General Time Schedule

Periods Format

Semester - V

Sl No	Course Code	Course Name	Teaching Scheme					Examination Scheme						
			instruction period sper week			Total Periods per semester	Credits	Continuous internal evaluation			Semester end examination			
			L	T	P			mid sem 1	mid sem 2	internal evaluation	Max Marks Min Marks		total marks	Min marks for Passing including internal
1	18PKG-501C	Industrial Management and Packaging Economics	3	1	0	60	3	20	20	20	40	14	100	35
2	18PKG-502C	Packaging Machines	3	1	0	60	3	20	20	20	40	14	100	35
3	18PKG 503C	Drug and Pharmaceutical Packaging	3	1	0	60	3	20	20	20	40	14	100	35
4	18PKG-504E	Elective-1	3	1	0	60	3	20	20	20	40	14	100	35
5	18PKG-505E	Elective-2	3	1	0	60	3	20	20	20	40	14	100	35
6	18PKG-506P	Packaging Machinery Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
7	18PKG-507P	CAD Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
8	18PKG-508P	Transport worthiness Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
9	18PKG-509P	Programming In C'Lab Practice	1	0	2	45	1.5	20	20	20	40	20	100	50
10	18PKG-510P	Project Work				105	4.5							
11		Academic activities	0	0	7	105	2.5	0	0	Rubrics			--	-
			16	4	15	630	**25**	200	200	200	400	150	1000	450
12	Activities: student performance is to be assessed through Rubrics													

Electives	**Type**	**Subject code**
Product Packaging	Elective-1	18PKG-504EA
Packaging and Environment	Elective-1	18PKG-504EB

Food Preservation Packaging	Elective-2	18PKG-505EA
Refrigeration and Cold Storage	Elective-2	18PKG-505EB

All the above marks are in percentage Weightage

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**Industrial Management & Packaging Economics**	Course Code	**18PKG-501C**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of Basics of communication and general awareness about industry

On completion of the course, the student will be able to :

Course Outcomes

CO1	Explain the Principles and functions of Management.
CO2	Outline of Organization structure& organizational behavior
CO3	Functions of production management
CO4	Make use of materials management.
CO5	Make use of ISO 9000 & T.Q.M
CO6	Defend the Importance of economy in production
CO7	Influence of packaging in national economy.

MID SEM –I EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	

Total Questions	4	4	4	

SEMESTER END EXAMINATION							
Sl No	Unit No.	Questions to be set for SEE					Remarks
		R			U	A	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI			7,8	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	
Total Questions		8			8	8	

Legend:		
	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

Course Content

UNIT 1 - **PRINCIPLES AND FUNCTIONS OF MANAGEMENT.** **Duration: 10 Periods(L:6-T:4)**

Definitions of Industry, Commerce and Business. Evolution of management theories. Principles of Scientific Management, functions of management. Difference of administration and management.

UNIT 2 - **ORGANISATION STRUCTURE & ORGANISATIONAL BEHAVIOUR.**

Duration: 10Periods(L:6-T:4)

Role of industry, Types of ownership – Sole proprietorship, Partnership, Private limited, Public limited company, Industrial Cooperatives, Philosophy, types of Organisations, Line and Staff and functional organisations. Advantages and limitations, departments in a large scale industry. Effective organisation. Job analysis, Assessing applicants, selection, motivation, different theories, Leadership in organisation, decision making, communication,

UNIT 3 - **PRODUCTION MANAGEMENT.** Duration: 10 Periods(L:6-T:4)

Production, planning and control, relation with other departments, need for planning and its advantages, Routing, scheduling, despatching, PERT and CPM, simple problems.

UNIT 4 - **MATERIALS MANAGEMENT.** Duration: 10 Periods(L:6-T:4)

Materials in industry, inventory control model, ABC Analysis, Safety stock, re-order, level, Economic ordering quantity, Stores layout, stores equipment, Stores records, purchasing procedures, purchase records, Bin card, Cardex.

UNIT 5 - **INTRODUCTION TO ISO 9-0 AND TQM.** Duration: 10 Periods(L:6-T:4)

Concept of quality discussed by B. Crosby W. Edward, Deming, Shigco Shingo.Quality systems – Definitions of the terms used in quality systems like, quality policy, quality management, quality systems, quality control and quality assurance. Elements quality systems : Management responsibility, Quality system, contract review, design control, document control, purchasing, purchaser – supplied product, product identification and traceability, process control, Inspection and testing. Principles of quality assurance – Definition of quality assurance. Indian standards on quality systems – Main features of IS 13999 : 1990, IS 14000 : 1990, IS 14004 : 1990, IS 14001: 1990, IS 14002 : 1990, IS 14003: 1990. Know the necessity of International standards – Evolution of ISO. **5-S** principles – importance – meaning – approach – benefits . Various standards under ISO – Outstanding features of ISO 9000 series of standards – ISO 9000 Phenomenon ISO 9000 series of quality systems – Constituents of ISO 9000 series of standards for quality systems. Drawbacks of ISO 9000 series of standards, list the beneficiaries of ISO 9000 (Whom does ISO 9000 help).

UNIT 6 - **PACKAGING IN ECONOMICS** Duration: 10 Periods(L:6-T:4)

Packaging Economics: Introduction, importance of economy in production role of packaging in national economy. Packaging in general economy, total packaging cost, transport cost, functional or protective packaging, effect of improvement in packaging design, substitute of resources, recycling resources - Uses of different packaging materials, packaging material cost. Relation of packaging cost and percentage lost in packaging materials - Computation of cost for different packages like CFB aluminum cans, containers etc., Bottles, Closures, Rigid Carton, Folding Carton etc

Reference Books

Industrial Engineering and Management	-by O.P Khanna
Production Management	- by Buffa.
Engineering Economics and Management Science	- by Banga & Sharma.
S.S.I Hand Book	- by S.B.P. Publishers.
Personnel Management	- by Flippo.
Entrepreneurship	- by NITTT&R, Chennai.

SUGGESTED LEARNING OUTCOMES

1.0 PRINCIPLES AND FUNCTIONS OF MANAGEMENT.

Able to Define industry, commerce, Trade and business. Analyze the need of management , Understand the evolution of management, principles of scientific management and functions of Management.

2.0 ORGANISATION STRUCTURE AND ORGANISATIONAL BEHAVIOUR

Categorisation of different types of ownerships. Rephrase the features, advantages and limitations of ownerships and the factors for effective organisation. Analyze the organisational behaviour. Know the manpower sources and selection process. Rephrase the motivation theories and Leadership theories. Analyze the decision making process and communication process.

3.0 PRODUCTION MANAGEMENT

Distinguish and integrate production, planning and control. Know the Relation between production department with other departments. Explain the stages of Production, planning and control.
Construct the PERT and CPM networks to Identify the critical path.

4.0 MATERIALS MANAGEMENT.

Able to explain the role of the materials in Industry and Derivation of expression for inventory control. Analyze the different inventory techniques Explain stock layout and purchase process

5.0 INTRODUCTION TO ISO 9000 AND TQM.

Analyze the concept of quality, quality systems and quality Assurance. Able to Know the Indian Standards on quality systems like ISO standards. Discuss ISO standards and ISO 9000 series of quality systems. Rephrase the features and drawbacks of ISO 9000 series and TQM.

6.0 PACKAGING ECONOMICS

Importance of Packaging Economics in general economy. Measure the packaging cost, transport cost and Functional or protective packaging. Estimate the improvement in packaging design, make use of resources, recycling resources. Importance of costing, Different types of costs, Cost verses price, steps in costing procedure. Computation of cost for different packages.

Suggested Student Activities

1. Each student should visit library to refer to manual/Journals of industrial management
2. Each student should visit the nearby industry to know the organization structure
3. Each student will do the report on different types of industries.
4. Each student should visit the nearby industry to know the production and materials management

5. Quiz, Seminars and Group discussion
6. Surprise test

Suggested e-Resources:

1. http://nptel.ac.in
2. https://www.bachelorsportal.com/.../what-is-industrial-engineering-and-why-should
3. www.iim.in.com
4. www.iopp.org
5. https://en.wikipedia.org/wiki/Industrial_engineering

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Explain the Principles and functions of Management.	R/U/A	1,2,9	**06**
CO2	Outline of Organization structure& organizational behavior	R/U/A	1,2,9,10	**12**
CO3	Functions of production management	R/U/A	1,2,6,9	**12**
CO4	Make use of materials management.	R/U	1,2	**10**
CO5	Make use of ISO 9000 & T.Q.M	R/U/A	1,2,5	**10**
CO6	Defend the Importance of economy in production	R/U/A	1,2,3,8,9,10	**02**
CO7	Influence of packaging in national economy.	R/U/A	1,2,3,8,9,10	**08**
				60

Model Question papers

MODEL QUESTION PAPER

BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)

D.PKGT –V - SEMESTER EXAMINATION

18PKG-501C - INDUSTRIAL MANAGEMENT AND PACKAGING ECONOMICS

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. Define scientific management.
2. Write any two differences between Management and Administration.
3. List out different leadership models.
4. List out the principles of management given by Henry Fayol.

PART –B ***MARKS:2***

X3 = 6

NOTE: Answer ALL questions. Each question carries THREE marks.

5 (a).Draw the sketch of line organization and give its advantages.

or

5 (b).What is motivation? List out the theories of motivation.

6 (a).Write any three functions of production planning and control.

or

6 (b).What is the dispatching? Briefly explain the dispatching procedure.

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a).State and explain the causes of accidents and the precautions to be followed?

or

7(b).Explain the functions of management.

8(a).Write the difference between Private Limited and Public Limited joint-stock companies.

or

8(b).A project has nine activities. The duration of each activity is as follows :

Sl. No.	1	2	3	4	5	6	7	8	9
Activity	1–2	1–3	2–4	3–4	4–6	5–6	3–5	5–7	6–7
Duration	6	8	7	12	3	5	7	11	10

i. Draw the network.
ii. Identify critical path.
iii. Find project duration.

MODEL QUESTION PAPER

BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)

D.PKGT – V - SEMESTER EXAMINATION

18PKG-501C - INDUSTRIAL MANAGEMENT AND PACKAGING ECONOMICS

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. Define organization and list the types of organizations?
2. Write the any three difference between PERT and CPM?
3. What is the concept of feasibility study?
4. List out the welfare activities?
5. What are the causes of accidents?
6. Define the quality?
7. What are zero defects?
8. Define the Entrepreneur?

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).Draw the sketch of line organization and give its advantages.

(OR)

9(b).What is motivation? List out the theories of motivation.

10(a).What is the dispatching? Briefly explain the dispatching procedure.

(OR)

10(b).What are the salient features of Indian factories Act?

11(a).What are the difference between the Entrepreneurship and Management?

(OR)

11(b).What is plant layout? Write the advantages of plant layout?

12(a).What is *ABC* analysis with graphical sketch?

(OR)

12(b).Explain the purchasing procedures?

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a).State and explain the causes of accidents and the precautions to be followed?

(OR)

13(b).State the constituents of ISO 9000 SERIES of standards for quality systems?

14(a).Explain the method of site selection?

(OR)

14(b).Explain the advantages and disadvantages of partnership type of ownership?

15(a).A project has nine activities. The duration of each activity is as follows :

Sl. No.	1	2	3	4	5	6	7	8	9
Activity	1–2	1–3	2–4	3–4	4–6	5–6	3–5	5–7	6–7
Duration	6	8	7	12	3	5	7	11	10

i. Draw the network.
ii. Identify critical path.
iii. Find project duration.

(OR)

15(b). Explain break-even analysis with a neat sketch?

16(a). Explain the principles of scientific management.

(OR)

16(b). Derive an expression for economic ordering quantity?

QUESTION BANK

18PKG-501C - INDUSTRIAL MANAGEMENT AND PACKAGING ECONOMICS

PART –A

1. Define the terms Business, Trade, Commerce.
2. What are the different types of ownerships?.
3. What are the different types of Co-operatives?
4. What is the difference between shares and debenture?
5. Write short notes on Scheduling
6. What are the Objectives of Materials Handling:
7. What are the functions of Purchasing Department?
8. What is the Role of packaging in Product distribution.
9. What is Transport Cost:
10. Define the Cost:
11. Write about human relations in organization theory.
12. What are the different types of Organization structures?
13. What are the different Types of Modern Motivational Theories
14. What is Job analysis?
15. Write short notes on dispatching
16. Write down the names of purchase records.
17. What are the different Stages in PPC
18. What are the Factors to be consider in Packaging Industry
19. What is Transport Cost:
20. What is difference between COST and PRICE:
21. Define Industry and commerce?
22. Differentiate Pvt.Ltd and Public Ltd company.
23. What is Trait Theory of Leadership?
24. Define Routing and Scheduling?
25. What is BIN card? Explain.
26. What are the important functions of purchase department ?
27. What are the different Levels in The Management:
28. What is functional packaging:

PART –B

1. What is the Difference between Management, Administration And Organisation?

2. What is Sole Proprietorship? Write advantages and disadvantages of Sole proprietorship.
3. Explain about Line Organisation.
4. What are the principles of scientific management?
5. Explain about Mallow's need priority theory.
6. What is the difference between job description and job specification
7. Explain the Secondary Packing Material cost
8. Explain Total Packaging Cost.
9. Write the functions of management?explain.
10. Explain about Functional orgnisation.

PART –C

1. Explain about ABC analysis
2. Explain the Importance of Packaging Economy.
3. Explain the Relation of packaging cost and percentage lost in packaging materials
4. Explain Total Packaging Cost.
5. Explain about ABC analysis.
6. Role of packaging in national economy:
7. Explain about Primary Packing Material cost
8. What are the different steps in costing procedure? Explain.
9. Explain about Break even analysis.
10. Explain the Role of packaging in national economy:
11. Explain about Decision Making.
12. Draw the network diagram and identify critical path on the diagram and calculate the project duration for the following activities.

Activity	1-2	1-3	1-4	2-5	3-5	3-6	4-6	5-7	6-7
Expected Time(Days)	4	5	8	7	9	8	9	6	7

13. Draw the network diagram and identify critical path on the diagram and calculate the project duration for the following activities.

Activity	1-2	2-3	2-4	3-5	4-5	5-6
Duration in days	3	7	5	4	4	3

14. Draw the network diagram and identify critical path on the diagram and calculate the project duration for the following activities.

