

Maharashtra State Board Of Technical Education, Mumbai

Learning and Assessment Scheme for Post S.S.C Diploma Courses

Programme Name	: Diploma In Printing Technology		
Programme Code	: PN	With Effect From Academic Year	: 2023-24
Duration Of Programme	: 6 Semester	Duration	: 16 WEEKS
Semester	: Third	NCrF Entry Level	: 3.5
		Scheme	: K

Sr No	Course Title	Abbreviation	Course Type	Course Code	Total IKS Hrs for Sem.	Learning Scheme						Credits	Assessment Scheme										Total Marks
						Actual Contact Hrs./Week			Self Learning (Activity/ Assignment /Micro Project)	Notional Learning Hrs /Week	Paper Duration (hrs.)		Theory			Based on LL & TL		Based on Self Learning					
						CL	TL	LL					FA-TH	SA-TH	Total	Practical		SLA					
																Max	Min	Max	Min	Max	Min		

(All Compulsory)

1	PRINT MATERIAL SCIENCE	PMS	DSC	323320	2	4	-	2	-	6	3	3	30	70	100	40	25	10	-	-	-	-	125
2	FLEXOGRAPHIC PRINTING PROCESS	FPP	DSC	323321	2	3	-	4	1	8	4	3	30	70	100	40	25	10	25#	10	25	10	175
3	OFFSET PRINTING PROCESS	OPP	DSC	323322	2	3	-	4	1	8	4	3	30	70	100	40	25	10	25@	10	25	10	175
4	PREPRESS IN DIGITAL PRINTING	PDP	DSC	323323	2	3	-	4	1	8	4	3	30	70	100	40	25	10	25@	10	25	10	175
5	ESSENCE OF INDIAN CONSTITUTION	EIC	VEC	313002	-	1	-	-	1	2	1	-	-	-	-	-	-	-	-	-	50	20	50
6	GRAPHIC DESIGN SOFTWARE	GDS	SEC	323010	-	1	-	2	1	4	2	-	-	-	-	25	10	25@	10	25	10	75	
7	PRINT FINISHING	PTF	SEC	323011	2	1	-	2	1	4	2	-	-	-	-	25	10	25@	10	25	10	75	
Total					10	16	0	18	6		20		120	280	400		150		125		175		850

Abbreviations : CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, FA - Formative Assessment, SA -Summative Assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends : @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

Course Category : Discipline Specific Course Core (DSC) : 4, Discipline Specific Elective (DSE) : 0, Value Education Course (VEC) : 1, Intern./Apprenti./Project./Community (INP) : 0, Ability Enhancement Course (AEC) : 0, Skill Enhancement Course (SEC) : 2, Generic Elective (GE) : 0

GRAPHIC DESIGN SOFTWARE**Course Code : 323010**

Programme Name/s : Printing Technology
Programme Code : PN
Semester : Third
Course Title : GRAPHIC DESIGN SOFTWARE
Course Code : 323010

I. RATIONALE

This course intends to use graphic design softwares for printing design skills. This course will teach students how to develop ready to print layouts using image editing, publishing and imposition softwares. After completion of this course, a student will develop skills required to design any printing job, by judiciously choosing the software with respect to the print layout.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

This course is to be taught and implemented with the aim to develop in the student, the course outcomes (COs) leading to the attainment of following industry identified outcome expected from this course :To prepare design layouts using different graphic software.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - List the purpose of graphic design software.
- CO2 - Design the layout with vector-based software.
- CO3 - Apply various effects to an image using image editing software.
- CO4 - Use of imposition software for layout design.
- CO5 - Develop layouts using various graphic softwares.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory	Based on LL & TL				Based on SL					
				CL	TL	LL						Practical				SLA					
							FA-TH	SA-TH				Total		FA-PR		SA-PR		SLA			
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min										
323010	GRAPHIC DESIGN SOFTWARE	GDS	SEC	1	-	2	1	4	2	-	-	-	-	-	25	10	25@	10	25	10	75

