



**DEPARTMENT OF CHEMISTRY**  
**NATIONAL INSTITUTE OF TECHNOLOGY: TIRUCHIRAPPALLI**

| <b>COURSE PLAN</b>  |  |                       |   |
|---|--|-----------------------|---|
| <b>Course title</b>   | <b>CHMI 22-Natural Products Chemistry</b>  |                       |   |
| <b>Course code</b>  | <b>CHMI 22</b>   | <b>No. of Credits</b> | <b>3</b>  |
| <b>Department</b>   | <b>Chemistry</b>   | <b>Faculty</b>        | <b>Dr. Seenuvasan Vedachalam</b><br><b>Dr. Rajesh Kumar V</b> |
| <b>Course type</b>  | <b>Elective course</b>   |                       |   |
| <b>Course Coordinator(s) (if, applicable)</b>   |  | <b>Dr. S. Anandan</b> |   |
| <b>E-mail:</b>  | <a href="mailto:sanand@nitt.edu">sanand@nitt.edu</a><br><a href="mailto:seenuvasanv@gmail.com">seenuvasanv@gmail.com</a><br><a href="mailto:orgrajeshkumar@gmail.com">orgrajeshkumar@gmail.com</a> | <b>Phone:</b>         | 91-431-2503639<br>91-8220462456                               |
| <b>COURSE OVERVIEW</b>  |  |                       |   |
| This is an elective course offered for the B.Tech students. Three credits are awarded for the course. Three lectures will be conducted every week and by two faculty members in Chemistry dept.   |  |                       |   |
| <b>COURSE OBJECTIVE</b>   |  |                       |   |
| To introduce the Natural Product Chemistry especially, Chemical structural classification, structural elucidation of selected alkaloids and terpenes. Also to introduce about Amino acids based reactions and structure of proteins. Student will learn about structure and synthesis of Steroids especially conversion of cholesterol to progesterone, androsterone, testosterone, cortisone and vitamin D. Also student will learn about Nucleic acids Structure especially RNA and DNA using complimentary base pairing - Watson and Crick model. To Introduce about Carbohydrates structural determination of configuration through Fisher and Hudsons rules. Also they will learn the preparation of alditols, glycosides, deoxysugars. vitamin C. This course will give brief knowledge about the natural products which is the chemical component or substance produced by a living organism and its chemical synthesis. |  |                       |   |
| <b>COURSE OUTCOMES (CO)</b>   |  |                       |   |
| <ul style="list-style-type: none"><li>• Students will become familiar with the basics of Natural Product especially Alkaloids, Terpenes, Amino acids, Steroids Nucleic acid and Carbohydrate.</li><li>• In addition, they will be learning the synthesis, structure and reactivity of these natural product.</li><li>• This course is highly useful because it can produces desirable knowledge on natural products which encounter B.Tech students future jobs prospective towards food, chemical</li></ul>  |  |                       |   |

and Pharma industries.

**COURSE TEACHING AND LEARNING ACTIVITIES**

| Sl.No. | Week                  | Topic  | Mode of Delivery |
|--------|-----------------------|--|------------------|
| 1      | II-week<br>Feb/2018   | <b><u>Dr. Seenuvasan Vedachalam portion</u></b><br><br><b><u>Unit V</u></b><br>Introduction about Carbohydrates and Determination of configuration monosaccharides | C&T, PPT         |
| 2      | III-week<br>Feb/2018  | Determination of configuration monosaccharides and Hudsons rules for lactone formation   | C&T, PPT         |
| 3      | IV-week<br>Feb/2018   | Transformation of sugars, preparation of alditols  | C&T, PPT         |
| 4      | I-week<br>Mar/2018    | Preparation of glycosides and deoxysugars.<br>Reactivity. Synthesis of vitamin C from glucose .  | C&T, PPT         |
| 5      | II-week<br>Mar/2017   | <b><u>Unit IV</u></b><br><b>Introduction about Nucleic acids and</b> Structure of nucleosides and nucleotides - RNA and DNA, ..                                    | C&T, PPT         |
| 6      | III-week<br>Mar/2017  | Discussion about complimentary base pairing - Watson and Crick model. DNA-drug interaction   | C&T, PPT         |
| 7      | IV-week<br>Mar/2017   | <b><u>Unit III:</u></b><br><b>Steroids:</b> Classification - synthesis and structure elucidation of cholesterol,   | C&T, PPT         |
| 8      | I-week<br>April/2017  | conversion of cholesterol to progesterone - androsterone and testosterone - cortisone - vitamin D.   | C&T, PPT         |
| 9      | II-week<br>April/2017 | conversion of cholesterol to testosterone - cortisone - vitamin D.   | C&T, PPT         |
| 10     | III-week<br>Feb/2018  | <b><u>Dr. Rajesh Kumar V portion</u></b><br><br><b><u>Unit I:</u></b><br>Isolation and structural elucidation of selected alkaloids and terpenes - quinine         | C&T, PPT         |
| 11     | IV-week<br>Feb/2018   | Isolation and structural elucidation of selected alkaloids and terpenes - morphine, and reserpine  | C&T, PPT         |

