

WEST BENGAL STATE COUNCIL OF TECHNICAL EDUCATION											
TEACHING AND EXAMINATION SCHEME FOR DIPLOMA IN ENGINEERING COURSES											
COURSE NAME: FULL TIME DIPLOMA IN PACKAGING TECHNOLOGY											
DURATION OF COURSE: 6 SEMESTERS											
SEMESTER: 5th											
BRANCH: PACKAGING TECHNOLOGY											
SR. NO	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	Food preservation & Packaging	5	3	-	3	10	20	30	70	100	200
2	Packaging Technique & Machinery	3	3		-	10	20	30	70	-	100
3	Packaging Economics Legislation & Management	3	3	-	-	10	20	30	70	-	100
4	Package printing Technology	5	3		3	10	20	30	70	100	200
5	Principle of Refrigeration & fluid mechanics	3	2		2	5	10	15	35	50	100
6	Packaging Technology lab 6	2		-	4	-	-	-	-	100	100
7	Industrial project & Entrepreneurship Development	2	1	-	2	-	-	-	-	50	50
9	Professional Practice-III	2	1	-	2	-	-	-	-	50	50
<b>Total:</b>		<b>25</b>	<b>16</b>	<b>-</b>	<b>16</b>	<b>45</b>	<b>90</b>	<b>135</b>	<b>315</b>	<b>450</b>	<b>900</b>
<b>STUDENT CONTACT HOURS PER WEEK:33 hrs</b> <b>Theory and Practical Period of 60 Minutes each.</b> <b>L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.</b>											

Name of the course : <b>Food preservation &amp; Packaging</b>			
Course code: PT/FPP/S5		Semester: 5th	
Duration: 17 Weeks		Maximum Marks: 100	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 3hrs/week Tutorial: Nil		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
<b>Practical:</b> 3hrs/week Name of the course : <b>Food processing &amp; Packaging lab</b> Course code: <b>PT/LFPP/S5</b>		Practical: 100 Continuous Internal Assessment : 50 External Assessment : 50	
Credit: 5			
Objective: Students will be to understand.			
<ul style="list-style-type: none"> <li>• Basic concepts of preservation of food products and other items.</li> <li>• Handling and storage of food products.</li> <li>• Handling and storage of other consumable products.</li> <li>• Develop an in-depth technical knowledge regarding packaging processes of food and other specific items.</li> </ul>			
Contents:			
		Hrs./unit	Marks
Unit – 1	<p><b>Food preservation by Canning</b> General Canning technique Can lacquer, can filling solution, Can construction, mechanical defects Can defects, aseptic canning</p> <p><b>Food preservation by Drying</b> Concept of drying, drying curve (no problem required) Different type of driers – solar, tray, spray, fluidised bed drying, tunnel drier, drum drier (working principles with schematic diagram only) Concept of critical moisture, equilibrium moisture content, Concept osmotic dehydration, IMF food</p>	10	
Unit – 2	<p><b>Food preservation by Freezing</b> Refrigeration and Freeze Drying Different phases of freeze drying, freezing curve Types of freezer – plate, blast, immersion, cryogenic freezing (principles, schematic diagram &amp; use only)</p> <p><b>Preservation by Fermentation</b> Introduction to fermentation (general view) Different fermented food (name, source &amp; use)</p>	8	
Unit – 3	<p><b>Preservation by Irradiation</b> Principles, measurement unit, Effect of irradiation on food</p>	8	

	product <b>Use of preservative in foods</b> Chemical preservative <b>CA Storage and MAP</b> Basic principle of CA and MA storage of fruits and vegetables		
Unit – 4	<b>Packaging Systems</b> Packaging Systems: Vacuum and gas packaging, aseptic packaging, intelligent packaging, active packaging, shrink packaging, PET, tetra pack. Edible packaging, Biodegradable polymeric films, Bio-plastic.	10	
Unit – 5	<b>Packaging Requirements</b> Packaging requirements of different types of foods: fruits and vegetables, meat, fish, poultry product, dairy products, edible oils and spice products, cereal product, bakery products, confectioneries, snack foods, tea, coffee, beverages.	12	
	Total	42(Lecturer +Tutorial)	70
Internal assessment Examination and preparation for semester examination		3 weeks (6Lecture hour)	
Total		51 Lecture hour (17 Weeks)	

Text and Reference Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	S. Natarajan M. Govindarajan B.Kumar	Fundamental of Packaging Technology	PHI Learning Private Limited.
2.		Hand book of Packaging Technology	Engineers India Research Institute
3	D.R. Heldman & R.P. Singh / AVI	Food Process Engineering	
4	G. Subbulakshmi & S.A. Uddipi	Food Processing and Preservation	New Age International
5	N.W Desrosier	The Technology of Food preservation	AVI
6	B. Srilaxmi	Food Science	New Age International
7	N. Shakuntala Manay & M. Shadaksharaswamy	Foods Facts and Principles	New Age Publication