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Identify graphic design softwares for making layout design. TLO 1.2 Enlist uses of graphic design softwares. TLO 1.3 Choose system environment to perform efficiently on graphic design software.	Unit - I Softwares in Graphic Design 1.1 Introduction of Graphic Design Software: Definition, types, applications 1.2 Capabilities of Graphic Design Software: Handling text, generation of graphics, editing of images, output. 1.3 System requirement: Hardware and software environment required for Graphic Design software like Hardware, Operating System, printer, scanner.	Lecture Using Chalk-Board Presentations Video Demonstrations
2	TLO 2.1 Enlist characteristics and applications of vector based software. TLO 2.2 Apply available tools and options of Vector based software for designing. TLO 2.3 Prepare file for output in vector based software.	Unit - II Vector based software 2.1 Definition of vector graphics, characteristics and applications. 2.2 Identify interface, palettes, color mode and toolbars, Handling various text and apply different formatting, Place, Import, and export various contents 2.3 Set the file for printing equipment.	Lecture Using Chalk-Board Presentations Video Demonstrations
3	TLO 3.1 Enlist characteristics and applications of image editing software. TLO 3.2 Apply available tools and options of image editing software for designing. TLO 3.3 Prepare file for output in image editing software.	Unit - III Image editing software 3.1 Definition of raster (bitmap) graphics, characteristics and application 3.2 Identify the interface, palettes, color mode and toolbars. Handlings layers and apply different options like masking, cutout, image resolution and import various contents. Color separation, flattening, preflight check. 3.3 Set the file for printing equipment.	Lecture Using Chalk-Board Presentations Video Demonstrations
4	TLO 4.1 Justify need of imposition software, Compare imposition schemes. TLO 4.2 Apply tools and options available in imposition softwares. TLO 4.3 Prepare file for output on printing equipment.	Unit - IV Imposition Software 4.1 Concept of imposition: Concept and need of imposition. Elements of a standard imposition schemes and their applications, Comparison of different types of imposition schemes in layout. 4.2 Select page layout, imposition styles, interlocking for commercial jobs and packaging jobs 4.3 Graphic marks: Different types of graphic marks incorporated in an imposition scheme.	Lecture Using Chalk-Board Presentations Video Demonstrations
5	TLO 5.1 Design for commercial and packaging Product using graphic design software. TLO 5.2 Apply tools for retouching images using image editing software. TLO 5.3 Apply different imposition schemes.	Unit - V Applications of Graphic Design Software 5.1 Design for commercial Product: Design for books, magazines, newspapers, leaflet, letterhead, visiting card and envelopes using vector based softwares, Design for packaging product: Design for cartons, labels, pouches and metal can using image editing and vector based softwares. 5.2 Retouch images using image editing softwares. 5.3 Design an imposition scheme for book, magazine, Compare and list challenges of preparing same design with multiple graphic softwares.	Lecture Using Chalk-Board Presentations Video Demonstrations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 1.1 Prepare layout design.	1	*Prepare a layout design using any graphic design software.	2	CO1
LLO 2.1 Design a new page for magazine and book using vector-based software.	2	Design a new page for magazine and book using vector-based software.	2	CO2
LLO 3.1 Use different types of viewing modes in vector based software.	3	Use different types of viewing modes in vector based software.	2	CO2
LLO 4.1 Use step and repeat options to create designs in vector-based software.	4	*Use step and repeat options to create designs in vector-based software.	2	CO2
LLO 5.1 Use power clip command.	5	Create a variety of designs in vector-based software by utilizing the power clip command.	2	CO2
LLO 6.1 Use 3D effects on text.	6	Utilize various 3D effects on text in software that is based on vectors.	2	CO2
LLO 7.1 Trace bitmap logo.	7	*Convert a bitmap logo into vector using vector-based software.	2	CO2
LLO 8.1 Change color modes in software.	8	Change the color mode of an image using image editing software.	2	CO3
LLO 9.1 Use masking effect on image	9	*Create a masking effect on the image by using image editing software.	2	CO3
LLO 10.1 Change Image resolution	10	Change the image resolution using image editing software.	2	CO3
LLO 11.1 Resize image using image editing software	11	Modify the size of an image using image editing software.	2	CO3
LLO 12.1 Apply collage style in given layout	12	*Create a photo collage of various images using image editing software.	2	CO3
LLO 13.1 Change the background in given image	13	Change the background of an image using image editing software.	2	CO3
LLO 14.1 Apply design skills in image editing software	14	Prepare a layout of a photo in multiple ups using image editing software.	2	CO3
LLO 15.1 Apply design skills in image editing software	15	*Create a full sheet work imposition plan for 8 and 16 pages of a specific size.	2	CO4
LLO 16.1 Apply design skills in image editing software	16	*Design an imposition scheme for half sheet work on 8 and 16 pages of the same size in work and turn style.	2	CO4
LLO 17.1 Apply design skills in image editing software	17	Design an imposition scheme for half sheet work on 8 and 16 pages of the same size in work and turn style.	2	CO4
LLO 18.1 Apply design skills in image editing software	18	*Design a cover page for a magazine using image editing softwares.	2	CO5
LLO 19.1 Apply design skills using image editing software.	19	Design layout of artwork with link and layer options.	2	CO5
LLO 20.1 Apply design skills using vector-based software.	20	Design visiting card, letterhead and envelope using vector-based software.	2	CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)

Micro project

- Collect information of different graphic softwares available in market
- Visit local design house and collect information of graphic design softwares used.
- Install available version of graphic design software on computer/laptop
- Visit local press and collect information of layout designing by vector based software
- Visit local press and collect information of image correction by image editing software
- Visit a newspaper press and collect information of layout designing by graphic software
- Prepare a workflow of Newspaper layout designing
- Prepare a workflow of Magazine cover page layout designing
- Prepare a digital layout of carton package
- Visit a local press and collect the information about image editing on large format digital presses
- Visit a local photo studio and collect the information about operations performed on image.

Assignment

- Prepare a pamphlet on climate change and put it on the college notice board
- Use different online free software like Canva, greeting island to make different occasions greeting cards.
- Survey a market for innovative design ideas and prepare a report
- Give a seminar on relevant topic
- Enlist different graphic softwares used in market for designing
- Prepare one Instagram post of any one feature of Image editing software.
- Prepare one youtube post of any one feature of vector based software.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Vector based graphic design software of any version (for example CorelDraw, Adobe Illustrator)	1,2,3,4,5,6,7,18,19,20
2	Imposition software of any version (for example Adobe Indesign)	14,15,16
3	Image editing software of any version (For example Adobe Photoshop)	8,9,10,11,12,13,17
4	Computer (Windows 10 Pro, Intel® Core™i5, RAM 8GB, 64-bit operating system)	All
5	Printer (LaserJet color / Black and white, Print Resolution: 600x600 DPI, Print Speed Black: 18 PPM, Paper Size: A3, A4)	All
6	A4 Size Flat Bed Color Scanner	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Softwares in Graphic Design	CO1	3	0	0	0	0

GRAPHIC DESIGN SOFTWARE**Course Code : 323010**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
2	II	Vector based software	CO2	3	0	0	0	0
3	III	Image editing software	CO3	3	0	0	0	0
4	IV	Imposition Software	CO4	3	0	0	0	0
5	V	Applications of Graphic Design Software	CO5	3	0	0	0	0
Grand Total				15	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Each Practical will be assessed considering 60% weightage to process and 40% weightage to output.

Summative Assessment (Assessment of Learning)

- Actual performance in internal practical examination is of 25 marks

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	3	3	3	2	3	3			
CO2	3	3	3	3	2	3	3			
CO3	3	3	3	3	2	3	3			
CO4	3	3	3	3	2	3	3			
CO5	3	3	3	3	2	3	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Hollis,Richard	Graphic Design: A Concise History	New York: Thames and Hudson, 1994. Print ISBN:9780500202708
2	O'Connor	Elements and principles of design: Tools fordigital imagery, art and design	Z (2014) ISBN:9780992426309
3	Eskilson,Stephen	Graphic Design: A New History	New Haven: Yale UP, 2007. Print ISBN:9780300172607
4	Steven Heller, Gail Anderson	The Graphic Design Idea Book	Laurence king publishing ISBN-13:9781780677569

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
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GRAPHIC DESIGN SOFTWARE**Course Code : 323010**

Sr.No	Link / Portal	Description
1	Align text in various shapes: https://www.youtube.com/watch?v=uH04AMidp7c	How to align text in various shapes using vector based softwares.
2	Apply 3D effects on text: https://www.youtube.com/watch?v=LegtbMgj-yY	How to apply 3D effects on text using vector based softwares.
3	Use step and repeat options to create a design: https://www.youtube.com/watch?v=eUdw9-8wctc	How to use step and repeat options.
4	https://youtu.be/yOXscNSSvkQ	How to Use Power Clip Option with Groups
5	https://www.youtube.com/results?search_query=photoshop+masking+background+remover	How to do image masking using image editing software
6	https://www.youtube.com/watch?v=Yv2gR5HAmb8	To convert low resolution to high resolution of images.
7	https://www.youtube.com/watch?v=MDvAZLZ2EEY	create photo collage in photoshop
8	https://www.youtube.com/watch?v=z7st9CRQ5cw	create imposition in imposition softwares
Note :		
<ul style="list-style-type: none"> Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students 		