Activity	1-2	2-3	2-4	3-5	4-5	5-6
Duration(days)	6	4	5	6	4	3

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**PACKAGING MACHINES**	Course Code	**18PKG-502C**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of Basics of packaging technology and Elements of packaging Technology, Conventional Packaging Materials.

On completion of the course, the student will be able to :

Course Outcomes

CO1	To introduce the need and importance of packaging
CO2	To impart knowledge about types of packaging, packaging materials, machineries
CO3	To Identify unit operations that comprise common packaging lines
CO4	Specify operating requirements of individual packaging machines in order to allow groups of packaging machines to function as a coherent system.
CO5	Understand the relationships between products, packages, machines and personnel.
CO6	To analyse the advantages of Vacuum metallization processes.

Course Content

UNIT 1 - PRODUCT FILLING

Duration: 10 Periods(L:6-T:4)

Introduction to product filling - Filling liquid and semi liquid products - Liquid filling techniques - Volumetric filling of liquid - Constant level - filling of liquids - Filling dry products - Dry filling techniques - Volumetric filling techniques - Volumetric filling - Filling by weight - Filling by count. Bottle feeding - Bottle cleaning - Filling liquids - Filling dry goods, Handling and storage of empty

cans - Cleaning empty cans - Product preparations - Filling - Closing - Processing - Cooling - Handling and storage of filled cans.

UNIT 2 - WRAPPING OVER WRAPPING AND BUNDELLING

Duration: 10 Periods(L:6-T:4)

Introduction to wrapping - Wrapping methods - Over wrapping - Multi packing and Bundling Maintenance requirements - Bags manufacture, filling and closing - Paper bags - Film bags –Open mesh bags, Bag filling and closing equipment, Bag - in - box packages - Standard case sealing, Adhesive application systems., Wrap around , case sealing - Tray erection.

UNIT 3 - SYSTEM, ASEPTIC & VACUUM PACKAGING

Duration: 10 Periods(L:6-T:4)

Introduction to system packaging - Types of system packaging, Selection of appropriate system - Salient features of different types of systems - lined carton System - coated and laminated carton system - stand - up pouches, form - fill - seal (FFS) system, vacuum thermo forming system, Aseptic system, processing and zone - Aseptic processing systems - Characteristics of specific elements - Flow control, Heat transfer, Deaerator - Aseptic surge tank - Automatic flow diversion - Aseptic filling and packaging systems. Vacuum packaging - Methods of Vacuum packaging - Gas packaging - Mechanical air replacement - Compensated vacuum - Active packaging - Vacuum packaging machinery.

UNIT 4 - STRIP, SKIN AND BLISTER PACKAGING MACHINES

Duration: 10 Periods(L:6-T:4)

Introduction - need of packaging of pharmaceuticals - characteristics - strip packaging – skin packaging blister packaging - Consumer goods Packs - Basic configuration - Production methods - Components - Functional components of strip, skin and Blister packaging machines - Schematic Representation - Selection
of forming film Consideration - qualities of the film material - Types of forming film - Advantages - Disadvantages - Blister / Strip Defects - commonly used materials

UNIT 5 - BLOW & INJECTION MOULDING MACHINES

Duration: 10 Periods(L:6-T:4)

Introduction - Injection blow molding - Stretch blow molding - Extrusion blow molding - Co-extrusion blow molding - Components for blow molding - Basic process - Working principle - Process material - Die design - Design consideration - Functions - Advantages of blow molding - Disadvantages of blow molding - Blow molding applications - Examples of blow molding - properties of PES containers - Melt flow Index - Physical properties of super high flow PEs - Container design factors - Benefits of High flow PE Resins.

UNIT 6 - VACUUM METALLIZING - THERMO FORMING, FORM FILL AND SEAL MACHINES

Duration: 10 Periods(L:6-T:4)

Definition, Process, Types of Metallization, Advantages, Materials, Applications - Developments - Introduction to Thermo forming - Skin packaging v/s Blister packaging - Packaging essentials - Shrink wrapping - Stretch wrapping - Introduction to FFS - Vertical FFS Machines - Horizontal F.F.S Machines - Thermoformed F.F.S packs

Reference Books

1. Food Packaging - F.A.Paine
2. Hand Book of Packaging - J.F. Hanlon & others
3. Packaging- an introduction – Stanely Sacharow
4. Encyclopedia of Packaging technology – John Willey

SUGGESTED LEARNING OUTCOMES

UNIT – 1 PRODUCT FILLING

Choose the techniques involved in product filling
List the various product filling methods
Understand about volumetric filling
Compare of liquid filling vs. Dry filling techniques
Interpret product filling by weight and by count
Examine bottling - processes and packaging

UNIT – 2 WRAPPING, OVER WRAPPING AND BUNDELING

Write wrapping relates with bundling

List the wrapping methods

Match the method and applications of types of wrapping

Understand bag manufacture

Relationship between paper bags and film bags

UNIT – 3 SYSTEM, ASEPTIC & VACUUM PACKAGING

Classify types of system packaging

Distinguish between lined carton system and coated and laminated carton system

Examine stand - up pouches

Analyze the aseptic processing system

Know the tetra pak – composition – materials

Classify types of tetrapaks

Write the applications of tetra pak

Write about vacuum packaging

Know about gas packaging - mechanical air replacement - compensated vacuum

UNIT - 4 STRIP, SKIN AND BLISTER PACKAGING MACHINES

Write the Need of packaging of pharmaceuticals

Contrast between Strip packaging and Skin packaging

Contrast between Strip packaging and Blister packaging

Examine the Basic configuration of Strip, Skin, Blister packaging

Select the forming film Consideration - qualities of the film material

List the Types of forming films used

List the Advantages and Disadvantages of Strip, Skin, Blister packaging

Know commonly used materials for Strip, Skin, Blister packaging

UNIT – 5 BLOW & INJECTION MOULDING MACHINES

Interpret the Basic process of blow molding

Function and Working principle of blow molding

Know the Design consideration of blow molding

Compare between Advantages Disadvantages of blow molding

Identify various Blow molding operations and applications

Physical properties of super high flow PEs

Write the factors to be considered for a Container design

Summarize the Benefits of High flow PE Resins

UNIT-6 VACUUM METALLIZING - THERMO FORMING, FORM FILL AND SEAL MACHINES

Write the Principle of Vacuum metalizing Process

Understand and discuss Vacuum metalizing Process

List the Materials used for Vacuum metalizing Process

Distinguish between Vacuum metalizing Process and Thermoforming - Process

Discuss Thermoforming - Process step by step

Elaborate the FFS Principle - functions

Compare between Skin packaging v/s Blister packaging

Write the differences between Shrink wrapping and Stretch wrapping

Suggested Student Activities

7. Each student should visit library to refer to manual/Journals of Packaging machines related to packaging processes.
8. Each student should visit the Lab to know the processes used for packaging.
9. Each student will do the report on Types of Different Packaging machines available in the market
10. Identify and prepare a list of materials used in the Different types of packaging processes and their machineries.
11. Quiz, Seminars and Group discussion
12. Surprise test

Suggested e-Resources:

6. http://nptel.ac.in
7. www.packagingclinic.com
8. www.iip.in.com
9. https://pcri.org
10. trade.gov/publications/pdfs/packaging-machinery-sustainability-competitiveness
11. epgp.inflibnet.ac.in/...packaging...packaging...machineries/.../2670_et_m30
12. www.packmachbook.com/handbooksample
13. www.iopp.org

CO-PO Mapping Matrix

Course Outcome	CL	Linked PO	Teaching periods

CO1	To introduce the need and importance of packaging	R/U/A	1,2,9	**8**
CO2	To impart knowledge about types of packaging, packaging materials, machineries	R/U/A	1,2,9,10	**12**
CO3	To Identify unit operations that comprise common packaging lines	R/U/A	1,2,6,9	**8**
CO4	Specify operating requirements of individual packaging machines in order to allow groups of packaging machines to function as a coherent system.	R/U	1,2	**12**
CO5	Understand the relationships between products, packages, machines and personnel.	R/U/A	1,2,5	**8**
CO6	To analyse the advantages of Vacuum metallization processes.	R/U/A	1,2,3,8,9,10	**12**
				60

Model Question papers

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-502C - PACKAGING MACHINES

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the different types of filling techniques?
2. What is the role of supplier in system packaging?
3. What are the types of tetra pak package forms available in india?
4. What are materials used for bags?

PART –B ***MARKS:2 X3 = 6***

NOTE: Answer ALL questions. Each question carries THREE marks.

5(A) Classify the packaging machines?

OR

5(B) Write about Stretch Wrapping?

6(A) What is strip packaging and its functions?

OR

6 (B) Write the steps involve in FFS Machine?

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a) Explain auger filling method with neat sketch.

or

7(b)Draw horizontal form-fill seal machine and explain.

8(a)Explain about thermoforming with an neat sketch

or

8(b)Explain about twist wrapping method with neat sketch.

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-502C - PACKAGING MACHINES

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the techniques involved in product filling?
2. What is the importance of canning processes involved in packaging?
3. What are the applications of wrapping?
4. What is aseptic zone?
5. What are the different types of sterilizing agents?
6. What are the types of blow molding operations?
7. What are the types of Form Fill Seal Machine?
8. What are the packaging materials used for Strip packaging

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).Classify the packaging machines?

(OR)

9(b).Write about types of system packaging?

10(a).Write about the advantages and applications of thermoformed container?

(OR)

10(b).Write about the different bottling processes?

11(a).Write the steps involve in FFS Machine?

(OR)

11(b).Draw the elements of blown film and indicate the parts?

12(a).Write about Stretch Wrapping?

(OR)

12(b).What is strip packaging and its functions?

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a).Explain auger filling method with neat sketch.

(OR)

13(b).Draw horizontal form-fill seal machine and explain.

14(a).Explain about thermoforming with an neat sketch

(OR)

14(b).Explain about twist wrapping method with neat sketch.

15(a).Explain Co-extrusion blow moulding with a neat sketch

(OR)

15(b).Explain about bag - in - box concept

16(a).Explain the composition of tetra pak aseptic carton with a neat sketch?

(OR)

16(b).Explain about vacuum metallization process?

QUESTION BANK

18PKG-502C - PACKAGING MACHINES

PART-A

1. What are the different types of filling techniques?
2. What is the role of supplier in system packaging?
3. What is strip packaging and its functions?
4. What are the types of tetra pak package forms available in india?
5. What are materials used for bags?
6. What are the types of system packaging?
7. What is wrapping and write the types of it?
8. What are the materials used for paper bags?
9. What are the requirements of basic aseptic system?
10. What are the operational steps in system packaging?
11. What are the different techniques used for the filling liquids?
12. What are the different types of film materials used for strip packaging?
13. What are the advantages and applications of thermoformed container?
14. What are the types of blow molding operations?
15. What are the applications of blisters in pharmaceuticals?
16. What is the importance of canning processes involved in packaging?
17. What are the applications of wrapping?
18. What is aseptic zone?
19. What are the different types of sterilizing agents?
20. What are the different bottling processes?
21. What is aseptic processing system?
22. What are the techniques involved in product filling?
23. What is wrapping
24. What is Bundling?
25. What is Strip Packaging?
26. What is Skin Packaging?
27. What is Blister Packaging?
28. What are the packaging materials used for Strip packaging

29. What are the packaging materials used for Skin packaging
30. What are the packaging materials used for Blister Packaging?
31. What are the types of Form Fill Seal Machine?
32. What is the Principle of Form Fill Seal Machine?

PART-B

1. Write the types, advantages and disadvantages of blow molding operations?
2. Write about Shrink wrapping?
3. Write about Stretch Wrapping?
4. Write the steps involve in FFS Machine?
5. Write the functions of Form Fill Seal Machine?
6. Classify the packaging machines?
7. Write about the composition of tetra pak aseptic carton
8. Draw the elements of blown film and indicate the parts?
9. Write the functions of strip packaging?
10. Write about types of system packaging?
11. Write about wrapping and write the types of it?
12. Write about the requirements of basic aseptic system?
13. Write about the operational steps in system packaging?
14. Write about the different techniques used for the filling liquids?
15. Write about the different types of film materials used for strip packaging?
16. Write about the advantages and applications of thermoformed container?
17. Write about the importance of canning processes involved in packaging?
18. Write about the different types of sterilizing agents?
19. Write about the different bottling processes?
20. Write about the techniques involved in product filling?
21. Write about auger filling method
22. Write about horizontal form-fill seal machine
23. Write about thermoforming
24. Write about twist wrapping
25. Write about aseptic processing system
26. Write about cup/flask filling method

27. Write about bread wrapping

PART-C

1. Explain auger filling method with neat sketch.
2. Draw horizontal form-fill seal machine and explain.
3. Explain about thermoforming with an neat sketch
4. Explain about twist wrapping with the help of a sketch?
5. Explain cup/flask filling method with neat sketch.
6. Explain about bread wrapping method with neat sketch.
7. Explain aseptic processing system?.
8. Draw injection blow molding machine and explain.
9. Draw vertical form-fill seal machine and explain briefly.
10. Explain about product feed systems?
11. Explain about Strip packaging?
12. Explain about Blister packaging
13. Explain about parcel wrapping with a neat sketch?
14. Explain about bag - in - box concept
15. Explain the composition of tetra pak aseptic carton with a neat sketch?
16. Explain Wrapping process with neat sketch.
17. Explain Blister forming process
18. Explain Bottling process
19. Explain about product feed systems?
20. Explain Box making machine
21. Explain about vacuum metallization process?
22. Explain Pouch making machine
23. Explain about thermoforming process?
24. Explain Bag making machine
25. Explain about form fill seal machine?
26. Explain about bread wrapping method with neat sketch.
27. Draw injection blow molding machine and explain.
28. Draw vertical form-fill seal machine and explain briefly.
29. Explain auger filling method with neat sketch.
30. Explain about stretch blow molding process with a neat sketch?