|    |                      |   |          |
|----|----------------------|---|----------|
| 12 | I-week<br>Mar/2018   | Isolation and structural elucidation of selected alkaloids and terpenes - citral, juvabione and logifolene. | C&T, PPT |
| 13 | II-week<br>Mar/2017  | <u>Unit II:</u><br>Synthesis of amino acids - reactions – properties - amino acids in nature:               | C&T, PPT |
| 14 | III-week<br>Mar/2017 | Synthesis of amino acids - reactions – properties of $\beta$ -amino acids and their metabolites in nature   | C&T, PPT |
| 15 | IV-week<br>Mar/2017  | Discussion on structure of proteins - peptides, insect pheromones.  | C&T, PPT |

#### COURSE ASSESSMENT METHODS

| SI No.       | Week/Date             | Mode of assessment | Portions                     | Duration | %<br>Weightage |
|--------------|-----------------------|--------------------|------------------------------|----------|----------------|
| 1            | IV-week<br>Feb/2017   | Assignment I       | Unit V                       | One week | 5              |
| 2            | I-week<br>March/2017  | Test I             | Unit I, Unit V               | 1 hour   | 20             |
| 3            | II-week<br>March/2017 | Assignment II      | UNIT I,II                    | One week | 5              |
| 4            | IV-week<br>March/2017 | Test II            | Unit IV, Unit II             | 1 hour   | 20             |
| 5            | IV-week<br>April/2017 | End semester       | Unit I, II, III, IV<br>and V | 3 hours  | 50             |
| <b>TOTAL</b> |                       |                    |                              |          | <b>100</b>     |

#### ESSENTIAL READINGS

1. I. L. Finar, Organic Chemistry Vol. I & Vol. II- Pearson Education, 6th edn.
2. F. A. Carey and R. J. Sundberg, (Eds) 3rd Edition, Part B. Plenum/Rosetta, 1990.
3. I. Fleming, Selected Organic Synthesis, John Wiley and sons, 1982.
4. Atta-ur-Rahman, Studies in Natural Products Chemistry, Vol.1 and 2, Elsevier, 1988.
5. R. Krishnaswamy, Chemistry of Natural Products; A Unified Approach, Universities Press.
6. R. J. Simmonds: Chemistry of Biomolecules: An Introduction, RSC.

#### 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 (as followed previously)

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

1. 75% attendance is compulsory for writing the end semester exam.
2. Whoever failed to appear for test I & test II will have to attend the compensation exam which will be conducted in the II the week of April. The compensation exam will cover the entire portion (Unit I, II, IV and V)
3. Whoever failed to make 75% attendance will have to attend the compensation evening classes which will be conducted in the IV week of March in order to appear for the end semester examination

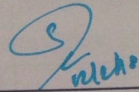
**ADDITIONAL COURSE INFORMATION**

The respective faculty will be available for consultation at times as per the intimation by the faculty. Location (OJAS-315,215)

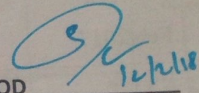
D V. Seenuwajan  
12/02/2018

Coordinator 12/02/2018

CC-Chairperson

  
12/2/18

HOD

  
12/2/18