Semester III: Course Name: Organic Chemistry (PPE202/PPE221)

Course Outcome (CO):

After com	pleting this course the student will be able to
PPE202.1	Describe the basics of bond formation and naming of organic compounds. (Remember)
PPE202.2	Describe various types of organic reactions, their mechanisms and their rearrangements. (Remember)
PPE202.3	Illustrate bond formation in organic compounds and their molecular arrangement in three dimensional aspects.
	(Apply)
PPE202.4	Illustrate the structure, properties, reactions and applications of organic compounds used in manufacturing of
	various monomers and polymers etc.(Apply)
PPE221.1	Explain the importance of detecting purity of organic compounds like their health hazards, environmental
	aspects, storage etc. (Understand)
PPE221.2	Explain how compounds containing different functional groups should be identified (Understand)

CO-PO Mapping

СО	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
PPE202.1	3	-	-	-	-	-	-	-	-	-	-	-
PPE202.2	3	-	-	-	-	-	-	-	-	-	-	-
PPE202.3	-	-	-	3	-	-	-	-	-	-	-	-
PPE202.4	-	-	-	2	-	-	-	-	-	-	-	-
PPE221.1	2	2	-	-	-	-	-	-	-	-	-	-
PPE221.2	2	3	-	-	-	-	-	-	-	-	-	-
Average	2.50	2.50	-	2.50	-	-	-	-	-	-	-	-

CO	PSO 1	PSO 2	PSO 3
PPE202.1	3	-	-
PPE202.2	3	-	-
PPE202.3	2	-	-
PPE202.4	-	-	3
PPE221.1	-	-	2
PPE221.2	-	-	3
Average	2.67	-	2.67

Semester III: Course Name: Introduction to Polymer Engineering (PPE203) Course Outcome (CO)

After comp	leting this course, the student will be able to
PPE203.1	Define the basic terminologies like molecular weight, macromolecules, functionality, crystallinity, glass transition temperature and degree of polymerization.(Remember)
PPE203.2	Classify the polymers based on origin, mode of polymerization, structures, thermal behavior and applications. (Understanding)
PPE203.3	Identify the properties and application of polymer by its molecular weight and molecular weight distribution. (Understanding)
PPE203.4	Predict the properties of polymer based on its structures, tacticity, functionality and polydispersity. (Applying)
PPE203.5	Correlate the structure-property-application of polymer. (Analyzing)

CO-PO Mapping:

СО	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
PPE203.1	2	2	2	1	-	-	-	-	-	-	-	-
PPE203.2	2	-	-	2	-	-	-	-	-	-	-	-
PPE203.3	2	-	1	2	-	-	-	-	-	-	-	-
PPE203.4	2	-	1	2	-	-	-	-	-	-	-	-
PPE203.5	2	-	-	2	-	-	-	-	-	-	-	-
Average	2	2	1.25	1.8	-	-	-	-	-	-	-	-

СО	PSO 1	PSO 2	PSO 3
PPE203.1	2	-	-
PPE203.2	2	-	-
PPE203.3	1	-	-
PPE203.4	2	-	-
PPE203.5	2	-	-
Average	1.8	-	-

Semester III: Course Name: Polymer Testing (PPE204/PPE223) Course Outcome (CO)

After com	pleting this course, the student will be able to
PPE204.1	Describe the different types of testing standards & importance of polymer testing with basic terminologies. (Remember)
PPE204.2	Explain the standard polymer testing methods for evaluating required properties of different plastics materials. (Understanding)
PPE204.3	Analyze the test results with respect to different testing parameters. (Analyzing)
PPE204.4	Plan the complete testing process considering pre and post testing requirements. (Applying)
PPE223.1	Choose and operate the appropriate testing equipment properly. (Applying)
PPE223.2	Experiment to evaluate the required polymer properties using polymer testing equipments.(Applying)

