

**SIES Graduate School of Technology, Nerul**  
**Department of Printing and Packaging Technology**  
**Course Outcomes R-2016 UoM Syllabus (Choice Based Credit Grading System)**

**Second Year Sem-III**

**Subject: Applied Mathematics – III**

- PPC301.1 Obtain and invert Laplace Transform using standard results and shifting theorem.
- PPC301.2 Determine eigen values & eigen vectors of a matrix and power or exponential of a matrix using them.
- PPC301.3 Formulate and analyze mathematical problems followed by drawing clear and reasonable conclusions.
- PPC301.4 Infer about a particular sample with high degree of reliability.
- PPC301.5 Formulate and analyze statistical problems followed by drawing clear and reasonable conclusions.
- PPC301.6 Apply fourier transform in engineering learning

**Subject: Packaging Introduction & Concepts**

- PPC302.1 Effectively observe and compare the different package forms
- PPC302.2 Describe the importance of compatibility studies and their associated parameters
- PPC302.3 Analyze the various hazards & environmental issues related to Packaging
- PPC302.4 Analyze the aesthetics of a package and the differentiating factors
- PPC302.5 Elaborate the importance of quality in packaging
- PPC302.6 Explain significance of packaging in terms of today's market

**Subject: Introduction to Printing Technology**

- PPC303.1 Distinguish various printing principles like planography, intaglio & relief.
- PPC303.2 Compare the process of image generation on the basis of typography, reprography & layout making.
- PPC303.3 Analyze the various Press configurations of Offset, Gravure, Flexography & Letterpress.
- PPC303.4 Classify Inks and Substrates used in various Printing technologies.

- PPC303.5 Recognize various materials used in printing operations and distinguish Print finishing operations
- PPC303.6 Choose an appropriate Printing process for any given Printing job.

**Subject: Glass, Metal and Textile Based Packaging Materials**

- PPC305.1 Describe & interpret the various manufacturing process for glass bottles, metal cans & tubes and textile based bags .
- PPC305.2 Explain various design aspects for various types of package forms made up of glass.
- PPC305.3 Explain various design aspects for various types of package forms made up of metal.
- PPC305.4 Summarize the aerosol technology and its wide application in packaging.
- PPC305.5 Discuss various quality control and testing procedures for these package forms.
- PPC305.6 Describe the basics of fabric & textile technology to produce bags of various materials like jute, hemp etc.

**Subject: Applied Mathematics III Tutorial**

- PPT301.1 Obtain and invert Laplace Transform using standard results and shifting theorem.
- PPT301.2 Determine eigen values & eigen vectors of a matrix and power or exponential of a matrix using them.
- PPT301.3 Formulate and analyze mathematical problems followed by drawing clear and reasonable conclusions.
- PPT301.4 Infer about a particular sample with high degree of reliability.
- PPT301.5 Formulate and analyze statistical problems followed by drawing clear and reasonable conclusions.
- PPT301.6 Apply fourier transform in engineering learning

**Subject: Principles of Graphic Arts and Design**

- PPL301.1 Create a design based on specific requirement.
- PPL301.2 Analyze the usage of particular colour & text in Package design.
- PPL301.3 Generate various design layouts with proper visual impacts.
- PPL301.4 Create a design for folding carton with appropriate software.
- PPL301.5 Edit an image and use it in a Package design.
- PPL301.6 Generate Logos for a given concept or product.

**Subject: Screen Printing Laboratory**

- PPL302.1 Prepare screen printing image carrier by direct, indirect photographic methods.
- PPL302.2 Demonstrate the use of different photographic films for mesh preparation according to image.
- PPL302.3 Produce different printed samples for various substrates like fabric, glass, acrylic, wood by selecting suitable inks & coatings for that material.
- PPL302.4 Produce & analyze a halftone dot image generated for four color printing and registration of color.
- PPL302.5 Analyze the common faults in Screen Printing Process
- PPL302.6 Printing of two color job in textile and paper materials

**Subject: Paper Based Material Testing**

- PPL303.1 Check grammage and thickness of paper & paperboard.
- PPL303.2 Find out burst factor of paper.
- PPL303.3 Perform stiffness test.
- PPL303.4 Perform Puncture resistance of CFB.
- PPL303.5 Identify flute types in CFB
- PPL303.6 Make paper carry bags as per the standard.

