

SCHEME OF STUDIES
DIPLOMA IN PRINTING TECHNOLOGY
(C-20)

CURRICULUM STRUCTURE

V Semester Scheme of Studies - Diploma in Printing Technology [C-20]

Pathway	Course Category / Teaching Department	Course Code	Pathway Title	Hours per Semester			Total contact hrs /Semester	Credits	CIE Marks		SEE-1 Marks (Theory)		SEE-2 Mark (Practical)		Total Marks	Min Marks for Passing (including CIE marks)	Assigned Grade	Grade Point	SGPA and CGPA
				L	T	P			Max	Min	Max	Min	Max	Min					
Programme Specialization Pathway																			
1	PT Specialization pathways in emerging areas Student may select any one of the specializations	20PT51I	Visual Design and Digital Printing	104	52	312	468	24	240	96	60	24	100	40	400	160			
		20PT52I	Web Fed Offset Printing Machines	104	52	312	468	24	240	96	60	24	100	40	400	160			
		20PT53I	Advanced Packaging Technology	104	52	312	468	24	240	96	60	24	100	40	400	160			
Science and Research Pathway				L	T	P	Total	Credit	CIE Marks		SEE Marks								
2	BS/SC/PT Specialization pathway in Science and Research (Student need to take all four papers in this pathway)	20SC51T	Paper 1-Applied Mathematics	52	26	0	78	6	50	20	50	20	100	40					
		20SC52T	Paper 2 – Applied Science	52	0	52	104	6	50	20	50	20	100	40					
		20RM53T	Paper 3 – Research Methodology	52	0	52	104	6	50	20	50	20	100	40					
		20TW54P	Paper 4 – Technical Writing	39	13	52	104	6	60	24	40	16	100	40					
			Total	195	39	156	390	24	210	84	190	76	400	160					
Entrepreneurship Pathway																			
3	ES/PT	20ET51I	Entrepreneurship and Start up	104	52	312	468	24	240	96	160	64	400	160					

Both SGPA & CGPA

L:- Lecture T:- Tutorial P:- Practical BS- Basic Science:: ES-Engineering Science:: SC: Science , I: Integrated :: PT: Printing Technology

Note : In 5th Semester student need to select any one of the pathways consisting of 24 credits

Students can continue their higher education irrespective of the pathway selected

CURRICULUM STRUCTURE

VI Semester Scheme of Studies - Diploma in Printing Technology [C-20]

Pathway	Course Category / Teaching Department	Course Code	Pathway	Course		Total contact	Credits	CIE Marks		SEE Marks		Total Marks	Marks for Passing (including CIE)	Assigned Grade	Grade Point	SGPA and CGPA
								Max	Min	Max	Min					
Internship	ES/PT	20PT61S	Specialisation pathway	Internship/project	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			
		20PT61R	Science and Research Pathway	Research project	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			
		20PT61E	Entrepreneurship and Start up pathway	Minimum Viable Product -MVP/ Incubation/ Startup proposal	40 Hours / week Total 16 Weeks	640	16	240	96	160	64	400	160			

Note: Student shall undergo Internship/Project/research project/MVP/Incubation/Startup proposal in the same area as opted in 5th semester pathway

Visual Design and Digital Printing



Government of Karnataka

DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Printing Technology	Semester	V
Course Code	20PT51I	Type of Course	L:T:P (104:52:312)
Course Name	Visual Design and Digital Printing	Credits	24
CIE Marks	240	SEE Marks	160

Rationale

Visual Designing and Digital Printing is the core of the Graphic Designing and Digital Print world. Designing software can give competitive edge in the particular area of Print and Media Industry at changing world.

This specialization course is taught in Boot camp mode. Boot camps are 12 weeks, intense learning sessions designed to prepare you for the practical world – ready for either industry or becoming an entrepreneur. You will be assisted through the course, with development-based assessments to enable progressive learning.

In this course, you'll learn how to Visualization skills for Designing and Digital Printing in industrial applications that are needed for today's job market.

Leading to the successful completion of this boot camp, you shall be equipped to either do an internship in an organization working as Visualizer, Graphic Designer, CSR, Team Member or do a project in the related field. After the completion of your Diploma, you shall be ready to take up roles like a Visual or Graphic Design Engineer, CSR, Production Team head and can rise up to the level of Manager, also can become Entrepreneur in the related field and more.

This course will teach you about Visualization skills, Theory knowledge and Hands on experience in Designing Software and Digital Printing Process. Hence this path way is for diploma engineers who want to specialise in the field of Visual Design and Digital Printing.

Course Cohort Owner

A Course Cohort Owner is a faculty from the core discipline, who is fully responsible for one specialised field of study and the cohort of students who have chosen to study that specialised field of study.

Guidelines for Cohort Owner

1. Each Specialized field of study is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. One faculty from the Core Discipline shall be the Cohort Owner, who for teaching and learning in allied disciplines can work with faculty from other disciplines or industry experts.
3. The course shall be delivered in boot camp mode spanning over 12 weeks of study, weekly developmental assessments and culminating in a mini capstone.
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.
5. The cohort owner shall be responsible to identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for any industrial visits.
7. Cohort owner shall maintain and document industrial assignments, weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom sessions can augment or use supplementally teaching and learning opportunities including good quality online courses available on platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademy, SWAYAM , etc.

Course outcome: A student should be able to

C01	Identify the Vector Graphics and Bitmap Graphics with its Resolutions
C02	Select the best Typography for related applications work.
C03	Understanding and Analyze the importance of Layout format for Magazine, Newspaper, and Bookwork
C04	Design the best creative Design works.
C05	Understand and Comparison of Digital Printing and Press operations.

Detailed course plan

Week	CO	PO	Days	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P
1	CO1	PO 1,4 7	1	An overview of Vector Graphics- Resolution and Quality File Size- Common Formats- Bitmap Graphics- Resolution- Size and Quality- Color- File Size and File Formats	2	1	1	Present a Pros and Cons of Vector Graphics and Bitmap Graphics.			3
			2	The CorelDraw Window Interface - The Startup Screen- Title Bar - Menu Bar - Standard Toolbar - Property Bar - Other Toolbars - Toolbox - Color Palette - Status Bar - Drawing Window - Dialog Boxes.	1	1	2	Video demonstration: Demonstrate the various Corel Draw Interface			3
			3	An overview of Design - Introduction to graphic design - goal, audience, venue and budget.	3	1		Present an overview of Design	3		
			4	Design Principles - Balance- Symmetrical and asymmetrical - Optical Centre, Unity, Emphasis, Contrast, rhythm, proportion and harmony	2	1	1	Present an overview of Design Principles.			3
			5	Developmental Weekly Assessment				Assessment Review and corrective action 1. Report on Vector Graphics and Bitmap Graphics. 2. Presentation on Corel Draw Interface. 3. Note down all the Design Principles			3
			6	Industry Class on Corel Draw software+Industry Assignment	2		3				

2	CO1	PO 1,4,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate the working with tools, menus and panels in CorelDraw software		1	2
			2	Working with Toolbars.	1	1	2	Demonstrate the working with Various Tools in CorelDraw software.			3
			3	Working with Menubar	1	1	2	Demonstrate the working with Various Menus in CorelDraw software.			3
			4	Working with various Panels.	1	1	2	Demonstrate the working with Various Panels in CorelDraw software.			3
			5	Developmental Weekly Assessment				Assessment Review and corrective action 1. Report on Various Tools in CorelDraw software. 2. Presentation on Design Tools. 3. Note down all the Menus and Sub Menus			3
			6	Industry Class on Basics of CorelDraw Software	2		3				
3	CO1	PO 1,4,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate How a logo and Symbols can be design according to the Theme given using Drawing Predefined Shapes in Corel Draw Software			3
			2	Working with New Documents, Templates Artboards and Saving the	1		3	Creating a New Documents, work with Templets and saving file formats.			3

