

DEPARTMENT OF CHEMISTRY
SRM UNIVERSITY
KATTANKULATHUR



LESSON PLAN
Academic year: 2017-18, Odd semester

Program : M.Sc. (Chemistry)
Subject Title : **Organic Chemistry - III**
Subject Code : PCY15302

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

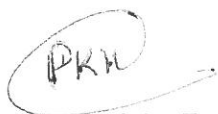
| UNIT & TITLE | TOPICS | LECTURE | REFERENCES |
|---|---|---------|---|
| UNIT-I: IR - SPECTROSCOPY <i>done</i> | Principles of vibrational spectroscopy; various modes of vibration (stretching and bending) | 1, 2 | 1. D. L. Pavia et al., Introduction to Spectroscopy, 5 th ed., Cengage learning, 2015. |
| | Energy levels of an anharmonic oscillator | 3 | 2. C. N. Banwell, Fundamentals of Molecular Spectroscopy, 3 rd ed., TMH, New Delhi, 1983. |
| | Hooke's law | 4 | 3. W. Kemp, Organic Spectroscopy, 3rd Ed., MacMillon, 1994. |
| | Characteristic vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds | 5, 6 | 4. P. S. Kalsi, Spectroscopy of Organic Compounds, 6 th ed., New age international publishers, 2007 |
| | Characteristic vibrational frequencies of alcohols, ethers, phenols and amines | 7, 8 | |
| | Characteristic vibrational frequencies of carbonyl Compounds such as aldehydes, ketones, esters, amides, acids, anhydrides, lactones, lactams | 9, 10 | |
| | Characteristic vibrational frequencies of conjugated carbonyl compounds | 11, 12 | |
| UNIT-II: ¹H-NMR SPECTROSCOPY <i>done</i> | Nuclear spin states of common nuclei. Population densities of nuclear spin states and saturation | 1 | 1. P. M. Silverstein, F. X. Wester, Spectroscopic Identification of Organic Compounds, 6 th ed., Wiley 1998. |
| | The mechanism of nuclear resonance, Diamagnetic anisotropy: shielding of nuclei caused by electrons. Deshielding effects in detail | 2 | 2. D. L. Pavia et al., Introduction to Spectroscopy, 5 th ed., Cengage learning, 2015. |
| | Chemical shift, Factors that influence ¹ H chemical shifts. Chemical shift values and correlation for protons bonded to carbon (aliphatic, olefinic, aldehydic and aromatic) | 3, 4 | 3. P. S. Kalsi, Spectroscopy of Organic Compounds, 6 th ed. New age international publishers, 2007. |
| | Chemical shift values and correlation for protons bonded to other nuclei (alcohols, phenols, enols, carboxylic acids, amines and amides) | 5 | 4. W. Kemp, Organic Spectroscopy, 3rd Ed., MacMillon, 1994. |
| | Typical ¹ H-NMR of different compounds | 6 | |
| | Chemical exchange - Effect of deuteration | 7 | |
| | Spin-spin splitting: the origin of spin-spin splitting, (n+1) rule, Pascal's triangle etc. Complex spin-spin interaction between two, three, four and five nuclei | 8, 9 | |

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| | Coupling constant 'J'. Factors influencing coupling constant. Variation of coupling constant with dihedral angle; Karplus equation | 10 | |
| | Classification (ABX, AMX, ABC, A2B2 etc.) | 11 | |
| | CW and FT-NMR instrument | 12 | |
| UNIT-III: MASS SPECTROMETRY <i>done</i> | Introduction to 'Mass Spectrometry' of organic compounds | 1 | 1. P. M. Silverstein, F. X. Wester. Spectroscopic Identification of Organic Compounds, 6 th ed., Wiley 1998. 2. D. L. Pavia et al., Introduction to Spectroscopy, 5 th ed., Cengage learning, 2015. 3. P. S. Kalsi, Spectroscopy of Organic Compounds, 6 th ed, New age international publishers, 2007. |
| | Instrumentation of mass spectrometry | 2, 3 | |
| | Discussion on various ionization techniques such as EI, CI, ESI, FAB and MALDI towards ion production | 4, 5 | |
| | Molecular-ion peaks and meta-stable peaks | 6 | |
| | Fragmentation and factors affecting fragmentation | 7 | |
| | Mass spectral fragmentation of common organic functional groups. Mc. Lafferty rearrangement | 8, 9 | |
| | Ion analysis and ion abundance | 10 | |
| Discussion on: Nitrogen rule, isotope labeling and high resolution mass spectrometry | 11, 12 | | |
| UNIT-IV: TERPENOIDS AND CAROTENOIDS | Classification of terpenoids / carotenoids | 1, 2 | |
| | Nomenclature of terpenoids / carotenoids | 3, 4 | |
| | Occurrence and isolation of terpenoids / carotenoids | 5, 6 | |
| | Isoprene rule and special isoprene rule | 7, 8 | |
| | General methods of structure determination | 9, 10 | |
| | Synthesis of Citral, Geraniol, Terpineol, Farnesol and Zingiberene | 11, 12 | |
| UNIT-V: FLAVONOIDS AND ISOFLAVONOIDS | Occurrence and isolation of flavonoids / isoflavonoids | 1, 2 | |
| | Nomenclature of flavonoids / isoflavonoids | 3, 4 | |
| | Structure determination of flavonoids / isoflavonoids | 5, 6, 7 | |
| | Synthesis of apigenine and luteoline | 8, 9 | |
| | Synthesis of quercetin and butein | 10, 11, 12 | |

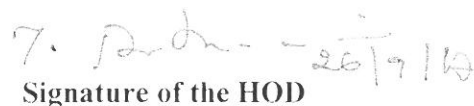
Faculty Detail

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Signature of the HOD