**Subject: Glass, Metal and Textile Based Packaging Materials Tutorials**

- PPL304.1 Use various testing standards
- PPL304.2 Calculate capacity & dimensions for containers
- PPL304.3 Analyze Thermal shock & chemical resistance for glass bottles
- PPL304.4 Perform & Analyze coating related tests for metals used for cans
- PPL304.5 Analyze corrosion tests for metals
- PPL304.6 Conduct tests for textile based materials

**SEM-IV****Subject: Plastics in Packaging**

- PPC401.1 Describe the various polymerization mechanisms and techniques.
- PPC401.2 Differentiate between thermoplastics & thermosets.
- PPC401.3 Effectively communicate the relation between effects of temperature and crystallinity of polymers.
- PPC401.4 Identify and categorize various plastics by chemical and instrumentation methods.

- PPC401.5 Choose a plastic material for a specific application based on their physical and chemical properties.
- PPC401.6 Describe the properties that are important from the point of view of plastic processing.

**Subject: Ancillary Packaging Materials**

- PPC402.1 Analyze various cushioning materials and describe their properties.
- PPC402.2 Analyze the types of adhesives and apply the concept of adhesion in the packaging.
- PPC402.3 Elaborate the functions of various closures and choose a closure for a specific application.
- PPC402.4 Choose the right label for a specific packaging application.
- PPC402.5 Analyze the types of straps & tapes and describe their application in different packages.
- PPC402.6 Describe the significance of codings and coatings in packaging.

**Subject: Colour Reproduction**

- PPC403.1 Summarize the Colour Vision theory and its concept.
- PPC403.2 Discuss & summarize the conventional and digital method of colour separation.
- PPC403.3 Examine images and modify them with colour correction.
- PPC403.4 Measure the densitometric terms and analyze graphically.
- PPC403.5 Summarize the spectrophotometric terms and perform relative measurements of various printed samples.
- PPC403.6 Recognize the input & output devices being used.

**Subject: Offset Printing**

- PPC404.1 Describe the various terminologies in offset printing process.
- PPC404.2 Operate offset machines and evaluate single colour sheet feed press.
- PPC404.3 Identify and rectify suitable solutions for errors associated with platemaking and pressroom.
- PPC404.4 Analyze troubles related with quality and can produce possible remedies to minimize print problems.
- PPC404.5 Identify the conversion technology of offset printed jobs
- PPC404.6 Plan & Layout the imposition of commercial jobs.

**Subject: Digital Electronics & Microcontrollers**

- PPC405.1 Describe any logical expression using basic gates.
- PPC405.2 To examine the structure of various number systems and its application in digital design
- PPC405.3 Discuss the combinational & sequential circuits like encoder, decode, flip-flop, registers & counters.
- PPC405.4 Identify features of various Microcontroller.
- PPC405.5 Write and execute assembly language programs.
- PPC405.6 Summarize the need and functioning

**Subject: Principles of Graphic Arts and Design-II**

- PPL401.1 Create a Package design based on specific requirement.
- PPL401.2 Create Ups using the editing software for given substrate dimension.
- PPL401.3 Generate various design layouts with proper visual impacts.
- PPL401.4 Create a design for folding carton with appropriate software.
- PPL401.5 Edit an image and use it in a Package design
- PPL401.6 CO6. Design a Website and Upload in Internet.

**Subject: Plastic Material Testing**

- PPL402.1 Identify plastic material by chemical and instrumentation method.
- PPL402.2 Perform simple tensile test on UTM.
- PPL402.3 Determine ESCR of a plastic sample.
- PPL402.4 Perform impact test using dart impact method.
- PPL402.5 Determine coefficient of friction of plastic films.
- PPL402.6 Analyzethermogram from a DSC.

**Subject: Colour Reproduction Laboratory**

- PPL403.1 Match any two given colours under prescribed light source
- PPL403.2 Measure density and compare with the standards.
- PPL403.3 Analyse the colour difference between any two given printed samples
- PPL403.4 Measure various vitals of Print quality such as Dot gain, Print contrast, Hue error & Grayness and Trapping
- PPL403.5 Comment on Print quality based on measured values
- PPL403.6 Suggest Corrections required to achieve better print quality

**Subject: Offset Printing\***

- PPL404.1 Analyse the problem of printed sample & troubleshoot it

- PPL404.2 Perform printing on single color offset printing machine
- PPL404.3 Evaluate the number of sheets required for printing a particular job.
- PPL404.4 Evaluate the inking & dampening system condition through testing.
- PPL404.5 Plan & provide a dummy pack for a particular product.
- PPL404.6 Evaluate the conversion technologies used for a commercial pack.

