appropriate conclusions. Students should be able to integrate knowledge across chemical sub disciplines and apply this knowledge to solve problems. In the laboratory, in addition to the characteristics described above, students should understand the fundamental uncertainties in experimental measurements.
Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognize how culture can shape communication.	**5 Written communication:-** Students should be able to retrieve specific information from the chemical literature, critically evaluate technical articles, and manage many types of chemical information. Students should able to develop proficiency with electronic searching of appropriate technical databases, including structure-based searching.
	6 Oral communication:- Students should orally able to use communication technology such as computerized presentations as well as software for word processing, chemical-structure drawing, writing review article on any related topic, poster preparation and research paper presentation to any conferences.
	7 Teamwork:- Students should be able to Solve scientific problems often involves working in disciplinary and multidisciplinary

	teams. This is especially true in industry and increasingly in academic settings. Students should learn to work productively with a diverse group of peers in classroom and laboratory activities. Students should be able to lead portions of an activity or be effective followers, as dictated by the situation. Peer- and self-assessment is often an effective way to evaluate student contributions to group activities.
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	**10 Sustainability, societal & environmental impact:** With this course students will know/ aware/ learn about the sustainable use of the organic reagents while performing the laboratory experiments. Students will be able to understand various photochemical reactions happening in the environment and their participation in global warming. So they will be having capabilities/ knowledge how to tackled/ deal with different types of organic pollutants coming from the organic laboratory and industry.

Practical work: NA

(Mention what practical work this Course involves)

Lecture/tutorial times

(Give lecture times in the format below)

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the Course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for mid and end semester examinations.

Details of referencing system to be used in written work

1. Designing Organic Synthesis, S. Warren. Wiley.
2. Organic Synthesis: The Disconnection Approach, S. Warren, Wiley.
3. Organic Synthesis-Concept, Method sand Starting Materials, J. Fuhrhop.
4. Some Modern Methods of Organic Synthesis. W carruthers, Cambridge Univ. Press.
5. Modern Synthetic Reactions H.O. House, W.A Benjamin.
6. Advanced Organic Chemistry: Reactions, Mechanisms and Structure, J. March. Wiley.
7. Principles, of Organic Chemistry Part B.F .a. Carey and R.J. Sund berg, Plenum Press.
8. Fundamentals of photo chemistry, K.K. Rothagi-Mukheriji, Wiley- Eastern.
9. Essentials of Molecular Photochemistry, a Gilbert and J. Baggott, Blackwell Scientific Publication.
10. Molecular Photochemistry, N.J. Turro, W.A. Benjamin.
11. An Introduction to the Chemistry of Heterocyclic Compounds by R.M. Aches on (John Wiley & Sons Ltd. New York, 1967).
12. Heterocyclic Chemistry (2/e) by J.A. Joule and G.F. Smith (Van No strand Rein hold (UK) Co.Ltd.1978).
13. The Chemistry of Carbon Compounds by Rodd, E.R.(Ed.),Vol.4A to 4C(Elsevier, Amsterdam,1957 1973).
14. Ring Index by Patterson, Capell and Walker (American Chemical Society, New York, 1960).

Text books

1. Introductory Photochemistry, A. Cox and t. Camp, McGraw Hill.
2. A Textbook of Organic Chemistry, Robert Thornton Morrison, Robert Neilson Boyd, SaibalKanti Bhattacharjee, Pearson.
3. A textbook of Organic Chemistry, Raj K. Bansal, New Age International Publisher.
4. Reactions and Reagents in Organic Chemistry, O. P. Agarwal, O. D. Sharma, Goel Publishing House.
5. Photochemistry, R.P. Kundall and A. Gilbert. Thomson Nelson.

