

GUJARAT TECHNOLOGICAL UNIVERSITY
Diploma in Chemical Engineering
Semester: 4

Subject Name: **DYES AND PHARMACEUTICALS**

Sr No.	Course Content
1	Introduction of Dyes. 1.1 Definition and applications. 1.2 History and growth of synthetic dye stuff industry in India. 1.3 Colour phenomenon in dyes. 1.4 Classification of dyes. 1.4.1 Classification based on application. 1.4.2 Classification based on chemical constitution. 1.5 Brief idea of important unit processes. 1.5.1 Nitration 1.5.2 Sulfonation 1.5.3 Halogenations 1.5.4 Oxidation 1.6 Material of construction for above unit processes. 1.7 Basic operations in dyes manufacture.
2	Structure chemistry and application of various dyes. 2.1 Azo dyes. 2.2 Direct dyes. 2.3 Acid dyes. 2.4 Reactive dyes. 2.5 Azoic dyes. 2.6 Dispersed dyes. 2.7 Vat dyes. 2.8 Sulfur dyes.
3	Preparation of dyes. 3.1 Aniline by reduction of nitrobenzene. 3.2 Anthraquinone from phthalic anhydride. 3.3 Vat dyes. 3.4 Indigo dyes.
4	Pollution problems in Dyestuff industries. 4.1 Types of pollution generated. 4.2 Severity of pollution. 4.3 Important pollutants and their effects. Methods of treatment / remedies
5	Introduction of pharmaceuticals. 5.1 Development and scope of industry.

	5.2 Status of industry in India. 5.3 Characteristics of pharmaceutical industry. 5.4 Economics of pharmaceutical industry.
6	Drugs. 6.1 Classification of Drugs. 6.2 Unit processes involved in the manufacturing of drugs. 6.3 Reactor systems and raw materials of drugs. 6.4 Brief idea about sulfa drugs, anti- TB drugs, Antileprotic drugs, Analgesics. 6.5 Anesthetics and Ant malarial drugs
7	Anti-biotic & Vitamins. 7.1 Importance of antibiotic and vitamins. 7.2 Study of antibiotics. 7.2.1 Penicillin. 7.2.2 Streptomycin. 7.2.3 Tetracycline. 7.2.4 Chloramphenicol. 7.3 Structure, properties and applications of Vitamin-A, Vitamin-B, Vitamin-B complex, Vitamin-C, Vitamin-D, Vitamin-E, Vitamin- K.
8	Miscellaneous. 8.1 Health benefits of pharmaceuticals in brief. 8.2 Effluent control of pharmaceutical industry.

Laboratory Experiences:

- (1) Preparation of Nitrobenzene from Benzene
- (2) Preparation of m-Dinitrobenzene from Nitrobenzene
- (3) Preparation of Dispersed Dye
- (4) Preparation of Mordant yellow dye
- (5) Preparation of Butter yellow dye
- (6) Preparation of Fast green O dye
- (7) Preparation of Phenyl Azo β -naphthol from Aniline
- (8) Determination of Aspirin content in the given sample
- (9) Estimation of Benzyl penicillin in the given sample
- (10) Estimation of Cephalaxin in the given sample
- (11) Estimation of Sulphamethoxazole in the given sample
- (12) Preparation of Sulphanilamide from Acetanilide.
- (13) Synthesis of Aspirin from Salicylic acid
- (14) Determination of % age of vitamin-C in the given tablet

REFERENCES:

- (1) An Introduction to Synthetic drugs and dyes – P. P. Singh, R. S. Rao;
Himalaya Publishing House.
- (2) Dryden, C.E., "Outlines of Chemical Technology ", Edited and Revised by
Gopala Rao. M. and M.Sittig, Second edition, Affiliated East-West press, 1993.
- (3) Austin, G.T., "Shreve's Chemical Process Industries ", Fifth Edition,
McGraw-Hill International Book Co, Singapore, 1984.
- (4) M. V. Naik; "Chemical Process Technology", Nirali Prakashan
- (5) Kent, J.A.(ed), " Riggel's Hand Book of Industrial Chemistry ",
Van Nostrand Reinhold, 1974.
- (6) Industrial Chemistry- B.K.Sharma – Goel Publishers.