**Subject: Digital Electronics & Microcontrollers Laboratory**

- PPL 405.1 To demonstrate the knowledge of operation of logic gates.
- PPL 405.2 To apply Boolean theorems, DeMorgan's theorems and Karnaugh maps reduction method to simplify logic problems.
- PPL 405.3 Create the appropriate truth table from a description of a combinational logic functions.
- PPL 405.4 Demonstrate the knowledge of operation of basic types of flip-flops.
- PPL 405.5 To analyze and design digital combinational circuits including arithmetic circuits (half adder, full adder, half subtractor and full subtractor).
- PPL 405.6 Develop skill in simple program writing for 8051.

**Subject: Ancillary Packaging Material Testing**

- PPL406.1 Determine peel / bond strength of an adhesive.
- PPL406.2 Perform shear resistance test on tape/label.
- PPL406.3 Determine the grammage of all components in a label.
- PPL406.4 Determine tack of a self-adhesive tape or a label by Rolling Ball Tack Tester.
- PPL406.5 Determine opening and closing torque for closures.
- PPL406.6 Effectively perform strapping and taping of a CFB Box.

**SEM – V**

**Subject: Plastic Processing and Conversion Technologies**

- PPC501.1 Describe the fundamental concepts in plastic processing and conversion technology.
- PPC501.2 Analyse the various plastic materials and its application
- PPC501.3 Understand and use suitable conversion technique as per the end product
- PPC501.4 Produce plastic products by using various conversion techniques
- PPC501.5 Perform different testing methods for plastic product
- PPC501.6 Study different processing parameters required in industry

**Subject: Gravure Printing**

- PPC502.1 Describe the various components of gravure printing machine and its functions.
- PPC502.2 Explain various design aspects gravure cylinder and the process of engraving it.
- PPC502.3 Summarize the various operations performed while printing on Gravure machine
- PPC502.4 Discuss various inks and substrates used for gravure process with quality control measures
- PPC502.5 Describe various web handling and registration control for gravure printing
- PPC502.6 Calculate the different anatomy of gravure cylinder

**Subject: Theory of Machines and Design**

- PPC503.1 Analyse the stresses and strains in mechanical components, and understand, identify and quantify failure modes for mechanical parts.
- PPC503.2 Describe the basic machine elements used in machine design.
- PPC503.3 Design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.
- PPC503.4 Develop the approach to design the component under realistic conditions.
- PPC503.5 Design Machine element against static loading
- PPC503.6 Develop the ability to design the component under realistic conditions

**Subject: Instrumentation and Process Control**

- PPC 504.1 Knowledge of measuring devices and signal conditioning will help students to select the correct transducer as per the requirement.
- PPC 504.2 Students will be able to confidently design a PID controller using opamps or through MATLAB program.
- PPC 504.3 The understanding of applications of PLC's in latest printing machines and also packaging machines will be develop.
- PPC 504.4 Understand applications of PLC's in industries and printing and packaging machines.
- PPC 504.5 Explain PLC and SCADA systems and their use in process control.
- PPC 504.6 To Understand and formulate various applications like DAS and data logger

**Subject: Industrial Products Packaging**

- PPC 505.1 Effectively choose packaging materials based on characteristics of industrial products.
- PPC 505.2 Describe the various properties & defects of wood packaging material
- PPC 505.3 Analyse the various hazards & environmental issues related to Packaging and select a specific protection method for the product.
- PPC 505.4 Choose various bulk carriers for industrial packaging based on the type of product.
- PPC 505.5 Analyse various types of internal fitments for product protection and retainment.
- PPC 505.6 Explain the characteristics and applications of various wooden package forms.

**Subject: Plastic Processing and Conversion Technologies Laboratory**

- PPL 501.1 Describe the fundamental concepts in plastic processing and conversion technology.
- PPL 501.2 Analyse the various plastic materials and its application.
- PPL 501.3 Understand and use suitable conversion technique as per the end product.
- PPL 501.4 Produce plastic products by using various conversion techniques.
- PPL 501.5 Perform different testing methods for plastic product.
- PPL 501.6 Study different processing parameters required in industry.