				Documents.						
			3	Creating Rectangles- 3-Point Rectangles - Ellipses - Using the Modifier Keys, Arcs and Pie Wedges - Polygons - Drawing a Star- Perfect Shapes -	2		2	Create a file in a Corel Draw software which consist of different types of Rectangles, Ellipses, Arcs and Pie Wedges, polygons and star shapes.		3
			4	Demonstrate the Steps How to Create a Logo.			4	Draw a layout and Execute the given logo Experiment according to the Theme.		3
			5	CIE 1- Written and practice test				Assessment Review and corrective action 1. Report on creating a New Documents and Saving File formats for different applications. 2. Presentation on Creating Various Shapes. 3. Note down steps to create Logo and Symbols.		3
			6	Industry Class on Create a logo and its application	2		3			
4	CO2	PO 1,3 4,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Briefly introduces the role of text type in page layout, including size, line length, style, leading, spacing, and format.	1	2

			2	Typography- Anatomy of types – Measurements followed in typography - Point, Pica, X height, Ascender, and descender, base line and body width. Parts of type - arm, stroke, bracket, bowl, terminal, serif, hairline, count, stem and spine.	2		2	Demonstrate the Anatomy of Type.	1		2
			3	Type groups – sanserif, serif, novelty/decorative, black letter and roman old style, type face, type font, type family, type style, Modern Typefaces, Display Types, true type and open type.	1		3	Demonstrate the purpose of Type Face, font, family and Style.	1		2
			4	Importance of Legibility and Readability, Vector fonts and bitmapped fonts, Logos and trademarks.	2		2	Examine the Importance of Legibility and Readability	1		2
			5	Developmental Weekly Assessment				Assessment Review and corrective action 1. Report on Typography 2. Presentation on Type face, font, Family and style 3. Report on Vector Fonts and Bitmapped Fonts, Logos and trademarks.			3
			6	Industry Class on Usage of Typography according to the application of work.	2		3				
5	CO3	PO 1,2 3,4, 6,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will	2	2		Demonstrate How a Pagination of Book work can be Creating & Manipulating Text can be done in Corel Draw Software			3

			be on planning for the coming week.						
		2	Creating Text - Artistic Text - Paragraph Text- Character Formatting - Font-	1		3	Design a page layout of a book work and manipulate the pagination according to guidelines given in Corel Draw Software - Character Formatting. Font Face - Arial Font Style - Regular, Bold, italic Font Size & Effects - HEADING - 16pt - Caps Sub heading - 14pt- Small Caps Running matter-12pt - Sentence Case Superscript & Subscript Font Color - HEADING -Blue Running matter - Black		3
		3	Paragraph Formatting- Spacing - Indents - Tabs and Indents	1		3	Design a page layout of a book work and manipulate the pagination according to guidelines given in Corel Draw Software- Paragraph Formatting. Paragraph alignment - Justification Spacing After Paragraph - 3pt First Line Tab - 5pt Line Spacing - 1.5 lines		3
		4	Frames and Columns - Bullets- Changing Case- Insert Symbol Character	1		3	Design a page layout of a book work and manipulate the work according to guidelines given in Corel Draw Software- Frames & Column. Column - Two Column work Frames - 4 Frames Bullets - Alphabetic Cap A		3

			5	CIE 2 - Written and Practice Test			Symbols - Special Characters			3
			6	Industry Class on Creation and Manipulation of Text according to the application of work	2	3	Assessment Review and corrective action 1. Report on Layout of Book work 2. Presentation on Character formatting 3. Report on Paragraph Formatting, Frames & Column			
6	CO3	PO 1,2 3,5 7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2	Explain the importance of Color Fundamentals.	3		
			2	Fundamentals of Colour - visible spectrum - primary, secondary and tertiary colors - subtractive color and additive color theory - process color - spot color - tint, shade and tones.	1	3	Demonstrate the applying of color to text and manipulating according to the applications, Creating New Swatches and add to the Colour Swatches.			3
			3	Psychological effects of colours - warm and cool colours	1	3	Discuss examples and Demonstrate the effects of colors.			3
			4	Environment for Colour works - Color Temperature	1	3	Setting the environment for Colour works - Color Temperature			3
			5	Developmental Weekly Assessment			Assessment Review and corrective action 1. Report on Importance of Color 2. Demonstration or presentation applying of color and its applications			3

							3. Report on Setting and effect of Color.			
			6	Industry Class on Color Profile	2		3			
7	CO3	PO 1,4,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate how to create a Karishma Album		1 2
			2	Discuss the importance of the Selecting and Manipulating Objects	1		3	Videos and Demonstrate the how we can change the Positioning Objects- Resizing Objects - Rotating and Skewing Objects		3
			3	Manipulating Objects with Other Tools	1		3	Demonstrate the how we can Manipulating the objects from Free Rotation Tool - Free Scale Tool - Free Skew Tool -The Transform Toolbar - Undoing All Transformations		3
			4	Demonstrate the adjusting the places of images in Design			4	Create an Artwork using Move and Rotate Object.		3
			5	CIE 3 - Written and Practice Test				Assessment Review and corrective action 1. Report on Positioning and Resizing of objects. 2. Demonstration or presentation M 3. Report on Setting and effect of Color.		3
			6	Industry Class on creation of Artwork using move and rotation of objects.	2		3			

8	CO1	PO 1,4 7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2	Explain the importance of Layout format for Magazine, Newspaper, and Bookwork.			3	
			2	Discuss about grids, guides, caption, quotes, headers and footers, folio, headlines, sub headlines and margins.	2	2	Video and Demonstrate the working with grids, guides, caption, quotes, headers and footers, folio, headlines, sub headlines and margins.			3	
			3	Handling originals/photo - cropping, scaling and skewing	1	3	Videos and of Handling of Originals/Photo			3	
				4	Demonstrating Imposition scheme – half sheet work, sheet work /work and turn, work and tumble and work and twist.	2	2	Demonstrating of half sheet work, sheet work /work and turn, work and tumble and work and twist.			3
				5	Developmental Weekly Assessment			Assessment Review and corrective action 1. Report on Importance of Layout 2. Demonstration or presentation guides, headers and footers, margins. 3. Report on handling of Originals.			3
				6	Industry Class on Layout format for Magazine, Newspaper, and Bookwork	2	3				
9	CO4	PO 1,4 7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will	2	2	Explain the importance of Ordering Objects and align objects			3	

				be on planning for the coming week.						
			2	Ordering Objects- The Object Manager - Working with Objects - Moving Objects		1	3	Demonstrate the working with ordering of Objects		3
			3	Working with Layers and Aligning Objects		1	3	Demonstrate the working with Aligning with the Keyboard - Distributing Objects		3
			4	Find and Replace –Spell Checker - Automatic Spell Checking	1	1	2	Demonstrate the working with Find and Replace –Spell Checker.		3
			5	CIE 4 – Written and Practice Test				Assessment Review and corrective action 1. Report on Ordering Objects 2. Demonstration or presentation Align of objects 3. Report on Find and replace, Spell checker.		3
			6	Industry Class on ordering objects and align objects	2		3			
10	CO4	PO 2,4 5,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate and explain the importance of designing a Printed product and Exporting file formats		3
		.	2	Proof reading, proof reading marks, printers mark - crop, trim, bleed slug and registration, considerations for print production.		1	3	Able to create a Printer marks and consideration of points for print production.		3

			3	Understanding file formats - TIFF, JPEG, PDF, GIF, EPS and PNG		1	3	Video and Demonstrate Identifying and Practice the Various File Formats			3
			4	Export Multiple Assets at the same time		1	3	Video and Demonstrate the Exporting the Multiple Assets at the same time.			3
			5	Developmental Weekly Assessment				Assessment Review and corrective action 1. Report on Exporting File Formats 2. Presentation Proof Reading Marks. 3. Report on Multiple assets at the same time.			3
			6	Industry Class on designing a Printed product and Exporting file formats	2		3				
11	CO4	PO 2,4 5,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate about Corporate Visiting Card, Cover page design			3
			2	Draw the Layout of Visiting Card, Cover page design and Mention Its Attributes	1		3	Draw a neat Layout of Visiting Card and its parts		1	2
			3	Steps for designing a Visiting Card, Cover page.		1	3	Video and Demonstrate the steps for Creating a Visiting Card, Cover page			3
			4	Demonstrate a Corporate Visiting Card, Cover page Design.		1	3	Create and Practice a Visiting Card, Cover page design			3