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**

PRINT FINISHING**Course Code : 323011**

Programme Name/s : Printing Technology
Programme Code : PN
Semester : Third
Course Title : PRINT FINISHING
Course Code : 323011

I. RATIONALE

The printed product must be bound and performed with aesthetic and reinforcing operations to provide protection and visual appearance. Students learning this course will understand various binding and finishing techniques used in printing processes. Students will also develop innovative approaches to find sustainable materials to produce print-finished products.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Select the print finishing methods to apply for the particular Printed Product.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - List different techniques for print finishing.
- CO2 - Select suitable binding & print finishing techniques for a given printed product.
- CO3 - Identify the stages of binding & print finishing techniques.
- CO4 - Operate the various finishing machines and equipment's.
- CO5 - Suggest a solution to a problem associated with the final product.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Paper Duration		Theory			Based on LL & TL				Based on SL			
				CL	TL	LL					Total	Practical		SLA							
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min				
				Max	Min	Max	Min	Max			Min	Max	Min								
323011	PRINT FINISHING	PTF	SEC	1	-	2	1	4	2	-	-	-	-	-	25	10	25@	10	25	10	75

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

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2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

PRINT FINISHING

Course Code : 323011

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Select the finishing technique needed for the particular job. TLO 1.2 List factors affecting the selection of print finishing and binding techniques TLO 1.3 List the tools used for book binding & print finishing	Unit - I Scope of print finishing 1.1 An overview of print finishing. 1.2 An Overview of print finishing and its areas of use. Print finishing operations in the printing industry. 1.3 Equipment, machines and tools used in print finishing. IKS: Ancient Indian practices of religious book binding. Embellishments on the religious books and textiles. Use of environment friendly, sustainable materials in binding and finishing.	Video Demonstrations Lecture Using Chalk-Board Presentations
2	TLO 2.1 Enlist the various methods of binding TLO 2.2 Compare various covering styles. TLO 2.3 Suggest boarding techniques based on the needs of the product.	Unit - II Print finishing techniques 2.1 Adhesive/Perfect Binding, Case binding, Loose leaf binding. 2.2 Covering - Quarter, Half, Full, Limp & Library style binding. 2.3 Boarding methods- pasting down, split, drawn in work, cut flush, extra square, ASTI (all sides turned in).	Video Demonstrations Presentations Chalk-Board Site/Industry Visit
3	TLO 3.1 Identify different pre-forwarding operations TLO 3.2 Justify purpose steps in forwarding operations TLO 3.3 Select the appropriate print finishing technique for product	Unit - III Print finishing operations 3.1 Pre-forwarding operations 3.2 Forwarding operations- for book binding and print finishing 3.3 Print finishing technique - Cutting and creasing, lamination, perforation, punching / die cutting, varnishing / drip off / coating - matt, gloss & silk, spot & textured UV, foil stamping, embossing, debossing,	Lecture Using Chalk-Board Demonstration Model Demonstration
4	TLO 4.1 Classify the adhesive according to the end user requirement. TLO 4.2 Enlist different equipments used in print finishing process. TLO 4.3 Identify the paper folding technique. TLO 4.4 List of case-making machine parts functions	Unit - IV Print finishing machines 4.1 Adhesives - Hot melt adhesives, animal (protein) glues, water-based adhesives, PUR hot-melts, Sustainable Adhesive System Solutions for Modern Book Binding 4.2 Construction and working of - single knife trimmer, nipping, perforating, gathering, sewing and stitching machine. Types of perfect binding machine 4.3 Construction and working- Knife folding, Buckle folding, Combination folding. 4.4 Case binding, Case making machine - Parts, Function	Lecture Using Chalk-Board Video Demonstrations Site/Industry Visit
5	TLO 5.1 Determine the new trends in print finishing operations. TLO 5.2 Explore the most recent developments and sustainable materials for print finishing methods. TLO 5.3 Propose a solution for the print finishing operation trouble.	Unit - V Print finishing advancements 5.1 Hybrid Print finishing formats and equipment's, Trends and developments in finishing operations. 5.2 The sustainability concept and its application to binding and print finishing. Advancements in finishing techniques & materials. 5.3 Troubles and remedies related to Print finishing operation	Video Demonstrations Lecture Using Chalk-Board Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Use tools for book binding.	1	*Practice the usage of tools used for book binding.	2	CO1

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Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 2.1 Use of different Equipment's used in book binding.	2	Identify different equipment used in book binding.	2	CO4
LLO 3.1 Prepare quarter bound book	3	Prepare quarter bound cut flush book.	2	CO2
LLO 4.1 Prepare quarter bound book.	4	*Prepare quarter bound cut flush turn-in book.	2	CO2
LLO 5.1 Prepare quarter bound book.	5	Prepare quarter bound ASTI stitch book.	2	CO2
LLO 6.1 Prepare binding book.	6	Prepare limp binding book.	2	CO3
LLO 7.1 Prepare tear-off and perforated pad.	7	*Prepare tear-off and perforated pad.	2	CO3
LLO 8.1 Prepare loose leaf file.	8	*Prepare loose leaf file.	2	CO3
LLO 9.1 Prepare half bound book.	9	Prepare half bound book kettle stich.	2	CO3
LLO 10.1 Prepare full bound book	10	Prepare full bound book French stitch.	2	CO3
LLO 11.1 Use wire stitching machine.	11	*Perform stitching operations using wire stitching machine.	2	CO4
LLO 12.1 Use sewing machine.	12	Perform sewing operations using sewing machine for side & center sewing.	2	CO4
LLO 13.1 Use perfect binding machine.	13	*Demonstration of a perfect binding machine.	2	CO4
LLO 14.1 Use folding machine.	14	*Demonstration of a buckle folding & a knife folding.	2	CO4
LLO 15.1 Use lamination machine.	15	*Demonstration of a lamination machine.	2	CO3
LLO 16.1 Perform finishing operations.	16	Perform finishing operations using at least 3 processes for given job.	2	CO4
LLO 17.1 Use hybrid print finishing press.	17	Demonstration of hybrid print finishing press and identify the major stages.	2	CO5
LLO 18.1 Overcome troubles in book binding.	18	Identify at least three troubles and their corresponding remedies related to the print finishing operations.	2	CO5

Note : Out of above suggestive LLOs -

- '*' Marked Practicals (LLOs) Are mandatory.
- Minimum 80% of above list of lab experiment are to be performed.
- Judicial mix of LLOs are to be performed to achieve desired outcomes.