**Subject: Package Design and Graphics – I**

- PPL502.1 Define basic design terminology,
- PPL502.2 Visualize and prepare detail drawing of a given object
- PPL502.3 Create a design based on specific requirement.
- PPL502.4 Design Plastic/Glass/Metal Containers.
- PPL502.5 Analyse various package designs.
- PPL502.6 Design & draw detail and assembly of different packages

**Subject: Theory of Machines and Design Laboratory**

- PPL503.1 Analyse the stresses and strains in mechanical components, and understand, identify and quantify failure modes for mechanical parts.
- PPL503.2 Describe the basic machine elements used in machine design.
- PPL503.3 Design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.
- PPL503.4 Develop the approach to design the component under realistic conditions.
- PPL503.5 Design Machine element against static loading

PPL503.6 Develop the ability to design the component under realistic conditions

**Subject: Instrumentation and Process Control Laboratory**

- PPL504.1 Knowledge of measuring devices and signal conditioning will help students to select the correct transducer as per the requirement.
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- PPL504.3 The understanding of applications of PLC's in latest printing machines and also packaging machines will be developed.
- PPL504.4 Understand applications of PLC's in industries and printing and packaging machines.
- PPL504.5 Explain PLC and SCADA systems and their use in process control.
- PPL504.6 To Understand and formulate various applications like DAS and data logger

**Subject: Business & Corporate Ethics**

- PPL505.1 Communicate effectively in both oral and written form and equip to demonstrate knowledge of professional and ethical responsibilities
- PPL505.2 Design a technical document using precise language, suitable vocabulary and apt style
- PPL505.3 Develop the life skills/ interpersonal skills to progress professionally by building stronger relationships
- PPL505.4 Demonstrate awareness of contemporary issues knowledge of professional and ethical Responsibilities
- PPL505.5 Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews and writing resume/SOP
- PPL505.6 Deliver formal presentations effectively implementing the verbal and non-verbal skills

**SEM – VI**

**Subject: Packaging Machineries and Systems**

- PPC601.1 Suggest the packaging material use and its conversion as per the product geometry.
- PPC601.2 Suggest the filling machine required for the line operations.
- PPC601.3 Choose the ancillary machineries required in the line operations based on the product to be packed.
- PPC601.4 Analyse the different conveying system used for various line operations.

- PPC601.5 Select different online and offline testing methods that are required during the converting operations or on the packaging lines.
- PPC601.6 Suggest Methods and Machine used for case packing.

**Subject: Food and Pharmaceutical Packaging**

- PPC602.1 Analyse and choose a barrier material for a specific food product based on barrier properties studied.
- PPC602.2 Analyse and choose a preservation method for a specific food product-based product sensitivity and shelf life required.
- PPC602.3 Describe the various characteristics of pharmaceutical drugs and their sensitivities.
- PPC602.4 Select the right type of package form for a pharma product, based on the product nature, form & size.
- PPC602.5 Determine the shelf life of given food and develop the technique to improve the same.
- PPC602.6 Develop a pharmaceutical package to increase the stability of the medicine during its storage.

**Subject: Flexographic Printing**

- PPC603.1 Develop ability to operate flexography machine.
- PPC603.2 Acquire skills to handle trouble shoot on flexography presses.
- PPC603.3 Identify press type & configuration.
- PPC603.4 Discuss the merits & demerits of press types & structural variants.
- PPC603.5 Analyse the ink & Substrate for any print job.
- PPC603.6 Describe the Quality control, Environmental & safety tools & regulations available.

**Subject: Colour Management**

- PPC604.1 Summarize importance of Colour management.
- PPC604.2 Select test charts for various devices to create profile based on the need.
- PPC604.3 Apply various rendering intents on images using image editing software.
- PPC604.4 Measure the quality of profile generated by software.
- PPC604.5 Summarize various colour management workflows.
- PPC604.6 Understand the current trends in Colour management industry.

**Subject: (Department Elective –I) Packaging Distribution Dynamics**

- PPDE6011.1 Analyse the hazards encountered in distribution and determine protection requirement

- PPDE6011.2 On the basis of principles of distribution dynamics estimate the vibration, shock encountered by a product in distribution
- PPDE6011.3 Calculate cushioning requirement for a product in distribution.
- PPDE6011.4 Perform tests to gauge package performance in distribution.
- PPDE6011.5 Analyse ways to reduce the effect of vibration, shock and handling of product during distribution.
- PPDE6011.6 Explain the method for developing the cushion curve and damage boundary curve.

