Department of Chemistry
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN			
Course Title	**Sterochemistry, Photochemistry and rearrangement reactions**		
Course Code	**CH 602**	**No. of Credits**	**3 (Theory)**
Department	**Chemistry**	**Faculty**	**Dr. S. Velmathi**
Programme	**M.Sc.(Chemistry)**		
Pre-requisites -Course Code	**NIL**		
Course Coordinator(s) (if, applicable)	**Dr. S. Velmathi**		
E-mail	**velmathis@nitt.edu**	**Telephone No.**	**2503640**
Course Type	☑ **Core course**	☐ **Elective course**	

COURSE OVERVIEW

This course is offered to I year M.Sc.(Chemistry) students. This 3 credit course is for theory. Three theory classes will be conducted per week.

COURSE OBJECTIVE

To introduce the basic principles involved in the photochemistry and pericyclic reactions, stereochemistry, conformational analysis, assign R and S, E and Z configuration, and important rearrangement reactions.

COURSE OUTCOMES (CO)

Students would become familiar with the:

- ✓ Fundamentals of photochemistry and pericyclic reactions
- ✓ Optical activity and chirality and assign absolute configurations for the molecules
- ✓ Conformational analysis and about different form of (Sawhorse, Newman and Fischer projections) and their inter-conversion
- ✓ synthetic utility of various rearrangement reactions

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1	I week of January	**Unit-III** Fundamentals of photochemistry: Qualitative introduction about different transitions, Norrish type I and II reactions	C&T, PPT
2	II week of January	Paterno-Buchi reaction, photo reduction of ketones, photochemistry of arenes,	C&T, PPT
3	III week of January	Cis-trans isomerization, di-pi-methane and Hoffmann-Loeffler-Freytag rearrangements.	C&T, PPT
4	IV week of January	**Unit-IV** Pericyclic reactions: Classification, Woodward-Hoffmann rules, and FMO theory and stereochemical aspects of electrocyclic reactions	C&T, PPT
5	I week of February	Sigmatropic, cycloaddition, Diels-Alder reactions and ene reactions	C&T, PPT
6	II week of February	Claisen, Cope, Sommelet-Hauser reactions in synthesis.	C&T, PPT
7	III week of February	**Unit-I** Optical activity and chirality: absolute and relative configuration - R-S notation system, molecules with more than one asymmetric center. optical isomerism of biphenyls, allenes and spiranes.	C&T, PPT

8	IV week of February	Enantiotopic and diastereotopic atoms, groups and faces. Stereo specific and stereo selective synthesis, E, Z-nomenclature of olefins, cumulenes and oximes.	C&T, PPT
9	I week of March	Compounds containing chiral nitrogen and sulfur. Geometrical isomerism,	C&T, PPT
10	II week of March	**Unit-II** Conformational analysis: Fischer projection, inter-conversion of Sawhorse, Newman and Fischer projections	C&T, PPT
11	III week of March	conformational analysis of ethane and disubstituted ethane derivatives, cycloalkanes and substituted cyclohexane.	C&T, PPT
12	IV week of March	Conformation and stereochemistry of cis and trans decalin and 9-methyldecalin. Anomeric effect in cyclic compounds.	C&T, PPT
13	I week of April	**Unit-V** Rearrangement reactions: involving electron deficient, carbon, nitrogen, oxygen centers, emphasis on synthetic utility of these rearrangements. Baker–Venkataraman, benzilic acid, [1,2]-Meisenheimer, [2,3]-Meisenheimer,	C&T, PPT
14	II week of April	Wagner-Meerwein, Pinacol, Demyanov, Dienone Phenol, Favorskii, Wolff	C&T, PPT
15	III week of April	Hofmann, Curtius, Lossen, Schmidt, Beckmann, Benzidine, Hofmann-Loffler rearrangements.	C&T, PPT

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment	2nd week of February	Depends on the activity	5
2	Test I	3rd week of February	60 minutes	20
3	Seminar	IV week of March	Depends on the activity	5
4	Test II	2nd week of April	60 minutes	20
5	End semester	IV week of April	3 hours	50

Theory = Total (100)

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

References:

1. M. B. Smith, J. March, March's Advanced Organic Chemistry, John Wiley & Sons, 6th Edn, 2007
2. R. R. Carey and R. J. Sundburg, Advanced Organic Chemistry, Part A and Part B, Springer, 5th Edn, 2007
3. E. J. Eliel, Stereochemistry of Carbon Compounds, John Wiley, 1997
4. B. P. Mundy, M. G. Ellerd, F. G., Jr. Favaloro Name Reactions and Reagents in Organic 7. Synthesis, Wiley-Interscience, 2005

Text Books:

1. Photochemistry and Pericyclic Reactions by Jagdamba Singh, 3rd Edition, ISBN-13: 978- 1906574161 ISBN-10: 1906574162 , New Age Science publisher
2. R.O.C. Norman and J. M. Coxon, Principles of organic synthesis, ELBS, 1994.
3. Stereochemistry of Organic Compounds: Principles and Applications 4th Revised Edition By D. Nasipuri, Publisher: New Academic Science Ltd.
4. P. Y. Bruice, Organic Chemistry. Pearson Education, 3rd edition, 2006

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

1. Feedback from students during class committee meetings.
2. Anonymous feedback through questionnaire at the end of the semester.

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

1. 75% attendance is compulsory for Theory component.
2. For those who missed Test I or Test II due to genuine reasons, retest will be conducted during the III week of April 2017.

ADDITIONAL COURSE INFORMATION

The faculty will be available for consultation at times as per the intimation by the faculty.

Coordinator _____ **CC-Chairperson** _____ **HOD** _____ 4/1/17