8	Khetarpaul and punia,	Food Packaging	Daya pub. House
9	Indian institute of packaging	Packaging of food products-	
10	N.T.Crosby	Food Packaging Materials	published by Applied Science
11	F.T.Day	Packaging of Food Beverages	
12	Sacharow & Griffin	Food Packaging-	
13	A.L. Brody	Flexible Packaging of Foods	
14	R. Heiss	Principle of food packaging-	

**Examination Scheme Theoretical:****Name of the course : Food processing & Packaging Course code: PT/FPP/S5****Internal Examination: 20 Assignment & Attendance: 5+5=10****End semester exam: 70 Credit :3**

Teaching Scheme			Examination Scheme																			
Theory	3Hrs/Week		Internal Scheme	End Semester Examination																		
Tutorial	Nil			Group	Unit	Objective Questions (Only MCQ/Fill in the Blanks/ True or False)				Subjective Questions												
Total Contact Periods	17 Weeks or 51 Hrs		30	A	1	To Be Set	To be Answered	Marks Per Question	Total Marks	To Be Set	To be Answered	Marks Per Question	Total Marks									
Periods	Class Test	Contact Periods				B	3	6	Any 20	One	1 x 20 = 20	2	Any 5 at least 2 from each group	Ten	=	10 x 5 = 50						
								2									6					
				B	4	6												2				
						5	4															
	3	48																				

Name of the course : <b>Packaging Technique &amp; Machinery.</b>			
Course code: <b>PT/PTM/S5</b>		Semester: 5th	
Duration: 17 Weeks		Maximum Marks: 100	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 3hrs/week Tutorial: Nil		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
Credit: 3			
<b>Objective:</b> After the completion of this course the students will be able to Know			
1. Different types of packaging machines & their specification .			
2. Different types of packaging techniques.			
<b>Contents:</b>			
		<b>Hrs./unit</b>	<b>Marks</b>
Unit1 Introduction	Types of packaging machinery, uses, characteristics of packaging machinery and advantage of mechanical and electrical integration.	5	10
Unit2 Form, fill Sealing machine	Form, fill, seal machines , Horizontal, & vertical, Volumetric filling machine. Filling by weight process Dry product filling, objective, basic elements of dry product filling significance of sigma, product filling system augers Types of feeder used in product filling system Vibrating bin discharge , cascade filing system Vacuum filing system Rotary filler, manually loaded filler, in line filler Selection of fillers Methods of filling in sealed container Filling of materials in pouch Liquid filling machinery with its fundamental characteristics Filling of carbonated liquid. Impulse sealing machine	15	20
Unit3 Wrapping Technique.	Package wrapping Technique., Shrink film wrapping ,-sleeve shrink wrapping, pallet over or all round sealed wrapping ,Properties of heat shrinkable films. Stretch wrapping . properties & special features ,stretch	5	10

	wrapping methods, ,sketch of stretch wrapping machine Skin packaging- sequence of operations Usefulness of shrink wrap system. Blister packaging system		
Unit 4 Control of Packaging Atmosphere.	Vacuum packaging, Modified atmosphere packaging.(MAP). Controlled atmosphere packaging, Active Packaging Technology	5	7
Unit5 Manufacturing related to Metal Packaging	Working Principle of Aerosole Packaging, Methods of manufacturer of can (DWI & DRD Process), Manufacture of collapsible tube	10	15
Units 6 Different Packaging Technique	Flexible Packaging, Blister package & Pouch package, Retort Package, Cushion Package, Asceptic packaging processing system – block diagram and brief idea	10	8
		45	
Internal assessment Examination and preparation for semester examination		2 weeks (6Lecture hour)	
Total		51Lecture hour (17 Weeks)	

Text and Reference Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	S. Natarajan M. Govindarajan B.Kumar	Fundamental of Packaging Technology	PHI Learning Private Limited.
2.		Hand book of Packaging Technology	Engineers India Research Institute
3.	U.K Jain D.C Goupale S.Nayak	Pharmaceutical Packaging Technology	Pharma Med Press
4.		Packaging of food products	Indian Institute of Packaging
5.	Joseph F. Harlon Robert J. Kelsey Hallie E. Forcinio	Hand Book of Package Engineering	CRC Press

6	M. Siegel	Modern Packaging Encyclopaedia	Morgram-Grampain Publishing Co
7	Paine F. A	Fundamentals of packaging	Brookside Press Ltd. London