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Collect ten different samples of covering materials, securing material and reinforcing materials used in book binding.
- Collect different samples of threads used in book binding.
- Collect information of different types of board use in binding.
- Collect samples of different types of paper & board.
- Visit binding unit & collect information of work flow.
- Prepare estimation Sheet for different binding materials.
- Collect information of different tools used in book binding.

PRINT FINISHING

Course Code : 323011

- Collect information regarding different advanced equipment used in binding and print finishing

Assignment

- Prepare list of different covering materials used in book binding.
- Collect data on ecofriendly book binding.
- Collect information on spot laminations.
- Prepare report on estimation of book binding.
- Collect information on different adhesion techniques used in book binding adhesives
- Collect information on carton making machine manufactures.
- Collect information regarding different covering materials used in book binding
- List developmental stages in modern book binding.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and may be considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Nipping press & different binding Tools	1
2	Stitching Machine	13
3	Perfect Binding Machine	13
4	Perforation Machine	16
5	Sewing Machine	3,4
6	Folding Machine	3,4,5,9,10
7	Cutting Machine	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Scope of print finishing	CO1	2	0	0	0	0
2	II	Print finishing techniques	CO2	3	0	0	0	0
3	III	Print finishing operations	CO3	4	0	0	0	0
4	IV	Print finishing machines	CO3	3	0	0	0	0
5	V	Print finishing advancements	CO5	3	0	0	0	0
Grand Total				15	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Each practical will be assessed considering 60% weightage to process and 40% weightage to output.

Summative Assessment (Assessment of Learning)

- Actual performance in internal practical examination of 25 marks.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	2	2	3	2	3	2			
CO2	2	2	1	2	2	2	2			
CO3	3	2	2	3	3	2	2			
CO4	2	2	2	3	3	2	2			
CO5	2	3	3	3	3	2	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Kipphan, Helmut	Handbook of Print Media	Heidelberger Druckmaschinen AG, Springer Heidelberg, ISBN 3-540-67326-1
2	Binding & Finishing	Ralp Lyman	GATF Press ISBN-13: 978-0883621639
3	A.G. Martin	Finishing Process in Printing	Focal Press ltd ISBN-13: 978-0803822894
4	Tony Clark	Book Binding with Adhesives	Welbound ISBN-13: 978-0077094041

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=dE_S7auPz48	Basic Book Binding Tools
2	https://www.mdpi.com/2571-9408/6/1/33	Sustainable Adhesive System Solutions for Modern Book Binding
3	https://www.youtube.com/watch?v=kOFtILg-NAo	Book Binding Series
4	https://www.youtube.com/watch?v=mC6XPHu1xCw	Gold Embossing
5	https://www.youtube.com/watch?v=lezUpWtANvI	Book Binding & Stitching Machine
6	https://www.youtube.com/watch?v=WmIyffh3ev8	Thread Book Sewing Machine
7	https://www.youtube.com/watch?v=Lm5XtUxMfUw	Perfect Binding Machine
8	https://www.youtube.com/watch?v=af5662g5zg4	Folding Machine
9	https://www.youtube.com/watch?v=3DW2uS1rfYs	Lamination Machine
10	https://www.youtube.com/watch?v=s8zHQSPcUmU	Foil Stamping Machine
11	https://www.youtube.com/watch?v=fU9TMafz8ww	Hybrid Print Finishing machine

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

PRINT MATERIAL SCIENCE**Course Code : 323320****Programme Name/s : Printing Technology****Programme Code : PN****Semester : Third****Course Title : PRINT MATERIAL SCIENCE****Course Code : 323320****I. RATIONALE**

With the prerequisite of Basic Sciences course, the Print Material Science course enabled students to learn and understand science, structured content, and the use of important materials in printing industry, viz, substrates, inks and chemicals. It will cover technical aspects of the manufacturing process, will explore various stages, raw materials, and applications of different materials.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Specify raw materials according to the printing process and sustainability.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify the applications of different substrate and boards.
- CO2 - Suggest type of substrate required for given product.
- CO3 - Choose different methods of manufacturing of substrate and ink.
- CO4 - Select the manufacturing of substrate and ink.
- CO5 - Select appropriate material and ink for given product.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme								Total Marks	
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL					
				CL	TL	LL			FA-TH			SA-TH	Total	Practical				SLA			
														FA-PR	SA-PR						
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min										
323320	PRINT MATERIAL SCIENCE	PMS	DSC	4	-	2	-	6	3	3	30	70	100	40	25	10	-	-	-	-	125

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

PRINT MATERIAL SCIENCE

Course Code : 323320

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 List raw materials used for paper / board substrates. TLO 1.2 Explain paper manufacturing process. TLO 1.3 Elaborate finishing processes for paper.	Unit - I Manufacturing of paper and paperboards 1.1 Structure of cellulose fiber and types of pulp. 1.2 Construction and working of paper / board manufacturing machine, stages involved in manufacturing. 1.3 Finishing treatments for paper: calendering, coating, conditioning, cutting, slitting. IKS: Ancient Indian systems of making of substrates 'Bhurjapatra' and treatment for printing. Composition of colorants using sustainable natural materials such as flower and plant extracts.	Lecture Using Chalk-Board Video Demonstrations Site/Industry Visit
2	TLO 2.1 Identify physical properties of paper. TLO 2.2 Identify optical properties of paper. TLO 2.3 Identify strength properties of paper. TLO 2.4 Identify miscellaneous properties of paper.	Unit - II Properties of paper and paperboard 2.1 Physical properties - Grammage, bulk, caliper, curl, dimensional stability, machine and cross direction, smoothness, temperature and humidity (conditioning of paper), wire side and felt side (two-sidedness) 2.2 Optical properties - Brightness, whiteness, color, finish, gloss, opacity. 2.3 Strength properties - Bursting strength, folding endurance, tearing resistance, tensile strength. 2.4 Miscellaneous properties - Ash content, pH, porosity, printability, water absorbency (Cobb value).	Lecture Using Chalk-Board Video Demonstrations Site/Industry Visit
3	TLO 3.1 Describe properties of natural fibers. TLO 3.2 Describe properties of synthetic fibers and blends. TLO 3.3 List treatments carried out in textile printing.	Unit - III Materials in textile printing 3.1 Natural materials and properties - cotton, wool and other natural fibers. 3.2 Synthetic materials and properties - rayon, polyester and blends. 3.3 Treatments carried out in textile printing.	Demonstration Video Demonstrations Site/Industry Visit
4	TLO 4.1 Illustrate manufacturing process of polymeric substrates. TLO 4.2 List properties of polymer substrate. TLO 4.3 Suggest sustainability development methods	Unit - IV Polymer substrates and sustainability 4.1 Working of film extrusion, co-extrusion process. Classification and applications of polymer substrates. 4.2 Different properties of polymeric substrates, Surface treatment methods used in applications of polymeric films. 4.3 Sustainability - Waste management, alternative materials, recycling. Developments in bio-degradable substrates.	Lecture Using Chalk-Board Demonstration Hands-on
5	TLO 5.1 List different terms related to printing inks. TLO 5.2 List ink ingredients for conventional printing processes. TLO 5.3 Illustrate functioning of ink manufacturing process. TLO 5.4 Compare ink drying mechanisms. TLO 5.5 Specify inks for specialty applications.	Unit - V Printing Ink : Formulations and Drying 5.1 Terms related to inks - viscosity, rheology, tack, resistance, opacity, density, color, 5.2 Ingredients of ink - Pigments, Vehicles, Resins, Additives, Driers - liquid driers, paste driers, inhibitors, accelerators 5.3 Manufacturing process of Inks - paste and liquid inks. Formulations and properties of inks used for conventional printing processes 5.4 Ink drying methods - penetration, absorption, oxidation-polymerization, evaporation and radiation (UV, EB, IR, LED). 5.5 Specialty inks and applications - Food grade, thermochromic, magnetic, security purpose, fluorescent	Lecture Using Chalk-Board Video Demonstrations Hands-on