CO-PO Mapping

СО	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
PPE204.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE204.2	2	2	-	-	-	-	-	-	-	-	-	-
PPE204.3	2	2	-	-	-	-	-	-	-	-	-	-
PPE204.4	1	1	-	-	-	-	-	-	-	-	-	-
PPE223.1	2	2	-	2	2	-	-	-	-	-	-	-
PPE223.2	2	2	-	2	2	-	-	-	-	-	-	-
Average	1.83	1.8	-	2	2							

СО	PSO 1	PSO 2	PSO 3
PPE204.1	2	-	-
PPE204.2	2	-	-
PPE204.3	2	-	-
PPE204.4	2	-	-
PPE223.1	2	-	-
PPE223.2	2	-	-
Average	2	-	-

Semester III: Course Name: Material Engineering (PPE205)

Course Outcome (CO)

СО	Statement
PPE205.1	Recall basic terminologies and enlist parameters of different class of materials
PPE205.2	Illustrate different crystal structures, crystal symmetry, close packing of crystals, apply different rules and techniques to solve for crystals and packing parameters.
PPE205.3	Explain equilibrium, suitable processes for conversion of materials, imply the final properties of material with structure.
PPE205.4	Explain equilibrium diagrams, solidification process and diffusion in solids, apply different techniques and rules to solve for equilibrium, solidification and diffusion parameters.
PPE205.5	Illustrate different mechanical and thermal properties and related concepts in materials.
PPE205.6	Illustrate diffferent electronic, magnetic and optical properties and related concepts in materials.

CO-PO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE205.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE205.2	3	-	-	-	-	-	-	-	-	-	-	-
PPE205.3	-	-	2	-	-	-	-	-	-	-	-	-
PPE205.4	-	3	-	-	-	-	-	-	-	-	-	-
PPE205.5	3	-	-	-	-	-	-	-	-	-	-	-
PPE205.6	3	-	-	-	-	-	-	-	-	-	-	-
Average	2.75	3	2	-	-	-	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE205.1	2	-	-
PPE205.2	2	-	1
PPE205.3	2	-	-
PPE205.4	1	-	2
PPE205.5	2	-	-
PPE205.6	2	-	-
Average	1.83	-	1.5

Semester III: Course Name: Mechanical Operation (PPE206/PPE224)

Course Outco	me (CO)							
After complet	After completing this course the student will be able to:							
PPE 206.1	206.1 Explain fundamentals of mechanical operations involved in plastic & processing industry.							
PPE 206.2	Select specific mechanical operations for different materials.							
PPE 206.3	Explain the mechanical operating element used in mechanical operation.							
PPE 206.4	Classify the various process like sorting, sedimentation, filtration, mixing & agitation etc.							
PPE 206.5	Identify various types of gas cleaning equipments & its methods.							
PPE 206.6	Know the various storage & conveying of solids in industry.							

CO-PO Mapping

СО	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
PPE 206.1	3	3	-	2	1	-	-	-	-	-	-	-
PPE 206.2	3	3	-	2	1	-	-	-	-	-	-	-
PPE 206.3	3	-	-	3	-	-	-	-	-	-	-	-
PPE 206.4	3	-	-	2	-	-	-	-	-	-	-	-
PPE 206.5	2	2	-	-	-	-	-	-	-	-	-	-
PPE 206.6	2	3	-	-	-	-	-	-	-	-	-	-
Average	2.67	2.75	-	2.25	1.00	-	-	-	-	•	•	-

СО	PSO 1	PSO 2	PSO 3
PPE 206.1	3	-	-
PPE 206.2	3	-	-
PPE 206.3	2	-	-
PPE 206.4	-	-	3
PPE 206.5	-	-	2
PPE 206.6	-	-	3
Average	2.67	-	2.67

Semester III: Course Name: Lab II: Analysis of Polymer (PPE222)

Course Outcome (CO)

СО	Statement
PPE222.1	Determine the bulk density of polymers.(Remembering)
PPE222.2	Determine amine value and iodine value of polymer sample. (Understanding)
PPE222.3	Analyze the polymer by determining the molecular weight with end group analysis and viscometry method. (Analyzing)
PPE222.4	Examine moisture content and water absorption in polymer sample. (Analyzing)
PPE222.5	Analyze the melamine content and purity of HMTA in a sample.(Analyzing)