**Examination Scheme Theoretical:** Name of the course : **Packaging Technique & Machinery**

Course code: **PT/PTM/S5**

Internal Examination: 20 Assignment & Attendance: 5+5=10

End semester exam: 70

<b>Name of the course : Packaging Economics, Legislation &amp; Management.</b>			
Course code: <b>PT/PELM/S5</b>		Semester: 5 <sup>th</sup>	
Duration: 17 Weeks		Maximum Marks: 100	
Teaching Scheme:		Examination Scheme:	
Theory: 3hrs/week Tutorial:		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
Credit: 3			
Objective: After the completion of this course the students will be able to Develop the concept of Economics related to packaging. Awareness about the legislation relaed to packaging. Learn the fundamental concepts of packaging management.			
CONTENTS:			
		Hrs/unit	Marks
Packaging Economics	Group A	17	22
Unit1	Principles of Packaging Economics. Costing: Principles- Elements- Types- Methods. Cost Estimation: Functions – Procedure- Calculation.		
Unit2	2.1. Elements of cost of Packaging: Development Cost, One time cost, Material cost, packaging machinery cost, packaging process cost , distribution cost, Write off inventories. 2.2. Cost effectiveness in packaging- simplicity in packaging. 2.3. Price: Cost and price – difference- profit margin- pricing		

	mechanism- competitive price.		
Unit3	3.1. Concept of Value: Use value, esteem value, cost value, exchange value- value analysis- Objectives- procedures – examples, Cost reduction in packaging. 3.2. packaging and loss prevention. 3.3. Cost of pollution of environment –disposal off of packaging.		
Packaging Legislation.	Group B	18	30
Unit 4	4.1.Defination legislation- Bill, Law , Act- Legislative Body. 4.2 Rules –Regulations-Guidelines. Regulatory body. Standards & codes – Indian, International ,BIS,ISO,ISO9000 Series,BS14000 Series.		
Unit5	5.1 Legislation Related to packaging: for domestic market, for export 5.2 Loss related to packaging of various items- ( salient features only) 5.2.1. Food &edible products –agricultural, processed food, seafood, other perishable products, preservatives- storage-distribution- usage. 5.2.2. Electronic & electrical goods –fragile items- handling instructions. 5.2.3. Pharmaceutical items . 5.2.4 Consumer goods (FMCG). 5.2.5. Machinery & its parts. 5.2.6. Fuels, explosives, other consumables.		
Unit6	6.1. Laws related to labeling & storage (salient features only): 6.1.1. Purpose of labeling- shipping container labeling- symbols used. 6.1.2. Laws for labeling of various items. 6.1.3. Storage & usage instruction- cautions related to storage.		
Unit7	7.1. Some important laws & regulations (salient features only): Weight & Measurement Act, 1976. Legal Metrology (Packaged commodities)Rules Packaged Commodities Act. Consumer Protection Act, 1986, Rules, 1987. Consumer Protection Council (Centre & State level)- objectives- prevention of Food Adulteration Act. Consumer Rights Act, 2011. Plain Packaging Act (for cigarettes & similar items)  7.2. ECO Regulations, recyclability, Pollution control acts. 7.3. Regulatory agencies (some examples from India & US): FDA- Food & Drug Administration. EPA – Environmental Protection Agency. FTC – Federal Trade Commission. CPSC – Consumer Product Safety Commission. PDCI – Package Design Council , International.		



Packaging Management	Group C	10	18
Unit8	8.1. Planning package production- Periodic requirement of materials( as per marketing plan)- purchase raw materials- vendor development. 8.2. Production Planning & Control in packaging process. 8.3. Purchase, operation & maintenance of packaging machinery. 8.4. Inventory control of packaging materials.		
Unit9	9.1. Role of packaging technologist- function of technologist in product package design- cost reduction- optimum utilization of plant & machinery. 9.2. Demand Forecasting- improvement & alternative searching – package printing – abiding latest legal requirements.		
	Total	45(Lecturer +Tutorial)	70
Internal assessment Examination and preparation for semester examination		2 weeks  (6Lecture hour)	
Total		51 Lecture hour(17 Weeks)	

Text and Reference Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	A.P.Venna	Industrial Engg. & Management	S.K.Kataria & Sons.
2.	A.K.Bhadra & Suman Roy	Industrial Management	
3.	F.A.Paine	The packaging media	
4.	Brody, A.L & Marsh, K.S.	Encyclopedia of packaging technology	1997 John Willey & Sons

Examination Scheme Theoretical:

Name of the course: : **Packaging Economics & Legislation & management** Course code: PT/PELM/S5

Internal Examination: 20 Assignment & Attendance: 5+5 =10

End semester exam: 70

Group	Unit	Subjective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A	1 to 3	3	Any five tacking at least one from each group	10	50
B	4 to 7	4			
C	8 to 9	3			

Group	Unit	Objective Question			Total Marks
		To be set (25 Question)	To be answered	Marks per Questions	
A	1 to 3	9	Any twenty (20)	1	20
B	4 to 7	10			
C	8 to 9	6			