31. Explain Extrusion blow moulding with a neat sketch
32. Explain Co-extrusion blow moulding with a neat sketch

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**DRUG AND PHARMACEUTICALS PACKAGING**	Course Code	18PKG-503C
Semester	**V**	Course Group	**:Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

18PKG-403C, 18PKG-404C

Course Outcomes

On completion of the course, the student will be able to :

CO1	**Know the packaging consideration for various pharmaceutical products.**
CO2	**Appreciate the provisions, laws & regulations for packaging of pharmaceuticals including labels**
CO3	**Identify suitable packaging materials for various pharmaceutical products.**
CO4	Appreciate the critical characteristics and special requirements of packages for various types of products to Identify/select suitable primary package, secondary and tertiary package.
CO5	**Analyze the various Transport considerations in selection of mode and type of load for transportation, laws and regulations en-route, permissions and permits of controlling authorities, transit hazards.**
CO6	**Appreciate the technology of packaging for various pharmaceuticals products , new designs with innovative packages ideas**

MID SEM –I EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					

S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATION						
Sl No	Unit No.	Questions to be set for SEE				Remarks
		R		U	A	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3 (5, 6)	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		3 (7,8)	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	
Total Questions		8		8	8	

Legend:	
Remembering (R)	1 Mark
Understanding (U)	3 Marks
Application (A)	5 Marks

Course Content

UNIT 1 INTRODUCTION TO DRUG PACKAGE AND THEIR SPOILAGE MECHANISMS

Duration: 10 Periods(L:6-T:4)

Understand the concept of drug, List out the general aspects of drug package.

Understand the basic terminology FDA , Ampoule, Vial, Caplet , Capsule, DMF, Parenteral drug, USP, BP, CRP ,Classify the pharmaceuticals on the basis of dosage forms, Explain various dosage forms .

Explain the preparation of various pharmaceutical products, Understand the spoilage agents of drug, Know the affect of moisture or a drug, Know the effects of light and oxygen on drug, Know the effects of hest on a drug, Know the effects of various hazards on a drug

UNIT 2 PACKAGE DEVELOPMENT AND LABELING REQUIREMENTS OF PHARMACEUTICALS:

Duration: 10 Periods(L:6-T:4)

Approved Materials & its Sterilization methods, Package structure, Labeling - Text and graphics requirements, Bar codes, RFID Features, Expanded Content Labels, Package Inserts; Legislative requirements for packaging of medical preparations, Statutory requirements, General manufacturing considerations, Packaging Specification. Licensing considerations - Sources of official guidance, FDA, Influence of pharmacopoeias, License application procedure; Stability tests on finished product, Medicinal formulation/packaging compatibility, Stresses from manufacturing process, Toxicological investigations, Environmental issues, Variations, Medical devices. List out and explain the basic requirements of pharmaceutical package, Explain the principles involved in design of injectables.

UNIT3 PHARMACEUTICAL PACKAGING MATERIALS

Duration: 10 Periods(L:6-T:4)

Materials used for pharmaceutical packaging- Glass, metals, Plastics, Plastic films, Elastomers ,Paper and Paper board-their properties advantages and various applications.

UNIT4 FABRICATION AND FILLING OF PHARMACEUTICAL CONTAINERS

Duration: 10 Periods(L:6-T:4)

Understand the Fabrication of Glass container
Explain the Blown glass containers fabrication method
Explain the fabrication of Ampoules and Vials
Explain the Fabrication of metal containers like Two-piece cans and Three-piece cans.
Fabrication of Plastic containers like Bottles, Vials and Collapsible tubes.
Understand the concept of Container filling and sterilization processes.

UNIT5 CLOSURES FOR PHARMACEUTICAL PACKAGES AND CHILD RESISTANT PACKAGING

Duration: 10 Periods(L:6-T:4)

Closure by adhesives, Closure by separate devices, Cans , bottles ,jars, tubes.
Explain the different types of Closure materials for pharmaceutical products.
Counter Fit Methods in Packaging
Introduction to child resistant packaging(CRP),Explain historical background of CRP
Explain the Testing procedure of CRP

UNIT6 PACKAGES USED FOR PHARMACEUTICALS

Duration: 10 Periods(L:6-T:4)

PRIMARY PACKAGES

Films and laminates, Pouches & Strip Packs, Blister Packaging, OTC Drug Packs, Ethical Drug Packs, Clinical Trial & Sample Drug Packs, Unit dose packaging, Plastic Containers – Standard containers, Dispensing Bottles, Cans, Jars; Prefillable Inhalers -Metered Dose, Dry Powder; Prefillable Syringes –

Injectors, Cartridges; Tubes - Composite Tubes, Plastic Tubes, Metal Tubes; Parental Vials & Ampoules; Containers - Semi-Rigid Containers, Mini-Bags; Medical Packages – Disposable gloves, Syringes, needles, catheters, dressings, sutures, surgical devices; Glass Containers; Aerosol Containers.

SECONDARY CONTAINERS

Secondary Containers - Paperboard Containers; Shipping Containers – Corrugated Boxes, Folding Cartons, Trays, etc;

Know about the packages used for liquids of bulk packages, consumer and pharmacy package.
Packages used for semi solids
Packages for solids like Powders and granules ; tablets and caplets ;Capsules
Design of Blister and Strip Packaging
Explain the concept of QbD in Packaging Development

Reference Books

1. Packaging of Pharmaceuticals & health care products –H.Lockhart and F.A.Paine
2. Pharmaceutical Packaging Handbook by Edward Bauer
3. Packaging Drugs & Pharmaceuticals by Wilmer A. Jenkins (Author), Kenton R. Osborn
4. Packaging of Pharmaceuticals by C.F.Ross
5. Fundamentals of Packaging by F.A. Paine
6. Packaging – an introduction by Stanely Sacharow

SUGGESTED LEARNING OUTCOMES

UNIT 1 INTRODUCTION TO DRUG PACKAGE AND THEIR SPOILAGE MECHANISMS

Understand the concept of drug.
List out the general aspects of drug package.
Understand the basic terminology FDA , Ampoule, Vial, Caplet ,
a. Capsule, DMF, Parenteral drug, USP, BP,CRP,CFR,NDA.
Classify the pharmaceuticals.
List dosage forms .
Describe the preparation of various pharmaceutical products.
Understand the spoilage agents of drug.
Know the effects of various hazards on a drug

UNIT 2 PACKAGE DEVELOPMENT AND LABELING REQUIREMENTS OF PARMACEUTICALS

List out Approved Materials & its Sterilization methods,
Legislative requirements for packaging of medical preparations, Statutory requirements,
General manufacturing considerations,
Understand the Licensing considerations - Sources of official guidance, FDA, Influence of pharmacopoeias, License application procedure;
Stability tests on finished product,
Medicinal formulation/packaging compatibility,
List out and explain the basic requirements of pharmaceutical package Label,
Explain the principles involved in design of injectables.

3.0 PHARMACEUTICAL PACKAGING MATERIALS

Describe the Materials used for pharmaceutical packaging- Glass, metals, Plastics, Plastic films, Elastomers ,Paper and Paper board.

4.0 FABRICATION AND FILLING OF PHARMACEUTICAL CONTAINERS

Understand the Fabrication of Glass container
Explain the Blown glass containers fabrication method
Explain the fabrication of Ampoules and Vials
Explain the Fabrication of metal containers like Two-piece cans and Three-piece cans.
Explain the Fabrication of Plastic containers like Bottles, Vials and Collapsible tubes.
Understand the concept of Container filling and sterilization processes.

UNIT 5CLOSURES FOR PHARMACEUTICAL PACKAGES AND CHILD RESISTANT PACKAGING

Classify the Closures used in pharmaceutical packaging
Explain the different types of Closure materials for pharmaceutical products.
Describe Counter Fit Methods in Packaging
Understand child resistant packaging(CRP)
Explain historical background of CRP
Explain the Testing procedure of CRP

UNIT 6 PACKAGES USED FOR PHARMACEUTICALS

Know about the packages used for liquids of bulk packages, consumer and pharmacy package.
List the Packages used for semi solids, solids like Powders and granules ,tablets and caplets ;Capsules
Design of Blister and Strip Packaging for a give pharma product
Write the concept of QbD in Packaging Development

Suggested Student Activities

13. Each student should visit library to refer to manual/Journals of drug Packaging related to packaging materials and components.
14. Each student should visit the Lab to know the materials used for packaging.
15. Each student will do the report on Types Different Packages available in the pharma industry
16. Analyze the composition of different pharma packages.
17. Identify and prepare a list of materials used in the Different types of drug packaging applications.
18. Quiz, Seminar
19. Group discussion
20. Surprise test

Suggested e-Resources:

1. https://en.wikipedia.org/wiki/Drug_packaging
2. https://www.packagingdigest.com/pharmaceutical-packaging

3. https://www.pharmatutor.org/articles/the-pharmaceutical-packaging-article
4. https://www.pharmaceuticalonline.com/.../major-trends-in-pharmaceutical-packaging-...
5. http://nptel.ac.in
6. www.packagingclinic.com
7. www.iip.in.com
8. https://pcri.org

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Know the packaging consideration for various pharmaceutical products.	R/U/A	1,2,9,10	**8**
CO2	Appreciate the provisions, laws & regulations for packaging of pharmaceuticals including labels	R/U/A	1,2,8,9,10	**12**
CO3	Identify suitable packaging materials for various pharmaceutical products.	R/U/A	1,2,6,9	**8**
CO4	Appreciate the critical characteristics and special requirements of packages for various types of products to Identify/select suitable primary package, secondary and tertiary package.	R/U	1,2	**12**
CO5	Analyze the various Transport considerations in selection of mode and type of load for transportation, laws and regulations en-route, permissions and permits of controlling authorities, transit hazards.	R/U/A	1,2,5	**8**
CO6	Appreciate the technology of packaging for various pharmaceuticals products , new designs with innovative packages ideas	R/U/A	1,2,3,8,9,10	**12**
				60

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-503C – DRUG AND PHARMACEUTICAL PACKAGING

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. Define Vial
2. What are three Classes of degradation forms of Pharmaceutical products. Explain
3. List out any SIX schedules used in drug labeling.
4. What are the USP requirements for labeling parenteral drugs.?

PART –B ***MARKS:2 X3 = 6***

NOTE: Answer ALL questions. Each question carries THREE marks.

5 (a).Expand the terms. a) CPSC b) USP c) DMF

(OR)

5 (b).Give the classification of Pharmaceuticals.

6 (a).Define label, how it helps packaging?

(OR)

6 (b).What are the advantages of Plastics when it is used as a packaging material for Pharmaceuticals?

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a).Explain the different spoilage agents of a Pharmaceutical product. ?

(OR)

7(b).Explain the preparation of various Pharmaceuticals products.

8(a).Explain the Spoilage mechanism of drug in relation to

i) Environmental factors ii) Different transportation hazards.

(OR)

8(b).Explain the basic requirements of a Pharmaceuticals package.

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER END EXAMINATION
18PKG-503C – DRUG AND PHARMACEUTICAL PACKAGING

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1) Define Capsule
2) What are the USP requirements for labeling parenteral drugs.?
3) What are the different spoilage agents of a Pharmaceutical product. ?
4) What do you mean by Strip packaging.
5) What are the basic Elements of Filling of bottles and Jars?
6) What are the basic functions of Pharmaceutical closures ?
7) What do you mean by counterfeit method in Packaging ?
8) Write about Elastomers as Drug packaging material

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).What are the advantages of Plastics when it is used as a packaging material for Pharmaceuticals?

(OR)

9(b).Explain about Blister packaging

10(a).Explain the classification of Pharmaceuticals.

(OR)

10(b).Explain the preparation of various Pharmaceuticals products.

11(a).Write about history of Child Resistant packaging ?

(OR)

11(b).Write about different types of Child Resistant Closures.

12(a).Explain the basic requirements of a Pharmaceuticals package.

(OR)

12(b).Explain the Spoilage mechanism of drug in relation to Environmental factors

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a).Explain the different spoilage agents of a Pharmaceutical product. ?

(OR)

13(b).Explain the preparation of various Pharmaceuticals products.

14(a).Explain the Spoilage mechanism of drug in relation to

i) Environmental factors ii) Different transportation hazards.

(OR)

14(b).Explain the process of Filling and sealing of sterile liquids.

15(a).Explain the different types of closures for Bottles and Jars in Pharmaceuticals.

(OR)

15(b).Explain in detail the Test procedure for Child resistant packaging.

16(a). Explain about Design factors of a Pharmaceuticals Package ?

(OR)

16(b).Explain the different types of closures for Bottles and Jars in Pharmaceuticals field.

18PKG-503C – DRUG AND PHARMACEUTICAL PACKAGING
QUESTION BANK

PART-A

1. Elaborate the following terms with relation to Pharmaceuticals field a) FDA b) USP c) DMF
2. Define the following terms
   (a) Ampoule (b) vial (c) capsule
3. Define the following terms (a) Drug (b) Drug packaging
4. Expand the following terms.
   FDA /DMF/NDA/USP/CPSC/PPP/CRP
5. Define the following Caplet/Capsule/Ampoule/Vial
6. Give the classification of Pharmaceuticals.
7. Expand the following terms.
   a) CPSC b) USP c) DMF d) FDA
8. classify the of Pharmaceutical products on the basis of dosage form.
9. Expand the following terms.
   a) NDA b) USP c) DMF d) CRP
10. Expand the following terms.
    a) FDA b) USP c) DMF d) NDA
11. Give the classification of Pharmaceuticals.
12. Define the following terms
    (a) Ampoule (b) vial (c) caplet
13. List various drug spoilage agents
14. What are the spoilage agents of a drug
15. What are the different spoilage agents of a Pharmaceutical product. ?
16. List out the different spoilage agents of a Pharmaceutical product. ?
17. What are the basic principles involved in design of inject able .
18. List out the special requirements for design of inject able.
19. Write any SIX schedules analyzing in Drug Pharmaceutical.
20. What are the items to be listed in label of a drug?
21. What are the USP requirements for labeling parenteral drugs.?
22. What are the basic principles involved in design of Injectables package?
23. List out any six schedules available for Drug nomenclature.
24. What are the different types of glasses used for Packaging of Injectables.
25. What are properties required in selecting elastomers as Package materials
26. What are the basic Elements of Filling of bottles and Jars.?
27. List out the containers used for pharmaceuticals.?
28. What are the different types of containers used for injectable pharmaceuticals?
29. What are the different types of containers used for injectable fluids.
30. What are the different containers used for pharmaceuticals products.
31. What are the advantages of Blister packaging ?
32. Write any six advantages of Blister packaging?

33. What is Strip packaging.
34. What are the factors to be considered for Design of a Package for Pharmaceuticals.?
35. What are the packages user for sterile liquids
36. What do you mean by Child resistant packaging ?
37. What do you mean by poison prevention Packaging?

