

SIES Graduate School of Technology, Nerul
Department of Printing and Packaging Technology
Course Outcomes R-2012 UoM Syllabus (Choice Based Grading System)

Second Year Sem-III

Subject: Applied Mathematics III

- PPC301.1 Obtain the Laplace Transform and inverse Laplace Transform using standard results and properties.
- PPC301.2 Apply the concept of eigen values and eigen vectors to engineering problems.
- PPC301.3 Expand the periodic functions using Fourier series and complex form of Fourier series, understand the concept of half range sine and cosine series.
- PPC301.4 Perform calculation with operators gradient, divergence and curl.
- PPC301.5 Use binomial poisson and normal distribution to solve statistical problems.
- PPC301.6 To analyse the problem by using large and small sampling theory.

Subject: Principles of Packaging Technology

- 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 Predict the application packaging technology as a whole.
- PPC302.5 Analyze the various hazards & environmental issues related to 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 & layouting.
- PPC303.3 Distinguish the various press configurations of offset, gravure, flexo & letterpress.

PPC303.4 Recognize various materials used in printing operations and distinguish print finishing operations

PPC303.5 Explain various types of ink available for printing and their properties.

PPC303.6 Select an appropriate printing technology for any given printing job.

Subject: Paperbased Packaging Materials

PPC304.1 Explain the raw materials and operations involved in pulping and paper making process

PPC304.2 Identify and describe the manufacturing process for different types of paper based packages.

PPC304.3 Design and estimate material requirements for major forms of paper based packaging.

PPC304.4 Test and analyze the major properties of paper based packaging materials.

PPC304.5 Explain various design aspects for various types of package forms made up of paper

PPC304.6 Explain various quality control & testing procedures for paper package

Subject: Principles of Graphic Arts and Design

PPC305.1 Create a design based on specific requirement.

PPC305.2 Analyze and demonstrate the use of particular colour & text appropriately in the designs.

PPC305.3 Generate various design layouts with proper visual impacts.

PPC305.4 Create a design with different softwares used for designing purpose.

PPC305.5 Identify the tools involved in recreating a design

PPC305.6 Examine the process involved in designing a job

Subject: Material Science and Technology

PPC306.1 Point out effectively various materials and their feasible applications involved in packaging & printing technology.

PPC306.2 Explain the materials on the basis of their chemistry.

PPC306.3 Identify and examine various significant properties required for a specific material for a particular application.

- PPC306.4 Explain electrical, magnetic and chemical properties of materials used in Printing and packaging industry.
- PPC306.5 Analyse any given material through advanced technologies like SEM
- PPC306.6 Discuss the role of smart and nano materials in Packaging and printing industry.

Subject: Screen Printing Laboratory

- PPL301.1 Prepare screen printing image carrier by direct, indirect photographic methods.
- PPL301.2 Demonstrate the use of different photographic films for mesh preparation according to image.
- PPL301.3 Produce different printed samples for various substrates like fabric, glass, acrylic, wood by selecting suitable inks & coatings for that material.
- PPL301.4 Produce & analyze a halftone dot image generated for four color printing and registration of color.
- PPL301.5 Familiarize with equipment and chemicals used for screen printing
- PPL301.6 Printing of two color job on textile and paper materials

Semester 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
- PPC401.6 Describe the properties that are important from the point of view of plastic processing.

Subject: Glass, Metal and Textile Based Packaging

- PPC402.1 Describe & interpret the various manufacturing process for glass bottles, metal cans & tubes and textile based bags.
- PPC402.2 Explain various design aspects for various types of package forms made up of glass & metal.
- PPC402.3 Summarize the aerosol technology and its wide application in packaging.
- PPC402.4 Discuss various quality control and testing procedures for these package forms
- PPC402.5 Describe the basics of fabric & textile tech. to produce bags of various materials.
- PPC402.6 Analyse the packages made of Glass, metal & textiles for operations involved.