Name of the course: <b>Package Printing Technology</b>			
Course code: <b>PT/PPT/S5</b>		Semester: 5th	
Duration: 17 Weeks		Maximum Marks: 100	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 4hrs/week Tutorial: Nil		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
<b>Practical:</b> 3hrs/week Name of the course : <b>Packaging Technology</b> <b>Lab 1</b> Course code: <b>PT/LPPT/S5</b>		Practical: 100 Continuous Internal Assessment : 5 0 External Assessment : 50	
Credit: 5			
Objective: On completion of this course, student should be able to			
1.Devolop the concept of different printing process & Methods 2.Select the proper paper for a particular job and printing process 3.selection of most suitable ink for a particular printing process 4. Perform tests on properties of printing materials			
Contents:			
		Hrs./unit	Marks
Unit 1 Printing Process and Methods	Introduction to Process of communication, Lay out and paste up ,Composition for printing	5	
Unit 2 Graphic design	Theory of full colour Graphic arts. Photography , graphic Design Preparation and reproduction of art work	10	
Unit 3 Printing techniques	Letter press , Flexography, Lithography, Gravure and Silk screen Printing, Image carrier , Printing Process. Finishing operations, Bar codes, holograms, Trouble shooting Trends and the future	15	
Unit 4 Printing materials	Paper & other Printing stocks and Printing ink	10	
Unit 5 Print quqlity Evaluation	Quality of Print ink, Substrate, Printability of paper evaluation	5	
	Total	45(Lecturer +Tutorial)	70
Internal assessment Examination and preparation for semester examination		2 weeks (6Lecture hour)	
Total		51 Lecture hour (17 Weeks)	

Text and Reference Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	Engineers India Research	Hand book of Packaging Technology	Engineers India Research Institute
2.	Joseph F. Harlon Robert J. Kelsey Hallie E. Forcinio	Hand Book of Package Engineering	CRC Press
3.	Long Robert P	Package Printing	Graphic Magazines
4.	Eldred Nelson R	Package Printing	Jelmar Publishing Co, Inc, NY
5.	Thomes	Lithographers Manual Latest Edition	GATF
6	Cherry	Gravure Printer	GATF
7	FTA	Flexography: Principles & Practices Latest Edition	FTA
8	Phil Green	Understanding Digital Colour	GATF
9.	Victor Strauss	The Printing Industries	Printing Industries of America
10	D. E. Bisset	The Printing Ink Manual	North Wood Books
11	C. S. Misra	Printing Inks & Papers	Anupam Prakashan Allahabad
12	Helmut Kiphan	Handbook of Printing Media	Springer

### Examination Scheme Theoretical:

Internal Examination: 20 Assignment & Attendance: 5+5=10

End semester exam: 70

Group	Unit	Subjective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A	1, 2, 3	8 Qs	Any five tacking at least one from each group	10	50
B	4, 5	4 Qs			

Group	Unit	Objective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A	1, 2, 3	15	Any twenty (20)	1	20
B	4, 5	05			

Name of the course : <b>Principle of Refrigeration &amp; fluid mechanics</b>			
Course code: <b>PT/PR&amp; FM/S5</b>		Semester: 5th	
Duration: 17 Weeks		Maximum Marks: 50	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 2hrs/week Tutorial: Nil		Internal Examination:10 Assignment & Attendance:5+5 End semester exam : 35	
<b>Practical:</b> 2hrs/week Name of the course : Refrigeration Lab Course code: <b>PT/LPRC/S5</b>		Practical: 50 Continuous Internal Assessment : 25 External Assessment : 25	
Credit: 2			
Objective: After completion of this course student should be able to acquire knowledge about			
1.Principle & type of refrigeration 2.Vapour compression refrigeration & its component 3.Principle of Cold storage & its application in packaging			
Contents:			
		Hrs./unit	Marks
Unit – 1	Refrigeration – Definition , Principle Type (names only)& application, Ton of refrigeration	2	2
Unit – 2	Vapour compression Refrigeration – Principle & application, Reversed Carnot cycle ( TS diagram ) & COP(No deduction no numerical Problem) Actual Vapour compression cycle , name of the Process, Ts, Ph diagram , COP (No deduction no numerical Problem), Schematic diagram of the cycle, Name of the component (condenser ,drier, evaporator, expansion device)	7	4
Unit – 3	Refrigerants- primary, secondary, , Name of some commonly used Primary & secondary refrigerants, (Properties of refrigerants not required )	3	2
Unit – 4	Schematic diagram of window air conditioning & central air conditioning system only (no mathematical deduction, No numerical problem )	2	4