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Measure grammage and grain direction of paper/ board sample.	1	*Measure grammage and grain direction of paper/ board samples.	2	CO1 CO2
LLO 2.1 Measure bulk and density of given paper.	2	*Measure bulk and density of given paper samples.	2	CO1 CO2
LLO 3.1 Measure caliper of given paper / board.	3	Measure caliper of given paper / board samples.	2	CO1 CO2
LLO 4.1 Measure bursting strength of given paper/ board samples.	4	*Measure bursting strength of given paper/ board samples.	2	CO2
LLO 5.1 Measure Tensile strength of given Paper / Board	5	Measure tensile strength of given paper / board samples.	2	CO2
LLO 6.1 Measure water absorbency of given paper / board samples.	6	*Measure water absorbency of given paper / board samples.	2	CO2
LLO 7.1 Measure folding strength of given paper samples.	7	Measure folding strength of given paper samples.	2	CO2
LLO 8.1 Measure tearing strength of given paper samples.	8	*Measure tearing strength of given paper samples.	2	CO2
LLO 9.1 Print on natural fabrics using screen printing process.	9	*Print on natural fabrics using screen printing process.	2	CO3
LLO 10.1 Measure peel strength of given plastic film samples	10	Print on synthetic fabrics using screen printing process.	2	CO4
LLO 11.1 Measure Smoothness of given paper / board / film samples LLO 11.2 Print on polymer samples using screen printing process.	11	*Print on polymer samples using screen printing process.	2	CO4
LLO 12.1 Take draw-down print for offset ink.	12	Take draw-down print for offset ink.	2	CO5
LLO 13.1 Measure viscosity of liquid and paste inks.	13	*Measure viscosity of liquid and paste inks.	2	CO5
LLO 14.1 Measure rub resistance of given printed sample.	14	Measure rub resistance of given printed sample.	2	CO5
LLO 15.1 Analyze any 2 press stability parameters of given ink. LLO 15.2 Measure coefficient of friction and ash content of given paper sample.	15	Measure coefficient of friction and ash content of given paper sample.	2	CO2
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> *' Marked Practicals (LLOs) Are mandatory. Minimum 80% of above list of lab experiment are to be performed. Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Prepare report on raw materials used in three newspaper printing presses.
- Prepare a report on finishing processes carried out in local paper manufacturing units. .
- Survey local rigid packaging industries to list products made.
- Visit paper and packaging material testing unit and report the testing environment used.
- Visit flexible packaging material testing unit and report the testing environment used.

Assignment

MSBTE Approval Dt. 02/07/2024

Semester - 3, K Scheme

PRINT MATERIAL SCIENCE**Course Code : 323320**

- Publish a short social media video on substitute materials used in flexible packaging.
- Publish a short social media video on substitute materials used in rigid packaging.
- Visit library to survey a binding processes used in printing.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and may be considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	GSM tester	1,2
2	Caliper tester for paper	2
3	Tensile strength tester	3
4	Bursting strength tester	3,4
5	Cobb tester	4
6	Tearing strength tester	5
7	Viscometer	5

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Manufacturing of paper and paperboards	CO1	10	4	4	4	12
2	II	Properties of paper and paperboard	CO2	14	4	4	8	16
3	III	Materials in textile printing	CO3	10	4	4	4	12
4	IV	Polymer substrates and sustainability	CO4	10	4	4	6	14
5	V	Printing Ink : Formulations and Drying	CO5	16	4	4	8	16
Grand Total				60	20	20	30	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Two unit tests of 30 marks each and average of two unit tests out of 30 marks.

Summative Assessment (Assessment of Learning)

- End semester assessment of 70 marks through offline examination.

XI. SUGGESTED COS - POS MATRIX FORM

PRINT MATERIAL SCIENCE

Course Code : 323320

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	1	1	1	2	1	1			
CO2	3	2	1	2	3	2	1			
CO3	2	2	2	2	3	1	1			
CO4	2	2	2	2	3	2	1			
CO5	3	2	2	2	3	2	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	NIIR BOARD OF CONSULTANTS AND ENGINEERS	PAINTS, PIGMENTS, VARNISHES AND ENAMELS TECHNOLOGY HANDBOOK	ISBN-10 8178330377, ISBN-13 978-8178330372
2	Prakash Shetty	Science and Technology of Printing Materials	ISBN-10: 8180940446, ISBN-13: 978-8180940446
3	NIIR Board	Complete Technology Book on Printing Ink Paperback	NIIR ISBN-10: 8178330482 ISBN-13: 978-8178330488
4	Bob Thompson	Printing Materials : Science and Technology	Pira International ISBN-13: 978-1858029818

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=aWbSzXGHtzU	Effects for offset printing
2	https://www.youtube.com/watch?v=ReAUe3GZP0g	Humidification for Print and Paper
3	https://www.youtube.com/watch?v=3bNgSaBdXQw	Ink Functionality
4	https://www.youtube.com/watch?v=p4nFshPIV8o	UV Print on Correx Board, Tested on New FastCOLOUR Hybrid UV Printer First Assembled
5	https://www.youtube.com/watch?v=oJkLTEgkpc0	The Ultimate Guide to Duplex Board Types, Uses, and Benefits Taiba Print