Subject: Digital Imaging & Colour Management

- PPC403.1 Discuss & summarize the conventional and digital method of colour separation.
- PPC403.2 Examine images and modify them with colour correction.
- PPC403.3 Measure the densitometric terms and analyze graphically for printed samples.
- PPC403.4 Summarize the spectrophotometric terms and perform relative measurements of various printed samples.
- PPC403.5 Recognize the input & output devices being used.
- PPC403.6 Analyze input & output devices, create profiles and demonstrate their results.

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 Analyze the costing of commercial printing jobs
- PPC404.6 Examine the process involve in manufacturing and finishing the products

Subject: Digital Electronics and Microprocessor

- PPC405.1 Describe any logical expression using basic gates
- PPC405.2 Discuss the combinational & sequential circuits like encoder, decode.
- PPC405.3 Discuss the sequential circuits like flip-flop, registers & counters.
- PPC405.4 Summarize the need and functioning of microprocessor in various machines of packaging and printing technology.
- PPC405.5 Describe 8086 architecture and programming.
- PPC405.6 Analyse possible applications of microprocessors in various machines of packaging and printing technology.

Semester V

SUB: 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

SUB: 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 Summarise 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

SUB: Ancillary Packaging Materials

- PPC503.1 Perform the main testing procedures and understand the requirements for testing ancillary packaging materials.
- PPC503.2 Choose and design packaging solutions with respect to the right ancillary material for the target product/package.
- PPC503.3 Elaborate the properties and functions of various ancillary materials.
- PPC503.4 Choose the right label for a specific packaging application.
- PPC503.5 Analyse the types of straps & tapes and describe their application in different packages.
- PPC503.6 Describe the significance of coding and coatings in packaging.

SUB: Theory of Machines and Designs

- PPC504.1 Analyse the stresses and strains in mechanical components, and understand, identify and quantify failure modes for mechanical parts
- PPC504.2 Describe the basic machine elements used in machine design.
- PPC504.3 Design machine elements to withstand the loads and deformations for a given application, while considering additional specifications.
- PPC504.4 Develop the approach to design the component under realistic conditions.
- PPC504.5 Design Machine element against static loading
- PPC504.6 Develop the ability to design the component under realistic conditions.

SUB: Instrumentation and Process Control

- PPC505.1 Knowledge of measuring devices and signal conditioning will help students to select the correct transducer as per the requirement.
- PPC505.2 Students will be able to confidently design a PID controller using opamps or through MATLAB program.
- PPC505.3 The understanding of applications of PLC's in latest printing machines and also packaging machines will be developed.
- PPC505.4 Understanding applications of PLC's in industries and printing and packaging machines
- PPC505.5 Explain PLC and SCADA systems and their use in process control
- PPC505.6 To Understand and formulate various applications like DAS and data logger

SUB: Communication and Corporate Skills

- PPS501.1 Write a technical report in specific format.
- PPS501.2 Write a technical proposal in specific format.
- PPS501.3 Use interpersonal skills effectively and enhance communication.
- PPS501.4 Prepare the Notice, Agenda and Minutes of a formal meeting.
- PPS501.5 Understand the importance of ethics and apply it for their career advancement.
- PPS501.6 Understand employment skills and prepare a resume along with the skills required to face an interview

Semester VI

SUB: 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

SUB: 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

SUB: Industrial Products Packaging

- PPC603.1 Effectively choose packaging materials based on characteristics of industrial products
- PPC603.2 Describe the various properties & defects of wood packaging material
- PPC603.3 Analyze the various hazards & environmental issues related to Packaging and select a specific protection method for the product
- PPC603.4 Choose various bulk carriers for industrial packaging based on the type of product
- PPC603.5 Analyse various types of internal fitments for product protection and retainment
- PPC603.6 Explain the characteristics and applications of various wooden package forms