Unit – 5	Application of refrigeration in packaging – Ice refrigeration, Cold storage – Principle & Schematic Diagram	2	2
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Unit 6	Introduction to fluid mechanics Properties of fluid-density, specific weight, specific gravity Compressibility, viscosity, cohesion, adhesion, surface tension capillarity Ideal fluid , real fluid , Newtonian fluid	3	5
Unit 7	Fluid pressure and its measurement Absolute pressure , gauge pressure, Vacuum pressure Different units of pressure Pascal's Law Measurement of pressure – Piezometer, simple manometer, Bourdon tube Pressure gauge ,Sketches only (no numerical problem)	3	6
Unit 8	Kinematics of fluid – Discharge or rate of discharge, continuity equation (no numerical problem) Types of flow ( steady, unsteady, uniform ,non uniform flow, laminar flow turbulent flow, compressible , incompressible flow, rotational , irrotational flow Line of flow (path line, stream line)	4	5
Unit 9	Bernoulli's equation, different types of heads ( no deduction , no numerical problem ) Measurement of flow through pipes – venturimeter , orifice meter expression and sketches only ( no deduction , no numerical problem )	4	5
	Total	30(Lecturer +Tutorial)	35
Internal assessment Examination and preparation for semester examination		2 weeks (4Lecture hour)	
Total		51Lecture hour (17 Weeks)	

Text and Reference Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	R.K Rajput	Refrigeration & air conditioning	s. k kataria & sons
2.	R.S. Khurmi	Refrigeration & air conditioning	
3.	C.P Arora	Refrigeration & air conditioning	
4.	A.R Basu	Fluid mechanics & machines	Dhanpat Rai & co (P) ltd
5.			

## Sessional

### Name of the Subject: Food Preservation and Packaging Laboratory

<b>Course Code: PT/LFPP/S5</b>		<b>Semester: Fifth</b>		<b>Credits: 2</b>	
<b>Duration: 6 Semesters</b>		<b>Maximum Marks: 100</b>		<b>Subject Code:</b>	
Objective:					
On completion of this work, students get the knowledge about nutritive value of food material					
Teaching Scheme			Examination Scheme		
<b>Practical</b>	<b>3 Hrs/Week</b>	Internal Scheme		External Scheme	
<b>Tutorial</b>	<b>Nil</b>	<b>Continuous Internal Assessment of 50 marks is to be carried out by the teachers throughout the Third Year First Semester. Distribution of marks: Performance of Job – 35, Notebook – 15.</b>		External Assessment of 50 marks shall be held at the end of the Third Year First Semester on the entire syllabus.: On Spot Job – 25, Viva-voce – 25	
<b>Total Contact Periods</b>	<b>17 Weeks or 51 Hrs</b>				
<b>Sl.No.</b>	<b>Detail Contents</b>				
1.	Development and study of frozen food in any organization and Industry				
2.	Development and study of canned food in any organization and Industry				

3.	Development and study fermented food in any organization and Industry
4.	Preparation of drying curve and study of dried food product packaging.
5.	Development and packaging of freeze drying food product in any organization and Industry
6.	Development and packaging of spray drying food product in any organization and Industry
7.	Shelf-life studies of foods within different packaging materials
8.	Development of food product by Vacuum packaging

Name of the course : <b>Packaging Technology Lab 6</b>	
Course code: <b>PT/ LPT6/S5</b>	Semester: 5th
Duration: 17 Weeks	Maximum Marks: 100
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 4hrs/week	Continuous Internal Assessment : 50 (Performance of job :30 + Notebook :20) External Assessment : 50
Credit :2	

<b>Objective:</b>
On satisfactory completion of the course, the student should be in a position to develop the skills corresponding to the knowledge acquired in the theoretical subject Packaging machinery & equipment. Field visit may be conducted to visualize actual production machine

List of laboratory experiments :	
1	To study Vacuum packaging machine
2	To study Heat sealing machine
3	To study Shearing machine
4	To study Creasing machine
5	To study Cutting machine
6	To study Stitching machine
7	To study Glueing machine
8	To study Bottle filling & capping machine in industry
9	To study Form fill sealing machine in industry
10	To study Wrapping machine in industry
11	To study Labeling & marking machine in industry



Name of the course : <b>Refrigeration &amp; fluid mechanics Lab</b>	
Course code: <b>PT/L PRC/S5</b>	Semester: 5th
Duration: 17 Weeks	Maximum Marks: 50
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 2hrs/week	Continuous Internal Assessment : 50 (Performance of job :30 + Notebook :20) External Assessment : 50
Credit :1	

<b>Objective:</b>
On satisfactory completion of the course, the student should be in a position to develop the skills & APPLICATION corresponding to the knowledge acquired in the theoretical subject principle of refrigeration & air conditioning