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

FLEXOGRAPHIC PRINTING PROCESS**Course Code : 323321****Programme Name/s : Printing Technology****Programme Code : PN****Semester : Third****Course Title : FLEXOGRAPHIC PRINTING PROCESS****Course Code : 323321****I. RATIONALE**

Flexographic printing technology is often used for printing on flexible packaging materials. Students who have taken courses in printer design and printing processes will gain an understanding of the flexographic printing production process, including handling the required equipment and troubleshooting.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The students will be able to identify the printing and post printing machinery to be used for a given job.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Identify the application area of flexographic printing.
- CO2 - Make an image carrier for a given flexographic printing job.
- CO3 - Plan constructional details of the printing unit.
- CO4 - Print a given job on flexographic printing press.
- CO5 - List the end use requirements of raw materials used.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH			Theory	Based on LL & TL		Based on SL							
				CL	TL	LL						Practical			SLA						
				FA-TH	SA-TH	Total	FA-PR	SA-PR			SLA										
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min												
323321	FLEXOGRAPHIC PRINTING PROCESS	FPP	DSC	3	-	4	1	8	4	3	30	70	100	40	25	10	25#	10	25	10	175

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

FLEXOGRAPHIC PRINTING PROCESS

Course Code : 323321

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 List developmental stages in flexographic printing. TLO 1.2 State working principle of flexographic printing. TLO 1.3 Describe the applications of flexographic printing.	Unit - I Overview of Flexography 1.1 Invention and development of flexographic printing. Common flexographic printing terms - ink metering, anilox roller, doctor blade, flexible image carrier, rotary printing, printing pressure. 1.2 Working principle of flexographic printing - description and comparison with other printing processes. 1.3 Overview of application area - materials, machinery and end users. IKS: Ancient Indian practices of printing using wooden blocks on textiles. Use of water resistant colorants. 'Mudra' - Relief image carrier used by Royalty.	Chalk-Board Presentations Video Demonstrations
2	TLO 2.1 List the requirements of image carrier. TLO 2.2 Classify image carrier making techniques. TLO 2.3 Describe image carrier making procedures.	Unit - II Image Carriers 2.1 Materials used and construction of image carriers. Properties of image carriers - hardness, thickness, relief depth, elongation, shrinkage allowance calculation, spectral sensitivity (J/sq.cm), exposure range, UV-A, UV-C light sources. 2.2 Light and heat sensitive conventional and Computer-to-Plate making methods. Construction and working of Computer-to-Plate machine. 2.3 Comparison between image carrier making techniques. Quality factors associated with equipment and consumables involved.	Chalk-Board Hands-on Demonstration
3	TLO 3.1 List printing machine configurations used in flexographic printing. TLO 3.2 Recommend printing machine configuration for a given printing job. TLO 3.3 Discuss post printing machines in flexible packaging.	Unit - III Printing Machinery and Equipment 3.1 Inline, common impression and stack flexographic printing presses- construction and comparison. Factors behind the development of machine configurations. 3.2 Advantages, limitations and application area of Inline, common impression and stack flexographic presses. Hybrid printing involving flexographic printing- construction and applications. 3.3 Finishing operations performed on flexographic printed job- lamination, slitting, varnishing, punching, embossing. Applications of finishing operations.	Chalk-Board Hands-on Site/Industry Visit
4	TLO 4.1 List units of flexographic press. TLO 4.2 State components of flexographic printing unit. TLO 4.3 Describe inking systems used on flexographic printing presses. TLO 4.4 Explain plate mounting techniques.	Unit - IV Printing Unit 4.1 Unwinder, printing unit and winder units- construction, working and trouble shooting. 4.2 Construction, functions, design considerations, terminology and types of anilox roll. Specifications and factors to be considered for selecting anilox roll according to job. 4.3 Types, construction and working of flexographic inking system. Doctor blade specifications. Troubleshooting associated with ink metering. 4.4 Automation in plate mounting techniques. Troubleshooting associated with plate mounting.	Chalk-Board Hands-on Video Demonstrations

FLEXOGRAPHIC PRINTING PROCESS

Course Code : 323321

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 List printed flexible and rigid packaging materials. TLO 5.2 Discuss types of ink in flexible and rigid packaging material printing. TLO 5.3 List environment friendly approaches in flexographic printing.	Unit - V Product requirements 5.1 End use requirements for applications- FMCG, pharmaceutical, in-mold label (IML) and printed electronics. 5.2 Ingredients and formulation of inks. Extended gamut printing, troubleshooting related to inks. 5.3 Concept of sustainability and its relevance to flexographic printing. Developments in substrates, inks and finishing processes aimed at making flexographic printed product environment friendly.	Chalk-Board Hands-on Video Demonstrations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Tabulate the technical specifications and features of flexographic printing and finishing machines in a laboratory.	1	*Tabulate the technical specifications and features of flexographic printing and finishing machines in a laboratory.	4	CO1
LLO 2.1 Prepare a layout of flexographic printing laboratory showing printing, finishing and material handling infrastructure.	2	Prepare a layout of flexographic printing laboratory showing printing, finishing and material handling infrastructure.	4	CO1
LLO 3.1 Pass the substrate through units of flexographic press and draw web path diagram.	3	*Pass the substrate through units of flexographic press and draw web path diagram.	4	CO1
LLO 4.1 Make a sheet photopolymer plate for 2-color flexographic printing job.	4	*Make a water washable sheet photopolymer plate for 2-color flexographic printing job.	4	CO2
LLO 5.1 Make a liquid photopolymer plate for 2-color flexographic printing job.	5	Make a liquid photopolymer plate for 2-color flexographic printing job.	4	CO2
LLO 6.1 Make a CTP plate for 4-color flexographic printing job.	6	*Make a CTP plate for 4-color flexographic printing job.	4	CO2
LLO 7.1 Pass the substrate through inline flexographic press using different ways.	7	*Pass the substrate through inline flexographic press using different ways.	4	CO3
LLO 8.1 Print 2-color job on non absorbent substrate using inline flexographic press.	8	*Print 2-color job on non absorbent substrate using inline flexographic press.	4	CO3
LLO 9.1 Print 2-color job on absorbent substrate using inline flexographic press.	9	Print 2-color job on absorbent substrate using inline flexographic press.	4	CO3
LLO 10.1 Mount and demount roll of substrate to set winder and unwinder units.	10	Mount and demount roll of substrate to set winder and unwinder units.	4	CO4
LLO 11.1 Set up doctor blade assembly and meter the ink flow.	11	*Set up doctor blade assembly and meter the ink flow.	4	CO4
LLO 12.1 Mount 2-color flexographic plates using mounting technique provided on machine.	12	Mount 2-color flexographic plates using mounting technique provided on machine.	4	CO4
LLO 13.1 Test flexographic substrates and printed product for physical and optical properties.	13	*Test flexographic substrates and printed product for physical and optical properties.	4	CO5
LLO 14.1 Measure densitometric and colorimetric quantities of flexographic ink.	14	Measure densitometric and colorimetric quantities of flexographic ink.	4	CO5
LLO 15.1 Perform lamination and varnishing on flexographic printed product.	15	Perform lamination and varnishing on flexographic printed product.	4	CO5

FLEXOGRAPHIC PRINTING PROCESS

Course Code : 323321

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
Note : Out of above suggestive LLOs -				
<ul style="list-style-type: none"> • ** Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Assignment**

- Prepare short video on innovations in flexographic printing and post it on social media platform.
- Publish a short interview of local flexographic printing press entrepreneur.
- Prepare a list of applications of IIOT in flexographic printing.

Micro project

- Prepare a report on storage methods for substrates and inks in flexographic printing press.
- Review the quality control methods used flexographic printing presses in nearby area.
- Collect the information of various flexographic presses in local area.
- Enlist the equipment used on production floor flexographic printing press.
- List software used in flexographic printing press for printing, estimating and managerial activities.
- Review the waste disposal methods used in flexographic printing presses in nearby area.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Anilox roll and inking unit cleaning machine.	10,11,12
2	Spectrophotometer for printing.	13,14
3	Color densitometer for printing.	13,14
4	Flexographic plate exposure unit.	4,5,6
5	Web fed lamination machine.	7,8,9,15
6	Two color flexographic printing press.	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Overview of Flexography	CO1	7	2	4	4	10
2	II	Image Carriers	CO2	8	4	4	4	12
3	III	Printing Machinery and Equipment	CO3	10	4	4	8	16
4	IV	Printing Unit	CO4	10	4	4	8	16

FLEXOGRAPHIC PRINTING PROCESS

Course Code : 323321

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
5	V	Product requirements	CO5	10	4	4	8	16
Grand Total				45	18	20	32	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Two unit tests of 30 marks each and average of two unit tests out of 30 marks.
- Each practical will be assessed considering 60% weightage to process and 40% weightage to output.

Summative Assessment (Assessment of Learning)

- End semester assessment of 70 marks through offline examination.
- Actual performance in Internal Practical Examination of 25 marks.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	1	1	3	2	1	1			
CO2	2	3	3	3	2	1	2			
CO3	2	3	3	3	2	2	1			
CO4	2	3	3	3	2	2	1			
CO5	2	2	2	3	3	1	2			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Flexographic Technical Association	Flexography Principles and Practice	Flexographic Technical Association, NY ISBN-13: 978-0989437417
2	Crouch, J. Page	Flexography Primer	Graphic Art Technical Foundation, Pittsburgh, USA, Gaf Press (1998) ISBN 10: 0883622041 ISBN 13: 9780883622049
3	Dr. Prof. Helmut Kipphan	Handbook of Print Media	Springer-Verlag Berlin Heidelberg New York ISBN 3-540-67326-1
4	Joseph Trungale	The Anilox Roll-Heart of the Flexo Process	TAPPI, Code - 0101R322

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=JnDTp08FUOw	Flexo Plate Making System Complete Process by LASERTECHTechnologies

FLEXOGRAPHIC PRINTING PROCESS**Course Code : 323321**

Sr.No	Link / Portal	Description
2	<a href="https://www.youtube.com/watch?v=fB-
eaQIcHh8">https://www.youtube.com/watch?v=fB- eaQIcHh8	Digital Flexo Platemaking using Flint Group's nyloflex NExT by Anderson Vreeland
3	https://www.youtube.com/watch?v=rEbvz7AeNsc	Smart Gearless Flexo Printing Machine with 0 Waste over RFID by TCE CONVERTING
4	<a href="https://www.youtube.com/watch?v=hTF_fg
pWoTo">https://www.youtube.com/watch?v=hTF_fg pWoTo	Flexographic Printing Basics by Label Technology Inc
5	https://www.youtube.com/watch?v=9pocAG01M5s	Flexographic Printing Explained by Rebecca Percival
Note : <ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**

OFFSET PRINTING PROCESS**Course Code : 323322**

Programme Name/s : Printing Technology
Programme Code : PN
Semester : Third
Course Title : OFFSET PRINTING PROCESS
Course Code : 323322

I. RATIONALE

Offset printing market area is growing in rigid packaging and commercial printing. Advancements in offset printing process led by AI, digital and electronics have underlined learning of skills in this area. Hence, this course will appropriately impart skills in line with industry in offset printing process involving image carriers, construction and working of units of printing machine and applications.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Prepare offset plate and operate multicolor offset printing machine.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Make imposition scheme and prepare plates for offset printing.
- CO2 - Choose sheetfed/ webfed offset machine configurations for given job.
- CO3 - Carry out pre make ready and make ready operations.
- CO4 - Demonstrate registration and related operations on printing machine.
- CO5 - Solve problems related to the print quality.

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
														FA-PR	SA-PR	Max	Min	Max	Min			
323322	OFFSET PRINTING PROCESS	OPP	DSC	3	-	4	1	8	4	3	30	70	100	40	25	10	25@	10	25	10	175	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- ClassRoom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