38. List out the different types of Child resistant closures in Pharmaceuticals packaging .
39. Write about history of CR packages.
40. What is the name of the first product of covers under PPP?
41. List out the different types of CR Closures. Explain
42. Write about different types of Child Resistant Closures.
43. What are the requirements to be met while selecting vial stoppers ?
44. What do you mean by counterfeit method in Packaging ?
45. What are the requirements to be met by Vial stoppers for injectables ?
46. What are the basic functions of Pharmaceutical closures ?
47. What are the different types of materials user for closures?
48. What are the functions we require while selecting closure for pharmaceuticals?
49. What are the different types of closures used for Pharmaceuticals products.?

PART-B

1. Explain how the Pharmaceutical products are classified on the basis of dosage forms.
2. Explain the preparation of any ONE Pharmaceuticals products preparation.
3. What are the special requirements for packaging of Injectables ?
4. What are three Classes of degradation forms of Pharmaceutical products. Explain briefly .
5. List out the various spoilage agents of a Pharmaceutical product.? Explain them .
6. Detail the design principles of inject able.
7. Explain the basic requirements of pharmaceutical package.
8. What are the requirements of a drug? Explain briefly
9. What is the recent regulation on label of a drug in India ? Explain the basic requirements of a
10. Pharmaceuticals package.
11. What are the advantages of Glass when it is used as a packaging material for Pharmaceuticals?
12. What are the advantages of Metals as a packaging material for Pharmaceuticals?
13. What are the different materials used for packaging of Pharmaceuticals.
14. What are the advantages and disadvantages of plastics as drug packaging
15. material over Glass and metal.
16. Explain the requirements of a Pharmaceuticals package design.
17. Explain about Blister packaging ?
18. Explain about Strip packaging.
19. What are the factors to be considered for Design of a Package for Pharmaceuticals.?
20. Explain about packages used for Solid pharmaceuticals.

21. Explain the fabrication and sealing process of glass container for medicines(Injectables)
22. with neat diagram.

23. Explain the fabrication, filling and sealing process of ampoule
24. Explain how the ampoules and vials or made from transfer glass with neat diagrams
25. Explain the filliing process of bottles and jars.
26. Explain about Skin packaging.
27. Explain about Design factors of a Pharmaceuticals Package ?
28. Explain in details about the test producers of CR package.
29. What is meant by CRP? Write the test procedure for CRP and Adult test.
30. Write about history of Child Resistant packaging ?
31. Explain the Spoilage mechanism of drug with different factors.
32. Explain the Spoilage mechanism of drug in relation to Environmental factors
33. Explain different types of closures used for Pharmaceuticals

PART-C

1. classify the of Pharmaceutical products on the basis of dosage form.
2. Explain the preparation of any TWO Pharmaceuticals products.
3. Explain the preparation of various Pharmaceuticals products.
4. How do you classify the pharmaceutical products are the basis of dosage
5. Explain the preparation of the following pharmaceutical products
   a) Solids b) Capsules
6. Explain the classification of injectable packages.
7. Explain the different spoilage mechanisms of a drug
8. Explain the effect of following on the potency of the drug
   a) Moisture b) Light c) Heat d) Mechanical hazards.
9. Explain the various kinds of hazards which destroy the potency of drug after its manufacture.
10. Write briefly about physical degradation of Pharmaceutical products?
11. What are the advantages of Metals as a packaging material for Pharmaceuticals?
12. What are the different materials used for packaging of Pharmaceuticals.
13. What are the advantages and disadvantages of plastics as drug packaging material over Glass and metal.
14. Explain the different materials used for packaging of Pharmaceuticals.
15. What are the advantages of Plastics as a packaging material for Pharmaceuticals over Glass and Metals?
16. Explain the following packaging materials used for Pharmaceuticals
    a) Metals b) Plastics c) Glass d) Paper and Paper board
17. Explain about packages used for Various pharmaceutical products.
18. Explain about packages used for Solid pharmaceuticals.
19. Explain about packages used for Various pharmaceutical products.
20. Write briefly about blister package with neat diagram.
21. Explain the following
    a)Single dose container b) Multi dose container
22. Explain the Stopper designs to be used for injectable vials.
23. Explain the different types of closures for Bottles and Jars in Pharmaceuticals field.
24. Explain the Stopper designs to be used for injectable vials.
25. Explain the different types of closures for Bottles and Jars in Pharmaceuticals field.
26. What are the different types of closures used for Pharmaceuticals products.?
27. Explain any TWO of closures with neat diagrams.
28. Explain the Stopper designs to be used for injectable vials.

29. Explain any one threaded closure to be used for Pharmaceuticals field.
30. What are the different types of closures used for Pharmaceuticals products.? Explain any ONE of them with neat diagrams.

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**PRODUCT PACKAGING**	Course Code	18PKG-504EA
Semester	**V**	Course Group	**:Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60 Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

18PKG-403C, 18PKG-404C

Course Outcomes

CO1	Ability to list packaging requirements based on product characteristics, distribution and markets conditions.
CO2	To select the proper packaging material on considering the product properties
CO3	Identify to select suitable primary package, secondary and tertiary package.
CO4	Analyze the various Transport considerations in selection of mode and type of load for transportation, laws and regulations en-route, permissions and permits of controlling authorities, transit hazards.
CO5	Appreciate the technology of Aerosol and its applications.
CO6	Appreciate the packaging consideration for various industrial goods and hazardous goods.

MID SEM –I EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a)	7(a)	

			5(b)	7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATION							
Sl No	Unit No.	Questions to be set for SEE					Remarks
		R			U	A	
1	I	4	1		9(a)	13(a)	
2	II						
3	III		2		10(a)	14(a)	
4	IV						
5	V		3	5, 6	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI			7,8	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	
Total Questions		8			8	8	

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

Course Content

UNIT 1 PACKAGING OF HORTICULTURAL CROPS

Duration: 10 Periods(L:6-T:4)

Introduction, main causes of deterioration, Role of Ethylene, Degreening of citrus ,Pre cooling, Classification of Horticultural commodities according to their respiration rates, to their respiratory behavior during ripening, to their ethylene production rate, Packaging materials of horticultural crops, CAP / MAP Packaging of horticultural crops

UNIT2 PACKAGING OF TOILETRIES AND ENGINEERING GOODS

Duration: 10 Periods(L:6-T:4)

cosmetic products ,Introduction ,Factors effect on the cosmetic products-Air, Light ,Heat, Cold ;Cosmetic packaging materials.

Soap, detergent and dirt; desired attributes of a soaps & detergents, Forms of soaps, detergent bar ,detergent powder and detergent liquid packaging, Packaging materials for soap, detergent bars and detergent powder/liquids

Packaging of light engineering products: Classification -Industrial and Consumer products-Packaging of Electronic goods

Packaging of heavy engineering goods: General considerations, Investigation of the product, Mode of transport, Durability of the package, Economic considerations ,Procurement of material

UNIT 3 PACKAGING OF FERTILIZERS, PESTICIDES

Duration: 10 Periods(L:6-T:4)

Packaging of fertilizers: Introduction, Packaging materials ,Recent developments in packaging materials,

Packaging of pesticides :Introduction, Formulation types ,Major factors governing the selection of packaging materials &packages, Economics , Transport, storage and Legal obligations.

UNIT 4 PACKAGING OF TEXTILES AND HANDICRAFTS

Duration: 10 Periods(L:6-T:4)

Packaging of textiles : Introduction, Different items of textiles requiring packaging ,Need for packaging of textiles ,Different items, modes and styles of packaging used in textiles

List of Indian standards (ISI) for packaging Materials used in packaging of Textiles meant for Inland and Export. Packaging of handicrafts :Introduction , Properties of Puffed rice and EP beads, Export packaging ,Recent developments.

UNIT 5 AEROSOL PACKAGING TECHNOLOGY

Duration: 10 Periods(L:6-T:4)

Introduction, Working principle of Aerosol with neat sketch, Aerosol cans, Aerosol valve ,Method of filling aerosol containers , comparison between liquid and gaseous propellants,Application of aerosols

UNIT 6 PACKAGING OF DANGEROUS GOODS

Duration: 10 Periods(L:6-T:4)

Introduction, General classification of chemicals and DG classification for packaging, Laws and regulations-national / international laws and, regulations for coding, marking and labelling, transport and, handling, Packaging of hazardous chemicals: Introduction , Requisites for packaging materials, common packages for hazardous chemicals.

Reference Books

1. Food Packaging F.A. Paine
2. Introduction to Packaging F.A. Paine

3. Hand Book of Packaging F.A .Paine
4. I.I.P Notes.

SUGGESTED LEARNING OUTCOMES

UNIT 1 PACKAGING OF HORTICULTURAL CROPS

List the Main causes of deterioration
Write the Role of Ethylene
Describe the Classification of Horticultural commodities according to their respiration rates,
Describe the Classification of Horticultural commodities according to their ethylene production
Understand the CAP / MAP Packaging of horticultural crops
List the Packaging materials for various horticultural crops

UNIT 2 PACKAGING OF TOILETRIES AND ENGINEERING GOODS

List the Factors effect on the cosmetic products
Write the Cosmetic packaging materials
Understand the terms soap, detergent and dirt
List the Desired attributes of a soap, detergent
Describe the Forms of soap packaging and detergent packaging
List the Packaging materials for soap, detergent bars and detergent powder
Understand Packaging Engineering Goods

UNIT 3 PACKAGING OF FERTILIZERS, PESTICIDES

Understand Packaging and its materials for Packaging of Fertilizers
List the Recent developments in packaging materials
Write the Major factors governing the selection of packaging materials and packages for Pesticides.
List the Requisites for packaging materials
Write the Common packages for hazardous chemicals

UNIT 4 PACKAGING OF TEXTILES AND HANDICRAFTS

Understand the Packaging of textiles
List the Different items of textiles requiring packaging
Write Need for packaging of textiles
List the Different items of packaging used in textiles
List of Indian standards (ISI) for packaging of textiles
Packaging of textiles meant for Inland
Understand packaging of handicrafts for exports

UNIT 5 AEROSOL PACKAGING TECHNOLOGY

Write the Working principle of Aerosol with diagram
List the Method of filling aerosol containers
What are the application of aerosols

UNIT 6 PACKAGING OF DANGEROUS GOODS

Write the Packaging Laws & Regulations on Dangerous Goods
List Standard DG Symbols
Understand Packaging of DG

Suggested Student Activities

21. Each student should visit library to refer to manual/Journals of Packaging related to packaging materials and components.
22. Each student should visit the Lab to know the materials used for packaging.
23. Each student will do the report on Types Different Packages available in the market
24. Prepare any one type of package carrying different food products in market.
25. Identify and prepare a list of materials used in the Different types of packaging applications.
26. Weekly Seminars/Quiz
27. Group discussions
28. Surprise tests

Suggested e-Resources:

14. **http://nptel.ac.in**
15. **www.iopp.org**
16. **https://www.propac.com/kinds-packaging/**
17. **https://www.kullabs.com/classes/subjects/units/lessons/notes/note-detail/6767**
18. **www.packagingclinic.com**
19. **www.iip.in.com**
20. **https://pcri.org**

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Ability to list packaging requirements based on product characteristics, distribution and markets conditions.	R/U/A	1,2,9	**8**
CO2	To select the proper packaging material on considering the product properties	R/U/A	1,2,9,10	**12**
CO3	Identify to select suitable primary package, secondary and tertiary package.	R/U/A	1,2,6,9	**8**
CO4	Analyze the various Transport considerations in selection of mode and type of load for transportation, laws and regulations en-route, permissions and	R/U	1,2	**12**

	permits of controlling authorities, transit hazards.			
CO5	Appreciate the technology of Aerosol and its applications.	R/U/A	1,2,5	**8**
CO6	Appreciate the packaging consideration for various industrial goods and hazardous goods.	R/U/A	1,2,3,8,9,10	**12**
				60

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-504EA – PRODUCT PACKAGING

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the requirements to be considered for packaging of Hazardous chemicals?
2. What are packaging materials used for Horticultural Crops
3. What are the different forms of soap packaging
4. What are the different Packaging material user for cosmetics

PART –B ***MARKS:2 X3 = 6***

NOTE: Answer ALL questions. Each question carries THREE marks.

5 (a).Define Soap, detergent and dirt.

(OR)

5 (b).Explain about CAP/MAP in packaging of Horticultural Crops

6 (a).What are the desired attributes of soaps and detergents

(OR)

6 (b).Explain briefly about Light Engineering goods?

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a).Classify the Horticultural commodities according to their rate of respiration and Ethylene production.

(OR)

7(b). What are the causes of deterioration of Horticultural Crops? Explain them briefly

8(a).What are the different considerations to be made for packaging of Heavy engineering goods ? Explain them briefly.

(OR)

8(b).Explain the working principle of an Aerosol with a neat sketch

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-504EA – PRODUCT PACKAGING

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the requirements to be considered for packaging of Hazardous chemicals?
2. What are the basic needs of Textiles packaging?
3. What are the different packaging materials used for meat and poultry?.
5. List out any Six fields of application of Aerosol containers.?
6. What are the packaging requirements for confectionery items ?
7. What are the different types of packaging materials used for pesticides?
8. What are the different types Food processing methods?

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).Define Soap, detergent and dirt. What are the basic needs of Textiles packaging ?

(OR)

9(b).Classify the Horticultural commodities according to their rate of respiration and Ethylene production.

10(a).Explain the methods of filling an Aerosol container.

(OR)

10(b).What are the basic components of an Aerosol? Explain them.

11(a).List out the various fields of application of Aerosol

(OR)

11(b).What are the advantages we can have, when fertilizers are sold after packaging?

12(a).Explain about the export packaging of Handicrafts.

(OR)

12(b).Explain briefly about Light Engineering goods?

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a).Explain about CAP / MAP in packaging of horticultural crops.

(OR)

13(b).List out the various causes of deterioration of horticultural crops. Explain

14(a).What are the different considerations to be made for packaging of Heavy engineering goods ? Explain them briefly.

(OR)

14(b).What are the Major factors governing the selection of packaging for pesticides.? Explain

15(a).Explain the working principle of an Aerosol with a neat sketch

(OR)

15(b).How Dangerous Goods are classified? Explain

16(a).Explain the classification horticultural crops according to their Ethylene production rate ?

