

Course code: Course Title	Course Structure			Pre-Requisite
<b>CH103: Unit Processes in Organic Synthesis-I</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>NIL</b>
	<b>1</b>	<b>0</b>	<b>2</b>	

**Course Objective:** The objective of the course is to inculcate skills in students related to the unit processes in organic synthesis.

S. No	Course Outcomes (CO)
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<b>CO1</b>	Describe types of reactions (Addition, elimination, electrophilic and nucleophilic substitution, rearrangements), generation & structure of common reactive intermediates (carbocation, carbanion, and free radicals), electrophile and nucleophile.
<b>CO2</b>	Describe different types of unit processes involved in the production of industrially important products (halogenation, nitration, sulphonation, hydrogenation, and esterification).
<b>CO3</b>	Apply the unit processes for the manufacturing of industrial products.

<b>S. No</b>	<b>Contents</b>
<b>UNIT 1</b>	A brief introduction about: types of reactions (Addition, elimination, electrophilic and nucleophilic substitution, rearrangements), generation & structure of common reactive intermediates (carbocation, carbanion, and free radicals), electrophile and nucleophile, Different types of unit processes for the manufacturing of industrial products.
<b>UNIT 2</b>	Halogenation: Halogenating agents, mechanisms and kinetics of halogenation reactions, chlorination in the presence of a catalyst, photo halogenation. The industrial manufacturing process for at least one product.
<b>UNIT 3</b>	Nitration: Nitrating agents, aromatic nitration, kinetics and mechanism of aromatic nitration, Industrial processes for the manufacture of nitrobenzene.
<b>UNIT 4</b>	Sulphonation: sulphonating agents and their principal applications, chemical and physical factors in sulphonation, kinetics and mechanism, desulphonation, workup procedures, Industrial process for the manufacture of benzene sulphonic acid by continuous partial-pressure distillation method.
<b>UNIT 5</b>	Hydrogenation: Catalytic hydrogenation reactions, hydrogenolysis reactions, general principles concerning hydrogenation catalysts, general classification of hydrogenation catalysts, hydrogenation equipment, Industrial processes for hydrogenation of oils and The industrial manufacturing process for at least one product like methanol.

<b>UNIT 6</b>	Esterification: of acids and their derivatives, transesterification, hydrolysis of esters, industrial application of hydrolysis of triglycerides, kinetics of ester hydrolysis.
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<b>REFERENCES</b>		
<b>S.No.</b>	<b>Name of Books/Authors/Publishers</b>	<b>Year of Publication / Reprint</b>
<b>1</b>	Unit processes in Organic Synthesis; P. H. Groggins, McGraw Hill Education.	2001
<b>2</b>	Chemical Technology; A. F. Henglein, Pergamon Press.	1968
<b>3</b>	Organic Chemistry; Vol. 1, 6e, Finar, Pearson Education India.	2002