

INDUSTRIAL/FIELD VISITS : Minimum 18-20 visits

Semester Examination – II to be completed by 15th June.

15th June – 30 th June semester break.

1st July to 31st July PROJECT WORK

SYLLABUS**Post Graduate Diploma in Packaging: Teaching and Examination Scheme - Semester III**

Sr. No.	Subject	No. of Lectures	No. of Papers	Examination Duration	Marks
1	Production Management	36	1	3 hrs.	100
2	Financial Management	27	1	2 1/2 hrs.	75
3	Principles of Entrepreneurship	18	1	2 hrs.	50
4	Marketing Management	18	1	2 hrs.	50
5	Materials Management	9	1	1 hr.	25
6	Product Packaging (Food / Pharmaceuticals / Cosmetics , Chemicals etc.)	36	1	3 hrs.	100
7	Packaging Machinery	36	1	3 hrs.	100 *
8	Packaging Laws and Regulation	18	1	2 hrs.	50
9	Tooling and Design of Moulds for Packaging	27	1	2 1/2 hrs.	75
10	Introduction to Packaging Design Concepts	9	1	2 hrs.	25
11	Application of Computers in Packaging Design	18**	1	2 hrs.	50
12	Communication Skills	18	-	-	-
13	Practicals (Packaging Technology)	54	1	3 hrs.	50
	T O T A L :	405			750

* Portion of the marks (25 marks) will be assigned for project.

** For practical exercises, additional 18 hrs.

DETAILED THEORY SYLLABUS - SEMESTER – III

PRODUCTION MANAGEMENT

Chapter no 1 Introduction

- 1.1 Definition of products, production, production cycle, production Management
- 1.2 Functions of production planning & control
- 1.3 Production systems
- 1.4 Capacity planning
- 1.5 Product design & development

Chapter no 2 Productivity

- 2.1 Definition, Importance
- 2.2 Benefits of increased productivity
- 2.3 Productivity improvement techniques

Chapter no 3 Plant location, Plant lay out, Materiel handling, Maintenance and Industrial safety

Chapter no 4 Inspection & Quality Control

- 4.1 Inspection – Definition, function, types, sampling etc
- 4.2 Quality Control – Definition, functions, factors affecting the quality & quality cost
- 4.3 Quality System – Quality Circle, Quality Assurance, Quality Audit, Zero Defect, TQM, ISO – 9000 QS

Chapter no 5 Work Study

- 5.1 Method study, Advantages, Steps involved
- 5.2 Work Measurement – Advantages ,Steps involved, Allowances, Standard time.

Chapter no 6 Planning & Scheduling Techniques (Operation Research)

- 6.1 Introduction, Scope, Application
- 6.2 Methods – Linear Programming, Assignment Model, Transportation Model, Sequencing, Gantt Chart, PERT- CPM

Reference Books

FINANCIAL MANAGEMENT

Chapter 1: Introduction to Financial Accounts

- 1.1 Meaning & Scope of Accounting
- 1.2 Accounting Principles, Accounting Transactions, Journal, Ledger, Subsidiary Books, Cash/Bank Book, Trial Balance & Final Accounts of Sole Proprietor/Company Final Accounts, Accounting for Packages and containers.

Chapter 2 Introduction to Cost Accounts

- 2.1 Introduction to costing
- 2.2 Concepts of costing – Classification and Elements of costing
- 2.3 Elements of cost – Materials, labour, Overheads (Direct/Indirect)

Chapter 3 Marginal cost & marginal costing

- 3.1 Total cost- segregation of total cost into variable, Fixed and semi fixed cost, marginal cost
- 3.2 Break even point, P/V chart, break even charts/variants/validity, marginal cost statements and accounting, decision making, cost reduction tools and techniques

Chapter 4 Types of costing – job/contract /unit/operating

Chapter 5 Cost control & Planning

Cost control, standard costing, budgetary control, zero based budget, types of variance, variance analysis, wage, material and overhead variances, causes of variances

Chapter 6 Costing process concept - costing of joint products and by products

Chapter 7 Basics of finance

Need of finance, source of finance, fixed & working capital, assets &

liabilities, balance sheets & profit & loss accounts, reserve and surplus, fixed capital & working capital, financial ratios and their uses. (including problems)