**Subject: (Department Elective –I) Inks and Coatings**

- PPDE6012.1 Explain the formulation for different types of inks
- PPDE6012.2 Explain the ink components for different printing processes and materials
- PPDE6012.3 Test and analyse the properties of inks and coatings.
- PPDE6012.4 Suggest ink for a given process
- PPDE6012.5 Troubleshoot problems related to ink synthesis
- PPDE6012.6 Suggest suitable varnish for a given application.

**Subject: (Department Elective –I) Digital and security Printing**

- PPDE6013.1 Analyse & describe the Digital image anatomy for Pre-press environment.
- PPDE6013.2 Analyse & describe the concepts in digital printing with its Merits & De-merits.
- PPDE6013.3 Summarise the process involved in Digital work-flow & data handling.
- PPDE6013.4 Elaborate the importance of security printing with respect to use in everyday life.
- PPDE6013.5 Describe first line inspection of different documents & Creation of various security devices.
- PPDE6013.6 Discuss the significance of Brand protections and tools available.

**Subject (Department Elective –I) Print Finishing and Converting**

- PPDE6014.1 Analyse the print finished product.
- PPDE6014.2 Examine the Product for the entire process involved in manufacturing and finishing.
- PPDE6014.3 Discuss the print finishing requirements for verity of different segment jobs.
- PPDE6014.4 Analyse the layout and imposition of the job
- PPDE6014.5 Identify and rectify post finishing process problems
- PPDE6014.6 Discuss the various post finishing terminology

**Subject: Packaging Machineries & Systems Tutorials**

- PPT601.1 Suggest the packaging material use and its conversion as per the product geometry.
- PPT601.2 Suggest the filling machine required for the line operations.
- PPT601.3 Choose the ancillary machineries required in the line operations based on the product to be packed.
- PPT601.4 Analyse the different conveying system used for various line operations.
- PPT601.5 Select different online and offline testing methods that are required during the converting operations or on the packaging lines.
- PPT601.6 Suggest Methods and Machine used for case packing.

**Subject: Package Design & Graphics-II**

- PPL601.1 Understand the need and importance of CAD file in Packaging Design
- PPL601.2 Impact CAD of and Layout on costing and production
- PPL601.3 Using 3D as a QA tool to evaluate packaging design
- PPL601.4 Make a print ready graphic file (trapping, white/ varnish layers/barcodes / preflighting etc.,)
- PPL601.5 Understand the concepts of Digital sample making.
- PPL601.6 Understand various print and finishing processes and their effects on graphics.

**Subject: Flexographic Printing Laboratory**

- PPL602.1 Develop ability to operate flexography machine.
- PPL602.2 Acquire skills to handle trouble-shooting on flexography presses.
- PPL602.3 Identify press type & configuration
- PPL602.4 Discuss the merits & demerits of press types & structural variants.
- PPL602.5 Analyse the ink & substrate for any print job.
- PPL602.6 Describe the quality control, environmental & safety tools & regulations available.

**Subject: Colour Management Laboratory**

- PPL603.1 Summarize importance of Colour management.
- PPL603.2 Select test charts for various devices to create profile based on the need.
- PPL603.3 Apply various rendering intents on images using image editing software.
- PPL603.4 Measure the quality of profile generated by software.
- PPL603.5 Summarize various colour management workflows.
- PPL603.6 Understand the current trends in Colour management industry.

**Subject: (Department Elective –I Tutorial) Packaging Distribution Dynamics Tutorial**

- PPDET6011.1 Analyse the hazards encountered in distribution and determine protection requirement
- PPDET6011.2 On the basis of principles of distribution dynamics estimate the vibration, shock encountered by a product in distribution
- PPDET6011.3 Calculate cushioning requirement for a product in distribution.
- PPDET6011.4 Perform tests to gauge package performance in distribution.
- PPDET6011.5 Analyse ways to reduce the effect of vibration, shock and handling of product during distribution.
- PPDET6011.6 Explain the method for developing the cushion curve and damage boundary curve.

