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Semester V: Course Name: Polymer Rheology and Morphology (PPE301)

Course Outcome (CO):

After completing this course the student will be able to	
PPE301.1	Define the various terminologies used in rheology. (Remembering)
PPE301.2	Explain the visco-elastic behavior and deformational characteristics of various materials. (Understanding)
PPE301.3	Develop relationship among rheological parameters for various models. (Applying)
PPE301.4	List the factors affecting shear flow of various materials.(Analyzing)
PPE301.5	Explain the method used in determining transition region for various polymeric materials. (Evaluating)
PPE301.6	Explain crystallization, morphology of various polymeric materials. (Evaluating)

CO-PO Mapping

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
PPE301.1	3	-	-	-	-	-	-	-	-	-	-	-
PPE301.2	3	-	-	-	-	-	-	-	-	-	-	-
PPE301.3	3	1	-	-	-	-	-	-	-	-	-	-
PPE301.4	3	-	-	-	-	-	-	-	-	-	-	-
PPE301.5	2	-	-	2	-	-	-	-	-	-	-	-
PPE301.6	2	-	-	2	-	-	-	-	-	-	-	-
Average	3	1	-	2	-	-	-	-	-	-	-	-

CO-PSO Mapping

CO	PSO 1	PSO 2	PSO 3
PPE301.1	3	-	-
PPE301.2	3	-	-
PPE301.3	3	-	-
PPE301.4	3	-	-
PPE301.5	3	-	-
PPE301.6	3	-	-
Average	**3**	-	-

Semester V: Course Name: Polymeric Materials –I (PPE302)

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Course Outcome (CO)

After completing this course, the student will be able to	
PPE302.1	The structures of different polymeric materials and their respective raw material units. (Remembering)
PPE302.2	Explain properties of Polymers in context to their structures. (Understanding)
PPE302.3	Relate the structure-properties with the application of the polymers to the service of mankind. (Understanding)
PPE302.4	Utilize the knowledge of polymer properties and select those for application in different domain area. (Applying)
PPE302.5	Analyze the structure-property relationship of the polymers and classify them application wise. (Analyzing)

CO-PO Mapping:

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12
PPE302.1	3	2	-	-	-	-	-	-	-	-	-	-
PPE302.2	3	2	-	-	-	-	-	-	-	-	-	-
PPE302.3	3	2	-	-	-	-	-	-	-	-	-	-
PPE302.4	-	-	2	-	-	1	-	-	-	-	-	-
PPE302.5	-	-	2	-	-	-	-	-	-	-	-	-
Average	**3**	**2**	**2**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping:

CO	PSO 1	PSO 2	PSO 3
PPE302.1	3	-	-
PPE302.2	3	2	-
PPE302.3	3	2	-
PPE302.4	3	2	-
PPE302.5	3	2	-
Average	**3**	**2**	-

Semester V: Course Name: Heat Transfer (PPE303/PPE323)

Course Outcome (CO)

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CO	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 propertiesof 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 different electronic, magnetic and optical properties and related concepts in materials.

CO-PO Mapping

CO	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**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	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 V: Course Name: Instrumental Analysis of Polymers (PPE304/PPE322)

Course Outcome (CO)

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CO	Statement
PPE304.1	Define different terminologies related to instrumental analysis of polymers. (Remembering)
PPE304.2	Explain the working principles of different instruments. (Understanding)
PPE304.3	Select appropriate instruments and methods for analysis of certain characteristics of polymers. (Applying)
PPE304.4	Analyze the characterization results for polymeric materials. (Analyzing)
PPE304.5	Determine different characteristic parameters from characterization results. (Evaluating)
PPE304.6	Predict the characteristics of polymeric materials from the correlation of different types of analysis. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE304.1	3	-	-	-	-	-	-	-	-	-	-	-
PPE304.2	3	-	-	-	1	-	-	-	-	-	-	-
PPE304.3	3	2	2	2	2	-	-	-	-	-	-	-
PPE304.4	3	2	-	3	-	-	-	-	-	-	-	-
PPE304.5	3	3	-	3	2	-	-	-	-	-	-	-
PPE304.6	3	3	1	3	-	-	-	-	-	-	-	-
Average	**3**	**3**	**2**	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE304.1	3	-	-
PPE304.2	3	-	-
PPE304.3	3	-	-
PPE304.4	3	-	-
PPE304.5	3	-	-
PPE304.6	3	-	-
Average	**3**	**-**	**-**

Semester V: Course Name: Polymer Additives and compounding (PPE305)

Course Outcome (CO)