<b>Suggested List of Laboratory Assignment :</b>	
1	Study of vapour compression refrigeration system through chart
2	Study of vapour compression refrigeration system through non working model
3	Study of domestic refrigeration system through working model
4	Study of layout and different component of window air conditioning system through chart
5	Study of layout and different component of window air conditioning system through non working model
6	Study of different type of air conditioning system through chart
7	Study of different types of manometer
8	Study of venturimeter & orifice meter

<b>Name of the course : Package Printing Technology Lab</b>	
Course code: <b>PT/L PPT/S5</b>	Semester: 5th
Duration: 17 Weeks	Maximum Marks: 100
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 3hrs/week Credit 2	Continuous Internal Assessment : 50 (Performance of job :30 + Notebook :20) External Assessment : 50

<b>Objective:</b>
On satisfactory completion of the course, the student should be in a position to develop the skills corresponding to the knowledge acquired in the theoretical subject Package printing Technology

<b>Suggested List of Laboratory Assignment</b>	
1	Study of Electronic balance
2	Study of Thickness gauge
3	Study of Folding endurance testing equipment
4	Study of Bursting strength tester
5	Study of Smoothness tester
6.	Study of Porosity meter
7	Study of Glosometer
8	Study of Brighter tester
9	Study of Dart impact tester
10	Testing of quality of printing plastics for thickness, GSM, folding endurance, bursting strength, porosity gloss & dart impact
11	Surface treatment test of substrate
12	Testing of alkali resistance of print surface
13	Visit to a Institution or organization to study Printing by offset process
14	Visit to a Institution or organization to study Printing by flexographic process
15	Visit to a Institution or organization to study Printing by gravure process
16	or organization to study Print quality testing

Name of the course: Industrial Project & Entrepreneurship Development			
<b>Course Code: PT/ EDP /S5</b>		Semester: 5th	
Duration: One Semester (Teaching - 15 weeks + Internal Exam-2 weeks )		Maximum Marks: 50 Marks	
<b>Teaching Scheme:</b>		<b>Examination Scheme</b>	
Theory: 1Contact hrs./ week		Class Test (Internal Examination): Nil	
Tutorial: nil		Teacher's Assessment (Attendance, Assignment & interaction): 50	
Practical: 2 contact hours/ week			
Credit: 2 ( Two )			
<b>Rationale:</b>			
<ul style="list-style-type: none"> <li>➤ To Understand Market Assessment</li> <li>➤ To Identify entrepreneurship creativity and opportunities</li> <li>➤ To improve students skill to prepare report for business venture</li> </ul>			
<b>Objectives:</b>			
<b>The student will be able to:</b>			
<ul style="list-style-type: none"> <li>✓ Identify entrepreneurship opportunity.</li> <li>✓ Acquire entrepreneurial values and attitude.</li> <li>✓ Use the information to prepare project report for business venture</li> <li>✓ Develop awareness about enterprise management.</li> </ul>			
<b>Content Theory (Name of topic)</b>		<b>Periods</b>	<b>Marks</b>
<b>Group-A</b>			
<b>Unit 1</b>	<b>Entrepreneurship, Creativity &amp; Opportunities</b>	6	
	1.1) Concept, Classification & Characteristics of Entrepreneur 1.2) Creativity and Risk taking. 1.2.1) Concept of Creativity & Qualities of Creative person. 1.2.2) Risk Situation, Types of risk & risk takers. 1.3) Business Reforms. 1.3.1) Process of Liberalization. 1.3.2) Reform Policies. 1.3.3) Impact of Liberalization. 1.3.4) Emerging high growth areas. 1.4) Business Idea- Methods and techniques to generate business idea. 1.5) Transforming Ideas in to opportunities transformation involves Assessment of idea Feasibility of opportunity 1.6) SWOT Analysis		

<b>Unit 2</b>	<b>Information And Support Systems</b>	6	
	<p>2.1) Information Needed and Their Sources. Information related to project, Information related to support system, Information related to procedures and formalities</p> <p>2.2) SUPPORT SYSTEMS</p> <p>2.2.1 Small Scale Business Planning, Requirements. Govt. &amp; Institutional Agencies, Formalities Statutory Requirements and Agencies. Support Institutions and their Roles:</p>		
<b>Unit 3</b>	<b>Market Assesment</b>	3	
	<p>3.1) Marketing -Concept and Importance</p> <p>3.2) Market Identification, Survey Key components</p> <p>3.3) Market Assessment</p>		
<b>Group – B</b>			
<b>Unit 4</b>	<b>Business Finance &amp; Accounts</b>	6	
	<p><b>Business Finance</b></p> <p>4.1) Cost of Project</p> <ul style="list-style-type: none"> <li>• Sources of Finance</li> <li>• Assessment of working capital</li> <li>• Product costing</li> <li>• Profitability</li> <li>• Break Even Analysis</li> <li>• Financial Ratios and Significance</li> </ul> <p><b>Business Account</b></p> <p>4.2) Accounting Principles, Methodology</p> <ol style="list-style-type: none"> <li>1) Book Keeping</li> <li>2) Financial Statements</li> <li>3) Concept of Audit,</li> </ol>		
<b>Unit 5</b>	<b>Business Plan &amp; Project Report</b>	4	
	<p>5.1) Business plan steps involved from concept to commissioning- Activity Recourses, Time, Cost</p> <p>5.2) <b>Project Report</b></p> <ol style="list-style-type: none"> <li>1) Meaning and Importance</li> <li>2) Components of project report/profile</li> </ol> <p><b>Components of Project Report:</b></p> <ol style="list-style-type: none"> <li>1. Project Summary (One page summary of entire project )</li> </ol>		