**Subject (Department Elective –I Tutorial) Inks and Coatings Tutorial**

- PPDET6012.1 Explain the formulation for different types of inks
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- PPDET6012.5 Troubleshoot problems related to ink synthesis
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**Subject: (Department Elective –I Tutorial) Digital and security Printing Tutorial**

- PPDET6013.1 Analyse & describe the Digital image anatomy for Pre-press environment.
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- PPDET6013.4 Elaborate the importance of security printing with respect to use in everyday life.
- PPDET6013.5 Describe first line inspection of different documents & Creation of various security devices.
- PPDET6013.6 Discuss the significance of Brand protections and tools available.

**Subject: (Department Elective –I Tutorial) Print Finishing and Converting Tutorial**

- PPDET6013.1 Analyse the print finished product.
- PPDET6013.2 Examine the Product for the entire process involved in manufacturing and finishing.
- PPDET6013.3 Discuss the print finishing requirements for variety of different segment jobs.
- PPDET6013.4 Analyse the layout and imposition of the job
- PPDET6013.5 Identify and rectify post finishing process problems
- PPDET6013.6 Discuss the various post finishing terminology

**Subject: Industrial Visits**

- PPS601.1 Analyse the print, packaged, converted & finished product
- PPS601.2 Examine the Product for the entire process involved in manufacturing, converting and finishing.
- PPS601.3 Understand operational workflows for various Industries.
- PPS601.4 Analyse Plant Layout, Inventory & Logistics provisions.
- PPS601.5 Understand the Organisational structure and Manpower requirements.
- PPS601.6 Discuss the Safety-Health-Environmental practices, Laws, Regulations & Certifications found in the Industry.

**SEM – VII**

**Subject: Laws, Regulations & Sustainability in Packaging**

- PPC701.1 Summarize the rules and regulations with respect to packaging in India and their impact in the domestic market
- PPC701.2 Identify and compare the international laws with relation to packaging
- PPC701.3 Describe the need & scope of sustainability in a process, product/package or equipment
- PPC701.4 Describe & analyze the metrics & LCA for packaging sustainability
- PPC701.5 State and explain the various waste management systems
- PPC701.6 Describe the need of biopolymers & biobased polymers in sustainable economy

**Subject: Packaging Distribution & Logistics**

- PPC702.1 Justify the necessity of ULD for variety of Logistics environment
- PPC702.2 Analyse the requirement and suggest an appropriate Unit Load Devices.
- PPC702.3 Summarise the activities in Logistics and SCM.
- PPC702.4 Analyse the requirement and suggest suitable Material handling and Inventory systems.
- PPC702.5 Analyse the requirement and suggest suitable Transportation & Warehousing methods

PPC702.6 Describe the role of retailing in packaging industry.

**Subject: Financial & Marketing Management**

- PPC703.1 Explain the Indian finance system and its components.
- PPC703.2 Describe the concept of Time Value of Money, Corporate Finance and Sources of Funds
- PPC703.3 Elaborate on Financial Statements, Ratios, Capital Budgeting & Working Capital Management.
- PPC703.4 Perform investment appraisal using a capital budgeting technique
- PPC703.5 Explain the basics concepts of marketing management
- PPC703.6 Describe various types of marketing strategies with examples.

**Subject: Total Quality Management**

- PPC704.1 Enlist various principles of TQM
- PPC704.2 Implement various philosophies of TQM
- PPC704.3 Use statistical approach for quality control
- PPC704.4 List and explain various TQM Tools
- PPC704.5 Explain importance of ISO and quality systems
- PPC704.6 Implement quality tools for continuous improvement

**Subject: Project Management & Entrepreneurship**

- PPC705.1 Describe the fundamental concepts in Project management
- PPC705.2 Analyze the various scheduling and planning techniques
- PPC705.3 Understand and apply suitable strategy for any specific project
- PPC705.4 Apply project management principles in business situations to optimize resource utilization and time.
- PPC705.5 Analyze and manage risks involved in Project.
- PPC705.6 Demonstrate skills needed to run a successful business

**Subject: Department Elective – II Advanced Food Packaging**

- PPDE7011.1 Choose a packaging material with suitable permeability value as required
- PPDE7011.2 Describe & perform the migration analysis for packaging materials
- PPDE7011.3 Evaluate the shelf life of packaged food product
- PPDE7011.4 Describe the filling system & suggest a suitable one on the basis of product need
- PPDE7011.5 Apply concepts of microbial inactivation for retort & aseptic packaging
- PPDE7011.6 Develop an active and intelligent package for perishable food

**Subject: Department Elective – II Advanced Industrial Products Packaging**

- PPDE7012.1 Describe characteristics of industrial packaging materials & explain the corrosion prevention techniques
- PPDE7012.2 Estimate desiccant requirements for an industrial package.
- PPDE7012.3 Describe the various wooden packaging forms & reinforcement methods.
- PPDE7012.4 Compute the cube utilization for a given industrial packaging system.
- PPDE7012.5 Choose various bulk carriers for industrial packaging based on the type of product.
- PPDE7012.6 Explain the packaging considerations for various industrial products with examples.

**Subject: Department Elective – II Labelling Technology**

- PPDE7013.1 Explain and compare the different types of labels, their features and manufacturing process.
- PPDE7013.2 Explain the process of printing, finishing of labels
- PPDE7013.3 Select the types of labels and materials used on the different packages.
- PPDE7013.4 Explain the process of label application on the package
- PPDE7013.5 Design the labels of all types along with the compensations
- PPDE7013.6 Describe the new trends in the labelling industry.

**Subject: Packaging Distribution & Logistics Laboratory**

- PPL701.1 Identify the Pallet structure and its utility aspects
- PPL701.2 Explain the requisites of testing procedures, machinery and safety aspects
- PPL701.3 Perform the destructive testing of pallet infer the findings
- PPL701.4 Perform the destructive testing of empty CFB boxes and infer the findings
- PPL701.5 Perform the destructive tests on Product-Package system and infer the findings.
- PPL701.6 Understand the significance of Package testing for its transport and handling worthiness

**Subject: Department Elective – II Laboratory Advanced Food Packaging Laboratory**

- PPDEL7011.1 Choose a packaging material with suitable permeability value as required
- PPDEL7011.2 Describe & perform the migration analysis for packaging materials
- PPDEL7011.3 Evaluate the shelf life of packaged food product
- PPDEL7011.4 Describe the filling system & suggest a suitable one on the basis of product need
- PPDEL7011.5 Apply concepts of microbial inactivation for retort & aseptic packaging
- PPDEL7011.6 Develop an active and intelligent package for perishable food

**Subject: Department Elective – II Laboratory Advanced Industrial Products Packaging Laboratory**

- PPDEL7012.1 Estimate cushioning requirements
- PPDEL7012.2 Compute package design based on the type of industrial product
- PPDEL7012.3 Design wooden packages based on specifications & Indian standard
- PPDEL7012.4 Design internal fitments for industrial products

- PPDEL7012.5 Design CFB / folding cartons for industrial products
- PPDEL7012.6 Estimate cube utilization for industrial packages.

**Subject: Department Elective – II Laboratory Labelling Technology Laboratory**

- PPDEL7013.1 Explain different types of labels, their features and manufacturing process.
- PPDEL7013.2 Describe the process of printing, finishing and applying labels on the packs.
- PPDEL7013.3 Explain the types of labels and materials used on the different packages
- PPDEL7013.4 Select a suitable label for different type of packages
- PPDEL7013.5 Design the labels of all types along with the compensations.
- PPDEL7013.6 Find the new trends in the labelling industry

**Subject: Printing & Packaging Costing Tutorial**

- PPT701.1 Explain the concepts of Direct vs Indirect & Fixed vs Variable costs
- PPT701.2 Describe the elements of costing in printing & packaging jobs with examples
- PPT701.3 Estimate costing for a corrugated fibre board box / folding carton.
- PPT701.4 Estimate costing for a printing job.
- PPT701.5 Estimate costing for a multilayer plastic laminate material.
- PPT701.6 Estimate costing for a wooden package.

**Subject: Mini-Project**

- PPP701.1 Perform literature survey and identify the problem.
- PPP701.2 Apply basic engineering fundamental in the domain of practical applications.
- PPP701.3 Cultivate the habit of working in a team
- PPP701.4 Attempt a problem solution in a right approach.
- PPP701.5 Prepare report as per the standard guidelines.
- PPP701.6 Demonstrate knowledge and understand engineering & management principles

**Subject: Product Life Cycle Management**

- ILO7011.1 Gain knowledge about phases of PLM, PLM strategies and methodology for PLM feasibility study and PDM implementation
- ILO7011.2 Illustrate various approaches and techniques for designing and developing products.
- ILO7011.3 Apply product engineering guidelines / thumb rules in designing products for moulding, machining, sheet metal working etc
- ILO7011.4 Acquire knowledge in applying virtual product development tools for components, machining and manufacturing plant
- ILO7011.5 Apply environmental aspects in product design
- ILO7011.6 Illustrate various approaches and techniques in Life Cycle cost Assessment and Analysis.