(OR)

16(b).Explain the working principle of an Aerosol with a neat sketch

18PKG-504EA – PRODUCT PACKAGING
QUESTION BANK

PART-A

1. What is the Role of C2H2 in post harvest technology
2. Write about CAP/MAP in packaging of Horticultural Crops
3. What are packaging materials used for Horticultural Crops
4. What are the different forms of soap packaging
5. What are the different Packaging material user for cosmetics
6. Define soap, detergent and dirt
7. What are the different packaging materials user for Pesticides
8. What are the different packaging materials used for Pesticides
9. What are the benefits achieved when fertilizers are sold after packaging
10. What are the different types of materials user for fertilizer packaging?
11. Define an Aerosol? Give any two examples
12. List out the various fields of application of Aerosol
13. Define an Aerosol? What are its basic components
14. What are the basic components of Aerosol valve
15. Explain about types of propellants used in Aerosol?
16. Write any four fields of Application of Aerosols
17. Define an Aerosol system
18. What are the advantages we can get with packaging of fertilizers?
19. What are the different items of textiles requires packaging
20. What are the different styles of textile packaging
21. What are the basic needs of textiles packaging
22. List any four Indian standards (ISI) for packaging for textiles.
23. What are the different packages materials user for packaging of textiles
24. Expand the following terms related to Dangerous Goods ?
    a. a) IMO b) IATA c) HAZMAT
25. List out any four properties of puffer rice and EP beads (in a relation packaging of handicrafts)
26. List out any three international organizations on transport of dangerous goods?

PART-B

1. What are the factors which influence the $C_2 H_2$ production rate
2. What are the effects of C2H2 and quality of natural produce/ HORTICULTURAL CROPS
3. Classify the Horticultural commodities according to their rate of respiration
4. What are the causes of deterioration of Horticultural Crops? Explain them briefly
5. Classify the Horticultural crops according to the ethylene production rate
6. Explain the main casus of deterioration of HORTICULTURAL CROPS
7. Explain the classification of HORTICULTURAL CROPS according to C_2H_2 production rate
8. List out the various causes for destroys of Horticultural Produce. Explain them briefly
9. What are the desired attributes of soaps and detergents.
10. Explain briefly about the classification of Engineering goods.
11. Explain briefly about deterioration factors of cosmetic products.
12. Explain about packaging of Light engineering goods
13. What are the benefits achieved when fertilizers are sold after packaging
14. What are the different types of materials user for fertilizer packaging?
15. what are basic components of Aerosol valve .Explain
16. Explain the Role of C_2H_2 in post harvest technology

17. Explain about CAP/MAP in packaging of Horticultural Crops
18. What are the desired attributes of soaps and detergents
19. what are the packaging materials user for soaps and detergents
20. What are the deterioration factors of cosmetic products? Explain them briefly
21. What are the different types of Packages materials user for fertilizer?
22. What are the requirements to be considered for packaging of Hazardous chemicals
23. Explain about packaging of Hazardous chemicals
24. What are the advantages we can get with packaging of fertilizers?
25. What are the different items of textiles requires packaging
26. What are the different styles of textile packaging
27. What are the basic needs of textiles packaging
28. List any four Indian standards (ISI) for packaging for textiles.
29. What are the different packages materials user for packaging of textiles

PART-C

1. Explain the different considerations to be made for Packaging of Heavy Engineering goods?
2. Explain the methods of filling an Aerosol
3. What are the differences between liquefied and compressed gas propellants?
4. Explain the major factors to be governed the selection of packaging materials for pesticides
5. What are the major factors governed the selection to packaging materials for pesticides. Explain
6. What are the different packaging materials user for packaging of Handicrafts.
7. Explain the working principle of an Aerosol with a neat sketch
8. Explain the methods of filling an Aerosol
9. List out the differences between liquefied and compressed gas propellants
10. Explain the different factors to be considered for packaging of handicrafts
11. Explain about types of packages user for handicrafts
12. Explain about the export packaging of handicrafts.
13. How Dangerous Goods are classified? Explain
14. What are the information to be included on transport of dangerous goods ?
15. What are the General Packaging guidelines to be followed on transport of dangerous goods ?
16. What do you mean by Dangerous Goods ? Give examples
17. What are the United Nations Recommendations on the Transport of Dangerous Goods
18. Explain the classification of hazardous materials?.

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	PACKAGING AND ENVIRONMENT	Course Code	18PKG-504EB
Semester	**V**	Course Group	**:Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60 Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

18PKG-403C, 18PKG-404C

Course Outcomes

On completion of the course, the student will be able to :

CO1	To create awareness about the effect of packages on environment
CO2	To contribute towards optimization of packaging materials and aid in reuse and recycling of packages
CO3	To select package for export packaging with Standard marking symbols as per laws
CO4	To provide information about environmental pollution and how packaging contributes to it
CO5	To teach methods to minimize the wastages by optimization and recycling
CO6	To analyze about various international approaches in tackling environmental pollution

MID SEM –I EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

<table>
<tr><th colspan="8">SEMESTER END EXAMINATION</th></tr>
<tr><td rowspan="2">Sl No</td><td rowspan="2">Unit No.</td><td colspan="5">Questions to be set for SEE</td><td>Remarks</td></tr>
<tr><td colspan="3">R</td><td>U</td><td>A</td><td></td></tr>
<tr><td>1</td><td>I</td><td rowspan="6">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td rowspan="2"></td></tr>
<tr><td>2</td><td>II</td></tr>
<tr><td>3</td><td>III</td><td colspan="2" rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td><td rowspan="2"></td></tr>
<tr><td>4</td><td>IV</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">V</td><td rowspan="4">3</td><td rowspan="2">5, 6</td><td>9(b)
11(a)
11(b)</td><td>13(b)
15(a)
15(b)</td><td rowspan="2"></td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">VI</td><td rowspan="2">7,8</td><td>10(b)
12(a)
12(b)</td><td>14(b)
16(a)
16(b)</td><td rowspan="2"></td></tr>
<tr><td colspan="3">Total Questions</td><td colspan="2">8</td><td>8</td><td>8</td><td></td></tr>
<tr><td colspan="2" rowspan="3">Legend:</td><td>Remembering (R)</td><td colspan="5">1 Mark</td></tr>
<tr><td>Understanding (U)</td><td colspan="5">3 Marks</td></tr>
<tr><td>Application (A)</td><td colspan="5">5 Marks</td></tr>
</table>

Course Content

UNIT 1 Introduction to Packaging and the Environment

Duration: 10 Periods(L:6-T:4)

1.1. The concept of packaging and the environment
1.2. The concept of resource use
1.3. The concept of solid waste
1.4. The method of land filling
1.5. The method of incineration
1.6. The waste reduction and reuse

UNIT **2 Impact of Packaging on Environment**

Duration: 10 Periods(L:6-T:4)

2.1 Environmental pollution
2.2 Packaging disposal options

UNIT3 Recycling of Paper, PB, CFB

Duration: 10 Periods(L:6-T:4)

3.1 concept of recycling of paper and paper board
3.2 Sources of recycled paper
3.3 uses of recycled paper
3.4 Paper recycling process

UNIT4 Recycling of Plastics

Duration: 10 Periods(L:6-T:4)

4.1 concept of recycling of plastics
4.2 status of plastic recycling
4.3 Know about Primary and secondary recycling
4.4 Standard coding system

UNIT5 Recycling of Glass and Metals

Duration: 10 Periods(L:6-T:4)

5.1 concept of recycling of glass
5.2 Primary Recycling of glass
5.3 Secondary Recycling of glass
5.4 concept of recycling of metals
5.5 steel and aluminium recycling

UNIT6 Eco-Friendly Packaging, Export Packaging

Duration: 10 Periods(L:6-T:4)

6.1 '3R' concept
6.2 Considerations for export packaging
6.3 The Standard marking symbols
6.4 Degradable materials for packages

Reference Books

1. Packaging and the environment - Susan E M Selke
2. Packaging – An Introduction - Stanley Sacharow
3. Fundamentals of Packaging - F.A. Paine
4. The Packaging Users Hand Book - F.A. Paine
5. Hand Book of Package Engineering - J.F. Hanion

SUGGESTED LEARNING OUTCOMES

COURSE CONTENTS

UNIT 1 Introduction to Packaging and the Environment

Comprehend the concept of packaging and the environment
Know the concept of resource use
Explain the concept of solid waste
Explain the method of land filling
Explain the method of incineration
Explain the waste reduction and reuse

UNIT **2 Impact of Packaging on Environment**

Explain environmental pollution
Explain the Packaging disposal options

UNIT3 Recycling of Paper, PB, CFB

Explain the concept of recycling of paper and paper board
Explain the Sources of recycled paper
Explain the uses of recycled paper
Explain the Paper recycling process

UNIT4 Recycling of Plastics

Explain the concept of recycling of plastics
Explain the status of plastic recycling
Explain the Know about Primary and secondary recycling
Explain the Standard coding system

UNIT5 Recycling of Glass and Metals

Explain the concept of recycling of glass
Explain the Primary Recycling of glass
Explain the Secondary Recycling of glass
Explain the concept of recycling of metals
Explain the steel and aluminium recycling

UNIT6 Eco-Friendly Packaging, Export Packaging

Describe the '3R' concept
List the Considerations for export packaging
Explain the Standard marking symbols

Degradable materials for packages

Suggested Student Activities

29. Each student should visit library to refer to manual/Journals of Packaging related to packaging materials and their effect on environment.
30. Each student should visit the Lab to know the reduction methods of packaging materials.
31. Prepare any one type of package carrying different food products in market that will sustain.
32. Identify and prepare a list of materials used in the Different types of packaging applications and try to reduce the burden of it on Environment.
33. Each student should Participate in Haritha haram (Plantation) to reduce pollution
34. Quiz, Seminars
35. Group discussion
36. Surprise test

Suggested e-Resources:

21. http://nptel.ac.in
22. www.bpf.co.uk/packaging/environment.aspx
23. https://europen-packaging.eu/sustainability/packaging-environment.html
24. https://www.charlottepackaging.com/latest-news/packaging-affect-environment/
25. www.packagingclinic.com
26. www.iip.in.com
27. https://pcri.org

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	To create awareness about the effect of packages on environment	R/U/A	1,2,9,10	**8**
CO2	To contribute towards optimization of packaging materials and aid in reuse and recycling of packages	R/U/A	1,2,8,9,10	**12**
CO3	To select package for export packaging with Standard marking symbols as per laws	R/U/A	1,2,6,9	**8**
CO4	To provide information about environmental pollution and how packaging contributes to it	R/U	1,2	**12**

CO5	To teach methods to minimize the wastages by optimization and recycling	R/U/A	1,2,5	**8**
CO6	To analyze about various international approaches in tackling environmental pollution	R/U/A	1,2,3,8,9,10	**12**
				60

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-504E(B) – PACKAGING AND ENVIRONMENT

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the components of environment?
2. What are the methods of land fill?
3. What do you mean by environmental pollution?
4. What is environmental pollution?

PART –B ***MARKS:2 X3 = 6***

NOTE: Answer ALL questions. Each question carries THREE marks.

5 (a).Write about solid waste

(OR)

5 (b).Write about land fill.

6 (a).What is the beneficial use of solid waste?

(OR)

6 (b).What are the causes of environmental pollution?

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a).Write the advantages of land fill.

(OR)

7(b). What are the considerations for export packaging? Explain .

8(a). What are the effects the environment pollution? Explain .

(OR)

8(b).Explain recycling of aluminum

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER END EXAMINATION
18PKG-504E(B) – PACKAGING AND ENVIRONMENT

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the components of environment?
2. What are the methods of land fill?
3. What do you mean by environmental pollution?
4. What are the uses of recycled paper?
5. What is environmental pollution?
6. What do you mean by SCS (Standard Coding System)?
7. Define glass in packaging.
8. How do you define aluminum and steel in packaging industry?

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).Write about land fill.

(OR)

9(b).What is the beneficial use of solid waste?

10(a).What are the causes of environmental pollution? Explain

(OR)

10(b). Explain the recycling process of paper.

11(a). Explain the plastic recycling system.

(OR)

11(b).Explain how glass is related with environment.

12(a).Write about degradable materials for packages?

(OR)

12(b).Write about eco-friendly packaging?

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a). Write the advantages of land fill.

(OR)

13(b).Write about solid waste

14(a). What are the considerations for export packaging? Explain .

(OR)

14(b).What are the effects the environment pollution? Explain .

15(a).What are the standard marking symbols? Draw them

(OR)

15(b).Explain recycling of aluminum.

16(a).Explain the status of plastic recycling.

(OR)

16(b).Describe the basic concept of recycling of metals.

18PKG-504E(B) – PACKAGING AND ENVIRONMENT

QUESTION BANK

PART-A

1. What are the components of environment?
2. What are the methods of land fill?
3. What do you mean by environmental pollution?
4. What are the uses of recycled paper?
5. What is environmental pollution?
6. What do you mean by SCS (Standard Coding System)?
7. Define glass in packaging.
8. How do you define aluminum and steel in packaging industry?
9. What are the degradable materials for packages?
10. What do you know about eco-friendly packaging?
11. Define packaging and environment.
12. Define the term solid waste.
13. What is meant by recycling?
14. What do you mean by solid waste?
15. What are the uses of recycled plastic?
16. How can you prevent environmental pollution by plastics?
17. Write about primary recycling of glass.
18. What are the uses of recycled metals?
19. Define irradiation.
20. Write about export packaging.

PART-B

11. a) Write about land fill.
    b) What is the beneficial use of solid waste?
12. a) What are the causes of environmental pollution? Explain
13. Explain the recycling process of paper.
14. Explain the plastic recycling system.
15. Explain how glass is related with environment.
16. a) Define metal.
    b) What are the advantages of recycled aluminum and steel?
17. Explain the arguments against incineration.
18. Explain the arguments supporting incineration.
19. Explain the solutions to environmental pollution

PART-C

20. a) Write the advantages of land fill.

    b) Write about solid waste .

21. What are the considerations for export packaging? Explain .

22. What are the effects the environment pollution? Explain .

23. What are the standard marking symbols? Draw them

24. a) Explain the arguments against incineration.
    b) Explain the arguments supporting incineration.
25. Explain the solutions to environmental pollution.
26. a) What are the sources of recycled paper
    b) Explain the basic recycling process of paper based packaging materials.
27. a) Draw basic plastic recycling codes.
    b) Write about markets and recycling of plastic packaging.
28. a) Write about glass.
    b) What are the advantages of recycled glass.
29. Explain the advantages and disadvantages of recycled steel and aluminum over recycled plastic.
30. a) Explain recycling of aluminum.
    b) Explain recycling of steel.
31. Explain the standard marking symbols.