			5	CIE 5– Written and practice test				Assessment Review and corrective action 1. Report on Importance of Corporate Design 2. Demonstration or presentation on Creating Visiting Card Design 3. Report on Coverpage Design.			3
			6	Industry Class on creation Corporate Visiting Cards design and its features.	1		4				
12	CO5	PO 2,5,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Explain the Importance of Digital Images. Image input and Editing.		1	2
			2	Explain about Digital Printing and why we go Digital?	2	1	1	Video on Quality and Digital Printing			3
			3	Understanding of Digital Printing	2	1	1	Video and Demonstrate Anatomy of Digital images, Pixels and Resolution			3
			4	Creating and Processing the Image		1	3	Demonstrate about Image Input and Editing			3
			5	Developmental Weekly Assessment				Assessment Review and corrective action 1. Report on Digital Printing. 2. Demonstration or presentation on Understanding of Digital images, pixels and resolutions 3. Report on handling of			3

							Originals.			
			6	Industry Class on Digital Images. Image input and Editing.	2		3			
13	CO5	PO 2,4 5,6 7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate about Digital workflow and Digital Printing presses		1 2
			2	Digital Workflow for Color Reproduction - Receiving a Job, Pre-flighting, File Servers and Networks, High-Res Scans, Electronic Stripping, Data Storage.	4			Demonstrate about Receiving the Job, Pre-flighting. Data Storage		3
			3	Internship a) Research on various Designing or Digital industries and their operations to identify at least 3 companies along with the areas of work interest and develop an internship plan that clearly highlights expectations from the industry during the internship.	2		2	Video and Demonstration of Inkjet and Electrographic process <ul style="list-style-type: none"> • Thermal Transfer process, • Dye-sublimation process, • Inkjet process, • Electro photographic Process • Indigo E - Print 1000 Heidelberg DI - 46 		1 2
			4	Mini Project Identification of the Best method of Small Multicolor Printing Jobs - the students would like to work as part of the project – either as provided by faculty or as identified	2	1	1	Mini Project Identification of the Best Software for Creating a Add Design and print a A3 size Jobs statement the students would like to work as part of the project – either as provided by faculty or	1	2

			by the student. Document the impact the project will have from a technical, social and business perspective.				as identified by the student. Document the impact the project will have from a technical, social and business perspective.			
		5	Mini Project Identification of the Best method of Tag Printing Jobs - the students would like to work as part of the project – either as provided by faculty or as identified by the student. Document the impact the project will have from a technical, social and business perspective.	2	1	2	Review and corrective Action on Mini Projects			3

****Note:** Saturday session from 9 AM -2 PM

Reference:

1. Fundamentals of Copy and Layout (third edition) – Illinois USA - National text book company
2. Exploring Typography – Poppy Evans – Thomson Delmar Learning UK.
3. Typography and Typesetting – Van Nostrand Reinhold
4. Corel Draw User guide 2018 from Corel Corporation.
5. Corel Draw Training from engravers network
6. Corel Draw in Simple Steps – Wiley India Edition – dreamtech Press
7. Corel Draw X7 User Guide from Corel Corporation.
8. Pocket Guide to Digital Printing – Frank Cost- Delmar Publishers
9. Pocket Guide to Color With Digital Applications – Thomas E.Schildgen, Bob Jose
10. Digital Prepress Complete – Donnie o’Quinn, Steve Kurth, Tim Plumer

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE (1 to 5)

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	Printing Technology	Semester	V		
Course	Visual Design and Digital Printing	Max Marks	30		
Course Code	20PT51I	Duration	4 hours		
Name of the course coordinator					
Note: Answer one full question from each section.					
Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) – 10 marks					
1.a)	Compare about Symmetrical and Asymmetrical Balance.	L3	1	1,7	5 Marks
b)	Analyze the Pros and Cons of Vector Graphics and Bitmap Graphics.	L4	1	1,7	5 Marks
2.a)	Demonstrate about various Designing Tools.	L3	1	1,4,7	5 Marks
b)	Distinguish the various File Formats of Print and Web applications.	L4	1	1,4,7	5 Marks
Section-2 (Practical) - 20 marks					
3)	Sketching the various design tools used create shapes	L3	1	7	20 Marks
4)	Creating Various types of Logos with its steps	L4	1	7	20 Marks

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme : Printing				
Technology Semester : V				
Course : Visual Design and Digital Printing				
Max Marks : 100				
Course Code : 20PT51I				
Duration : 3 Hrs				
Instruction to the Candidate: Answer one full question from each section.				
Q.No	Questions	CL	CO	Marks
Section-1				
1.a)	Illustrate the various Drawing Tools of Coreldraw Software.	L3	1	10
b)	Demonstrate the various Corel Draw Interface.	L4		10
2.a)	Illustrate the purpose of various shape tools of Coreldraw Software.	L3		10
b)	Demonstrate the Creating types of Logos.	L4		10
Section-2				
3.a)	Examine the Importance of Legibility and Readability	L3	2	10
b)	Demonstrate the purpose of Type family and Style.	L4		10
4.a)	Illustrate the Anatomy of Type and label the parts.	L3		10
b)	Distinguish between Vector Fonts and Bitmapped Fonts.	L4		10
Section-3				
5.a)	Describe the Paragraph Formatting of Book Work Job.	L3	3	10
b)	Demonstrate the Book work page Layout with standard guidelines.	L4		10
6.a)	Differentiate between Primary and Secondary Color theory.	L3		10
b)	Discuss examples and Demonstrate the effects of colors.	L4		10
Section-4				

7.a)	Illustrate about working principles of Object manager.	L3	4	10
b)	Demonstrate the Exporting the Multiple Assets at the same time.	L4		10
8.a)	Describe about Layout of Visiting Card and its parts.	L3		10
b)	Analyze the Steps for designing a Visiting Card.	L4		10
Section-5				
9.a)	Explain the Importance of Digital Images and its input with Editing.	L3	5	10
b)	Analyze about Pre-Flighting process in Digital Printing.	L4		10
10.a)	How to receiving the Job in Digital Printing describe in detail.	L3		10
b)	Analyze the Electro photographic Printing process with neat sketch.	L4		10

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Case submission	20
2	Case presentation	20
3	Case innovation	20
4	Result	20
5	Viva voce	20
Total		100



Government of Karnataka

DEPARTMENT OF COLLEGIATE and TECHNICAL EDUCATION

Program	Printing Technology	Semester	V
Course Code	20PT52I	Type of Course	L:T:P (104:52:312)
Course Name	Web Fed Offset Printing Machines	Credits	24
CIE Marks	240	SEE Marks	160

Rationale

In present scenario, Printing industries are moving towards complete automation. Small and medium industries are in a phase of switching to CTP and Remote Control Console technology for quality of Production Process and Printing. They are intended to operate automatically in order to reduce production time and higher production rates and increased productivity, more efficient use of materials, better product quality, improved safety, shorter workweeks for labour, and reduced factory lead times. The web fed offset machine mainly used for the production of Magazines, Newspaper, Brochures, Pamphlets in large scale Production. Depending on the size of the organization, the engineer will perform all of these responsibilities. Therefore, it is necessary for diploma engineers to have knowledge of Advance Technologies in Web fed offset printing process. This pathway attempts to provide theoretical and practical aspects of Web Fed Offset machines to develop operational competency. Hence this path way is for diploma engineers who want to specialise in the field of Web Fed Offset Printing Machines

Course Cohort Owner

A Course Cohort Owner is a faculty from the core discipline, who is fully responsible for one specialised field of study and the cohort of students who have chosen to study that specialised field of study.

Guidelines for Cohort Owner

1. Each Specialized field of study is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. One faculty from the Core Discipline shall be the Cohort Owner, who for teaching and learning in allied disciplines can work with faculty from other disciplines or industry experts.
3. The course shall be delivered in boot camp mode spanning over 12 weeks of study, weekly developmental assessments and culminating in a mini capstone.
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.
5. The cohort owner shall be responsible to identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for any industrial visits.
7. Cohort owner shall maintain and document industrial assignments, weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom sessions can augment or use supplementally teaching and learning opportunities including good quality online courses available on platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademy, SWAYAM , etc.

Course outcome: A student should be able to

CO-01	Examine the configurations of different types of Web Fed Offset Machines
CO-02	Know the operating and maintenance procedure of inking system of web fed presses
CO-03	To know the Different dampening system.
CO-04	Operating the computer console machine ,infeed, printing unit and out feed unit
CO- 05	Operating the different quality control devices

Detailed course plan

Week	C O	P O	Days	1 st session (9am to 1 pm)			2 ND session (1.30pm to 4.30pm)				
				L	T	P	L	T	P		
1	CO1	PO1	1	Overview of a Web fed offset Presses/terminology and its Applications.	2	1	1	Present an overview of Web Fed Offset Presses with its Applications.			3
			2	Classification of Web Fed Presses: - <ul style="list-style-type: none"> • Inline Presses • Common Impression Cylinder Presses • Blanket To Blanket Presses. 	1	1	2	Examine the configuration Inline and CIC Presses and Present its working Principles.			3
			3	Blanket To Blanket Presses: <ul style="list-style-type: none"> • Printing Units • Cylinder Pressures and Timing • Setting Bearer Pressure and Cylinder Timing. 	3	1		Present the configuration of Blanket To Blanket Presses.	3		
			4	Working Principle of Multicolor Web Offset Press.	2	1	1	Video on Working Principle of Multicolor Web Offset Press			3
			5	Developmental Weekly Assessment				Assessment Review and corrective action 4. Report on General Terminology 5. Presentation on Inline, Stack and CIC Presses 6. Note down on Working principle of Web offset press.			3
			6	Industry Class on Web offset presses + Industry Assignment	2		3				
2	CO 2	PO 1,4	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate about Printing Unit Construction.		1	2

			2	Working with setting of in feed, delivery, folders, gear side, operator's side, printing couple, printing unit.	1	1	2	Video on Setting a Feeding Unit, Printing Unit of Multicolor Web Offset Press			3
			3	Construction of the Printing Unit, <ul style="list-style-type: none"> • Plate cylinder, • Blanket cylinder, • Impression cylinders 	1	1	2	Presentation on Construction of the Printing Unit			3
			4	Bearers, bearer drive, gear drive, under cut, packing, Blanket packing, Types of Blankets	1	1	2	Examine the Packing of Plate and Blanket Cylinder			3
			5	Developmental Weekly Assessment				Assessment Review and corrective action 1. Report on types of Construction of Printing Unit 2. Presentation on Working principle of Multicolor Web Offset Press. 3. Note down on Plate and Blanket Packing			3
			6	Industry Class on setting Feeding Unit and Printing Unit + Industry Assignment	2		3				
3	CO 2	PO 1,4	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate the specification and working of Inking System, maintenance of inking rollers and inking system of web fed Presses.			3
			2	Inking Systems: - <ul style="list-style-type: none"> • The Fountain Roller • The transfer roller • The roller train • The Form roller 	1		3	Demonstrate Inking System with its rollers.			3

			3	<ul style="list-style-type: none"> Setting the inking forme roller, Inking screws. Operating procedures, maintenance of inking rollers and inking system. 	2	2	Present the Operating procedures, maintenance of inking rollers and inking system of web fed Presses.			3
			4	Press Remote Control Systems: <ul style="list-style-type: none"> Press Remote Control Console Ink feed preset systems 		4	Demonstrate the Features of Remote Control Console.			3
			5	CIE 1 - Written and Practice Test			Assessment Review and corrective action <ol style="list-style-type: none"> Report on Construction of Inking System. Presentation on maintenance and operating procedure of Inking rollers and Inking System. 			3
			6	Industry Class on setting of Inking system and Remote Control Console + Industry Assignment	2	3				
4	CO3	PO 1,4	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2	Demonstrate the Dampening System, its classification and features.	1		2
			2	Dampening System: <ul style="list-style-type: none"> Dampening Solution, Ingredients, pH and conductivity Conductivity of dampening system 	2	2	Demonstrate the procedure of preparing the Dampening Solution.	1		2
			3	Types of dampening systems: <ul style="list-style-type: none"> Conventional dampening system Dahlgren dampening system. Levey Flap Ductor dampening system 	1	3	Demonstrate on Conventional Dampening System.		1	2

			4	<ul style="list-style-type: none"> • Brush Dampening System • Spray bar dampening System • Smith dampening System 	2	2	Video on Spray bar Dampening System.	1	2
			5	Developmental Assessment			Assessment Review and corrective action 1. Report on Conventional Dampening System. 2. Presentation on Brush Dampening system 3. Presentation on Spray Bar Dampening system		3
			6	Industry Class on Dampening System and its Classifications and their features +Industry Assignment.	2	3			
5	CO4	PO 1,4	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2	Demonstrate the Infeed unit, Dryer and Chill Rolls, Folder Design.		3
			2	<ul style="list-style-type: none"> • Infeed Unit. • Splicer • Preparation 	1	3	Video and Presentation on Infeed Unit, Splicing Process and its Preparation.		3
			3	Dryer and Chill Rolls <ul style="list-style-type: none"> • Introduction to Dryers • High Velocity hot- air Dryers • Combination Dryers. • Chill Rolls and its Operation. 	1	3	Video on working principle of High Velocity hot- air Dryers and Combination Dryers and Chill Rolls.		3

			4	Folders: <ul style="list-style-type: none"> Folding Principles Folder Designs: - <ul style="list-style-type: none"> Combination Folders Ribbon Folder Double Former Folder Cut off 	1	3	Present Various types of Folding.			3
			5	CIE 2 - Written and Practice Test			Assessment Review and corrective action <ol style="list-style-type: none"> Report on Infeed unit setting. Presentation on Dryer and chill rolls Presentation on various types of folding 			3
			6	Industry Class on Folding Mechanisms+Industry Assignment.	2	3				
6	CO4	PO 1,4	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2	Demonstrate the features of Inline Finishing and Auxiliary Folders, Web Tension	3		
			2	In-Line Finishing Gluers, Paster Wheels, Remoistenable Pattern Gluers Segmented Gluers, Envelope Pattern Gluers, Spot Gluers, Back bone Gluers	1	3	Video on Inline Finishing Operations.			3
			3	Auxiliary Folders: - <ul style="list-style-type: none"> Prefolders, Plow Folders, Pattern Perforating Units and Numbering Units. Variable Rotary Cutters and Sheeters 	1	3	Presentation on Auxiliary Folders and its Operating Procedure.			3

			4	<p>Web Tension: -</p> <ul style="list-style-type: none"> • Web Control Factors- Draw, Slip, paper. • Dryer, Modulus of elasticity, Measuring and Setting Tensions on the Press • Paper Behavior on Press 	1		3	Video on Web Tension of Web fed Press and list its factors.			3
			5	Developmental Assessment				<p>Assessment Review and corrective action</p> <ol style="list-style-type: none"> 1. Report on Inline Finishing Operations. 2. Demonstrate on Auxiliary folders 3. Presentation on Web Tension of Dryers 			3
			6	Industry Class on Inline Finishing and Auxiliary Folders, Web Tension +Industry Assignment.	2		3				
7	C05		1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate the Auxiliary Equipment's using in Web Fed Press		1	2
			2	<p>Auxiliary Equipment's</p> <ul style="list-style-type: none"> • Remote Control Console • Plate Scanner • Scanning Densitometer & Closed Loop system • Web preconditioners 	1		3	Video on features of Plate Scanner and Densitometer			3
			3	<ul style="list-style-type: none"> • Sheet cleaners • Ink agitators • Automatic ink level controller and pumping systems. 	1		3	Video on Automatic Blanket Washers and Automatic ink level controller and pumping system			3

				<ul style="list-style-type: none"> Automatic Blanket Washers 							
			4	<ul style="list-style-type: none"> Side lay sensors & Web Break Detectors Re moisturizers & Coaters Antistatic devices & Perforators Cutoff Controls 			4	Video on Side lay sensors & Web break detectors, Antistatic devices			3
			5	CIE 3 - Written and Practice Test				Assessment Review and corrective action 1. Report on Auxiliary Equipment's in Webfed offset Printing. 2. Presentation on Side Lay sensors & Web Break Detectors.			3
			6	Industry Class on Auxiliary Equipment's +Industry Assignment.	2		3				
8	C05	PO 1,3,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate the Image and web Control of Web Fed Presses.			3
			2	Image and web Control: - Image Control <ul style="list-style-type: none"> Registration Register Marks 	2		2	Examine and Present an Image Control on Web Fed Press.			3
			3	<ul style="list-style-type: none"> Color register, Relative print width and length. Web control- side lay, cutoff, web to web ribbon to ribbon. 	1		3	Video on Color Registration Factors.			3
			4	<ul style="list-style-type: none"> Controlling Fan Out Back up 	2		2	Video on Controlling Fan Out and Back Up Procedure.			3

			5	Developmental Assessment				Assessment Review and corrective action 1. Report on Image control in Webfed offset Printing. 2. Presentation on Color Registration factors and Web Control.			3
			6	Industry Class on Image and web Control+Industry Assignment.	2		3				
9	C05		1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate Quality Control Devices Using in Web Fed Offset Presses.			3
			2	Test Images for Web Offset <ul style="list-style-type: none"> • Press Performance Testing • News Paper Test Forms • SWOP Calibration Kit • Colour Reproduction Guide II • Standard Offset Colour Control Bars 		1	3	Explain the purpose of Colour Control Bars.			3
			3	<ul style="list-style-type: none"> • Plate Control Targets • Ladder Target • Gray Balance Chart • Star Target • Colour Control Bars 		1	3	Examine and Present Star Target Colour Control Bars			3
			4	<ul style="list-style-type: none"> • GATF Dot Gain Scale and Slur Gauge • Dot Gain Scale II • GATF Newsdot • Right Register Guide • QC Ink Water Balance Strips 	1	1	2	Examine and Present Dot Gain Scale II, GATF News dot, Right Register Guide, QC Ink Water Balance Strips			3

			5	CIE 4 - Written and Practice Test				Assessment Review and corrective action 1. Report on Test Images for Web offset 2. Presentation on Quality control aids			3
			6	Industry Class on Quality Control Devices Using in Web Fed Offset Presses.+Industry Assignment.	2		3				
10	CO2		1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate Makeready for Web fed Press to Print Multicolor.			3
			2	Makeready Infeed Makeready <ul style="list-style-type: none"> • Preparing the New Roll • Mounting the Roll • Makeready on Pastors. 		1	3	Overview Makeready of Infeed Unit.			3
			3	The Printing Units <ul style="list-style-type: none"> • Washing up the Inking System • Cleaning the dampening System • Preparing the Plates for Storage Preparing the new Plate		1	3	Makeready of Printing Unit.			3
			4	<ul style="list-style-type: none"> • Packing and Mounting the Plate • Cleaning and removing the Blanket • Selecting and Preparing the New Blanket • Mounting and Packing the Blanket 		1	3	Makeready of Plate and Blanket Cylinder..			3
			5	Developmental Assessment				Assessment Review and corrective action 1. Report on makeready of multicolor web fed offset printing machine.			3

							Presentation on autowashing inking system and Blanket cylinder.			
			6	Industry Class on Makeready Procedure for Web Fed Presses.. +Industry Assignment.	2	3				
11	C04		1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2	Demonstrate. Makeready for Dryer and Chill Rolls			3
			2	Makeready for Dryer and Chill Rolls Makeready for the folder <ul style="list-style-type: none"> • Adjusting the Former • The Nip Rollers 	1	3	Execute the Makeready for Dryer and Chill Rolls		1	2
			3	<ul style="list-style-type: none"> • Cut- Off • Jaw Fold • Chopper Fold • Perforators 		1	3	Execute the Makeready for the folder		3
			4	Running Makeready <ul style="list-style-type: none"> • Inking Up the Press • Starting the Press • Starting the Run 		1	3	Present Running Makeready for Web fed Press.		3
			5	CIE 5 - Written and Practice Test				Assessment Review and corrective action. 1.Report on makeready of Dryer and Chill Rolls 2.Presentation on different types of folders		3
			6	Industry Class on Demonstrate. Makeready for Dryer and Chill Rolls.. +Industry Assignment.	1	4				

12	C05		1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	2		Demonstrate the Requirements of Web Papers		1	2
			2	Requirements of web papers <ul style="list-style-type: none"> • Flatness • Moisture Content • Blistering • Moisture Resistance • Internal Strength 	2	1	1	Test the quality of Papers For Web fed Press.			3
			3	<ul style="list-style-type: none"> • Dimensional Stability • Piling • Surface Strength • Other requirements 	2	1	1	Test the quality of Papers For Web fed Press.			3
			4	Paper Properties Vs, Printability <ul style="list-style-type: none"> • Colour, Brightness, Opacity. • Smoothness, Gloss • Reactiveness 		1	3	Test the quality of Papers For Web fed Press.			3
			5	Developmental Assessment				Assessment Review and corrective action. 1.Report on Requirements of web papers 2.Presentation on paper properties			3
			6	Industry Class on Quality of paper for web fed Presses.+Industry Assignment.	2		3				

13	C05		1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week	2	2		Demonstrate the Types of Web Offset Inks, its properties and Performance Characteristics		1	2
			2	Types of Web Offset Inks <ul style="list-style-type: none"> • Heat Set Inks • Quick Set Inks • Offset News Ink • New Drying Inks 	4			Video on manufacturing web offset inks and Properties of its Testing.			3
			3	Internship <p>a) Survey on various Web offset industries and prepare a report on advance industry.</p>	2		2	Prepare a report and Present on Working flow of advance industry.		1	2
			4	Mini Project: Case study on advance Auxiliary Equipment's used in Web fed offset Printing Industry.	2	1	1	Mini Project: Case study on advance Waste Management in Web fed offset Printing Industry.	1		2
			5	Mini Project: Case study on Automation in Web fed offset Printing process.	2	1	2	Review and corrective Action on Mini Projects			3

****Note:** Saturday session from 9 AM -2 PM

Reference:

1. Web offset Press Operating – GATF Staff – 2000, 4th Edition, GATF Press.
2. A Hand Book for web Printer - 1977 W.R. Durrant, Web Control.
3. Web offset Press operating – 1992 Edward J.Kelly, David D.O. Rouse and Robert R.Serpanic.
4. Web offset Press Troubles – GATF David B.Grous.

CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

* The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE (1 to 5)

Note: Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	PRINTING TECHNOLOGY	Semester	V		
Course	Web Fed Offset Printing Machines	Max Marks	30		
Course Code	20PT52I	Duration	4 hours		
Name of the course coordinator					
Note: Answer one full question from each section.					
Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) - 10 marks					
1.a)	Compare Inline and Blanket to Blanket Web Fed offset Presses	L3	1	1,7	5 Marks
b)	Analyze any 5 terminologies of web fed offset Machines.	L4	1	1,4,7	5 Marks
2.a)	Demonstrate Printing Units of Blanket to Blanket Presses.	L3	1	1,7	5 Marks
b)	Write the Applications of Web fed offset Presses.	L4	1	1,7	5 Marks
Section-2 (Practical) - 20 marks					
3)	Draw a neat sketch of CIC web fed press with its working Principles.	L3	1	7	10 Marks
4)	Prepare and Present a report on Multicolor Web Offset Press	L4	1	7	10 Marks

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme : Printing Technology				
Semester : V				
Course : Web Fed Offset Printing Machines				
Max Marks : 100				
Course Code : 20PT52I				
Duration : 3 Hrs				
Instruction to the Candidate: Answer one full question from each section.				
Sl.No	Question	CL	CO	Marks
Section-1				
1.a)	Describe the terminologies any 10 terminologies of web fed offset Press	L3	1	10 Marks
b)	Distinguish between the CIC and Blanket Web fed Press	L4		10 Marks
2.a)	Write the working principle of Multi colour web offset Press.	L3		10 Marks
b)	Demonstrate Printing Unit of Blanket to Blanket Press.	L4		10 Marks
Section-2				
3.a)	Illustrate the folders of web offset Press.	L3	2	10 Marks
b)	Demonstrate the working of Infeed Section of web offset Press.	L4		10 Marks
4.a)	Examine the various parts of Plate cylinder with sketch.	L3		10 Marks
b)	Analyze gear side, operators side, printing couple and Printing Unit.	L4		10 Marks
Section- 3				
5.a)	Illustrate inking system of web offset Press.	L3	3	10 Marks
b)	Demonstrate the setting of inking forme rollers with sketch.	L4		10 Marks
6.a)	Describe maintenance of inking rollers and inking system.	L3		10 Marks

b)	Analyze the Press Remote Control Console.	L4		10 Marks
Section -4				
7.a)	Describe the Conventional dampening system	L3	4	10 Marks
b)	Demonstrate various Folder Designs of Web Offset Press.	L4		10 Marks
8.a)	Describe various Inline Operation of Web Offset Press.	L3		10 Marks
b)	Analyze various Web control factors	L4		10 Marks
Section- 5				
9.a)	Describe make-ready procedure of Web Offset Press	L3	5	10 Marks
b)	Analyze the Properties of Paper for Web Offset Press.	L4		10 Marks
10.a)	Describe the Requirements of Maintenance and Principal Function of Lubrication.	L3		10 Marks
b)	Discuss the Maintenance check list of Web Offset Press.	L4		10 Marks



Government of Karnataka

DEPARTMENT OF COLLEGIATE AND TECHNICAL EDUCATION

Program	Printing Technology	Semester	V
Course Code	20PT53I	Type of Course	L:T:P 104:52:312
Specialization	Advanced Packaging Technology	Credits	24
CIE Marks	240	SEE Marks	160

Rationale

The packaging's main purpose of **preservation, containment, and protection of food**, the packaging material can be rigid, flexible, or semi-flexible. Rigid packages include bottles, trays, cans, jars, and caps. The suitable material for packaging a certain type of food depends on the functions that the package is supposed to fulfil. These functions include shielding the foods against moisture, temperature variations, oxygen, light, and biological microorganisms. Also, damage protection, permeability, food identification, and chemical and optical. Packaging design is the connection of form, structure, materials, colour, imagery, typography, and regulatory information with ancillary design elements to make a product suitable for marketing.

Course Cohort Owner

A Course Cohort Owner is a faculty from the core discipline, who is fully responsible for one specialised field of study and the cohort of students who have chosen to study that specialised field of study.

Guidelines for Cohort Owner

1. Each Specialized field of study is restricted to a Cohort of 20 students which could include students from other relevant programs.
2. One faculty from the Core Discipline shall be the Cohort Owner, who for teaching and learning in allied disciplines can work with faculty from other disciplines or industry experts.
3. The course shall be delivered in boot camp mode spanning over 12 weeks of study, weekly developmental assessments and culminating in a mini capstone.
4. The industry session shall be addressed by industry subject experts (in contact mode/online / recorded video mode) in the discipline only.

5. The cohort owner shall be responsible to identify experts from the relevant field and organize industry session as per schedule.
6. Cohort owner shall plan and accompany the cohort for any industrial visits.
7. Cohort owner shall maintain and document industrial assignments, weekly assessments, practices and mini project.
8. The cohort owner shall coordinate with faculties across programs needed for their course to ensure seamless delivery as per time table
9. The cohort owner along with classroom sessions can augment or use supplementally teaching and learning opportunities including good quality online courses available on platforms like Karnataka LMS, Infosys Springboard, NPTEL, Unacademy, SWAYAM, etc.
10. Cohort owner shall guide the cohorts for the selection and execution of mini project.

Course outcome: A student should be able to

CO-01	Identify the different types of packaging, packaging materials and products.
CO-02	Learn about manufacturing process of metal packaging, 3 and 2-piece metal can.
CO-03	Learn about Manufacturing Semi Rigid packaging, skin packaging, Blister packaging, shrink packaging, clamp shell packaging and stretch packaging and plastic soap box.
CO-04	Analyze the Plastic shaping by extrusion moulding and injection moulding, methods of isolation shock. properties of finished products by using specified testing method.
CO-05	Handle different types of boards and machines for printing process

Detailed course plan

Week	C O	P O	Days	1 st session (9am to 1 pm)	L	T	P	2 ND session (1.30pm to 4.30pm)	L	T	P
1	C01	P01,	1	An over view of Packaging materials and Products.	2	1	1	Presentation an overview of Packaging materials and Products.	0	0	3
			2	Types of Packaging 1. Rigid Packaging:- • Advantages and limitations of glass containers. • Composition of Glass Containers • Requirements of Glass Containers	2	1	1	Study and arrange the materials used in manufacturing the glass containers.	0	0	3
			3	• Manufacturing the glass containers. Discuss on materials Coating in Glass containers • Closures For Glass Containers	2	1	1	Start the mixing materials and manufacture glass.	0	0	3
			4	Types of Closures • Screw and Lug Closure • Friction fit Caps and Roll-on Caps • Pilfer proof Caps and Crown Caps.	2	1	1	Coat the glass containers and use appropriate closures.	0	0	3
			5	Developmental Weekly Assessment				Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process.	0	0	3
			6.	Industry class-On manufacturing glass and its application+ Industry Assignment	0	0	5				

2	C02	PO1,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Presentation of Various types of Metal Packaging, Properties,etc.	0	0	3
			2	Metal Packaging: _ <ul style="list-style-type: none"> • Types of metal Package • Packaging Forms of Metal Containers • Advantages of Metal Packaging • Discuss mechanical properties of metal container. • Materials for metal Packaging. 	2	1	1	Study mechanical properties of metal container and Materials for metal Packaging.	0	0	3
			3	<ul style="list-style-type: none"> • Methods of a Manufacturing Three-piece Can. • Advantages and limitations. 	2	1	1	Quality checking, Printing Tin Sheets and Manufacturing the tin containers with sealing and closures.	0	0	3
			4	Methods of a Manufacturing Two-piece Can. Advantages and limitations	2	1	1	Quality checking, Printing Tin Sheets and Manufacturing the tin containers with sealing and closures.	0	0	3
			5	Developmental Weekly Assessment				Assessment Review and corrective action: <ol style="list-style-type: none"> 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of Tin. 3. Note down different types of materials and machinery used during the process. 	0	0	3
			6	Industry Class on Three Piece and two Piece Can Manufacturing. + Industr Assignment.	0	0	5				

3	CO3	PO1,3,7	1	Peer review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Presentation on Semi Rigid Packaging. High Visibility Packaging	0	0	3
			2	1. Semi rigid packaging. 2. High visibility Packages. • Clamshell Packaging • Skin Packaging	2	1	1	Prepare an Ointment Tube with crimping process, Clamshell Packages and Skin packages.	0	0	3
			3	• Blister Packaging • Shrink Packaging • Stretch Packaging	2	1	1	Prepare an Blister Packaging and Shrink Packaging and Stretch Packaging	0	0	3
			4	low-density polyethylene (LDPE), linear low-density polyethylene(LLDPE), high molecular high-density polythene(HMHDPE), polypropylene(PP), Biaxially oriented polypropylene (BOPP), Polyvinyl chloride(PVC), Polyvinyl dine chloride(PVDC).	2	1	1	Collect LDPE, LLDPE, HMDPE,PP,BOPP,PVC,PVDC plastics.	0	0	3
			5	CIE 1 – Written and Practice Test				Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material LLDPE, PS, BOPP 3. Note down different types of materials and machinery used during the process.	0	0	3
			6	Industry Class-LLDPE, PS, BOPP Plastics. +Industry Assignment	0	0	5				

4	CO4	PO2,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Video on manufacturing of product by extrusion blowing method and injection moulding	0	0	3
			2	Shaping plastics. 1). Extrusion blowing method. 2).Injection blowing method.	2	1	1	Manufacture a product using Extrusion blowing and injection blowing method	0	0	3
			3	Types of injection moulding. 1). Plunger type Injection moulding machine. 2).Screw type injection moulding machine.	2	1	1	Study different types of injection moulding	0	0	3
			4	Stretch Blow moulding. Compression moulding press. Transfer blow moulding. Thermoforming	2	1	1	Video on different types of moulding process.	0	0	3
			5	Developmental Weekly Assessment				Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process.	0	0	3
	2	1,2	6	Industry Class-Injection Molding, Plastic containers +Industry Assignment.	0	0	5				
5	CO4	PO2,3,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Presentation on Cushion Packaging and methods of isolation of shock.	0	0	3
			2	Cushion Packaging. • Need for Cushion Package Methods of Isolation of shock. Load spreading	2	1	1	Study different methods of Isolation shock.	0	0	3

				<ul style="list-style-type: none"> • Blocking • Flotation. • Wrapping of individual parts. • Moulded enclosures. 							
			3	Fragility of products. <ul style="list-style-type: none"> • Cushion materials • Resilient. • Non -Resilient. • Bulk cushion devices. • Foam Blocking 	2	1	1	Demonstrate the Cushion materials using for Packaging.	0	0	3
			4	Steps in Cushion Design. <ul style="list-style-type: none"> • Determining Product fragility. • Determining drop height. • Material selection. • Design of foam requirements 	2	1	1	Video on cushion designing.	0	0	3
			5	CIE 2 – Written and Practice Test	0	0	0	Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process.	0	0	3
			6	Industry Class: -Cushioning and methods of isolation shock+ Industry Assignment.	0	0	5				
6	CO4	PO2,4,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Industrial Visit for Testing of plastic packages.	0	0	3

		2	Testing of plastic packages. <ul style="list-style-type: none"> • Compatibility • Hot tack method. • Layer gauge method. 	2	1	1	Video on different Testing of plastic packages	0	0	3
		3	Testing of plastic films. <ul style="list-style-type: none"> • Gloss • Haze • See-through • Machinability • Slip • Curl • Rigidity 	2	1	1	Testing the plastic films using Gloss meter, Haze meter.	0	0	3
		4	Mechanical Tests <ul style="list-style-type: none"> • Tensile Strength • Elongation • Tear Strength • Impact strength • Burst strength 	2	1	1	Test the plastic materials- Falling dart impact tester, burst pressure test, Arc test.	0	0	3
		5	Developmental Weekly Assessment	0	0	0	Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process.	0	0	3
		6	Industry Class: Testing of plastic films and packages+ Industry Assignment.	0	0	5		0	0	3

7			1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Presentation on Packaging Atmosphere methods.	0	0	3
	CO4	PO2,4,5	2	Control of Packaging Atmosphere Methods <ul style="list-style-type: none"> • Vacuum packaging. • Modified Atmosphere packaging(MAP) • Controlled Atmosphere Packaging(CAP) 	2	1	1	Video on Control of Packaging Atmosphere methods.	0	0	3
			3	Features of Controlled atmosphere packaging <ul style="list-style-type: none"> • Active packaging Technology. • Aseptic packaging • Flexible Packaging 	2	1	1	Study about Features of controlled atmosphere.	0	0	3
			4	Freeze packaging protection <ul style="list-style-type: none"> • Freezer burn • Cavity ice 	2	1	1	Study about Features of controlled atmosphere.	0	0	3
			5	CIE 3 – Written and Practice Test	0	0	0	Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process.	0	0	3
			6	Industry Class: -Control packaging of atmosphere+ Industry Assignment.	0	0	5				

8	C05	P03,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week	2	1	1	Study about various carton design, Collect varieties of Board as per Carton requirements.	0	0	3
			2	Folding Cartons: - <ul style="list-style-type: none"> Advantages and Limitations of Folding Cartons Style and Design of cartons Selection of material for folding cartons 	2	1	1	Select various Designs of cartons and choose appropriate Thickness of Board.	0	0	3
			3	Outline the Carton Design as per size of the Product using Software.	2	1	1	Execute the outline and design the carton as per theme i., Bottle.	0	0	3
			4	Outline the Tray and window Carton Design as per size of the Product using Software	2	1	1	Execute the outline and design the carton as per theme Sweet Box and Scent bottle Cartons	0	0	3
			5	Developmental Weekly Assessment	0	0	0	-Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the steps/methods followed during the Processing of material to become a final product. 3. Note down different types of materials and tool used during the process.	0	0	3
			6	Industry Class: - Using illustrator Software + Industry Assignment	0	0	5				
9	C05	P04,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	List out the steps in Die making and collect the materials.	0	0	3
			2	Discuss on materials taken according to be taken as per Die making.	2	1	1	As per the measurements Sequential Operations carry out for a particular Die.	0	0	3

			3	Understand the Laser Die cutting Machines with its advantages and limitations.	2	1	1	Working on Die board carry out Laser Die cutting Procedure.	0	0	3
			4	Insert Cutting and Creasing rules in appropriate Position, Nicking out, Corking the die or ejection material and its function.	2	1	1	Insert Cutting and Creasing rules in appropriate Position, Nicking out, Corking the die or ejection material should be placed.	0	0	3
			5	CIE 4 - Written and Practice Test	0	0	0	Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing 3. Note down different types of materials and machinery used during the process.	0	0	3
			6	Industry Class: - laser Die-cutting+ Industry Assignment.	0	0	5				
10	C05	P02,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	List out the various types Machineries using in Punching of Cartons and their limitations.	0	0	3
			2	Working Principles of Hand Fed and Auto Fed Platen Punching Machines.	2	1	1	Punch the Badges through Hand Punching Machines or Depending on the Quantity use Auto fed machines for Punching.	0	0	3
			3	Understand the working Principle of Flat Bed Punching machines, its specifications and Advantages with its limitations.	2	1	1	Fix the die board on the Flat Bed of punching Machine and punch the cartons.	0	0	3
			4	Understand the working Principle of Rotary Punching machines, its specifications and Advantages with its limitations.	2	1	1	Fix the Die cut Cylinder on the rotary of punching Machine and punch the cartons.	0	0	3
			5	Developmental Weekly Assessment	0	0	0	Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week.	0	0	3

								2. Note down all the troubleshooting methods followed during the Punching the cartons. 3. Note down different types of materials and machinery used during the process.			
			6	Industry Class: - Advancement in Punching.+ Industry Assignment	0	0	5				
11	C05	P01,3	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Study about Corrugated Boards, its features and role in Packaging industry.	0	0	3
			2	Corrugated Board: - <ul style="list-style-type: none"> • Definition • Properties of Corrugated board • Types of Corrugated Boards 	2	1	1	Identify the Properties of Corrugated board and prepare the varieties of corrugated boards.	0	0	3
			3	Understand the following terms: - <ul style="list-style-type: none"> • Flute Selection • Types of Corrugated Boxes • Fiber Drum 	2	1	1	Prepare Various Types of Corrugated Boxes to Pack given weight of the Products.	0	0	3
			4	<ul style="list-style-type: none"> • Advantages of Fiber Board containers • Multiwall Paper Sacks • Plastic Woven Sacks • Paper Bags 	2	1	1	Prepare Multiwall Paper Sacks, Plastic Woven Sacks and Paper Bags to Pack given weight of the Products.	0	0	3
			5	CIE 5- Written and practice test	0	0	0	Developmental Assessment -Assessment Review and corrective action. 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process.	0	0	3
			6	Industry Class: - Corrugated Board Manufacturing+ Industry Assignment	0	0	5				

12	CO5	PO4,5,7	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	List out the varieties of Boards using in Packaging and find out how to meet the requirements of the customers,	0	0	3
			2	Discuss on various kinds of Boards using in Packaging industry, their size, GSM, as per meet the demands of the customer.	2	1	1	Collect the various samples of the boards, state its GSM, and size.	0	0	3
			3	State the following Properties of the Boards: <ul style="list-style-type: none"> • Uniformity • Printability • Manufacturing Ability • Durability during Storage • Compatibility with the content 	2	1	1	Find out the following Properties of the Boards: - <ul style="list-style-type: none"> • Uniformity • Printability • Manufacturing Ability • Durability during Storage • Compatibility with the content 	0	0	3
			4	Testing of Packaging Materials: - Thickness, Water vapour Permeability, Tensile strength. Puncture resistance, Bursting strength, Seal Strength, Grease Resistance,	2	1	1	Procedure/Test on Packaging materials: <ol style="list-style-type: none"> 1. Determine the Water vapour Permeability test of a given sample. 2. Determine the Bursting Strength test of a given sample. 	0	0	3
			5	Developmental Weekly Assessment	0	0	0	Assessment Review and corrective action. <ol style="list-style-type: none"> 1. Draw a neat layout diagram of the entire process carried out during the week. 2. Note down all the troubleshooting methods followed during the Processing of material to become a final product. 3. Note down different types of materials and machinery used during the process. 	0	0	3
			6	Industry Class: - Importance of Testing properties on Packaging substrates+ Industry Assignment	0	0	5				

