

GUJARAT TECHNOLOGICAL UNIVERSITY
CHEMICAL TECHNOLOGY (36)
SUBJECT NAME: MEDICINAL CHEMISTRY-II & TECHNOLOGY OF STERILE
PRODUCTS (DE-VIII)
SUBJECT CODE: 2173606
B.E. VIIth SEMESTER

Type of Course: Chemical Technology

Prerequisite: Studied department electives of previous semesters. Basic knowledge of Chemical Engineering, Pharmaceutics, Biochemistry & Chemistry is required

Rationale: The main objective of this subject is to study the synthesis & Biochemistry of Vitamins, Peptides, Chemistry of natural products, lay out design & unit operation in parenterals, ophthalmic products, and stability evaluation of pharmaceutical dosage forms.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Examination Marks | | | | | | Total Marks |
|-----------------|---|---|---------|-------------------|--------|-----|-----------------|-----|--------|-------------|
| L | T | P | C | Theory Marks | | | Practical Marks | | | |
| | | | | ESE (E) | PA (M) | | PA(V) | | PA (I) | |
| | | | | | PA | ALA | ESE | OEP | | |
| 4 | 0 | 3 | 7 | 70 | 20 | 10 | 20 | 10 | 20 | 150 |

L-Lectures; T-Tutorial/TeacherGuidedStudentActivity;P-Practical;C-Credit;ESE-EndSemesterExamination; PA-Progressive Assessment, ALA- Active Learning Assignment, OEP- Open Ended project

Contents:

| Sr. No. | Topic | Teaching Hours | Module Weightage (%) |
|---------|--|---------------------------|----------------------|
| 01 | Vitamins, Peptide, Protein & carbohydrate drugs: Synthesis & Bioorganic chemistry of Vitamins, Peptide & protein drugs, Carbohydrate drugs, role of vitamins as coenzyme. | 30 | 50 |
| 02 | Chemistry of Natural Products: Marine Natural Products: Introduction, occurrence and characteristic structural features, And structure of few marine products. Pyrethroids and retinones: Occurrence, reactions, biological activity, structure and Chemistry Eicosanoids:Classifications, nomenclature, and chemical properties, and biological activity of Thromboxanes, Prostaglandins, Leukotrienes, Pheromones Porphyrins:Structure, general chemistry and properties, examples Haemoglobin, chlorophyll, cytochromes, etc. | 2 2 6 2 3 | 25 |
| 03 | Preformulation, Formulation: Evolution, Large scale manufacture & packing with focus | 10 | 17 |

| | | | |
|-----------|---|---|---|
| | on equipment with reference Parenterals & ophthalmic Layout design & Unit operations related to above dosage forms | | |
| 04 | Blood products, Glandular products, medical sutures, ligatures | 3 | 5 |
| 05 | Stability evaluation: Stability evaluation of pharmaceutical dosage forms | 2 | 3 |

Suggested Specification table with Marks (Theory):

| Unit No | Unit Title | Distribution of Theory Marks (%) | | | | | Total |
|---------|--|----------------------------------|---------|---------|---------|---------|-------|
| | | R Level | U Level | A Level | N Level | E Level | |
| 1 | Vitamins, Peptide, Protein & carbohydrate drugs | 30 | 5 | 5 | 5 | 5 | 50 |
| 2 | Chemistry of Natural Products | 15 | 2.5 | 2.5 | 2.5 | 2.5 | 25 |
| 3 | Preformulation, Formulation | 10.2 | 1.7 | 1.7 | 1.7 | 1.7 | 17 |
| 4 | Blood products, Glandular products, medical sutures, ligatures | 3 | 0.5 | 0.5 | 0.5 | 0.5 | 5 |
| 5 | Stability evaluation | 1.8 | 0.3 | 0.3 | 0.3 | 0.3 | 3 |

Legends: R: Remembrance; U: Understanding; A: Application; N: Analyze; E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Reference Books:

1. Dispensing of Pharmaceutical Students, Cooper & Gunn, London, Pitman Medical Pubs. Co. 1965
2. Therapeutic Systems: Pattern-Specific Drug Delivery, Hellmann, Struttgart, G. Thiense Pub. 1978.
3. Bricyclopedia of Pharmaceutical Technology, J.Swarbrick, New York, Marcel Dekker, 1993.
4. Remington's Pharmaceutical Sciences, A.R.Gennaro Mac Pub. Co. Easton, Pennsylvania 1990
5. Strategies for Organic Drug Synthesis & Design, & Daniel Led nicer, John Willey & Sons Inc. New York., 2nd Ed, 1998.
6. Organic Chemistry of Drug Synthesis: Vol.1 to 6, Daniel Lednicer, John Wiley & Sons Inc.
7. Burger's Medicinal Chemistry & Drug Discovery: Vol. 1 to 6, A. Burger & M.E.Wolff, John Wiley & Sons – New Jersey, 6th Ed, 2003
8. Foye's Principles of Medicinal Chemistry, W.O. Foye, Lippincott Williams & Wilkins-Philadelphia, Oxford, 6th Ed, 2008.
9. Text book of Medicinal & Pharmaceutical Chemistry, Charles Owens Wilson Lippincott Williams & Wilkins – Philadelphia. 1962
10. Natural Products: chemistry and biological significance J. Mann, R.S. Davidson, et. Al.
11. Insecticides of Natural Origin, Sukh Dev,
12. Introduction to Flavanoids, B,A. Bohm
13. Many Organic chemistry and Medicinal chemistry books cover natural Products those can be referred

Course Outcomes:

1. To know the synthesis & Biochemistry of Vitamins, Peptides, Chemistry of natural products, lay out design & unit operation in parenterals, ophthalmic products, stability

- evaluation of pharmaceutical dosage forms.
2. To carry out the synthesis of drug molecules and preparations of pharmaceutical formulations
 3. To be able to apply this knowledge in API & Pharmaceutical Formulation industries
 4. To build a bridge between theoretical and practical concept used in industry

List of Experiments:

| | |
|----|--|
| 1. | Preformulation studies of drugs (5 APIs) |
| 2. | Preformulation studies of granules |
| 3. | Isolation of casein from milk |
| 4. | Formulation of syrups |
| 5. | Formulation of gels |

Major Equipment:

Glasswares, heating mantles / water baths, weighing scale, mechanical stirrers, oven, oil bath, vacuum oven, UV spectra photometer etc

Open Ended Project fields:-

Students are free to select any area of science and technology based on chemical technology applications to define Projects.

Some suggested projects are listed below:

1. Literature survey on marine natural products,
2. Literature survey on biochemistry of vitamins
3. Design of parenteral manufacturing industry
4. PPT on stability of pharmaceutical dosage forms

List of Open Source Software/learning website:

1. Literature available under R&D of Pharmaceutical Industries.
2. Literature available on internet
3. Medical dictionaries
4. Delnet
5. Pharma journals / e-journals.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide.