

**PROPOSED CURRICULAR STRUCTURE FOR PART – II (2<sup>nd</sup> YEAR) OF  
THE  
FULL-TIME DIPLOMA COURSES IN ENGINEERING & TECHNOLOGY**

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: THIRD											
BRANCH: PACKAGING TECHNOLOGY											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	Introduction to Packaging Technology.	4	3	1	-	10	20	30	70	-	100
2	Hazards in Packaging	2	2	-	-	5	10	15	35	-	50
3	Cellulose and Fiber Technology.	4	4	-	-	10	20	30	70	-	100
4	Basic Electronics	4	3		2	10	20	30	70	50	150
5	Introduction to Thermodynamics & Heat Transfer.	4	2	1	2	10	20	30	70	50	150
6	Packaging Technology lab 1	1	-	-	2	-	-	-	-	50	50
7	Packaging Technology lab 2	2	-	-	3	-	-	-	-	100	100
8	Packaging Technology lab 3	2	-	-	3	-	-	-	-	100	100
9	Professional Practice-I	2	1	-	2	-	-	-	-	50	50
<b>Total:</b>		<b>25</b>	<b>15</b>	<b>2</b>	<b>14</b>	<b>45</b>	<b>90</b>	<b>135</b>	<b>315</b>	<b>400</b>	<b>850</b>
STUDENT CONTACT HOURS PER WEEK:33 hrs Theory and Practical Period of 60 Minutes each. L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											

Name of the course : <b>Introduction to Packaging Technology</b>			
Course code: PT/INTPT/S3		Semester: 3rd	
Duration: 17 Weeks		Maximum Marks: 100	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 3hrs/week Tutorial: 1hrs/week		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
Credit: 4			
<b>Objective:</b>			
1. Understand the basic concepts of packaging its characteristics. 2. Learn different packaging materials. 3. Understand the basic concepts of packaging evaluation, ecological aspects.			
<b>Contents:</b>			
		Group - A	
		Hrs./unit	Marks
Unit – 1 Introduction	Historical background, fundamental principle of packaging, definition of packaging as integral process in product and marketing, Function of package, Different package components.	08	5
Unit – 2 Introduction to packaging materials	2.1 Primary Packaging Material (Plastic, Glass, Metal), Secondary Packaging Material (Paper and Board), Tertiary Packaging Material. Different Packaging Materials used food, pharmacy and other industries. 2.2 Introduction to Food & Pharmaceutical Packaging: Major Food products & their packaging materials (Fresh foods, Dairy products, Fish, Meat , sea food & Drinks) 2.3 Wood: Properties of wood as Packaging Material, forms of wood, decay and preservation of woods.	12	30
		Group - B	
Unit – 3 Packaging Material	Physical characteristics of the product – Physical state, weight, symmetry, fragility, rigidity, surface finish.  Physico-chemical characteristics – susceptibility to	09	10

	water, water vapour, gases, odour, heat, light.  Cost and cost effectiveness and disposability. Basic consideration for protection of packaged items.		
Unit – 4 Corrosion	Definition, prevent corrosion of packaged items, principles of corrosion of packaged item.	4	5
Group - C			
Unit – 5 Some terms related with packaging	Flexible packaging, Retail packaging, Shrink packaging, System packaging, Aseptic packaging, Vacuum packaging, Strip packaging, Skin packaging, Blister & Pouch, Retort & Cushion packaging, Thermoform food container. Wrapping (Definition, types, advantages & disadvantages of different wrapping methods.)	08	10
Unit – 6 Defects in Packaging	Classification of packaging defects, Types of defects (class A, class B, class C), Some common packaging and their critical, major and minor defects.	4	10
	Total	45(Lecturer +Tutorial)	70
Internal assessment Examination and preparation for semester examination		2 weeks (6 Lecture hour)	
Total		51Lecture hour(17 Weeks)	

<b>Text and Reference Books:</b>			
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

**Examination Scheme Theoretical:**

Internal Examination: 20 Assignment &amp; 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		Any five tacking at least one from each group	10	50
B	3,4				
C	5,6				

Group	Unit	Objective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A	1, 2		Any twenty (20)	1	20
B	3, 4				
C	5, 6				

Name of the course : <b>Hazard in Packaging</b>			
Course code: <b>PT/HP/S3</b>		Semester: 3rd	
Duration: 17 Weeks		Maximum Marks: 50	
Teaching Scheme:		Examination Scheme:	
Theory: 2hrs/week Tutorial: Nil		Internal Examination:10 Assignment & Attendance:5 End semester exam : 35	
Credit: 2			
Objective:			
1.Understand the general methods of storage and their design 2.Learn different types of distribution hazards in packaging 3. Understand the basic consideration for protection of packaged items against hazard.			
Contents:			
		Group – A	
		Hrs./unit	Marks
Unit – 1 Storage	Hazard associated with storage – fire hazard, class of fire, type of extinguisher, material handling system (names only). Hazard associated with cold storage in relation to temperature, humidity, airflow. Construction of cold storage with simple sketch, Types of cold storage – sketch & function only (jacketed cold storage, forced,) Principle of design & layout of packaging system in store.	13	10
Unit – 2 Irradiation	Definition, Measurement of radiation energy, radiation dose, effect of radiation. Pharmacy and other industries.	8	5
		Group – B	
Unit – 3 Packaging of hazardous chemical	Introduction, Hazardous chemicals, Requisites for packaging materials, Common packages for hazardous chemicals.	12	10
Unit – 4 Distribution Hazard	Introduction, Different types of hazards of distribution- mechanical, impact, vibration, compression, drop, punching, tearing, climatic hazards. Hazard associated with transport include cold storages. Protection against chemical and physical hazards.	12	10

	Total	45(Lecturer +Tutorial)	35
Internal assessment Examination and preparation for semester examination		2 weeks (6 Lecture 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.	U.K Jain D.C Goupale S.Nayak	Pharmaceutical Packaging Technology	Pharma Med Press
4.		Packaging of food products	Indian Institute of Packaging

### Examination Scheme Theoretical:

Name of the course: Hazard in Packaging      Course code: PT/HP/S3

Internal Examination: 10      Assignment & Attendance: 2.5+2.5=5

End semester exam: 35

Group	Unit	Subjective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A	1, 2		Any five tacking at least one from each group	10	35
B	3, 4				

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

Name of the course : <b>Cellulose and Fibre board Technology</b>			
Course code: <b>PT/CFBT/S3</b>		Semester: 3rd	
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	
Credit: 4			
<b>Objective:</b>			
1. Understand properties, manufacturing technology, application and limitation of Cellulose Materials.			
2. Learn the properties, applications and testing of paper and different board materials.			
3. Know also the trends in use of those materials and forecast for future.			
<b>Contents:</b>			
		Group – A	
		Hrs/unit	Marks
Unit – 1 Cellulose Material	Introduction, Properties of cellulose materials, application, cellulose derivatives. Cellophane – Introduction, properties, application.	12	15
		Group – B	
Unit – 2 Paper and paper board	2.1 Paper – Definition, Pulping, Methods of production, Type of paper, Treated Paper, Advantages & Limitation of paper based package materials. Properties of paper, Specialty papers for packaging.  2.2 Paper Board – Definition, classification, manufacture of paper board. Testing of paper material-Tensile strength, Bursting strength, Rigidity, Cobb value, Moisture content, Wax pick up number, G.P properties in paper.	20	30
		Group – C	
Unit – 3 Corrugated Board	Introduction, Types of corrugated Board, Properties of corrugated board, Types of corrugated boxes, application.	12	15
Unit – 4 Folding Cartons	Introduction, Properties, Folding Carton design.	8	5

Unit – 5 Related Term	Glassine paper, Greaseproof paper, Cardboard, Yellow pages, Chipboard	8	5
	Total	60(Lecturer +Tutorial)	70
Internal assessment Examination and preparation for semester examination		2 weeks (8 Lecture hour)	
Total		68 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.	U.K Jain D.C Goupale S.Nayak	Pharmaceutical Packaging Technology	Pharma Med Press
4.		Packaging of food products	Indian Institute of Packaging

### Examination Scheme Theoretical:

Name of the course: Cellulose & Fibre Board Technology      Course code: PT/CFBT/S3

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		Any five tacking at least one from each group	10	70
B	2				
C	3,4,5				

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

Name of the course : THERMODYNAMIES & HEAT TRANSFER			
<b>Course code: PT/THM &amp; HT/S3</b>		Semester: 3rd	
Duration: 17 Weeks		Maximum Marks: 100	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 2hrs/week Tutorial: 1hrs/week Credit: 3		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
<b>Code: PT/L THM &amp; HT/S3</b> Practical: 2hrs/week <b>Credit: 1</b>		Practical: 50 Continuous Internal Assessment : 25 External Assessment : 25	
<b>Objective:</b>			
1.The Course will enable the student to understand the physical significance of thermodynamic laws offering packaging processer.			
2. Learn the thermodynamic properties of gas and steam.			
3. Apply principles of thermodynamic in packaging process.			
<b>Contents:</b>			
		Hrs./unit	Marks
Unit – 1 DEFINITIONS &BASIC CONCEPTS:	1.1 Definitions of Thermodynamics & Heat Engine. 1.2 Thermal Equilibrium –Statement of Zeroth Law of thermodynamics, thermodynamic Equilibrium. 1.3 System, Boundaries & Surroundings. 1.4 Properties of system- intensive & extensive properties. 1.5 Pressure, absolute pressure, gauge pressure & atmospheric pressure – units. 1.6 Temperature – unites. 1.7 Properties like specific volume, density & their units. 1.8 Energy – stored & transitional – unit of energy. 1.9 Heat, work & power – units. 1.10 First law of thermodynamic – statements & explanation. (S.I units only)	20	18

	<p>1.11 Energy equation for non- flow &amp; flow processes, internal energy &amp; enthalpy – units. (Simple problems to explain the concepts)</p> <p>1.12 Application of first law of thermodynamics in engineering system: Boiler, condenser &amp; turbine.</p> <p>1.13 Limitation of first law. 2nd law of thermodynamics – statements – PMM1 &amp; PMM2.</p> <p>1.14 Entropy – analogy of heat energy with work, concept of T-S plane from analogy with P-V plane – units.</p> <p>1.15 Application of thermodynamic principles in packaging.</p>		
Unit – 2 PROPERTIES OF GASES:	<p>2.1 Perfect &amp; real gases.</p> <p>2.2 Characteristic gas equation – characteristic &amp; universal gas constant – units.</p> <p>2.3 <math>C_p</math> &amp; <math>C_v</math>, ratio of <math>C_p</math> &amp; <math>C_v</math> &amp; relation between <math>C_p</math>, <math>C_v</math> &amp; <math>R</math>.</p> <p>2.4 Relation between pressure, temperature, volume, work done, change of internal energy, enthalpy &amp; entropy and heat transfer for the following processes:</p> <p>a) Constant volume process (non-flow process)</p> <p>b) Constant pressure process (non-flow process)</p> <p>c) Isothermal process (non-flow process)</p> <p>d) Adiabatic process (non-flow process)</p> <p>e) Polytropic process (non-flow process)</p> <p>P-V &amp; T-S diagrams.</p> <p>Brief discussion on reversible &amp; irreversible process.</p>	18	20
Unit – 3 STEAM	<p>3.1 Formation of steam, Change of state, T-S diagram.</p> <p>3.2 Basic terms &amp; properties of steam: Saturation temperature, Saturation pressure, dry wet &amp; superheat, steam, Dryness fraction, Degree of Superheated critical point, Sensible heat or liquid enthalpy, Enthalpy of evaporation, Enthalpy of dry saturated, Wet &amp; Superheated steam, Specific volume, Entropy of water, Of evaporation &amp; steam (dry, wet &amp; superheated).</p> <p>3.3 Throttling of steam (Concept only).</p> <p>3.4 Steam table – its use.</p> <p>3.5 Enthalpy – entropy diagram (Mollier chart) – its use.</p> <p>3.6 Steam calorimeters: throttling, Combined separating &amp; throttling.</p>	10	12

	Principle of calculation of dryness fraction by the above Calorimeters.		
Unit – 4 CONDENSER	4.1 Function & classification of condensers. 4.2 Advantages & disadvantages of using a condenser. (no problems)	3	8
Unit – 5 HEAT TRANSFER	5.1 Conduction:-Fourier’s law of heat conduction thermal conductivity. Heat transfer through plane homogeneous wall, Heat transfer through composite wall. Heat transfer through hollow cylinder. (No problem) 5.2 Convection: - Explanation of convective of heat transfer, principle of heat exchanger. (No deduction ) 5.3 Radiation: - Explanation, Definition of absorptivity, reflectivity & Transmissivity, Black body, Stefan-Boltzmann law – Statement & explanation of terms with unit. (No problem)	9	12
	Total	45(Lecturer +Tutorial)	70
Internal assessment Examination and preparation for semester examination		2 weeks (6Lecture hour)	
Total		51 Lecture hour(17 Weeks)	

Text Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	R.S Khurmi	Thermal Engineering	S Chand & Co.
2.	A.R.Basu	Thermal Engineering	Dhanpath Rai
3.	A.S.Sarao	Thermal Engineering	
Reference Books:			
S.N	Name of the Author	Title of the Book	Name of the Publishers
1.	P.L.Balani	Thermal Engineering	Khanna Publishers

**Examination Scheme Theoretical:**

Internal Examination:20    Assignment &amp; 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			Any five tacking at least one from each group	10	50
B					
C					

Group	Unit	Objective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A			Any twenty (20)	1	20
B					
C					

Name of the course : <b>THERMODYNAMIES &amp; HEAT TRANSFER LAB</b>	
Course code: <b>PT/L THM &amp; HT/S3</b>	Semester: 3rd
Duration: 17 Weeks	Maximum Marks: 50
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 2hrs/week	Continuous Internal Assessment : 25 (Performance of job :15 + Notebook :10) External Assessment : 25

**Objective:**

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.

**Suggested List of Laboratory Assignment:**

1	Determination of thermal conductivity of solids.
2	Determination of Emissivity.
3	Determination of Dryness Fraction of steam by separating & throttling calorimeter.
4.	Study of Heat exchanger.
5.	Study of Water tube & fire tube boiler.

<b>List of equipment's / apparatus for laboratory experiments :</b>	
1	Apparatus for measuring thermal conductivity of solid
2	Apparatus for measuring dryness fraction
3	Model of Cochran boiler
Note:	

### SEM – 3 (part II ) Packaging Technology

#### Elements of Basic Electronics

Name of the course : <b>ELEMENTS OF BASIC ELECTRONICS</b>			
Course code: <b>PT/EBE/S3</b>		Semester: 3rd	
Duration: 17 Weeks		Maximum Marks: 100	
<b>Teaching Scheme:</b>		<b>Examination Scheme:</b>	
Theory: 3hrs/week Tutorial:		Internal Examination:20 Assignment & Attendance:10 End semester exam : 70	
Credit: 4			
Objective: After the completion of this course the students will be able to			
<ol style="list-style-type: none"> <li>List out the classes of resistor, capacitor, inductors</li> <li>Understand the basic functions of Zener diode, transistors, and simple opto electronics devices</li> </ol>			
<b>CONTENTS:</b>			
		Hrs/unit	Marks
Unit1 Circuit Element	1.1 Active & Passive Components 1.2 Resistor- basic Idea, Colour Coding, Potentiometer, Preset. 1.3 Capacitor-basic Idea, Trimmers, Identifying values of Ceramic Disc Capacitor. 1.4 Inductor- basic idea, Specification, Application. 1.5 Voltage source and current source	8	12
<u>Unit2</u> <b>Diode</b>	2.1 Idea on Intrinsic, Extrinsic, P type, N type semiconductor 2.2 Construction, symbol, V-I characteristics of PN junction diode. 2.3 Application of diode. 2.4 Construction, symbol, characteristics of Zener diode 2.5 Examples of Diode & Zener Diode	7	12

	4		
<b>Unit3 Bipolar Junction Transistor</b>	3.1 Construction and operation of NPN and PNP transistors- 3.2 V-I characteristics of transistor in CE, CB, CC configuration. Definitions of current gains and their relationship for three configurations 3.3 Application of transistor as an amplifier.	8	12
<b>Unit 4 Field Effect Transistor</b>	4.1 Construction, operation, VI characteristics of JFET. 4.2 Idea on MOSFET, CMOS 4.3 Difference between BJT & JFET.	7	10
<b>Unit 5 Unijunction Transistor</b>	5.1 Construction, operation, characteristics of UJT. 5.2 Application of UJT.	3	5
<b>Unit6 Thyristors</b>	6.1 Operation, characteristics of SCR 6.2 Operation, characteristics of DIAC 6.3 Operation, characteristics, of TRIAC	4	6
<b>Unit7 Optoelectronics</b>	7.1. Elementary ideas of LED, LCD, 7.2 photodiode, phototransistor and solar cell and their applications.	4	7
<b>Unit8 Integrated Circuits</b>	8.1 Basic ideas of IC's- 8.2 Classifications: linear and digital IC's, 8.3 SSI, MSI, LSI and VLSI-field of applications	4	6
	<b>Total</b>	45(Lecturer +Tutorial)	70
<b>Internal assessment Examination and preparation for semester examination</b>		2 weeks (6Lecture hour)	
<b>Total</b>		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.Malvino	Electronic Principle	Tata MackGraw Hill
2.	V.K.Mehata	Basic Electronics	
3.	Millman & Halkias	Electronics devices & circuits	Tata MackGraw Hill
4.	Boylestad & Nashalsky	Electronic devices & circuit theory	PHI, New Delhi
5.	Senior	Optical fiber communication	
6.	Rashid	Power Electronics	

**Examination Scheme Theoretical:**Name of the course: **ELEMENTS OF BASIC ELECTRONICS****Course code:** PT/EBE/S3

Internal Examination: 20      Assignment &amp; 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			Any five tacking at least one from each group	10	50
B					
C					

Group	Unit	Objective Question			Total Marks
		To be set (10 Question)	To be answered	Marks per Questions	
A			Any twenty (20)	1	20
B					
C					

**Sessional:**

Name of the course : <b>Lab on Elements of Basic Eletronics</b>	
Course code: <b>PT/LEBE /S3</b>	Semester: 4th
Duration: 17 Weeks	Maximum Marks: 50
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 2hrs/week	Continuous Internal Assessment : 25 (Performance of job :15 + Notebook :10) External Assessment : 25
Credit :2	

**Objective:**

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 Elements of Basic Electronics.

**Suggested List of Laboratory Assignment :**

1	To know about the hand tools, their use & maintenance.
2	To learn & practice soldering and desoldering procedure
3	Identification of different passive and active circuit elements & to know their symbols: Resistor, capacitor, inductor, batteries/cells, diode/Zener diode, transistors, SCR, DIAC, TRIAC, etc.
4	To determine the value of a carbon resistor by using colour code and also by using multimeter.
5	To study different types of capacitor & to determine value of those.
6	To plot forward and reverse biased characteristics of diode and zener diode, transistor testing by millimeter.

**Sessional:**

Name of the course : <b>Packaging Technology Lab 1</b>	
Course code: <b>PT/L LPT1/S3</b>	Semester: 3rd
Duration: 17 Weeks	Maximum Marks: 50
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 2hrs/week	Continuous Internal Assessment : 25 (Performance of job :15 + Notebook :10) External Assessment : 25
Credit: 1	

**Objective:**

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 introduction to packaging.

<b>Suggested List of Laboratory Assignment :</b>	
1	Study of different types of templates used in packaging lab
2	Study of electronics balance used in packaging
3	Study of PH meter
4	Study of hot air oven used in packaging
5	To measure GSM of different paper sample
6	To measure PH of different paper sample

<b>List of equipment / apparatus for laboratory experiments :</b>	
1	Templates
2	Electronics balance
3	Hot air oven
4	Moisture content meter
5	PH meter
Note	

**Sessional:**

<b>Name of the course : Packaging Technology Lab 2</b>	
Course code: <b>PT/L LPT2/S3</b>	Semester: 3 <sup>rd</sup>
Duration: 17 Weeks	Maximum Marks: 100
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 3hrs/week	Continuous Internal Assessment : 50 (Performance of job :30 + Notebook :20) External Assessment : 50
Credit: 2	

**Objective:**

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 hazards in packaging.

<b>Suggested List of Laboratory Assignments :</b>	
1	To study the extent of damage of packaged items in vibration.
2	To study the extent of damage of packaged items from different drop height by drop tester.
3	To study the extent of damage of packaged item under impact in inclined impact tester.
4	To study the extent of damage under different environmental conditions in a environmental chamber.
5	To study the corrosion of metal plate in salt spray corrosion tester.

List of equipment's / apparatus for laboratory experiments :	
1	Vibration Tester
2	Drop Tester
3	Inclined Impact Tester
4	Salt spray corrosion tester.
5	Environmental Test Chamber
Note:	

**Sessional :**

Name of the course : <b>Packaging Technology Lab 3</b>	
Course code: <b>PT/L LPT3/S3</b>	Semester: 3 <sup>rd</sup>
Duration: 17 Weeks	Maximum Marks: 100
Teaching Scheme:	<b>Examination Scheme:</b>
Practical: 3hrs/week	Continuous Internal Assessment : 50 (Performance of job :30 + Notebook :20) External Assessment : 50
Credit: 2	

Objective:
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 cellulose & fibre board technology.

Suggested List of Laboratory Assignments :	
1	To measure thickness of paper samples
2	To study grammage cutter
3	To measure puncture resistance of paper
4	To measure bursting strength of paper
5	To measure cob value of paper
6	To measure folding endurance of paper

List of equipment's / apparatus for laboratory experiments :	
1	Thickness gauge
2	Grammage Cutter
3	Puncture resistance tester
4	Bursting strength tester

5	Cobb tester
6	Folding Endurance Tester
Note:	

<b>Name of the course: Professional Practice-I</b>	
<b>Course Code: PT/PP-II/S3</b>	Semester: Third
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> </ol>	

<ol style="list-style-type: none"> <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>
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Content (Name of topic)		Periods	Marks
<b>Group-A</b>			
Unit 1	<b>Field Visits</b>	13	
	<p>Structured field visits (minimum three) 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> <ol style="list-style-type: none"> <li>i) Cartoon manufacturing unit.</li> <li>ii) Bottle manufacturing unit.</li> <li>iii) Bottle filling, sealing &amp; capping unit.</li> <li>iv) Paper manufacturing unit.</li> <li>v)</li> </ol>		
Unit 2	<b>Lectures by Professional / Industrial Expert to be organized from of the following areas (any four)</b>	16	
	<ol style="list-style-type: none"> <li>i) Non conventional energy sources</li> <li>ii) <b>Open Source Software- an introduction and Practice session with Libre Office</b> <ul style="list-style-type: none"> <li>• Introduction to Libre Office Writer</li> <li>• Introduction to Libre Office Calc</li> <li>• Introduction to Libre Office Impress</li> <li>• Introduction to Libre Office Base</li> <li>• Introduction to Libre Office Math</li> <li>• Introduction to Libre Office Draw</li> </ul> </li> <li>iii) Water pollution control</li> <li>iv) Mobile communication</li> <li>v) Various government schemes such as EGS,</li> <li>vi) Industrial hygiene.</li> <li>vii) Recent innovations in packaging material.</li> </ol>		
	<p><b>Seminar :</b> Any one seminar on the topics suggested below: Students ( Group of 4 to 5 students) has to search /collect information about the topic through literature survey, visits and discussions with experts / concerned persons: Students will have to submit a report of about 10 pages and deliver a seminar for 10 minutes.</p> <ol style="list-style-type: none"> <li>1. Water Treatment for drinking water</li> <li>2. Problems related to traffic control</li> </ol>	16	

	3. Unemployment 4. Industrial hazards, safety & security. 5. Any other suitable topic		
	TOTAL	45	

### Reference book for OSCAD

Sl No.	Titles of Book	Name of Author	Name of Publisher
1.	OSCAD	Yogesh Save, Rakhi R, Shambhulingayyan N.D., Rupak M Rokade, Ambikeswar Srivastava, Manas Ranjan Das, Lavita Pereira, Sachin Patil, Srikant Patnaik, Kannan M. Moudgalya	Shroff Publisher & Distributor

Website: (i) <http://oscad.in>

(ii) <http://spoken-tutorial.org> of Indian Institute of Technology, Bombay (for more detail about Open source Software such as Libre Office, OSCAD and the like) **which is a part of National Mission on Education through ICT, MHRD Govt. of India.**

Demo lectures with power point presentations using LCD projector should be arranged for developing concepts on various topics.

**PROPOSED CURRICULAR STRUCTURE FOR PART – II (2nd YEAR) OF  
THE  
FULL-TIME DIPLOMA COURSES IN ENGINEERING & TECHNOLOGY**

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: THIRD											
BRANCH: PACKAGING TECHNOLOGY											
SR. NO.	SUBJECT	CREDITS	PERIODS			EVALUATION SCHEME					
			L	TU	PR	INTERNAL SCHEME			ESE	PR	Total Marks
						TA	CT	Total			
1	Introduction to Packaging Technology.	3	3	-	-	10	20	30	70	-	100
2	Hazards in Packaging	3	3	-	-	5	10	15	35	-	50
3	Cellulose and Fiber Technology.	4	4	-	-	10	20	30	70	-	100
4	Elements of Basic Electronics	4	3		2	10	20	30	70	50	150
5	Introduction to Thermodynamics & Heat Transfer.	4	2	1	2	10	20	30	70	50	150
6	Packaging Technology lab 1	1	-	-	2	-	-	-	-	50	50
7	Packaging Technology lab 2	2	-	-	3	-	-	-	-	100	100
8	Packaging Technology lab 3	2	-	-	3	-	-	-	-	100	100
9	Professional Practice-I	2	1	-	2	-	-	-	-	50	50
Total:		25	18	1	13	50	100	135	315	400	850
STUDENT CONTACT HOURS PER WEEK:33 hrs Theory and Practical Period of 60 Minutes each. L- Lecture, TU- Tutorials, PR- Practical, TA- Teachers Assessment, CT- Class Test, ESE- End Semester Exam.											