	<ol style="list-style-type: none"> <li>2. Introduction (Promoters, Market Scope/ requirement)</li> <li>3. Project Concept &amp; Product (Details of product)</li> <li>4. Promoters (Details of all Promoters- Qualifications, Experience, Financial strength)</li> <li>5. Manufacturing Process &amp; Technology</li> <li>6. Plant &amp; Machinery Required</li> <li>7. Location &amp; Infrastructure required</li> <li>8. Manpower ( Skilled, unskilled )</li> <li>9. Raw materials, Consumables &amp; Utilities</li> <li>10. Working Capital Requirement (Assumptions, requirements)</li> <li>11. Market ( Survey, Demand &amp; Supply )</li> <li>12. Cost of Project, Source of Finance</li> <li>13. Projected Profitability &amp; Break Even Analysis</li> <li>14. Conclusion.</li> </ol> <p>5.3) <b>Project Appraisal</b></p> <ol style="list-style-type: none"> <li>1) Meaning and definition</li> <li>2) Technical, Economic feasibility</li> <li>3) Cost benefit Analysis</li> </ol>		
Unit 6	<b>Enterprise Management And Modern Trends</b>	8	
	<p>6.1) <b>Enterprise Management:</b></p> <ol style="list-style-type: none"> <li>1) Essential roles of Entrepreneur in managing enterprise</li> <li>2) Product Cycle: Concept And Importance</li> <li>3) Probable Causes Of Sickness</li> <li>4) Quality Assurance : Importance of Quality, Importance of testing</li> </ol> <p>6.2) <b>E-Commerce:</b> Concept and process</p> <p>6.3) <b>Global Entrepreneur</b></p>		
		16	
<p><b>Contents Practical</b></p> <p>Skills to be developed: On satisfactory completion of the course, the students should be in a position to design few fundamental networks.</p> <p><b>Intellectual Skills:</b></p> <p><b>Motor Skill:</b></p>			
<b>Suggested List of Laboratory Experiments: Nil</b>			
<b>Sr. No</b>	<b>Assignments</b>		
1	Assess yourself-are you are entrepreneur?		
2	Prepare project report and study its feasibility		

Sr.No	Author	Name Of Book	Publisher
1.	Alpana Trehan	Entrepreneurship	Dreamtech press/ Kogent Learning solutions
1	J.S. Saini, B.S.Rathore	Entrepreneurship Theory and Practice	Wheeler Publisher, New Delhi
2	E. Gorden, K.Natrajan	Entrepreneurship Development	Himalaya Publishing.
3	Prepared by Colombo Plan Staff College for Technician Education.	Entrepreneurship Development	Tata McGraw Hill
4	J.B.Patel, D.G.Allampally	A Manual on How to Prepare a Project Report	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : <a href="mailto:ediindia@sancharnet.in/olpe@ediindia.org">ediindia@sancharnet.in/olpe@ediindia.org</a> Website : <a href="http://www.ediindia.org">http://www.ediindia.org</a>
5	J.B.Patel, S.S.Modi	A Manual on Business Opportunity Identification & Selection	
6	S.B.Sareen, H. Anil Kumar	National Derectory of Entrepreneur Motivator & Resource Persons.	
7	Gautam Jain, ,Debmuni Gupta	New Initiatives in Entrepreneurship Education & Training	
8	P.C.Jain	A Handbook of New Entrepreneurs	
9	D.N.Awasthi, Jose Sebastian	Evaluation of Entrepreneurship Development Programmes	
10	V.G.Patel	The Seven Business Crisis & How to Beat Them.	