CO	Statement

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PPE305.1	Define various additives used in polymers. (Remembering)
PPE305.2	Compare various additives used in polymers based on their category of performance.(Understanding)
PPE305.3	Identify the importance of additives in various sectors of application. (Applying)
PPE305.4	Analyze the change in properties and performance of plastics upon modification with the use of additives.(Analyzing)
PPE305.5	Evaluate the methods and machinery used for polymer compounding and testing. (Evaluating)
PPE305.6	Design a compounding plan for formulations based on the final product applications.(Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE305.1	1	-		-	-	-	-	-	-	-	-	-
PPE305.2	1	-		-	-	-	-	-	-	-	-	-
PPE305.3	2	-		-	-	-	-	-	-	-	-	-
PPE305.4	1	-		-	-	-	-	-	-	-	-	-
PPE305.5	1	-		-	1	-	-	-	-	-	-	-
PPE305.6		-	1	-	-	1	-	-	1	-	-	-
Average	**1.2**	**-**	**1**	**-**	**1**	**1**	**-**	**-**	**1**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE305.1	1	-	-
PPE305.2	1	-	-
PPE305.3	2	-	-
PPE305.4	1	-	-
PPE305.5	1	-	-
PPE305.6	1	-	-
Average	**1.2**	**-**	**-**

Semester V: Course Name: Elective-II (Paint Technology) (PPE341)

Course Outcome (CO)

CO	Statement
PPE341.1	Define paint, coating, binders, pigments, solvents and extenders used in coating. (Remembering)
PPE341.2	Classify the paints, surface preparation methods, pigments and solvents used in coatings.

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	(Understanding)
PPE341.3	Select appropriate components and processing to formulate the desired paint. (Analyzing)
PPE341.4	Analyze the paint and its film by rheological, mechanical, optical, chemical, thermal and morphological characterization. (Analyzing)
PPE341.5	Criticize the applicability of paint in different formulation. (Analyzing)
PPE341.6	Formulate the paint for advanced application.(Applying)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE341.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE341.2	2	2	-	-	-	-	-	-	-	-	-	-
PPE341.3	2	-	-	-	2	-	-	-	-	-	-	-
PPE341.4	2	2	-	2	-	-	-	-	-	-	-	-
PPE341.5	2	-	-	-	-	-	-	-	-	-	-	-
PPE341.6	2	2	-	-	-	-	-	-	-	-	-	-
Average	**2**	**2**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE341.1	1	-	-
PPE341.2	1	-	-
PPE341.3	1	-	-
PPE341.4	1	-	-
PPE341.5	1	-	-
PPE341.6	1	-	-
Average	**1**	**-**	**-**

Semester V: Course Name: Elective-II (Adhesive Technology) (PPE342)

Course Outcome (CO)

CO	Statement
PPE342.1	Define different terminologies related to adhesive technology. (Remembering)
PPE342.2	Explain different theories of adhesion. (Understanding)

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PPE342.3	Identify suitable method of surface preparation. (Applying)
PPE342.4	Analyze synthesis methods of different adhesives. (Analyzing)
PPE342.5	Evaluate different characteristics and performance of adhesives. (Evaluating)
PPE342.6	Predict suitable adhesives for particular substrate and applications. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE342.1	3	-	-	2	-	-	-	-	-	-	-	-
PPE342.2	3	-	-	2	-	-	-	-	-	-	-	-
PPE342.3	3	-	-	2	-	-	-	-	-	-	-	-
PPE342.4	3	-	-	3	-	-	-	-	-	-	-	-
PPE342.5	3	-	-	2	-	-	-	-	-	-	-	-
PPE342.6	3	-	-	-	-	-	-	-	-	-	-	-
Average	**3**	**-**	**-**	**1.8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE342.1	3	-	-
PPE342.2	3	-	-
PPE342.3	3	-	-
PPE342.4	3	-	-
PPE342.5	3	-	-
PPE342.6	3	-	-
Average	**3**	**-**	**-**

Semester V: Course Name: Lab I: Polymer Synthesis-II (PPE321)

Course Outcome (CO)

CO	Statement
PPE321.1	Describe the polymerization technique to synthesize various polymers subjecting to specific application.
PPE321.2	Explain the synthesis method for thermosetting in industry level & can set the parameter accordingly.