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**FOOD PRESERVATION PACKAGING**	Course Code	**18PKG-505EA**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60 Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

18PKG-303C and 18PKG-304C

On completion of the course, the student will be able to :

Course Outcomes

CO1	Describe the classification of foods and food spoilage and deterioration.
CO2	Analyse and choose a barrier material for a specific food product based on barrier properties studied.
CO3	Analyse and choose a preservation method for a specific food product based on product sensitivity and shelf life required.
CO4	Describe the various characteristics of foods and their sensitivities.
CO5	Ability to specify and supervise cold storage parameters / operation for a specific food product
CO6	Select the right type of package form for a specific food product, based on the product nature, form & size.

MID SEM –I EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATION						
Sl No	Unit No.	Questions to be set for SEE				Remarks
		R		U	A	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3 (5, 6)	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		3 (7,8)	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	
Total Questions		8		8	8	

Legend:	
Remembering (R)	1 Mark
Understanding (U)	3 Marks
Application (A)	5 Marks

Course Content

UNIT 1 - CLASSIFICATION OF FOODS, FOOD SPOILAGE AND DETERIORATION

Duration: 10 Periods(L:6-T:4)

To understand the various types of foods – their qualities – properties - To know the various factors effecting the food products – Microbiological growth – insect infestations – Abiotic spoilage

UNIT 2 - FRESH AND CHILLED FOODS

Duration: 10 Periods(L:6-T:4)

Meat and Poultry – preparation – properties –storage packaging – whole rate, vacuum, chilled transport MAP of poultry - Fish and shell fish – processors – chilling – handling & transportation, deterioration of fresh & chilled foods - Milk-Production of milk – properties, composition of milk – processing of milk – pasteurization spoilage of pasteurized milk – dairy products their storage – packaging

UNIT 3 - FRESH FRUITS AND VEGETABLES

Duration: 10 Periods(L:6-T:4)

Various fruits and vegetables – their growing process – properties – respiration – ripening-bacteriological condition – MAP nuts, seeds, & spices – preservation – packaging.

UNIT 4 - FROZEN AND HEAT PROCESSED FOODS

Duration: 10 Periods(L:6-T:4)

Freezing – various freezing methods – protection needed for storing – distribution – types of packages needed – freezer burn – frozen poultry – processing of meat – freezing fish – methods of storage and distribution – frozen fish products - Study the methods of processing food for preservation – effects of heat penetration – Aseptic processing and packaging of milk & dairy products, fruits, vegetables – ready to eat, convenience foods – irradiation – methods – applications –ultraviolet light- ultrasonic.

UNIT 5 - DRIED, MOISTURE SENSITIVE AND OTHER PROCESSED FOODS

Duration: 10 Periods(L:6-T:4)

Moisture level of dried & sensitive foods – oxygen scavengers – Dehydrated food – packaging requirements Preservation by chemical means – classifications – antioxidants – antibiotics – nitrite – Nitrate curing, Bacterial spoilage - fermented foods – types – characteristics – preservation packaging – fats & oils – factors effecting the spoilage

UNIT 6 - JUICES SOFT DRINKS AND ALCOHOLIC BEVERAGES

Duration: 10 Periods(L:6-T:4)

Nutritional significance - Non-alcoholic beverages - Juices - Nectars - Squashes - Cordials - Syrups - Equipment required - Processing - Alcoholic beverages - Pulping - Extraction - Fermentation - Beer -

Wine - Alcoholics – ciders – distilled spirit –'their' compositions - properties-factors effecting spoilage – prevention - Carbonation - Pasteurization - Packaging - Suitability for small-scale production

Reference Books

5. Food Packaging - F.A.Paine
6. Hand Book of Packaging - J.F. Hanlon & others
7. Packaging- an introduction – Stanely Sacharow
8. Encyclopedia of Packaging technology – John Willey

SUGGESTED LEARNING OUTCOMES

1.0 CLASSIFICATION OF FOODS, FOOD SPOILAGE AND DETERIORATION

Understand the different types of foods

To know the methods of food spoilage and deterioration

Name the methods involve in the process of biodeterioration

Outline the micro biological growth

Write the role of water in foods

Draw the sorption isotherm curve

2.0 FRESH AND CHILLED FOODS

Write the relationship between vacuum packaging and modified atmosphere packaging

Know the method of chilling

Formulate the quality and composition of milk

Write the is the effect of temperature on bacterial growth

Know the importance of pasteurization on dairy products

List out various dairy products

3.0 FRESH FRUITS AND VEGETABLES

Classify fruits and vegetables

Write Respiration and ripening is needed for fresh fruits and vegetables

Know role of temperature in fresh fruits and vegetables

Differentiate between nuts and seeds

Compare between fresh herbs and spices

4.0 FROZEN AND HEAT PROCESSED FOODS

Write the freeze burn

List various freezing methods

Understand the process of sterilization

Write the importance of UHT and pasteurization in dairy products

Understand Sous vide cooking mean

List out the various types of Irradiation

5.0 DRIED, MOISTURE SENSITIVE AND OTHER PROCESSED FOODS

List the methods of drying

Write is the role of moisture level of dried and moisture sensitive foods

Understand the active packaging systems

List out other processed foods

Classify various preservatives

Write the purpose of cured and smoked food

6.0 JUICES, SOFT DRINKS AND ALCOHOLIC BEVERAGES

Classify various alcoholic and Non-alcoholic beverages

Write the importance of fermentation

Write the bacteria involves in the fermentation process

Discuss the impact of carbonation in soft drinks

Acquire knowledge on major packaging systems for beverages

Write the manufacturing process of beer

Suggested Student Activities

37. Each student should visit library to refer to manual/Journals of food Packaging
38. Each student should visit the Lab to know the materials used for food packaging.
39. Each student will do the report on Types Different Packages available in the market
40. Prepare any one type of package carrying different food products in market.
41. Identify and prepare a list of materials used in the Different types of packaging applications.
42. Quiz and Group discussion

43. Surprise test

Suggested e-Resources:

28. https://www.iopp.org/
29. http://nptel.ac.in
30. www.packagingclinic.com
31. www.iip.in.com
32. https://pcri.org

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Describe the classification of foods and food spoilage and deterioration.	R/U/A	1,2,9	**8**
CO2	Analyse and choose a barrier material for a specific food product based on barrier properties studied.	R/U/A	1,2,9,10	**12**
CO3	Analyse and choose a preservation method for a specific food product based on product sensitivity and shelf life required.	R/U/A	1,2,6,9	**8**
CO4	Describe the various characteristics of foods and their sensitivities.	R/U	1,2	**12**
CO5	Ability to specify and supervise cold storage parameters / operation for a specific food product	R/U/A	1,2,5	**8**
CO6	Select the right type of package form for a specific food product, based on the product nature, form & size.	R/U/A	1,2,3,8,9,10	**12**
				60

Model Question papers

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-505EA - FOOD PRESERVATION PACKAGING

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What is food?
2. Define pasteurization
3. Classify different vegetables?
4. Define fermentation

PART –B ***MARKS:2 X3 = 6***

NOTE: Answer ALL questions. Each question carries THREE marks.

5 (a).Write about water activity $a_{w.}$

(OR)

5 (b).What is freezing? Why should the product be freezed?

6 (a).Write about the composition of fish.

(OR)

6 (b).Write different between spice and herbs.

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a).Explain about food Biodeterioration?

(OR)

7(b).Explain about radiation sterilization processes?

8(a).Explain different types of bacteria with a neat sketch?

(OR)

8(b).Explain different types of sterilization processes

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATIONS (C-18)
D.PKGT – V - SEMESTER EXAMINATION
18PKG-505EA - FOOD PRESERVATION PACKAGING

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What are the changes in food during refrigerated storage
2. What are the advantages of Vacuum Packaging?
3. What is the usual color of raw poultry?
4. What are the main methods of drying used in food processing?
5. What are the sources of food?
6. Write the composition milk
7. Write the methods of irradiation
8. Classify different methods of drying

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).Write about water activity a_w.
(OR)
9(b).Write about thawing?
10(a).Write the main classes of tea?
(OR)
10(b).Write about importance of microbiology in food.
11(a).Write about role of water in foods.
(OR)
11(b).What are the different types of freezing methods?
12(a).What are the different types of sterilization processes?
(OR)
12(b).What are the different preservation methods of fish?

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a).Explain briefly about processing of alcoholic beverages
(OR)
13(b).Explain briefly about pasteurization
14(a).Explain on Causes of food borne illness?
(OR)
14(b).Explain about different types of food processing methods?
15(a).Explain with neat sketch growth curve of microorganisms?
(OR)

15(b).Explain about food Biodeterioration?
16(a).Explain different types of bacteria with a neat sketch?
(OR)
16(b).Explain different types of sterilization processes

QUESTION BANK
18PKG-505EA - FOOD PRESERVATION PACKAGING

PART-A

1. Define pasteurization
2. Define carbonation
3. Define fermentation
4. Define smoking
5. Define cured fish
6. Define MAP?
7. Define CAP?
8. Define ROP?
9. Define sterilization.
10. Define smoking and curing.
11. Define nuts?
12. Define Vacuum Packaging?
13. Define blanching.
14. Define active packaging.
15. Define freeze curve.
16. Define fruit?
17. Define vegetable?
18. What is Biodeterioration?
19. What is freezing? Why should the product be freezed?
20. What are the changes in food during refrigerated storage
21. What do you mean by dehydration?
22. What are the advantages of Vacuum Packaging?
23. What is the usual color of raw poultry?
24. What is reduced oxygen packaging?
25. What is food?
26. What do you mean by dehydration process?
27. What are the main methods of drying used in food processing?
28. What is food irradiation?
29. What do you mean by HTST pasteurization?
30. What do you mean by fat spoilage?
31. What is freeze drying?
32. What is thawing?
33. What are the problems with cold-packaging?
34. What is freezing?
35. What do you mean by canning?
36. What do you mean by canning?
37. What do you mean by irradiation?
38. What is the purpose of blanching?

39. What do you mean by fat spoilage?
40. What are the problems with cold packaging?
41. What are the applications of irradiation?
42. What are the sources of food?
43. Write the composition milk
44. Write the methods of irradiation
45. Classify different methods of drying
46. Classify different types of alcoholic beverages
47. Classify different types of non-alcoholic beverages
48. Classify different fruits?
49. Classify different vegetables?
50. List the different dairy products
51. List out the food additives.
52. List out the fermented foods

PART-B

1. Write about blanching
2. Write about oxygen scavengers
3. Write about cured and smoked food
4. Write about sterilization process
5. Write about microbial growth phase
6. Write the main classes of tea?
7. Write about role of water in foods.
8. Write about importance of microbiology in food.
9. Write nutrition of nuts?
10. Write the characteristics of scotch.
11. Write short notes on Ohmic heating process
12. Write short notes on Causes of food-borne illness
13. Write different between spice and herbs.
14. Write about water activity $a_{w.}$
15. Write about the composition of fish.
16. Give the importance of microbiology in food.
17. Give four types of nuts and its nutrition.
18. What are the different types of sterilization processes?
19. What are the different types of freezing methods?
20. What are the different preservation methods of fish?
21. What are the different types of food processing methods?
22. What are the different ways of production of beer?
23. What are the different causes of food spoilage and deterioration?
24. What are the different types of nutrient in vegetables?
25. What are the different categories of beverages?
26. What are the different types of sterilization processes?
27. What are the different types of food sources?
28. What are the different categories of beverages?
29. What are sous vide? What are the different steps in sous vide?
30. What are the different types of spirit?
31. What are the different categories of beverages?
32. What are the different types of vodka drinks?
33. What are the different types of microbes?

34. Write role of effect of freezing on fish
35. Write the steps in sous vide process
36. How to prevent the food born diseases.
37. What are the conditions for spoilage of food?
38. What are the requirements of basic Aseptic system?
39. What are the main methods of drying used in food processing?
40. What is the need to Study Food Microbiology?
41. What do you mean by canning and Irradiation?
42. What are the Food Types in the Supermarkets?
43. What are the cured animal and cured vegetable products and advantages of freezing?
44. What is the difference between MAP and active packaging?

PART-C

1. Explain different types of bacteria with a neat sketch?
2. Draw flow chart for post harvest handling operation and explain briefly?
3. Draw Microbial growth phase and explain each phase on it.
4. Explain about food Biodeterioration?
5. Explain about radiation sterilization processes?
6. Explain about freezing methods?
7. Explain about microbial growth curve?
8. Explain about different preservation methods of fish?
9. Explain about different types of food processing methods?
10. Explain about different ways of production of beer?
11. Explain about the different causes of food spoilage and deterioration?
12. Explain about the different types of nutrient in vegetables?
13. Explain different types of vinegars.
14. Explain about freeze drying.
15. Explain different types of nut?
16. Explain with neat sketch growth curve of microorganisms?
17. Explain freeze curve
18. Explain different types of smoking
19. Explain different types of nut?
20. Explain with flow diagram classification of vegetables.
21. Explain the process of poultry preparation.
22. Explain the flowchart classification of vegetables.
23. Explain on Causes of food borne illness?
24. Explain foods?
25. Explain briefly about pasteurization
26. Explain briefly about processing of alcoholic beverages
27. Explain briefly about active packaging systems
28. Explain briefly about sterilization
29. Explain briefly about freezing methods
30. Explain abiotic spoilage and sorption isotherms
31. Describe Barrier or Hurdle concept.

Course Title :	REFRIGERATION AND COLD STORAGE	Course Code	18PKG-505EB
Semester	**V**	Course Group	**:Elective**
Teaching Scheme in Hrs(L:T:P)	**45:15:0**	Credits	**3**
Methodology	**Lecture + Assignments**	Total Contact periods:	**60 Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Department of Technical Education

State Board of Technical Education &Training (TS)

Pre requisites

Knowledge of 18 PKG-402C

On completion of the course, the student will be able to :

Course Outcomes

CO1	To understand various methods of refrigeration and analyze air refrigeration system.
CO2	To analyze & understand vapour compression, vapour absorption refrigeration systems.
CO3	To acquire knowledge on refrigerants, various equipment used in refrigeration.
CO4	To develop knowledge on air conditioning and understand psychrometry.
CO5	To learn about working of various air conditioning equipment.
CO6	To know about different applications of refrigeration, applications of air conditioning systems.