Chapter 8 Investment analysis

Simple, compound interest, normal and effective rate of interest, continuous compounding, sinking fund, capital budgeting methods of investment, payback period, rate of return, discounting methods, net present value, yield- annual capital charges – DCF(Discounted Cash Flow)

Chapter 9 Financial management – objective, scope and function, financial statement, their interpretation, dividend policies of company

Chapter 10 Accounting for packages and containers

Reference Books:

INTRODUCTION TO ENTREPRENEURSHIP

Chapter no 1 ENTREPRENEURSHIP

- 1.1 Definition, Need, Qualities required, Environment
- 1.2 Differentiation between Entrepreneur, Intrapreneur, Manager, Women entrepreneur and franchise
- 1.3 Project report preparation
- 1.4 Steps involved in starting small scale industry
- 1.5 Sick Industries – Reasons & Rehabilitation

Reference Books

MARKETING MANAGEMENT

Market structures and their effect on pricing and output. Demand curves, empirical determination of demand relationship, market share estimation.

Sale models for established product. Analysis of buyers perception and perception / product mix and brand strategy, new product development, pricing objectives and policies, price discrimination. Distribution strategy, analysis of data, international marketing, case studies.

Market Research

Marketing research and Decision making ; meaning and research; Research design; sampling and research; a) the sampling process b) determined sample size; measurement and research; concept of measurement; Questionnaire design; Observation, depth interviews, projective techniques and case analysis; Attitude scales; survey research, panels, Experimentation; Analysis of data; Statistical Techniques; Demand Analysis; Forecasting; The control, Evaluation and Reporting of marketing research; Ethical issues in marketing research; Management research, Advertising research.

Reference Books:

MATERIALS MANAGEMENT

Concept objectives for material function

Purchasing system – cycle – decisions make or buy – vendor developments and evolution

Inventory control systems, ABC analysis

Costing - Purchase negotiations and pricing – procedures.

Demand forecasting – Role and application of management science - Value Analysis.

Transportations - physical distribution – material handling, conveyors and other equipments

Disposal of scrap, disposal of waste, Standardisation.

Evaluating materials management functions – Materials budgetary control.

Reference Books

PRODUCT PACKAGING (FOOD, DRUG, COSMETICS, CHEMICALS etc)

Introduction to Food Technology:

Principles of Food Preservation. Food processing techniques and practices. Influence of packaging on shelf life. Product-package compatibilities. Package requirement of food stuffs.

Recent development in food packaging technology :

Aseptic Packaging, MAP/CAP, Retort packaging others

Methods of storage:

Cold storage, cool storage, deep freezer – Design and application.
Irradiation preservation of perishables.

Product Packaging:

Packaging of Food products:

Packaging of milk and milk products, processed and dehydrated food items, marine products, spices, essential commodities, bakery products, confectionery etc,

Packaging of Tea (Bulk packages/ Retail packages)

Packaging of Coffee (Bulk packages/ Retail packages)

Packaging of agricultural / horticultural / floriculture products

Packaging of Pharmaceuticals:

Orals / injectables, ointment, bandages, surgical instruments, etc

Packaging of Cosmetics

Packaging of Toiletries

Packaging of Health care products

Packaging of Hazardous goods

Fertilizers, pesticides, explosives, chemicals, petroleum products, LPG gas, motor oil, etc.

Packaging of Light engineering goods

Packaging of Heavy engineering goods.

Packaging of Consumer durables

Packaging of Leather goods and garments

Packaging of Textiles and Readymade garments

Packaging of sports goods

Packaging of handicrafts

Reference Book

PACKAGING MACHINERY

Packaging Machinery : Types, merits, demerits of the process

Filling of dry and liquid products

Gravimetric filling, volumetric filling, filling of still liquids, Filling of carbonated liquids.

In line check weighing

Equipment for filling tubes, packaging of counts, automatic capping machinery, form-fill seal machinery for liquids, Non-liquids, rigid preformed container machinery, bag handling-filling-sealing machinery.

Shrink and Stretch wrapping equipment.