13	C05	P03,4,5	1	Peer Review- First half of the session will be on summarization of previous week's activities, and second of the morning session will be on planning for the coming week.	2	1	1	Demonstrate about Testing of packaging materials.	0	0	3
			2	Demonstrate the Testing of packaging materials using different machineries.	2	1	1	Project Demonstrate about different testing tools used for Packaging substrates.	0	0	3
			3	Internship b) Research on various Design of Packaging or Packaging industries and their operations to identify at least 3 Secondary research on various industries and their operations to identify at least 3 companies along with the areas of work interest and develop an internship plan that clearly highlights expectations from the industry during the internship.	2	1	1	Video and demonstration of different moulding process. <ul style="list-style-type: none"> • Injection blow moulding process. • Extrusion blow moulding process. • Stretch blow moulding • Compression moulding. • Transfer blow moulding. 	0	0	3
			4	Mini Project Identification of the Best method of Designing a package for food industry - the students would like to work as part of the project - either as provided by faculty or as identified by the student. Document the impact the project will have from a technical, social and business perspective	2	1	1	Mini Project Identification of the Best Software for Creating a package design and take print out. statement the students would like to work as part of the project - either as provided by faculty or as identified by the student. Document the impact the project will have from a technical, social and business perspective.	0	0	3
			5	Mini Project Identification of the Best method of Designing a die for Packaging-the students would like to work as part of the project - either as provided by faculty or as identified by the student. Document the impact the project will have from a technical, social and business perspective.	0	0	3	Mini project Case study of different dies used for packaging.	0	0	3

			6	Consolidated Assessment and corrective action	0	0	2			
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CIE and SEE Assessment Methodologies

CIE Assessment	Assessment Mode	Duration In hours	Max Marks
Week 3	CIE 1- Written and practice test	4	30
Week 5	CIE 2- Written and practice test	4	30
Week 7	CIE 3- Written and practice test	4	30
Week 9	CIE 4- Written and practice test	4	30
Week 11	CIE 5- Written and practice test	4	30
	On line Course work (Minimum 10 hours online course with certification from (SWAYAM/NPTEL/Infosys Springboard)		40
	Profile building for Internship / Submission of Synopsys for project work		20
Portfolio evaluation (Based on industrial assignments and weekly developmental assessment) *			30
TOTAL CIE MARKS (A)			240
SEE 1 - Theory exam (QP from BTE) Conducted for 100 marks 3 hrs duration reduced to 60 marks		3	60
SEE 2 - Practical		3	100
TOTAL SEE MARKS (B)			160
TOTAL MARKS (A+B)			400

*The industrial assignment shall be based on peer-to-peer assessment for a total of 10 marks (on a scale of 1 to 10) and in the event of a group assignment the marks awarded will be the same for the entire group, the developmental assessment will be for a total of 20 marks and based on MCQ/case study/demonstration and such other assignment methods

Assessment framework for CIE (1 to 5)

Note : Theory to be conducted for 1 hour and practice for 3 hours, total duration of exam – 4 hours

Programme	Printing Technology	Semester	V
Course	Advance Packaging Technology	Max Marks	30
Course Code	20PT52I	Duration	4 hours
Name of the course coordinator			

Note: Answer one full question from each section.

Qn.No	Question	CL L3/L4	CO	PO	Marks
Section-1 (Theory) – 10 marks					
1.a)	Write about Rigid packaging.	L3	1	1	5
b)	Elaborate the mechanical properties of metal can.	L4	2	1,5	5
2.a)	Compare skin packaging and Blister packaging.	L3	3	1,3,7	5
b)	Illustrate and explain injection moulding.	L4	3	2,3	5
Section-2 (Practical) - 20 marks					
3)	Analyse the methods for manufacturing two -piece and three- piece metal can	L3	2	1,5	20
4)	Prepare shrink and stretch packaging.	L4	3	1,3,7	20

Note : Theory questions shall be aligned to practical questions

Assessment framework for SEE 1 (Theory)

Programme	: PRINTING TECHNOLOGY			
Semester	: V			
Course	: Advance Packaging Technology		Max Marks :	100
Course Code	: 20PT52I	Duration	: 3 Hrs	

Instruction to the Candidate: Answer one full question from each section.

Q.No	Question	CL	CO	Marks
Section-1				
1.a)	Explain the manufacturing process of the Glass container.	L3	1	10
b)	Discuss on materials coating in glass containers	L4		10
2.a)	Distinguish between Friction fit caps and Roll-on caps.	L3		10
b)	Write the composition of Glass containers.	L4		10
Section-2				
3.a)	Explain the manufacturing process of Three piece can	L3	2	10
b)	Write about types of metal package.	L4		10
4.a)	Differentiate between Three piece can and two piece can	L3		10
b)	Discuss about the advantages and limitations of two-piece metal can.	L4		10
Section- 3				
5.a)	Explain about Semi rigid packaging.	L3	3	10
b)	Write about LDPE and LLDPE.	L4		10
6.a)	Distinguish between Skin packaging and Blister Packaging	L3		10
b)	Discuss about PVDC and BOPP.	L4		10
Section-4				
7.a)	Illustrate and explain injection moulding.	L3	4	10
b)	Discuss Transfer Moulding.	L4		10
8.a)	Explain about different testing methods of Plastic packages.	L3		10
b)	Discuss about MAP and CAP	L4		10
Section-5				
9.a)	Explain the working principles of hand fed and auto-fed platen punching machine.	L3	5	10

b)	Write the advantages and limitations of Folding cartons.	L4		10
10.a)	Explain the properties of Boards.	L3		10
b)	Discuss about different types of corrugated boards.	L4		10

Scheme of Evaluation for SEE 2

Sl. No	Description	Marks
1	Case submission	20
2	Case presentation	20
3	Case innovation	20
4	Result	20
5	Viva voce	20
Total		100

References

Sl. No	
1	Fundamentals of Packaging Technology-S. Natarajan, M. Govindarajan, B. Kumar-PHI Learning Pvt. Ltd.
2	Hand book of Paper and Board-Herbert Holik-Wiley-VCH, 2006
3	The Wiley Encyclopedia of Packaging Technology”, 3rd Ed-Yam K. L-Wiley, 2009
4	Fundamentals of Packaging Technology-W. Soroka

Required Course Facilities:

1. Lab equipment’s list with appropriate specifications (Batch size:20)

Sl. No. Name of Equipment and Specification Quantity Required

SL NO	MACHINE DETAILS	QTY
1	UNIVERSAL TESTING MACHINE (UTM) 01 Nos.	01 Nos.
2	TABER TYPE TEAR STRENGTH TESTER	01 Nos
3	FALLING DART MACHINE	01 Nos.
4	ROCKWELL AND DUROMETER.	01 Nos.
5	BURSTING STRENGTH TESTER	01 Nos
6	TENSILE STRENGTH TESTER	01 Nos
7	FOLDING ENDURANCE TESTER	01 Nos
8	THERMO VISCO METER	01 Nos
9	OPACITY TESTER	01 Nos.
10	SEMIAUTOMATIC BLOW MOLDING MACHINE FOR SMALL BOTTLE	01 Nos.

11	SEMI AUTOMATIC INJECTION MOLDING MACHINE	01 Nos.
12	EXTRUDER MACHINE FOR BLOWING FILM	01 Nos.
13	FULLY AUTOMATICALLY INJECTION MOLDING MACHINE	01 Nos.
14	FULLY AUTOMATICAL BLOW MOLDING MACHINE	01 Nos.
15	SPECTRO DENSITO METER-XRITE 530	01 Nos.
16	EXTRUSION OF STRANDS AND PELLETIZATION	01 Nos.
17	BROOKFIELD VISCOMETER	01 Nos.

2. Related Industry connect to conduct industry classes:

- Esko graphics, Bangalore
- Global Printing and Packaging Co Pvt Ltd, Bangalore
- National packaging company, Bangalore
- Multi Flex Packaging India, Bangalore
- Astra pack, Bangalore
- kreatica design, Bangalore
- Total pack, Bangalore
- Manipal packaging industries, Bangalore.
- Manipal packaging industries, Manipal
- Blisto Pack, bangalore
- Transpack, bangalore.
- Bangalore packaging industries, Bangalore.
- Hasten pack Bangalore.

3. Appropriate Virtual practice links:

<https://www.youtube.com/watch?v=WyFLfE2PomI>

<https://www.youtube.com/watch?v=opeWVUH3RYk>

<https://www.youtube.com/watch?v=DKPkvM0Refk>

<https://www.youtube.com/watch?v=MMayloiYdX8>

<https://www.youtube.com/watch?v=0siDq8TqOgM>

<https://www.youtube.com/watch?v=njhhVnvQz-0>

<https://www.youtube.com/watch?v=grU9mOJ88yk>

<https://www.youtube.com/watch?v=L5jOi9und4Q>

<https://www.youtube.com/watch?v=E0xE07hnZUc>