MID SEM –I EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	
MID SEM –II EXAM					
S.No	Unit Name	R	U	A	Remarks
1	Unit-III	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-IV	3, 4	6(a)	8(a)	

			6(b)	8(b)	
Total Questions		4	4	4	

SEMESTER END EXAMINATION						
Sl No	Unit No.	Questions to be set for SEE				Remarks
		R		U	A	
1	I	4	1	9(a)	13(a)	
2	II					
3	III		2	10(a)	14(a)	
4	IV					
5	V		3 (5, 6)	9(b) 11(a) 11(b)	13(b) 15(a) 15(b)	
6	VI		3 (7,8)	10(b) 12(a) 12(b)	14(b) 16(a) 16(b)	
Total Questions		8		8	8	

Legend:		
	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

Course Content

UNIT 1 - FUNDAMENTALS OF REFRIGERATION **10 Periods**

History –definition and meaning of refrigeration ,methods of refrigeration – units of refrigeration , COP – applications.

UNIT 2 VAPOUR COMPRESSION and VAPOUR ABSORPTION REFRIGERATION SYSTEM **10 Periods**

Principle and analysis of vapour compression refrigeration system ,flash chamber and accumulator. Principle of vapour absorption refrigeration –refrigerants and absorbents-there properties, Electrolux refrigeration.

UNITS 3 REFRIGERANTS **10 Periods**

Primary and secondary refrigerants with examples –requirements of a refrigerants –properties of refrigerants .

UNIT 4.APPLICATIONS OF REFRIGERATION **10 Periods**

Components – functions of components – working of domestic refrigerator – ice plant – dry ice – manufacture – cold storage – bottle cooler – milk chilling plant.

UNIT 5. FUNDAMENTALS OF AIR CONDITIONING **10 Periods**

Terms related to air conditioning – psychometric chart – comfort air conditioning –equipment – Air conditioner – winter –summer – year round air conditioner

UNIT 6. APPLICATIONS IN FOOD REFRIGERATION **10 Periods**

Method of refrigeration adopted for manufacture, processing, preserving, storing & distributing the various food products (Candy, Beverages, Meat, poultry, fish, dairy, fruits & vegetables)Method of refrigeration adopted in transportation computing loads (refrigeration) in freezers. Computing time for freezing – simple problems

Reference Books

1. Refrigeration & air conditioning --by Domakundavar
2. Refrigeration & air conditioning --by Arora
3. Refrigeration & air conditioning --by Ballany
4. Refrigeration & air conditioning --by Sarao&Gabi
5. Refrigeration & air conditioning --by Dosatt
6. food packaging - by F A Paine

SUGGESTED LEARNING OUTCOMES

On the completion of the course the student should be able to know

1. FUNDAMENTALS OF REFRIGERATION
   Meaning of refrigeration
   Methods of refrigeration
   Units of refrigeration
   Co efficient of performance (COP)
   Applications
   Air refrigeration

2. VAPOUR COMPRESSION and VAPOUR ABSORPTION REFRIGERATION SYSTEM
   Importance of vapour compression system
   Understand the vapor compression refrigeration system
   Know the principle of simple vapour absorption systems.
   Identify –absorber pairs in the above system
   Write the desirable properties of refrigerants absorbers
   Demonstrate the working of Electrolux and lithium Bromido absorption refrigeration system

3. REFRIGERANTS
   Know the Primary and secondary refrigerants
   Identify the requirements of refrigerants
   Write the Properties of the refrigerants
   Identify the commonly used refrigerants

4. APPLICATIONS OF REFRIGERATION
   Demonstrate the Domestic refrigerator, Ice-plant, Dry-Ice, Water cooler – cold storage

5. FUNDAMENTALS OF AIR CONDITIONING

Know the terms related to air conditioning – psychometric chart – comfort air conditioning – equipment – Air conditioner – winter –summer – year round air conditioner.

6. APPLICATIONS IN FOOD REFRIGERATION

Method of refrigeration adopted for manufacture, processing, preserving, storing & distributing the various food products (Candy, Beverages, Meat, poultry, fish, dairy, fruits & vegetables)
Method of refrigeration adopted in transportation computing loads (refrigeration) in freezers.
Computing time for freezing – simple problems

Suggested Student Activities

44. Each student should visit library to refer to manual/Journals of Air-Conditioning and Refrigeration
45. Each student should visit the Lab to know the fundamentals of refrigeration
46. Visit websites of NTPC, BHEL,, NHPC, NPCIL, GEDA, SUZLON, GE, SIEMENS, ENERCON and KPC etc and find out the technical information about their machineries or Plants.
47. Download technical specifications/ catalogues, videos or any other suitable presentations on gas turbine power plant

5 Download technical specifications/ catalogues, videos or any other suitable presentations on gas turbine power plant.
6 Quiz, Seminars
7 Group discussion
8 Surprise test

Suggested e-Resources:

1. www.wikihow.com
2. Visit nearest outlet and list out Domestic Refrigerators manufacturers and know the capacity of the refrigerator and the refrigerant used in it.
3. Visit a central air conditioning plant.
4. Working of domestic refrigerator

: https://www.youtube.com/watch?v=h5wQoA15OnQ&vl=en

5. Working of window air conditioner:

https://www.youtube.com/watch?v=0PkOEHMNOLk

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	To understand various methods of refrigeration and analyze air refrigeration system.	R/U/A	1,2,9	**8**
CO2	To analyze & understand vapour compression, vapour absorption refrigeration systems.	R/U/A	1,2,9,10	**12**
CO3	To acquire knowledge on refrigerants, various equipment used in refrigeration.	R/U/A	1,2,6,9	**8**
CO4	To develop knowledge on air conditioning and understand psychrometry.	R/U	1,2	**12**
CO5	To learn about working of various air conditioning equipment.	R/U/A	1,2,5	**8**
CO6	To know about different applications of refrigeration, applications of air conditioning systems.	R/U/A	1,2,3,8,9,10	**12**
				60

State Board of Technical Education, Telangana State
Model Paper- 18
18PKG-505EB Refrigeration and Cold Storage
Mid Sem-I

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART –A ***MARKS: 4 X 1 = 4***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. Define the term Refrigeration effect. Write its units.
2. Write two limitations of reverse carnot refrigeration cycle.
3. List the operations involved in A VCR cycle
4. What is secondary refrigerant? Explain with examples

PART –B ***MARKS:2 X3 = 6***

NOTE: Answer ALL questions. Each question carries THREE marks.

5 (a).Describe briefly working of Bell coleman Air refrigeration cycle.

(OR)

5 (b).Explain about (i) Ice refrigeration (ii) Dry Ice refrigeration.

6 (a). Find COP of a refrigerating machine working on reverse carnot refrigerating cycle operating between -10 ° C and 40° C .

(OR)

6 (b).Explain briefly working of solar powered VARS.

PART –C ***MARKS:2 X5 =10***

NOTE: Answer ALL questions. Each question carries FIVE marks.

7(a).Explain the working principle of Electrolux refrigerator with a neat sketch?

(OR)

7(b).Explain any four properties of the following refrigerants

i) Ammonia
ii) Freon – 11
iii) Freon – 12

8(a).Describe the working principle of domestic refrigerator with a neat sketch ?

(OR)

8(b).Draw Line diagram of a simple VCR system and Explain briefly

State Board of Technical Education, Telangana State
C18-Semester End Examination (SEE)
Model Paper-
18PKG-505EB REFRIGERATION AND COLD STORAGE

TIME: TWO HOURS **MAXIMUM MARKS: 40**

PART –A ***MARKS: 8 X1 = 8***

NOTE: Answer ALL questions. Each question carries ONE marks.

1. What is Ton of Refrigeration
2. Define the term Coefficient of Performance (COP)
3. What are the applications of VCR system.
4. What is the need of VCR system
5. Write any three properties of Refrigerant-Absorbent pair
6. What are the Advantages of secondary Refrigerant
7. What are the applications of Dry Ice.
8. Define the term Human comfort?

PART –B ***MARKS:4 X3 =1 2***

Answer ALL questions. Each question carries THREE marks.

9(a).An air refrigeration plant working on carnot cycle between the temperature limits of 30^0c and -5^0c has a capacity of 10 tons. Determine power input to the plant

(OR)

9(b).Explain any four properties of the following refrigerants

i) Ammonia
ii) Sulphur dioxide

10(a).What is primary refrigerant? Give examples

(OR)

10(b).What are the advantages and disadvantages of dry ice

11(a).Draw Line diagram of a simple VCR system

(OR)

11(b).Explain the working principle of Lithium Bromide

12(a).Write the different types of freezing types

(OR)

12(b).Define the terms (1) Dry bulb temperature (2) Wet bulb temperature

PART –C ***MARKS:4 X5 =20***

Answer ALL questions. Each question carries FIVE marks.

13(a).Explain the working principle of Electrolux refrigerator with a neat sketch?

(OR)

13(b).An air refrigeration plant working on carnot cycle requires 6.2 kw. It works between temperature limits of 34^0c and -10^0c. Determine the capacity of the plant in tons of refrigeration

14(a).Draw Line diagram of a simple VCR system and Explain briefly

(OR)

14(b).Explain the working principle of simple vapour absorption refrigeration system with a line Diagram

15(a).Draw lay out of an ice plant and explain the manufacture of ice

(OR)

15(b).Explain working principle of a window air conditioner

16(a). Draw lay out of an ice plant and explain the manufacture of ice.

(OR)

16(b).Explain any four properties of the following refrigerants

i) Ammonia
ii) Freon – 11
iii) Freon – 12

18PKG-506P, PACKAGE MACHINERY LAB PRACTICE

Course Title :	**PACKAGE MACHINERY LAB PRACTICE**	Course Code	**18PKG-506P**
Semester	**V**	Course Group	**:Core**
Teaching Scheme in Periods(L:T:P)	**15:00:30**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact periods :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of 18PKG-502C

Course Content and Blue Print of Marks for SEE

Unit No	**Unit name**	**Hours/ Periods**	**Questions for SEE**			**Marks weightage**	**%Weightage**
			Handling	**Manipulation**	**Precision**		
1.	Study & demonstration of volumetric filling of liquid	6	15	10	15	40	100
2.	Study & demonstration of filling dry product	6	15	10	15	40	100
3.	Study & demonstration of carton forming processes.	3	15	10	15	40	100
4.	Study & demonstration on bag making machine	6	15	10	15	40	100
5.	Study & demonstration on box making machine	6	15	10	15	40	100
6.	Study & demonstration on various labelling methods	3	15	10	15	40	100

7.	Study & demonstration on various blister forming methods	6	15	10	15	40	100
8.	Study & demonstration on Strip Packaging Machine.	3	15	10	15	40	100
9.	Study & demonstration on continuous form – fill – seal machines	6	15	10	15	40	100
	Total	45					

Course outcomes

on successful completion of this course, the learner will be able to….

Course Outcome		CL	Linked PO	Teaching Hours
CO1	To demonstration of volumetric filling of Solid, Semi-solid and liquid products	R/U/A	1,2,3,4,7,9,10	9
CO2	To demonstration of carton, bag and box making forming processes	R/U/A	1,2,3,4,7,9,10	6
CO3	To demonstration on various labelling methods	R/U/A	1,2,3,4,7,9,10	9
CO4	To demonstration on various blister forming methods	R/U/A	1,2,3,4,7,9,10	9
CO5	To Study & demonstration on Strip Packaging Machine.	R/U/A	1,2,3,4,7,9,10	6
CO6	To demonstration on continuous form – fill – seal machines	R/U/A	1,2,3,4,7,9,10	6

Course Contents

Study & demonstration of volumetric filling of liquid
Study & demonstration of filling dry product
Study & demonstration of carton forming processes.
Study & demonstration on bag making machine
Study & demonstration on box making machine
Study & demonstration on various labelling methods
Study & demonstration on various blister forming methods
Study & demonstration on Strip Packaging Machine.
Study & demonstration on continuous form – fill – seal machines

State Board of Technical Education and Training, Telangana

Semester End Examination Model Question paper

DPKGT V semester practical Examination

Corse Code:18PKG-506P **Duration:2 hours**

Course Name: PACKAGE MACHINERY LAB PRACTICE **Max.Marks:40**

Instructions to the Candidate:

Answer any One of the following Questions.

1. Perform volumetric filling of liquid
2. Perform filling dry product
3. Perform carton forming processes.
4. Perform bag making machine
5. Perform box making machine
6. Perform various labelling methods
7. Perform various blister forming methods
8. Perform Strip Packaging Machine.
9. Perform continuous form – fill – seal machines

18PKG-507P CAD LAB PRACTICE

Course Title :	**COMPUTER AIDED DESIGN LAB PRACTICE**	Course Code	**18PKG-507P**
Semester	**V**	Course Group	**:Core**
Teaching Scheme in Periods(L:T:P)	**15:00:30**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact periods :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

CAD lab practice

SUGGESTED OBJECTIVES

1.0 Upon completion of the course the student shall be able to understand the concepts of 3D

1.1. View entities in three dimensions

- To set a new viewing direction
- To dynamically set a view direction

2.0 Create three-dimensional entities using different methods

- Draw two dimensional entities in three dimensional space
- Convert two dimensional planar entities into three dimensional entities by applying elevation and thickness
- Convert two dimensional planar entities into three dimensional entities by revolving or extruding.