Blister packaging equipment

Strip packaging

Lined cartons

Standipack

Labelling machinery

Cartoning machinery

Wrapping, multipack wrapping and bundling

Inplant plastic bottle making

Laminating – slitting – sheeting

Code marking and imprinting

Tape dispensers

Hot melt – use, method, equipment

Vacuum and gas packaging, method, application, equipment

Packaging of pottery and ceramics

Latest developments in packaging machinery

Reference Books

PACKAGING LAWS AND REGULATIONS

Standards, standadisation, Quality standards

Legal Meteorology at (Weights and measures rule)

Eco- regulations, eco labeling, eco packaging

Recycling of packaging materials

Pollution control

FDA/ AGMARK rules and regulations

Consumer protection law

Food packaging laws, recent FSSAI act that includes all Food Product Orders and regulations, HACCP

Counterfeiting

Label/ labeling regulation

Pictorial marking

RFID etc

Reference Books:

TOOLING AND DESIGN OF MOULDS FOR PACKAGING

1. Design of injection moulds – Concept of mould construction - Two plate, Three plate and split moulds. Mould components. Design of cavities and punches, mould draft and components. Basic ideas pertaining to design of moulds . Layout of mould cavities - Balanced layout. Concepts about moulding systems, cooling system and ejection system. Designs of mould pillars. Automatic moulds. Standard mould parts.

Materials of mould constructions and their heat treatment . Element of mould fabrication and mould polishing. Mould surface texturising & surface treatment.

Elementary ideas about hot runner systems – Advantages & limitations.

Use of CAD/CAM in mould design & manufacturing.

2. Blow moulds : Construction of blow moulds. Selection of parting line. Neck designs, pinch off designs. Cooling & venting arrangements. Materials of constructions. Heat and surface treatment.

3. Extrusion Dies : Considerations in design of dies. Construction & elementary design concepts about blown film dies (center fed and bottom fed), co-extrusion dies, sheet dies, box for dies strapping and monofilaments. Materials of die construction. Heat and surface treatment. Design features parting line selection influence of tooling on product quality

4. Product Design : Considerations in product design. Steps involved in production design.

Mechanical behaviour of plastics – Basic concepts about stress-strain behaviour and creep behaviour.

Material selection for specific products.

Product designing for components to be injection moulded - Wall thickness, sharp corners, holes, ribs, rims & bosses, gussets hinges, snap fits, threads & inserts, gate location, weld lines, raised & lowered letters etc. Design considerations for blow moulded & extruded components.

5. Designing for packaging applications

Materials, processors & selection of packages for various applications.

BOPP films, Multilayer films, Shrink and stretch films.

Containers & performances

Cost economies & Value engineering.

Reference Book:

COMMUNICATION SKILLS

- 1) Introduction, Process Of Communication, Types Of Communication, Four C's In Communication.
- 2) Written Communication, Exercise.
- 3) Barriers Communication, Interview Technique.
- 4) Non-Verbal Communication, Guidelines For Conducting A Good Meeting.
- 5) Group Discussion.

SEMESTER – III PRACTICALS

I CFB

- | A. MATERIAL TESTING | B. TRANSPORT |
|--------------------------|-----------------------|
| 1. Grammage | 1. Compression |
| 2. Flute height / type | 2. Inclined Impact |
| 3. Identification of gum | 3. Drop |
| 4. Moisture Content | 4. Vibration |
| 5. Flat crush | 5. Rolling |
| 6. Edge crush | 6. Stack load |
| 7. Fibre analysis | 7. S spray / Rain |
| 8. Excess paper used | 8. Hydraulic pressure |
| 9. Dimension | 9. Leakage test |
| 10. Puncture resistance | |

II SHELF LIFE

III HESSIAN

1. Grammage
2. Poter&shots
3. Seam strength
4. B. load
5. Moisture content

IV Adhesive tape

Postgraduate Diploma in Packaging: Teaching and Examination Scheme - Semester IV

Sr. No.	Subject	Duration	Marks
1	Training at Institute (2 months) followed by Industrial Training &	6 months	500*
2	Overall Performance		100**

* To submit typed report as Project work based on training and viva-voce.

** Marks will be assigned on the basis of regularity in attendance, conduct and progress.

CAMPUS PLACEMENTS

At the end of the Semester IV campus placement is arranged, wherein, students have the opportunity to face interviews arranged with a number of interested companies including from abroad. We have been very successful in placements as nearly all students get placed in the first round. The placements are centralised at Mumbai Headquarters and all students from the regional centres are also free to participate. Additionally, regional centres also conduct their own campus placements.

Assistance in Placement will be provided by the Institute only to the Students who have 90% attendance in all the semesters in all the subjects. Student will less than 90% attendance will not be allowed to appear in the Campus Placement Procedure.