CO-PO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE222.1	1	2	-	-	-	-	-	-	-	-	-	-
PPE222.2	1	2	-	-	-	-	-	-	-	-	-	-
PPE222.3	1	2	-	-	-	-	-	-	-	-	-	-
PPE222.4	1	2	-	-	-	-	-	-	-	-	-	-
PPE222.5	1	2	-	-	-	-	-	-	-	-	-	-
Average	1	2	-	-	-	-	-	-	-	-	-	-

CO	PSO1	PSO2	PSO3
PPE222.1	1	-	-
PPE222.2	1	-	-
PPE222.3	1	-	-
PPE222.4	1	-	-
PPE222.5	1	-	-
Average	1	-	-

Semester IV: Course Name: Process Calculations (PPE252)

Course Outcome (CO)

СО	Statement
DDE 252 1	Define various terminologies related to basic chemical calculations and various laws related to
F F E 232.1	stoichiometry. (Remember)
DDE252.2	Explain the material and energy balance concepts for various unit operations carried out in industries
FFE252.2	along with recycle and purge concept. (Understanding)
DDF2523	Apply knowledge of mathematics and basics of stoichiometry to solve design problems related to
11 E232.3	process industries. (Applying)
PPE252.4	Calculate various heat capacities like heat of reaction, formation, combustion etc. (Analyzing)
PPE252.5	Evaluate theoretical and excess calculations for fuels and their combustion. (Evaluating)
PPE252.6	Estimate the values related to humidification operations carried out in industries.(Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE252.1	2	-	-		-	-	-	-	-	-	-	-
PPE252.2	2	-	2		-	-	-	-	-	-	-	-
PPE252.3	-	3	2		-	-	-	-	-	-	-	-
PPE252.4	1	2	-		-	-	-	-	-	-	-	-
PPE252.5	1	2	-		-	-	-	-	-	-	-	-
PPE252.6	1	2	-		-	-	-	-	-	-	-	-
Average	1.4	2.25	2									

CO	PSO1	PSO2	PSO3
PPE252.1	-	-	1
PPE252.2	-	-	1
PPE252.3	-	-	2
PPE252.4	-	-	2
PPE252.5	-	-	2
PPE252.6	-	-	2
Average	-	-	1.66

<u>Semester IV: Course Name: Physical Chemistry of Polymers (PPE253/PPE271)</u> Course Outcome (CO)

СО	Statement
PPE253.1	Relate polymer characteristics based on their chemical structure and molecular architecture.
	(Remember)
PPE253.2	Find how orientation of polymer chain affects the properties of polymers. (Remember)
DDE452.2	Explain the behavior of polymers at interfaces from the point of view of their structure and their impact
PPE253.5	on various characteristics of polymer solution. (Understand)
DDE 252 4	Apply the knowledge and techniques of molecular structure and physical processes to determine
FFE233,4	polymer molecular weight. (Applying)
PPE253.5	Classify polymers on the basis of their molecular architecture and surface characteristics. (Analyzing)
DDE252 (Use insights from physicochemical experiments to evaluate the composition and architecture of
FFE253.0	polymers. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE253.1	3	-	-	2	-	-	-	-	-	-	-	-
PPE253.2	-	2	-	3	-	-	-	-	-	-	-	-
PPE253.3	3	2	-	1	-	-	-	-	-	-	-	-
PPE253.4	3	2	-	-	-	-	-	-	-	-	-	-
PPE253.5	-	-	-	2	-	-	-	-	-	-	-	-
PPE253.6	-	-	-	3	2	1	-	-	-	-	-	-
Average	3	2	-	2.2	2	1	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE253.1	3	-	-
PPE253.2	3	-	-
PPE253.3	3	-	-
PPE253.4	3	-	-
PPE253.5	2	-	-
PPE253.6	3	-	-
Average	2.83	-	-

<u>Semester IV: Course Name: Polymer Synthesis and Manufacturing (PPE254/PPE272)</u> Course Outcome (CO)

СО	Statement
PPE253.1	Define constituents used in polymerization and various polymerization techniques. (Remember)
PPE253.2	Explain the polymerization techniques to synthesize polymers subjecting to specific applications (Understanding)
PPE253.3	Solve numerical problems associated with polymerization kinetics. (Applying)
PPE253.4	Apply knowledge to synthesize thermoplastic polymers. (Applying)
PPE253.5	Identify suitable ingredients to synthesize thermoplastic polymers for different polymerization techniques. (Applying)
PPE253.6	Categorize various manufacturing procedures for thermoplastics and thermosets. (Analyzing)

CO-PO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE253.1	1	-	1	-	1	-	-	-	-	-	-	-
PPE253.2	2	-	-	2	2	2	-	-	-	-	-	-
PPE253.3	3	3	-	-	-	-	-	-	-	-	-	-
PPE253.4	2	-	1	1	-	-	-	-	-	-	-	-
PPE253.5	2	-	1	1	-	-	-	-	-	-	-	-
PPE253.6	2	1	-	-	-	2	-	-	-	-	-	-
Average	2	2	1	2	1.5	2	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE253.1	3	-	-
PPE253.2	3	2	-
PPE253.3	3	-	-
PPE253.4	3	2	-
PPE253.5	3	2	-
PPE253.6	3	2	-
Average	3	2	-

<u>Semester IV: Course Name: Programme Elective-I (Specialty Polymers) (PPE291)</u> Course Outcome (CO)

СО	Statement
PPE291.1	Relate structure and components of specialty polymer system. (Understanding)
PPE291.2	Classify different specialty polymers. (Understanding)
PPE291.3	Apply the characteristics of specialty polymers and related methods of its suitable working. (Applying)
PPE291.4	Analyze structure property correlation for different specialty polymers. (Analyzing)
PPE291.5	Evaluate the applicability of specialty polymers. (Evaluating)
PPE291.6	Adapt the process fundamentals towards the improvement of the characteristics of specialty polymers.
1122/1.0	(Evaluating)

CO-PO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE291.1	3	-	1	-	-	-	-	-	-	-	-	-
PPE291.2	3	-	3	-	-	-	-	-	-	-	-	-
PPE291.3	2	-	-	-	-	-	-	-	-	-	-	-
PPE291.4	3	2	-	2	-	-	-	-	-	-	-	-
PPE291.5	3	3	2	1	-	-	-	-	-	-	-	-
PPE291.6	2	3	3	-	-	-	-	-	-	-	-	-
Average	2.7	2.7	2.2	1.5	-	-	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE291.1	3	-	-
PPE291.2	3	-	-
PPE291.3	3	-	-
PPE291.4	3	-	-
PPE291.5	3	-	-
PPE291.6	3	-	-
Average	3	-	-

<u>Semester IV: Course Name: Programme Elective-I (Fiber Technology) (PPE292)</u> Course Outcome (CO)

CO	Statement
PPE292.1	Define the terminologies related to fiber technology. (Remembering)
PPE292.2	Illustrate the origin, structure, properties and applications of fibers. (Understanding)
PPE292.3	Explain the mechanism of preparation of man-made fibers. (Understanding)
PPE292.4	Explain mechanical and chemical processing of fibers. (Understanding)
PPE292.5	Solve basic numerical problems related to fiber technology. (Applying)
PPE292.6	Compare different fiber characteristics, their preparation and processing methods. (Analyzing)

CO-PO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE292.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE292.2	2	-	-	-	-	-	-	-	-	-	-	-
PPE292.3	2	1	-	-	-	-	-	-	-	-	-	-
PPE292.4	2	-	-	-	-	-	-	-	-	-	-	-
PPE292.5	3	3	1	-	-	-	-	-	-	-	-	-
PPE292.6	3	2	-	2	-	-	-	-	-	-	-	-
Average	2.33	2	1	2	-	-	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE292.1	2	-	-
PPE292.2	2	-	-
PPE292.3	3	-	-
PPE292.4	3	-	-
PPE292.5	3	-	-
PPE292.6	3	-	-
Average	2.67	-	-