1.1 Create three-dimensional faces
1.2 Create rectangular meshes
1.3 Create ruled surface meshes
1.4 Create extruded surface meshes
1.5 Create revolved surface meshes
1.6 Create three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions,
1.7 Create extruded solids
1.8 Create revolved solids
1.9 Create composite solids
1.10 Create intersect solids

3.0 Edit in three dimensions

3.1 Rotate in three dimensions
3.2 Array in three dimensions (Rectangular and polar)
3.3 Mirror in three dimensions
3.4 Align in three dimensions

4.0 Edit three dimensional solids

4.1 Practice Sectioning and Slicing solids
4.2 Practice hiding, shading and rendering

5.0 Practice the selection of material from library

5.1 Enable material library
5.2 Edit materials and material library

6.0 Appreciate the importance of Solid Modelling software like CREO (PRO-E) UNIGRAPHICS / CATIA

6.1 Use any of the solid modelling packages stated above and generate a solid model of a machine component for different 3D components

Exercise	Key components	Periods
1.0 View entities in three dimensions	A. Set a new viewing direction B. Set dynamically view direction	**02**
2.0 Create three-dimensional entities	A. Create three-dimensional faces B. Create rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes C. Create three dimensional entities such as boxes, Cylinders.	**18**
3.0 Edit in three dimensions	A. Rotate in three dimensions B. Array in three dimensions (Rectangular and polar) C. Mirror in three dimensions D. Align in three dimensions	**06**
4.0 Edit three dimensional solids	A. Practice Sectioning and Slicing solids B. Practice hiding, shading and rendering	**10**
5.0 Practice the selection of material from library	A. Enable material library B. Edit materials and material library	**03**
6.0 Appreciate the importance of Solid Modelling software like PRO-E / UNIGRAPHICS /	A. Use any of the solid modelling packages stated above and Generate a solid model of a machine component for different 3D components using Solid modelling packages	**06**

CATIA		
Total		**45**

Key Competencies to achieved by the student – CAD lab practice

COURSE CONTENT

Viewing entities in three dimensions

- setting a new viewing direction
- dynamically setting a view direction

Creation of three-dimensional entities using different methods

- Drawing of two dimensional entities in three dimensional space
- Converting two dimensional planar entities into three dimensional entities by applying elevation and thickness
- Converting two dimensional planar entities into three dimensional entities by revolving or extruding.

Creation of three-dimensional faces, rectangular meshes, ruled surface meshes, extruded surface meshes, revolved surface meshes, three dimensional entities such as boxes, Cylinders, Cones, Spheres, wedges, torus, Regions, extruded solids, revolved solids, composite solids, intersect solids.

Editing in three dimensions

Rotating in three dimensions, Array in three dimensions (Rectangular and polar)

Mirroring in three dimensions, Aligning in three dimensions

Editing of three dimensional solids

Sectioning and Slicing of solids, hiding, shading and rendering

Selection of material from library

Enable the material library, Editing materials and material library

The importance of Solid Modelling software like PRO-E / UNIGRAPHICS / CATIA

Use any of the solid modelling packages stated above and generate a solid model of a machine component for different 3D components

18PKG-508P, PAPER BASED MATERIALS TESTING LAB PRACTICE

Course Title :	**TRANSPORT WORTHINESS LAB PRACTICE**	Course Code	**18PKG-508P**
Semester	**V**	Course Group	**:Core**
Teaching Scheme in Periods(L:T:P)	**15:00:30**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact periods :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Pre requisites

This course requires the basic knowledge of 18PKG-403C

Course Content and Blue Print of Marks for SEE

Unit No	**Unit name**	**Hours/ Periods**	**Questions for SEE**			**Marks weightage**	**%Weightage**
			Handling	**Manipulation**	**Precision**		
1.	Compression test for transport package	3	15	10	15	40	100
2.	Drop test for transport package	3	15	10	15	40	100
3.	Study of Horizontal impact test (pendulum, horizontal & inclined)	6	15	10	15	40	100
4.	Vibration test of filled packages	3	15	10	15	40	100
5.	Stack load test for CFB	6	15	10	15	40	100
6.	Scuff resistance Test	6	15	10	15	40	100
7.	Crush strength	6	15	10	15	40	100
	Total	45					

Course outcomes

on successful completion of this course, the learner will be able to….

Course Outcome		CL	Linked PO	Teaching Hours
CO1	To determine compression strength of various packaging materials	R/U/A	1,2,3,4,7,9,10	9
CO2	To determine the package performance by conducting Drop test	R/U/A	1,2,3,4,7,9,10	6
CO3	To determine bursting strength burst factor of paper.	R/U/A	1,2,3,4,7,9,10	9
CO4	Estimate the Stock load capacity of CFB box	R/U/A	1,2,3,4,7,9,10	9
CO5	To determination of Scuff resistance of various packaging materials	R/U/A	1,2,3,4,7,9,10	6
CO6	To determination of Crush strength of various packaging materials	R/U/A	1,2,3,4,7,9,10	6

Course Contents

Transport worthiness of filled packages (IS: 7028)

1. Compression test for transport package (IS : 7028)

2. Drop test for transport package (IS : 7028)

3. Horizontal impact test (pendulum, horizontal & inclined) (IS : 7028)

4. Vibration test of filled packages. (IS : 7028)

5. Stack load test for CFB

6. Scuff resistance Test

7. Crush strength.

State Board of Technical Education and Training,Telangana

Semester End Examination Model Question paper

DPKGT V semester practical Examination

Corse Code:18PKG-508P **Duration:2 hours**

Course Name: TRANSPORT WORTHINESS LAB PRACTICE **Max.Marks:40**

Instructions to the Candidate:

(i)Answer any One of the following Questions.

(ii)Record the results on a graph sheet if required , and conclude your observation of the experiment

(iii) Draw the diagram for illustration ,choose appropriate values when not mentioned in the question

1. Determine the compression strength a given packaging materials experimentally for a completely filled package .
2. Determine the package performance by conducting Drop test for a completely filled package .
3. Determination of Burst strength of various packaging materials
4. Determination of Crush strength of various packaging materials
5. Determination of Scuff resistance of various packaging materials
6. Determine the package performance by conducting Compression test
7. Determine the package performance by conducting Vibration test
8. Determine the package performance by conducting Impact test

Department of Technical Education

State Board of Technical Education &Training (TS)

Course Title :	**Programming in 'C' lab Practice**	Course Code	**18PKG-509P**
Semester	**V**	Course Group	**Core**
Teaching Scheme in Periods(L:T:P)	**15:00:30**	Credits	: **1.5**
Methodology	**Lecture + Practical**	Total Contact periods :	**:45Pds**
CIE	**60 Marks**	SEE	**40 Marks**

Course Content and Blue Print of Marks for SEE

Unit No	Unit name	Hours/ Periods	Marks for SEE		
			Coding	Compilation	Execution
1	Input/output statements, variables and operators	**6**	**6**	**0**	**0**
2	Decision making, branching and loop statements	**13**	**4**	**4**	**4**
3	Arrays and strings	**13**	**4**	**4**	**4**
4	Functions, Structures and Unions	**13**	**4**	**4**	**4**
	Total	**45**	**40**		

Pre requisites

Knowledge of Computer Operation.

Course outcomes

Course Outcome	
CO1	Write programs using input/output statements, variables and operators
CO2	Demonstrate decision making, branching and loop statements
CO3	Construct programs on arrays and strings
CO4	Develop programs using functions, structures and unions

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

List of Programmes:

1. Input/output statements, variables and operators

1. Exercise on structure of C program
2. Exercise on Keywords and identifiers
3. Exercise on constants and variables
4. Execution of simple C program
5. Exercise on operators and expressions
6. Exercise on special operators
7. Exercise on input and output of characters
8. Exercise on formatted input and output

2. Decision making, branching and loop statements

1. Exercise on simple if statement
2.. Exercise on if..else statement
3.. Exercise on else..if ladder statement
4. Exercise on switch statement
5. Exercise on conditional operator

6. Exercise on while statement
7. Exercise on for statement
8. Exercise on do...while statement

3. Arrays and strings

1. Exercise on one dimensional arrays
2. Exercise on two dimensional arrays
3. Exercise on strings

4.Functions, Structures and Unions

1. Exercise on user-defined function
2. Exercise on recursion
3. Exercise on structure
4. Exercise on array of structures

REFERENCE BOOKS

1. **Let Us C -- Yeshwanth Kanetkar BPB Publications**
2. **Programming in ANSI C -- E. Balaguruswamy Tata McGrawHill**
3. **C The complete Reference -- Schildt Tata McGraw Hill**

E-learning links

1. http://www.tutorialspoint.com/cprogramming/
2. http://www.indiabix.com/online-test/c-programming Test/
3. https://fresh2refresh.com/c-programming/
4. http://www.learn-c.org/
5. https://www.javatpoint.com/c-programming-language-tutorial
6. https://www.cprogramming.com/tutorial/c-tutorial.html

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching periods
CO1	Write programs using input/output statements, variables and operators	**R, U, A**	**1,2,3,4,8,9 ,10**	**5**
CO2	Demonstrate decision making, branching and loop statements	**R, U, A**	**1,2,3,4,8,9 ,10**	**15**
CO3	Construct programs on arrays and strings	**R,U, A**	**1,2,3,4,8,9 ,10**	**10**
CO4	Develop programs using functions, structures and unions	**U, A**	**1,2,3,4,8,9 ,10**	**15**
CO5	Write programs using input/output statements, variables and operators	**R, U, A**	**1,2,3,4,8,9 ,10**	**5**
	Total Sessions			**45**

State Board of Technical Education and Training, Telangana
Semester End Examination Model Question paper

DPKG IV semester practical Examination

Corse Code:18PKG-509P **Duration:2 hours**

Course Name: Programming in C'Lab Practice

Max.Marks:40

Instructions to the Candidate:

Answer any One of the following Questions.

1. Exercise on structure of C program
2. Exercise on Keywords and identifiers
3. Exercise on constants and variables
4. Execution of simple C program
5. Exercise on operators and expressions

6. Exercise on special operators

7. Exercise on input and output of characters

8. Exercise on formatted input and output

9. Exercise on simple if statement

10. Exercise on if..else statement

11. Exercise on else..if ladder statement

12. Exercise on switch statement

13. Exercise on conditional operator

14. Exercise on while statement

15. Exercise on for statement

16. Exercise on do...while statement

17. Exercise on one dimensional arrays

18. Exercise on two dimensional arrays

19. Exercise on strings

20. Exercise on user-defined function

21. Exercise on recursion

22. Exercise on structure

23. Exercise on array of structures

SCHEME OF INSTRUCTIONS AND EXAMINATION

510-PROJECT WORK

V SEMESTER

Sl. No	Subject	Items	Max Marks
1	Project work	**CIE**	
		1. Mid - I: Abstract submission – (Marks awarded by the Guide)	20
		2. Mid – II: Content development/ literature survey, data collection/prototype etc. - (Marks awarded by the Guide)	20
		3.Internal evaluation - (Marks awarded by the Guide)	20
		SEE	
		4.a) Final report Submission b) Seminar /Viva Voce (Marks awarded by the External Examiner, Head of Section (i.e. Internal Examiner) and Guide).	20 20
Total			**100**

The Major Project shall carry 100 marks and pass marks are 50% a candidate failing to secure the minimum marks.

Course out comes:

The student should be able to

1.Applying the concepts of Packaging Design Knowledge to solve engineering ,and societal problems

2.Demonstrate the knowledge to assess safety, legal issues and consequent responsibilities

3.To function effectively as an individual and as a member in a team

4.To communicate effectively

5. To engage in life long learning in the context of technological changes

RUBRICS 1: level of achievement

	GOOD	AVERAGE	ACCEPTABLE	UNACCEPTABLE
Identification of problem	Good explanation of the purpose and need of the project	average explanation of the purpose and need of the project	Moderate explanation of the purpose and need of the project	Minimal explanation of the purpose and need of the project
Study the existing systems	Collects a great deal of information and good study of the existing systems	Collects some basic information	Limited information	Incomplete information
Objectives and methodology	Good justification to the objectives	Incomplete justification to the objectives	Only some objectives of the proposed	Objectives of the proposed work are either not identified or not well

1.Identification of problem and explanation of the purpose and need of the project (30 Marks)

2.Detailed study of the existing systems and feasibility of project proposal (30 Marks)

3.Methodology and Abstract submission(40 Marks)

RUBRICS2: Project

	GOOD	AVERAGE	ACCEPTABLE	UNACCEPTABLE
Incorporation of suggestions	Changes are made as per modification	All major changes are made as per modification	Few changes are made	Suggestions are not incorporated
Project demonstration	All defined objectives are achieved	All modules are achieved	Some of the defined objectives are achieved	Defined objectives are not achieved
Demonstration and presentation	Objectives achieved as per	Objectives achieved as per	Objectives achieved as per	No Objectives

	time frrame	time frrame	time frrame	achieved as per time frrame

1.Changes are made as per modifications suggested and new innovations added(30 Marks)

2. complete explanation of the key concepts strong description of the technical requirements(30 Marks) of the project

3.objectives achieved as per time frame(40 Marks)

SKILL UPGRADATION IN

V SEMESTER

Course Title :Skill Upgradation	**Course Code :-**
Semester :V	**Course Group :Practical**
Teaching Scheme in Periods (L:T:P:) : 0:0:105	**Credits :2.5**
Methodology : Practicals	**Total contact periods :105**

1. Each student should visit library to refer to manual/Journals of industrial management
2. Each student should visit the nearby industry to know the organization structure
3. Each student will do the report on different types of industries.
4. Each student should visit the nearby industry to know the production and materials management
5. Each student should visit library to refer to manual/Journals of Packaging machines related to packaging processes.
6. Each student should visit the Lab to know the processes used for packaging.
7. Each student will do the report on Types of Different Packaging machines available in the market
8. Identify and prepare a list of materials used in the Different types of packaging processes and their machineries.
9. Each student should visit library to refer to manual/Journals of drug Packaging related to packaging materials and components.
10. Each student should visit the Lab to know the materials used for packaging.
11. Each student will do the report on Types Different Packages available in the pharma industry
12. Analyze the composition of different pharma packages.
13. Identify and prepare a list of materials used in the Different types of drug packaging applications.
14. Each student should visit library to refer to manual/Journals of plate surface preparation & post press related to printing materials and components.
15. Each student should visit the Lab to know the different post press materials used for printing.
16. Each student will do the report on types of different techniques of pre and post press methods available in the market
17. Identify and prepare a list of materials used in the post press.
18. Each student should visit library to refer to manual/Journals of Packaging related to packaging materials and components.
19. Each student will do the report on Types Different Packages available in the market
20. Prepare any one type of package carrying different food products in market.
21. Identify and prepare a list of materials used in the Different types of packaging applications.

22. Each student should visit library to refer to manual/Journals of Packaging related to packaging materials and their effect on environment.
23. Each student should visit the Lab to know the reduction methods of packaging materials.
24. Prepare any one type of package carrying different food products in market that will sustain.
25. Identify and prepare a list of materials used in the Different types of packaging applications and try to reduce the burden of it on Environment.
26. Each student should Participate in Haritha haram (Plantation) to reduce pollution