### Video Cassettes

Sr. No.	Subject	Source
1	Five success Stories of First Generation Entrepreneurs	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : <a href="mailto:ediindia@sancharnet.in/olpe@ediindia.org">ediindia@sancharnet.in/olpe@ediindia.org</a> Website : <a href="http://www.ediindia.org">http://www.ediindia.org</a>
2	Assessing Entrepreneurial Competencies	
3	Business Opportunity Selection and Guidance	
4	Planning for completion & Growth	
5	Problem solving-An Entrepreneur skill	

<b>Name of the course: Professional Practice-III</b>	
<b>Course Code: PT/PP-III/S5</b>	Semester: 5th
Duration: 17 weeks (Teaching-15 weeks + Internal Exam-2 weeks )	Maximum Marks: 50
<b>Teaching Scheme:</b>	<b>Examination Scheme :</b>
Theory: 1 contact hours/ week	Internal Teachers' Assessment: 50 Marks
Tutorial:	
Practical: 2 contact hours/ week	End Semester Examination: Nil
Credit: 2	
<b>Rationale:</b>	
<p>In addition to the exposure both in theoretical and practical from an academic institution, it is desired that student should be familiar with the present day industry working environment and understand the emerging technologies used in these organization. Due to globalization and competition in the industrial and service sectors, acquiring overall knowledge will give student a better opportunity for placement facility and best fit in their new working environment.</p> <p>In the process of selection, normal practice adopted is to see general confidence, positive attitude and ability to communicate, in addition to basic technological concepts.</p> <p>The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.</p>	
<b>Objectives:</b>	
<p>The student will be able to-</p> <p>Student will be able to:</p> <ol style="list-style-type: none"> <li>1. Acquire information from different sources.</li> <li>2. Enhance creative skills</li> <li>3. Prepare notes for given topic.</li> <li>4. Present given topic in a seminar.</li> <li>5. Interact with peers to share thoughts.</li> <li>6. Acquire knowledge on Open Source Software and its utility</li> <li>7. Understand application of technologies in industry scenario.</li> <li>8. Prepare a report on industrial visit, expert lecture.</li> </ol>	

Content (Name of topic)		Periods	Marks
<b>Group-A</b>			
Unit 1	<b>Field Visits</b>	12	
	<p>Structured field visits (minimum one) be arranged and report of the same should be submitted by the individual student, to form a part of the term work.</p> <p>The field visits may be arranged in the following areas / industries:</p> <ul style="list-style-type: none"> <li><b>i) COSMETICS PACKAGING UNIT</b></li> <li><b>ii) CORRUGATED BOX MANUFACTURING UNIT</b></li> <li><b>iii) Soap &amp; detergent Packaging Unit</b></li> <li><b>iv) Fertilizer packaging Unit</b></li> <li><b>v) Food Processing &amp; packaging Unit</b></li> <li><b>vi) PRINTING Industry/unit</b></li> <li><b>vii) Carton making Industry/ unit</b></li> <li><b>viii) Bottle filling industry/ unit</b></li> <li><b>ix) Flexi packing unit</b></li> <li><b>x) package wrapping unit</b></li> </ul>		
Unit 2	<b>Aptitude and Reasoning Practice</b> <ol style="list-style-type: none"> <li>1. Mental ability test</li> <li>2. Non Verbal Reasoning</li> </ol>	10	
Unit 3	<b>Lectures by Professional / Industrial Expert/student seminar to be organized from of the following areas (any two)</b> <p>Aseptic Packaging  Packaging of Electronic Material  Surface design &amp; sales appeal  Recycling of packaging  Cushioning  Corrugated box Design  ISO  TQM  Packaging Regulations</p>	10	
Unit 4	<b>Group Discussion</b> <p>The student should discuss in a group of six to eight students. Two topics (at least) for group discussions may be selected by the faculty members. Some of the suggested topics are-</p> <ol style="list-style-type: none"> <li>1. Computer Game merits &amp; demerits</li> <li>2. Face book merits &amp; demerits</li> <li>3. Internet surfing merits &amp; Demerits</li> <li>4. Test Cricket Vs T-20 Cricket</li> </ol>	10	



Unit 5	<p><b>PHP&amp;MySQL</b></p> <ul style="list-style-type: none"> <li>✓ Introduction and Installation Of PHP and Operators</li> <li>✓ Arrays, Statements and functions in PHP</li> <li>✓ MySQL</li> <li>✓ Functions, Cookies and Sessions in PHP</li> <li>✓ Sending Email, User Login and Registration</li> </ul> <p><b><u>Recommended Text Books:</u></b></p> <p><b>It is alright to go ahead with teaching from the prescribed books as per the existing syllabus.</b></p> <p><b>Text books can be referred from the link given below.</b></p> <p><b><u>Text Books link for PHP :</u></b></p> <p><a href="http://www.flipkart.com/beginning-php-mysql-novice-professional-4th/p/itmdyggzm6yqzccq?pid=9788184897456&amp;ref=73b694e2-81dc-4d9f-b929">http://www.flipkart.com/beginning-php-mysql-novice-professional-4th/p/itmdyggzm6yqzccq?pid=9788184897456&amp;ref=73b694e2-81dc-4d9f-b929</a></p>	10	
TOTAL		50	