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PPE321.3	Interprete the processing behavior of thermosetting resins in order to select suitable process for production.
PPE321.4	Select suitable thermoset material based on its properties as per the requirements.
PPE321.5	Synthesize the thermosetting materials on lab scale along with following all lab safety measures.
PPE321.6	Analyze the properties of various thermoset polymers.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE321.1	3		-		-	-	-	-	-	-	-	-
PPE321.2	3		-		-	-	-	-	-	-	-	-
PPE321.3	3	2	-		-	-	-	-	-	-	-	-
PPE321.4	3	2	-		-	-	-	-	-	-	-	-
PPE321.5	3	2	-		-	-	-	-	-	-	-	-
PPE321.6	2		-	2	-	-	-	-	-	-	-	-
Average	**2.83**	**2.00**	**-**	**2.00**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE321.1	2	-	-
PPE321.2	2	-	-
PPE321.3	2	-	-
PPE321.4	2	-	-
PPE321.5	2	-	-
PPE321.6	2	-	-
Average	**2**	**-**	**-**

Semester VI: Course Name: Polymer Processing Technology (PPE351/PPE371)

Course Outcome (CO)

CO	Statement
PPE351.1	Define the basics of different polymer processing techniques. (Remembering)
PPE351.2	Explain the construction and working of polymer processing machines. (Understanding)
PPE351.3	Select the proper processing parameters to optimize the process. (Applying)

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PPE351.4	Identify and troubleshoot the processing problems so as to provide cost effective, clean and eco-friendly outputs. (Applying)
PPE371.5	Organize the operating parameters while working with processing equipments. (Applying)
PPE371.6	Experiment with the working of the processing machines to produce the polymeric products. (Applying)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE351.1	2	-	-	-	-	-	-	-	-	-	-	-
PPE351.2	2	-	-	-	-	-	-	-	-	-	-	-
PPE351.3	1	1	1	-	1	-	1	-	-	-	-	-
PPE351.4	1	1	-	-	-	-	1	-	-	-	-	-
PPE371.1	3	1	1	-	3	-	1	-	3	-	-	-
PPE371.6	3	-	-	-	3	-	-	-	3	-	-	-
Average	**2**	**1**	**1**	**-**	**2.33**	**-**	**1**	**-**	**3**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE351.1	2	-	-
PPE351.2	2	-	-
PPE351.3	1	-	-
PPE351.4	1	-	-
PPE351.5	3	-	-
PPE351.6	3	-	-
Average	**2**	**-**	**-**

Semester VI: Course Name: Elastomer Technology (PPE352/PPE372)

Course Outcome (CO)

CO	Statement
PPE352.1	Describe the structure, properties and applications of different types of elastomers and the roles of compounding ingredients. (Understanding)
PPE352.2	Summarize the chemical structure, molecular properties, physical/chemical properties, and areas of application of major types of elastomers. (Understanding)

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PPE352.3	Identify different approaches of vulcanization process and properties of vulcanisates. (Applying)
PPE352.4	Analyze different factors of compounding having influences on cure characteristics and vulcanizate properties. (Analyzing)
PPE352.5	Evaluate properties and performances of elastomers and compounding ingredients through different tests. (Evaluating)
PPE352.6	Formulate elastomeric compounding recipe with reference to its real life application. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE352.1	3	2	-	1	-	-	-	-	-	-	-	-
PPE352.2	2	3	-	-	-	-	-	-	-	-	-	-
PPE352.3	-	-	3	-	2	-	1	-	-	-	-	-
PPE352.4	-	2	-	3	-	-	-	-	-	-	-	-
PPE352.5	-	-	-	3	2	-	1	-	-	-	-	-
PPE352.6	-	-	2	3	-	-	-	-	1	1	-	-
Average	**2.5**	**2.3**	**2.5**	**1.75**	**2**	**-**	**1**	**-**	**1**	**1**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE352.1	3	-	-
PPE352.2	3	-	-
PPE352.3	3	-	-
PPE352.4	3	-	-
PPE352.5	3	-	-
PPE352.6	3	-	-
Average	**3**	**-**	**-**

Semester VI: Course Name: Mass Transfer (PPE353/PPE373)

Course Outcome (CO)

CO	Statement
PPE353.1	Define the fundamentals of mass transfer operation. (Remembering)
PPE353.2	Illustrate various mass transfer coefficient equations. (Understanding)
PPE353.3	Apply the concept of distillation operation to calculate number of theoretical stage. (Applying)
PPE353.4	Analyze the phenomenon of absorption and correlate the numerical. (Analyzing)

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PPE353.5	Measure the rate of drying operations practically. (Evaluating)
PPE353.6	Develop ternary diagram in liquid – liquid extraction. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE353.1	3	2	2	3	3	-	-	-	-	-	2	-
PPE353.2	3	-	3	3	2	-	-	-	-	-	-	-
PPE353.3	3	2	3	2	2	-	-	-	-	-	-	-
PPE353.4	2	1	-	-	-	-	-	-	-	-	2	2
PPE353.5	1	-	-	-	-	-	-	-	-	-	-	-
PPE353.6	-	1	-	-	-	2	-	-	-	-	-	-
Average	**2.4**	**1.5**	**2.66**	**2.66**	**2.33**	**2**	**-**	**-**	**-**	**-**	**2**	**2**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE353.1	-	-	2
PPE353.2	-	-	3
PPE353.3	-	-	3
PPE353.4	-	-	3
PPE353.5	-	-	2
PPE353.6	-	-	3
Average	**-**	**-**	**2.66**