**Subject: Reliability Engineering**

- ILO7012.1 Understand and apply the concept of Probability to engineering problems
- ILO7012.2 Apply various reliability concepts to calculate different reliability parameters
- ILO7012.3 Estimate the system reliability of simple and complex systems
- ILO7012.4 Carry out a Failure Mode Effect and Criticality Analysis

**Subject: Management Information System**

- ILO7013.1 The course is blend of Management and Technical field.
- ILO7013.2 Discuss the roles played by information technology in today's business and define various technology architectures on which information systems are built
- ILO7013.3 Define and analyze typical functional information systems and identify how they meet the needs of the firm to deliver efficiency and competitive advantage
- ILO7013.4 Identify the basic steps in systems development

**Subject: Design of Experiments**

- ILO7014.1 To understand the issues and principles of Design of Experiments (DOE)
- ILO7014.2 To list the guidelines for designing experiments
- ILO7014.3 To become familiar with methodologies that can be used in conjunction with experimental designs for robustness and optimization

**Subject: Operations Research**

- ILO7015.1 Apply the techniques used in operations research to formulate a real-world problem and solve it using various problem solving approaches.
- ILO7015.2 Develop an integrated framework for strategic thinking and problem solving.
- ILO7015.3 Identify the situations and appropriate equations and mathematical tools needed to solve optimization problems.
- ILO7015.4 Identify the characteristics of different situations and apply the appropriate decision making tools to be used in each type.
- ILO7015.5 Gain the ability to recognize situations in a manufacturing environment that suggests the use of certain quantitative methods to assist in optimizing the solution.
- ILO7015.6 Plan of national importance structures based upon the previous history.

**Subject: Cyber Security and Laws**

- ILO7016.1 Understand the concept of cybercrime and its effect on outside world.
- ILO7016.2 Understand different cyber offences and cyber-crime on different environment.
- ILO7016.3 Analyze various tools used in performing cybercrime.
- ILO7016.4 Understand the legal requirement of cyberspace.
- ILO7016.5 Distinguish different aspects of cyber law.
- ILO7016.6 Identify the need for different Information Security Standards compliance during software design and development.

**Subject: Disaster Management and Mitigation Measures**

- ILO7017.1 To understand physics and various types of disaster occurring around the world
- ILO7017.2 To identify extent and damaging capacity of a disaster
- ILO7017.3 To study and understand the means of losses and methods to overcome /minimize it.
- ILO7017.4 To understand role of individual and various organization during and after disaster
- ILO7017.5 To understand application of GIS in the field of disaster management
- ILO7017.6 To understand the emergency government response structures before, during and after disaster

**Subject: Energy Audit and Management**

- ILO7018.1 To understand the importance energy security for sustainable development and the fundamentals of energy conservation.
- ILO7018.2 To introduce performance evaluation criteria of various electrical and thermal installations to facilitate the energy management
- ILO7018.3 To relate the data collected during performance evaluation of systems for identification of energy saving opportunities.

**Subject: Development Engineering**

- ILO7019.1 To familiarise the characteristics of rural Society and the Scope, Nature and Constraints of rural Development
- ILO7019.2 To provide an exposure to implications of 73rdCAA on Planning, Development and Governance of Rural Areas
- ILO7019.3 An exploration of human values, which go into making a 'good' human being, a 'good' professional, a 'good' society and a 'good life' in the context of work life and the personal life of modern Indian professionals
- ILO7019.4 To familiarise the Nature and Type of Human Values relevant to Planning Institutions

## SEM - VIII

### **Subject: Industrial Training & Project**

- PPC801.1 Exhibit the corporate culture/ethics in their work-space/career.
- PPC801.2 Identify the size and scale of operations in Industry.
- PPC801.3 Accomplish allotted tasks within deadlines.
- PPC801.4 Demonstrate an understanding of various constraints in industry.
  
- PPC801.5 Learn problem solving techniques and also work as a team.
- PPC801.6 Apply the knowledge learnt in their own career.