SUB: Flexographic Printing

- PPC604.1 Learners develop ability to operate flexography machine
- PPC604.2 Learners acquire skills to handle trouble shoot on flexography presses
- PPC604.3 Learners will be able to identify press type & configuration
- PPC604.4 Learners will be able to discuss the merits & demerits of press types & structural variants
- PPC604.5 Learner will be able to Analyse the ink & Substrate for any print job
- PPC604.6 Learners will describe the Quality control, Environmental & safety tools & regulations available

SUB: Packaging Distribution Dynamics (Elective I)

- PPE601.1 Analyse the hazards encountered in distribution and determine protection requirement

- PPE601.2 On the basis of principles of distribution dynamics estimate the vibration, shock encountered by a product in distribution
- PPE601.3 Calculate cushioning requirement for a product in distribution
- PPE601.4 Perform tests to gauge package performance in distribution
- PPE601.5 Analyse ways to reduce the effect of vibration, shock and handling of product during distribution
- PPE601.6 Explain the method for developing the cushion curve and damage boundary curve

SUB: Inks and Coatings (Elective I)

- PPE602.1 Explain the formulation for different types of inks
- PPE602.2 Explain the ink components for different printing processes and materials
- PPE602.3 Test and analyze the properties of inks and coatings
- PPE602.4 Suggest ink for a given process
- PPE602.5 Troubleshoot problems related to ink synthesis
- PPE602.6 Suggest suitable varnish for a given application

SUB: Digital & Security Printing (Elective I)

- PPE603.1 Analyse & describe the Digital image anatomy for Pre-press environment
- PPE603.2 Analyse & describe the concepts in digital printing with its Merits & De-merits
- PPE603.3 Summarise the process involved in Digital work-flow & data handling
- PPE603.4 Elaborate the importance of security printing with respect to use in everyday life
- PPE603.5 Describe first line inspection of different documents & Creation of various security devices
- PPE603.6 Discuss the significance of Brand protections and tools available

SUB: Print Finishing and Converting (Elective I)

- PPE604.1 Analyze the print finished product
- PPE604.2 Examine the Product for the entire process involved in manufacturing and finishing
- PPE604.3 Discuss the print finishing requirements for variety of different segment jobs
- PPE604.4 Analyze the layout and imposition of the job
- PPE604.5 Identify and rectify post finishing process problems
- PPE604.6 Discuss the various post finishing terminology

SUB: Package Design and Graphics

- PPL601.1 Define basic design terminology,
- PPL601.2 Identify and apply the available design tools using various CAD softwares
- PPL601.3 Identify and apply the available design tools using various CAD softwares
- PPL601.4 Create Graphics Design for folding cartons/Plastic containers
- PPL601.5 Analyze various package design
- PPL601.6 Design an artwork/graphics for a label

SUB: Industrial Visit

- PPS601.1 Analyze 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

Semester VII

Subject : Sustainable Packaging

- PPC701.1 Describe the need & scope of sustainability in a process, product/package or equipment.
- PPC701.2 Describe & analyze the metrics & LCA for packaging sustainability.
- PPC701.3 State explain the various waste management systems.
- PPC701.4 Describe the need of biopolymers & biobased polymers in sustainable economy.
- PPC701.5 Identify various materials preferred to be sustainable.
- PPC701.6 Describe the need of Bio-Polymers and bio-based polymers in sustainable economy

Subject : Packaging Laws & Regulations

- PPC702.1 Summarize the rules and regulations with respect to packaging in India and their impact in the domestic market.
- PPC702.2 Identify and compare the international laws with relation to packaging.
- PPC702.3 Examine the labels and identify the regulation involve in it.
- PPC702.4 Discuss the regulatory act requirement for verity of different segment commodities.
- PPC702.5 Identify and rectify process involove in regulatory act.
- PPC702.6 Discuss the various indian reguatory act required for food/pharma labels.

Subject: Packaging Distribution & Logistics

- PPC703.1 Analyse the usage Unit Load Devices for their & application ofwrt Product-Package nature.
- PPC703.2 Discuss the Palletisation, containerisation & their varients.
- PPC703.3 Discuss & compare the Supply chain Management and Logistcs element.
- PPC703.4 Describe the Logistics elements like Inventry, Transportation modes, Warehousing & Material Handling.
- PPC703.5 To explain and perform transport worthiness tests for a given package.
- PPC703.6 Describe the role of retailing in packaging industry.