Semester IV: Course Name: Programme Elective-I (Biopolymers) (PPE293)

Course Outcome (CO)

СО	Statement
PPE293.1	Define the terminologies in the field of biopolymers. (Remembering)
PPE293.2	Illustrate the preparation procedure of various biopolymers. (Understanding)
PPE293.3	Apply the various pathways of manufacturing of biopolymers for suitable applications. (Applying)
PPE293.4	Classify the testing and toxic effects of various biopolymers. (Analyzing)
PPE293 5	Explain the importance of various processing techniques, properties and characteristics of bio-based
11 12/010	blends, composites and nanocomposites. (Evaluating)
PPE293.6	Discuss the alterative pathways to replace synthetic polymers by using biopolymers. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE293.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE293.2	3	-	-	-	-	-	-	-	-	-	-	-
PPE293.3	3	1	1	-	3	-	1	-	-	-	-	-
PPE293.4	2	3	-	2	-	-	-	-	-	-	-	-
PPE293.5	3	2	2	2	1	1	-	-	-	-	-	-
PPE293.6	3	3	-	-	2	3	2	-	-	-	-	-
Average	2.66	2.25	1.5	2	2	2	1.5	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE293.1	2	-	-
PPE293.2	2	-	-
PPE293.3	2	-	-
PPE293.4	2	-	-
PPE293.5	2	-	-
PPE293.6	2	1	-
Average	2	1	-

Semester IV: Course Name: Fluid Mechanics (PPE255/PPE273)

Course Outcome (CO)

СО	Statement
PPE255.1	Illustrate fundamental concepts of fluid mechanics and their applications in plastic and polymer engineering. (Understanding)
PPE255.2	Make use of basic equations to determine the different parameters when fluid B at rest or in motion.(Understanding)
PPE255.3	Utilize mathematical expression for fluid flow analysis and perform different calculation for single and multiphase flants (Understanding)
PPE255.4	Extend the principles of fluid mechanics to the operation, design, and selection of fluid flow machinery such as pumps. (Understanding)
PPE255.5	Evaluate various parameters like coefficient of discharge, for different flow meters, losses in pipe during flow and determine the nature of flow. (Evaluating)
PPE255.6	Compare advantages and disadvantages, application of different valves and other pipe fittings, centrifugal pump, fluidized and packed beds. (Applying)

CO-PO Mapping

СО	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE255.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE255.2	-	2	-	-	-	-	-	-	-	-	-	-
PPE255.3	-	2	-	-	-	-	-	-	-	-	-	-
PPE255.4	-	-	3	-	-	-	-	-	-	-	-	-
PPE255.5	-	-	-	2	-	-	-	-	-	-	-	-
PPE255.6	-	-	-	2	-	-	-	-	-	-	-	-
Average	2	2	3	2	-	-	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE255.1	-	-	
PPE255.2	-	-	
PPE255.3	-	-	
PPE255.4	-	-	
PPE255.5	-	-	
PPE255.6	2	1	-
Average	2	1	-

Semester IV: Course Name: DOS-III: Design Lab-I (CAD) (PPE274)

Course Outcome (CO)

CO	Statement
PPE274.1	Show the 2D drawing basics with user interface of CAD software (Remember)
PPE274.2	Demonstrate the knowledge of editing and modifying tools required for 2D drawing. (Understanding)
PPE274.3	Apply the knowledge of tools for necessary changes to complete the drawing. (Applying)
PPE274.4	Analyze the drawing to complete it in a ready to print format. (Analyzing)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE274.1	1	-	-	-	-	-	-	-	-	-	-	-
PPE274.2	2	-	-	-	-	-	-	-	-	-	-	-
PPE274.3	1	1	1	-	-	-	-	-	-	-	-	-
PPE274.4	1	1	-	1	1	-	-	-	-	-	-	-
Average	1.25	1	1	1	1	-	-	-	-	-	-	-

СО	PSO1	PSO2	PSO3
PPE274.1	-	1	-
PPE274.2	-	2	-
PPE274.3	-	1	-
PPE274.4	-	1	-
Average	-	1.25	-