Semester VI: Course Name: Polymeric Materials II (PPE354)

Course Outcome (CO)

CO	Statement
PPE354.1	Summarize the properties an applications of polymers. (Understanding)
PPE354.2	Identify the appropriate thermoplastic polymers for specific applications. (Applying)
PPE354.3	Compare the properties of various grades of thermoplastic polymers. (Analyzing)

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PPE354.4	Explain the effect of structural modifications on the properties of thermoplastic polymers. (Evaluating)
PPE354.5	Construct the relationship between structures and properties of thermoplastic polymers. (Creating)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE354.1	3	-	-	-	-	-	-	-	-	-	-	-
PPE354.2	3	-	-	-	-	-	-	-	-	-	-	-
PPE354.3	3	-	-	-	-	-	-	-	-	-	-	-
PPE354.4	3	2	2	-	-	-	-	-	-	-	-	-
PPE354.5	3	2	2	-	-	-	-	-	-	-	-	-
Average	**3**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE354.1	3	-	-
PPE354.2	3	-	-
PPE354.3	3	-	-
PPE354.4	3	-	-
PPE354.5	3	-	-
Average	**3**	**-**	**-**

Semester VI: Course Name: Design Lab – II (PPE374)

Course Outcome (CO)

CO	Statement
PPE374.1	Design 3D models for various plastics products. (Remembering)

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PPE374.2	Design the products by considering material properties. (Understanding)
PPE374.3	Design the various components of plastic products and also able to assemble it. (Applying)
PPE374.4	Design plastic product according to application. (Analyzing)
PPE374.5	Give guidelines for tooling and manufacturing. (Analyzing)
PPE374.6	Propose costing of product. (Analyzing)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE374.1	3	-	-	-			-	-	-	-	-	-
PPE374.2	3	2	-	-		2	-	-	-	-	-	-
PPE374.3	2	2	3	-	2		-	-	-	-	-	-
PPE374.4	2	1	3	-	1		-	-	-	-	-	-
PPE374.5	3	2	-	-			-	-	-	-	-	-
PPE374.6	2	2	-		3							
Average	**2.5**	**1.8**	**3**	**-**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE374.1	-	2	-
PPE374.2	-	2	-
PPE374.3	-	2	-
PPE374.4	-	2	-
PPE374.5	-	2	-
PPE374.6	-	2	
Average	**-**	**2**	**-**

Semester VI: Course Name: Design Lab – II Open Elective: I Introduction to Nanotechnology (PPE391)

Course Outcome (CO)

CO	Statement

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CO-PO-PSO Mapping of Third Year

PPE391.1	Define the terminologies in the field of nanotechnology. (Remembering)
PPE391.2	Classify different types and synthesis methods of nanomaterials. (Understanding)
PPE391.3	Identify the different properties of nanomaterials in terms of structure property relationship (Applying)
PPE391.4	Compare nanomaterials and nanocomposites with their conventional bulk materials and composites. (Analyzing)
PPE391.5	Explain the importance of various preparation techniques, properties and characteristics of nanomaterials and nanocomposites.. (Analyzing)
PPE391.6	Discuss the novel applications of nanomaterials and nanocomposites in various fields bv using different pathways.. (Analyzing)

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PPE391.1	2	-	-	-	-	1	1	-	-	-	-	-
PPE391.2	2	3	2	3	3	1	1	-	-	-	-	-
PPE391.3	3	1	-	3	3	1	1	-	-	-	-	-
PPE391.4	2	3	-	3	-	-	-	-	-	-	-	-
PPE391.5	3	2	2	3	1	1	1	-	-	-	-	-
PPE391.6	3	3	2	2	2	3	3	1	-	-	-	-
Average	**2.5**	**2.4**	**2**	**2.8**	**2.3**	**1.4**	**1.6**	**1**	**-**	**-**	**-**	**-**

CO-PSO Mapping

CO	PSO1	PSO2	PSO3
PPE391.1	3	-	-
PPE391.2	3	2	-
PPE391.3	3	2	-
PPE391.4	3	-	-
PPE391.5	3	-	2
PPE391.6	3	-	-
Average	**3**	**2**	**2**