Subject: Total Quality Management & Economics

- PPC704.1 List and explain various TQM Tools
- PPC704.2 Describe & compare various theories on Total Quality
- PPC704.3 Implement quality tools for continuous improvement
- PPC704.4 Analyze the concept of House of Quality
- PPC704.5 Identify the scope of Six Sigma, ISO and Quality systems in industrial scenario

PPC704.6 Estimate the cost for various packaging & printing materials, processes and equipments

Subject: Project Management and Entrepreneurship

PPC705.1 Identify the problem and select the project.

PPC705.2 Plan the project using different tools.

PPC705.3 Define Budget and estimate the cost of project.

PPC705.4 Identify the risks involved and assess uncertainty and risk management.

PPC705.5 Explain the components of the product business and pre-feasibility studies for the entrepreneurship development.

PPC705.6 Apply the entrepreneurship skills for product launching and incubation.

Elective II- Advanced Food Packaging

PPE701.1 Choose a packaging material with suitable permeability value as required.

PPE701.2 Describe & perform the migration analysis for packaging materials.

PPE701.3 Evaluate the shelf life of packaged food product.

PPE701.4 Describe the filling system & suggest a suitable one on the basis of product need.

PPE701.5 Apply concepts of microbial inactivation for retort & aseptic packaging

PPE701.6 Develop an active and intelligent package for perishable food

Elective II- Advanced Industrial Product Packaging

PPE702.1 Effectively choose packaging materials based on characteristics of industrial products.

PPE702.2 Describe the various properties & defects of wood packaging material

PPE702.3 Analyse the various hazards & environmental issues related to Packaging and select a specific protection method for the product.

PPE702.4 Choose various bulk carriers for industrial packaging based on the type of product.

PPE702.5 Design various internal fitments and wooden packages based on a given industrial product requirement.

PPE702.6 Optimize the utilization of packages and selection of materials to effectively save cost.

Elective II- Labelling Technology

PPE703.1 Define and identify different types of labels and their apt applications.

PPE703.2 Explain and Compare the different types of labels, their features and manufacturing process.

PPE703.3 Explain the process of printing, finishing and applying labels on the packs.

PPE703.4 Select a type of label and material based on the package type.

PPE703.5 Design the labels of all types along with the compensations.

PPE703.6 Describe the new trends in the labelling industry.

Subject: Seminar

- PPS701.1 To examine package forms, materials, print, graphics, labels, etc. and develop in them a “why” curiosity
- PPS701.2 To delve in a specific area of Packaging & Printing and learn the science & technology behind that process/product in detail.
- PPS701.3 To design questionnaires, collect data, perform analysis and prepare a report.
- PPS701.4 To write a review paper based on available white papers or research papers.
- PPS701.5 To present the data collected, analysed and concluded in cogent manner.
- PPS701.6 To apply/ experiment the theoretical inputs in practical arena.

Semester VIII**Subject: Professional Internship**

- PPI801.1 Exhibit the corporate culture/ethics in their work space/career.
- PPI801.2 Accomplish allotted tasks within deadlines
- PPI801.3 Learn problem solving techniques and also work as a team.
- PPI801.4 Apply the knowledge learnt in their career.
- PPI801.5 Analyse and identify his or her area of interest, will establish association with the same.
- PPI801.6 Make systematic documentation or report writing of work done.

Subject: Industry Project

- PPP801.1 To get acquainted with the process of undertaking literature survey
- PPP801.2 To get acquainted with identifying a problem
- PPP801.3 To get familiarized the process of problem solving in a group
- PPP801.4 To get acquainted with the process of applying basic engineering fundamental in the domain of practical applications
- PPP801.5 To inculcate the process of research
- PPP801.6 To Correlate the theoretical and experimental results and draw the proper interference