

# GUJARAT TECHNOLOGICAL UNIVERSITY

## CHEMICAL TECHNOLOGY (36) TECHNOLOGY OF SOLID DOSAGE FORMS & MEDICINAL NATURAL PRODUCTS SUBJECT CODE: 2163605 B.E. 6<sup>th</sup> SEMESTER

**Type of course:** Chemical Technology

**Prerequisite:** Studied department electives of previous semesters. Basic knowledge of Pharmaceutics & Chemistry is required.

**Rationale:** The main objective of this subject is to study the Technology of solid dosage forms, Medicinal natural products & Phytochemistry.

### Teaching and Examination Scheme:

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

### Content:

Sr. No.	Topic	Teaching Hours	Module Weightage (%)
01	<b>Technology of Solid Dosage Forms</b>		
	Preformulation, Formulation, Evaluation, Large scale manufacture and packing with focus on equipment with reference to tablets	12	50
	Coated tablets	6	
	Capsules: Hard gelatin and soft gelatin, microcapsules	8	
	Layout design and Unit operations related to above dosage forms	4	
02	<b>Medicinal Natural Products</b>		
	Scope of the subject, Source of the drug of natural origin, Classification of drug, factors involved in the production of drugs.	8	13
03	<b>Phytochemistry</b>		
	Chemical constituents in the production of plants (carbohydrates, protein enzymes, lipids, alkaloids, glycosides, steroids, tannins,	8	

terpenoids, flavonoids, plant pigments, etc). Biosynthesis approach		37
Extraction & isolation of plant drugs: conventional & modern techniques used in extraction & separation of phytoconstituents	3	
Quality control, application of spectroscopy & chromatography techniques for isolation, identification & analysis of phytoconstituents	5	
Detailed study of one representative from each of the above mentioned chemical class (10 drugs) Synthesis / isolation	5	
Recent advances in Phytopharmaceuticals.	1	

**Suggested Specification table with Marks (Theory):**

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
<b>60</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>00</b>

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

**Reference Books:**

1. Remington's Pharmaceutical Sciences, A.R. Gennaro Mac Pub. Co. Easton, Pennsylvania, 1990
2. Coated Pharmaceutical Dosage Forms, K.H. Bauer, CRC Press, Boca Raton. Med Pharm. 1998.
3. Indian pharmacopoeia, British Pharmacopoeia, United States Pharmacopoeia.
4. Pharmaceutical Coating Technology, G.C. Cole, New York, Ellis, Horwood, 1990
5. Pharmaceutical Unit Operations : Coating, K Avis, A Shukla and R Chang, Interpharm Press, 1998.
6. Pharmaceutical Dosage Forms Vol. I & II, Liebermann, New York, Marcel Dekker, 1996.
7. Hard Capsules : Development & Technology, K. Ridgway, London Pharmaceutical Press, 1987.
8. Medicinal Natural Products, A Biosynthetic Approach, Paul M. Dewick, Chichester: John Wiley & Sons, Ltd., 2nd Ed., 2002.
9. Strategies for Organic Drug Synthesis & Design, & Daniel Lednicer, John Wiley & Sons Inc. New York., 2nd Ed, 1998
10. Organic Chemistry of Drug Synthesis: Vol.1 to 6, Daniel Lednicer, John Wiley & Sons Inc.
11. Burger's Medicinal Chemistry & Drug Discovery: Vol. 1 to 6, A. Burger & M.E. Wolff, John Wiley & Sons – New Jersey, 6th Ed, 2003.
12. Foye's Principles of Medicinal Chemistry, W.O. Foye, Lippincott Williams & Wilkins-Philadelphia, Oxford, 6th Ed, 2008.
13. Text book of Medicinal & Pharmaceutical Chemistry, Charles Owens Wilson Lippincott Williams & Wilkins – Philadelphia. 1962
14. Textbook of Medicinal & pharmaceuticals Chemistry, Wilson & Griswold, Williams & Wilkins, 1st Ed, 2004
15. Phytopharmaceutical Technology, P H List & C C Schmidt, John Wiley & Sons, 1991. Phytochemical Techniques, Raman N, New India Publishing House, 2006

### **Course Outcome:**

- To know the Technology of solid dosage forms, Medicinal natural products & Phytochemistry.
- To carry out the formulation of solid dosage forms
- To be able to apply this knowledge in API & Pharmaceutical Formulation industries
- To build a bridge between theoretical and practical concept used in industry

### **List of Experiments:**

1. Preparation and evaluation of tablets of the following types: conventional, chewable, effervescent, soluble, dispersible, mouth dissolve, using different binders/granulation methods
2. Filling and evaluation of hard gelatin capsules
3. Micro encapsulation of liquids and solids
4. Large scale manufacture and evaluation of tablets (demonstration)
5. Coating of tablets (demonstration)
6. Evaluation of coated tablets.
7. Alkaloid extraction and its purification (2 exercises)

### **Design based Problems (DP)/Open Ended Problem:**

**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 synthesis of new techniques in tablet coating,
2. Lay out design of manufacturing facility of formulation, capsule, tablet coating.
3. Product profile and its manufacturing process of natural medicinal products.
4. Recent advances in Phytopharmaceuticals.

### **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. The best three works should submit to GTU.