Additional Materials: NA

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

- **Theory**
- CIE (60 marks)
  1. Mid semester Examination = 40 marks
  2. Attendance = 5 marks
  3. Presentation = 5 marks
  4. Assignment = 10 marks

  Total = 60 marks

- ESE (40 marks)
  1. Theory Exam = **40 marks**

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in mid semester or end semester will be considered for supplementary assessment in the respective components (i.e. mid semester or end semester) of semester concerned. Students must make themselves available during the supplementary examination period to take up the respective components (mid semester or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Practical Work Report/ Laboratory Report:

A report on the practical work is due the subsequent week after completion of the class by each group.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.
Do not share your work with other students (except where required for a group activity or assessment)

Course schedule (subject to change)

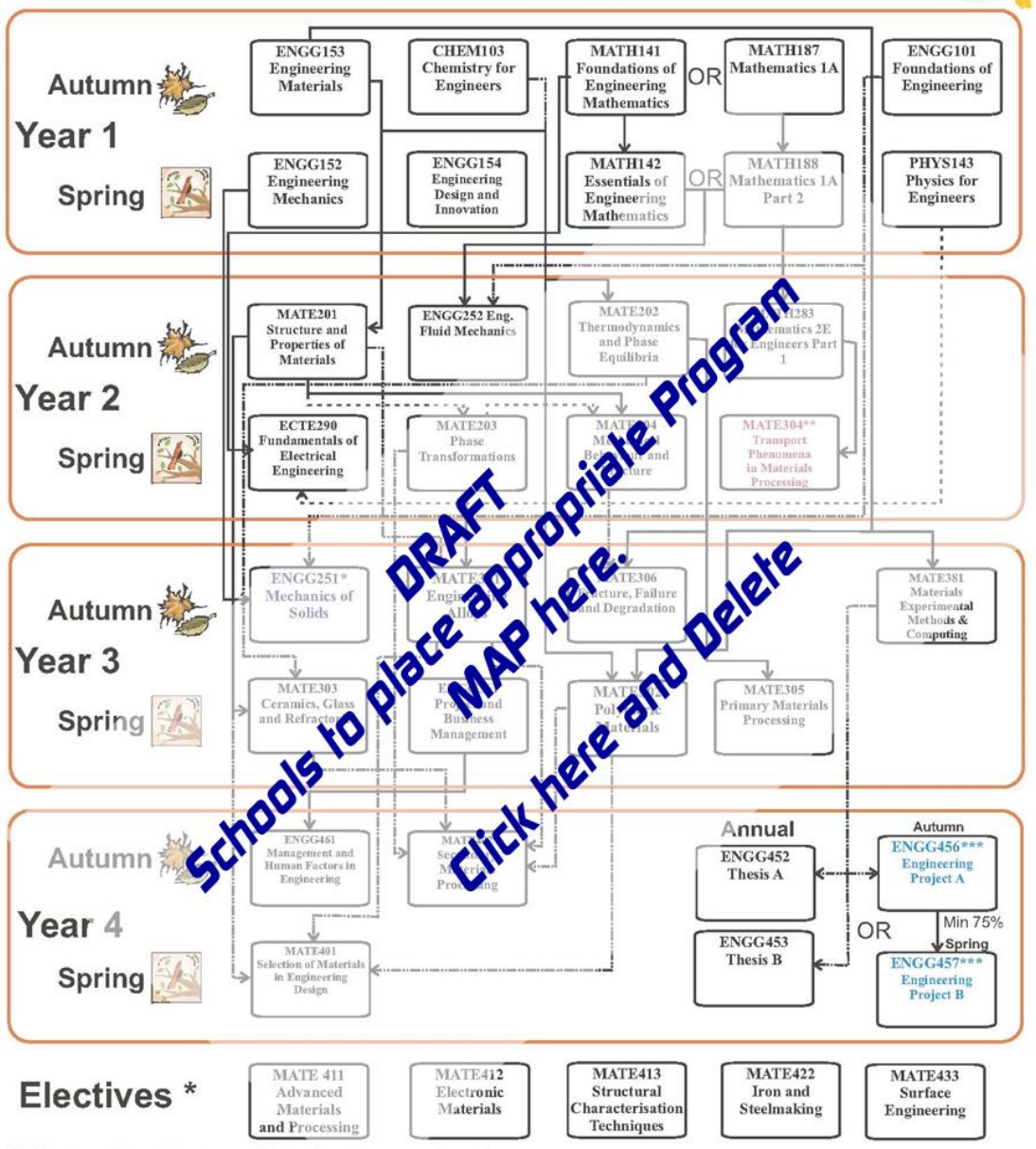
(Mention quiz, assignment submission, breaks etc as well in the table under the Teaching Learning Activity Column)

	Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
	Weeks 1	Reagents in Organic Synthesis [Oxidation]: CrO_3, MnO_2, $KMnO_4$, SeO_2, $Pb(OAc)_4$, OsO_4, HIO_4, DMSO, H_2O_2, Ozone, HgO, NBS,$K_3Fe(CN)_6$, DDQ, $Al(O\text{-}t\text{-}Bu)_3$	1	
	Weeks 2	Reagents in Organic Synthesis [Reduction]: $Al(O\text{-}iPr)_3$, Zn/HCl,N_2H_4/OH-, $NaBH_4$, $LiAlH_4$, Complex Hydrides, Na/NH_3, Cat.H_2, TBTH	1	
	Week 3	Some Miscellaneous Reagents in Organic Synthesis: Wilkinson catalyst, Grignard Reagent and Gilman reagent, PTC, DCC	1	
	Week 4	Some Miscellaneous Reagents in Organic Synthesis: Baker's Yeast, Dess-Martinreagent Trimethylsilylhalide, alkyl lithium, LDA, Sharpless Epoxidation	1	
	Week 5	Photochemical Reactions: Interaction of electromagnetic radiation with matter, types of excitations, fate of excited molecule	2	
	Week 6	Photochemical Reactions: Transfer of excitation energy, characteristics of photochemical reactions, Jablonski diagram, Photosensitization.	2	
	Week 7	Photochemistry of Carbonyl Compounds: Reactions of cyclic Ketone and acylic Ketone, Oxetane formation, Di-π methane rearrangement,	2	
	Week 8	Photochemistry of Carbonyl Compounds: cis-trans isomerization, Photo-Fries rearrangement, Applications of photochemistry.	2	
	Week 9	Nomenclature of Hetero cycles: Replacement and systematic: Nomenclature for monocyclic, fused and bridged hetero cycles.	3	Class Test
	Week 10	Aromatic Hetero cycles and Heterocyclic Synthesis: General chemical behaviour of aromatic hetero	3	

		cycles, Classification of heterocyclic compounds, Principles of heterocyclic synthesis involving cyclization reactions and reactivity and tautomerism		
	Week 11	Pyridine: Synthesis, reaction and its derivatives; Pyrrole: Synthesis, reaction and its derivatives;	3 & 5	
	Week 12	Chemistry of Imidazole, Triazoles, Tettrazole, heterocyclic fused rings heterocyclic compounds and their mechanism containing two heteroatom's. Significance of heterocyclic compounds in medicinal chemistry.	3 & 5	
	Week 13	Organic Name Reactions and their Applications: Robinson ring Annulation, Wittig reaction and its modifications;	4 & 5	
	Week 14	Peterson olefination, Shapiro reaction, Bamford Steven's Reaction, Julia olefination Stork Enamine reaction	4 & 5	
	Week 15	Buchwald–Hartwigamination, Sonogashira Coupling, Brown's Hydroboration reactions	4 & 5	
	Week 16	Bayer Villiger Reaction, Prevost and Woodward Hydroxylation.	4 & 5	

PROGRAM MAP for Bachelor of Engineering (Materials Engineering)

DEGREE - 2012



* Note: Students will take three electives
Some electives are only offered every 2nd year

ENGG251* Note: Full time students entering Year 3 in 2012 will need to take one elective in Autumn as they have already completed ENGG251

MATE304** Note: Full time students entering Year 3 in 2012 will need to take MATE304 in Spring of their 4th year or take it in 2012 and defer another subject to Spring 2012

ENGG456***Note: If ENGG456 Engineering Project A (6cp) is done instead of a thesis, a student needs to complete 4 electives and is not eligible for honours