OFFSET PRINTING PROCESS

Course Code : 323322

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain different types of imposition scheme and terms. TLO 1.2 Select workflow for type of CtP plate preparation TLO 1.3 Define workflow and requirements of waterless plate preparation.	Unit - I Plate Making 1.1 Imposition - Definition, Purpose, Terms related with imposition schemes, Page Characteristics, Variation in imposition schemes according to binding styles - center / side / loose leaf binding, Introduction and working of plate imposition software 1.2 CtP plates - Characteristics, workflow, Thermal plate & Violet plate, Requirements of input for CtP, Use of software, CtP machine - construction and working. 1.3 Waterless offset printing concept, Preparation of waterless plates, Advantages and limitations, Applications. IKS: Ancient Indian systems of using of oil paints/waxes on lime-stone flats to create images and transfer.	Chalk-Board Presentations Video Demonstrations
2	TLO 2.1 Explain working principle of lithographic offset printing process. TLO 2.2 Describe classification of offset printing based on feeding type. TLO 2.3 State raw material requirements.	Unit - II Lithographic Offset Printing Process 2.1 Working principle of lithographic offset printing process - Description and comparison with other printing processes. 2.2 Sheetfed and webfed offset printing machines - comparison, advantages, limitations, applications, metal printing machine. 2.3 Sustainability - concept and relevance in the offset process, Sustainable materials - Substrate, ink, chemicals.	Chalk-Board Presentations Site/Industry Visit
3	TLO 3.1 Explain feeding unit according to the substrate. TLO 3.2 Explain dampening and inking units according to job. TLO 3.3 Explain the process of setting printing and delivery units according to job.	Unit - III Major units in offset printing machine 3.1 Feeding Unit - Feeder Types - Single and Stream, Working Components of Feeding unit - From pile board till front lay, front / back separation, side lay and types, machines having sidelay less feeding, front lay. 3.2 Dampening system - need, construction and working, Types of dampening system - Conventional, Brush, Alcohol, Inker feed. Composition of Dampening Solution - pH, Conductivity, Hardness. Inking system - construction, working and types, theory of ink flow and factors affecting it, ink-water balance, inking roller material - required properties and storage conditions, ink film thickness. 3.3 Printing Unit - Plate, Blanket and Impression cylinder - Construction, Undercut, Packing pressure, Cylinder gap, Perfecting mechanism, Grippers - Types, working, Blanket - Types, Materials, Properties. Delivery unit - construction and working, function, parts of delivery unit, anti -set-off device..	Chalk-Board Video Demonstrations Hands-on Site/Industry Visit
4	TLO 4.1 Identify different web fed machine configurations with infeed unit. TLO 4.2 Identify different types of external dryers and chill rolls. TLO 4.3 Select workflow for folders according to the product.	Unit - IV Webfed offset printing machines 4.1 Construction and working - In-line, Stack, Y type, blanket to blanket, Infeed Unit - Reel stand, location and reel locking, braking system, dancer roller - functions and types, Automatic splicers – working of zero speed splicer and flying splicer (match speed). 4.2 Dryer - Need, operations and types - Hot Air, Radiation (UV, IR, LED), Combination, Chill roller - Need, operations and types - Baffle Plate, Jacketed 4.3 Folders - construction and working of Former, Jaw, Chopper.	Chalk-Board Video Demonstrations Presentations Site/Industry Visit

OFFSET PRINTING PROCESS

Course Code : 323322

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Identify different problems on sheet fed and web fed machines and suggest solutions. TLO 5.2 Explain the applications of AI, ML in offset process. TLO 5.3 Examine registration control mechanism.	Unit - V Troubleshooting in offset printing process 5.1 Sheetfed - Mis-register, Plate-blinding, Dot gain, Scum, Ink- Mottling, Set-off, Hickeys, Ghosting, Heat generation in inking system; Web - Out of round rolls, telescopic rolls, web - wrinkles, web- breaks, marking and sagging of web in folder. 5.2 Applications of AI, ML in offset process - preventive maintenance, material requirements, wastage. 5.3 Image and web control - box tilt, compensator roller, fan out, bustle (buzzle) wheels, Working of register control devices - stroboscope, camera.	Chalk-Board Video Demonstrations Hands-on Site/Industry Visit

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Prepare full sheet imposition.	1	*Prepare imposition scheme for full sheetwork bookwork having a each form of 16 pages.	4	CO1
LLO 2.1 Prepare half sheet imposition.	2	Prepare Dummy for 32-page Book- Half Sheet Work Imposition Scheme – Work and Turn and Tumble for 8 - page form / section – for center and side binding	4	CO1
LLO 3.1 Measure environmental conditions in plate making department.	3	Measure platemaking department related to temperature & humidity and understand ambient layout, ventilation, flooring, coloring, safe light.	4	CO1
LLO 4.1 Prepare CtP plates.	4	Preparation of processing chemicals and CTP plate for printing.	4	CO1
LLO 5.1 Measure the parameters of plate quality.	5	Measure offset plate quality by using Quality control tools as plate reader, step wedge, screen angle tester, screen ruling tester.	4	CO1
LLO 6.1 Identify the machine configuration.	6	*Identify plate-blanket-implosion and blanket-to-blanket configurations and operate perfecting mechanism.	4	CO2
LLO 7.1 Set up of feeding unit.	7	*Perform feeding unit settings for printing on paper / board on sheet fed machine.	4	CO3
LLO 8.1 Set up of dampening unit.	8	*Prepare dampening solution and perform dampening unit settings on sheet fed machine.	4	CO3
LLO 9.1 Set up of inking unit.	9	*Perform inking unit settings on sheet fed machine.	4	CO3
LLO 10.1 Set up of printing unit.	10	*Fix the plate, adjust packing and print 2 color job on A4 size paper.	4	CO3
LLO 11.1 Set the blanket cylinder.	11	Fix the blanket in the torsion rollers and setting on cylinder.	4	CO3
LLO 12.1 Set up of delivery unit.	12	*Adjust joggers, skeleton wheels, anti-set off unit, dryers for a given job.	4	CO3
LLO 13.1 Set up of webfed machine.	13	Demonstrate functions of reel stands, dancer roller, braking systems, splicers in infeed unit.*	4	CO4
LLO 14.1 Set finishing devices on webfed machine.	14	Demonstrate the setting of dryers, chill rolls and folders on webfed machine.	4	CO4
LLO 15.1 Demonstrate the setting of registration control devices on webfed machine.	15	*Demonstrate the setting and functions of box tilt, compensator roller, bustle wheels, stroboscope, on webfed machine.	4	CO5

OFFSET PRINTING PROCESS**Course Code : 323322**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 16.1 Troubleshoot problems in offset printing machine.	16	Identify and resolve the common problems (misregistration, scum, dot gain, mottle etc.) on offset printing machine.	4	CO5
Note : Out of above suggestive LLOs - <ul style="list-style-type: none"> • '* Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Collect the information of various offset machines setup installed in local area.
- Enlist various software used for job imposition and give details of workflow of software.
- Collect product samples from different stages of procedure of printed product.
- Enlist all the chemicals, other raw materials, equipment used on production floor along with specifications.
- Collect information about quality standards followed in various companies.
- Carry out market research for the raw material requirements used in process.

Assignment

- Visit press setups in local area to learn workflow of commercial job production.
- Visit press setups in local area to learn workflow of newspaper production.
- Visit press setups in local area to learn workflow of rigid packaging production.
- Visit press setups in local area to learn workflow of finishing operations after offset printing.
- Use of social media to prepare a video on waste disposal in printing press.
- Literature research on developments in offset printing.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Plate making equipment – Printing Down frame, Pasting table.	1
2	Free open source software for imposition.	1
3	Durometer - Rubber Hardness Shore A	3,4
4	Single color sheetfed offset printing machine.	6,7,8,9
5	Micrometer Screw Gauge - 25 mm, analog, LC - 0.01mm	All
6	Spectrophotometer	All

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

OFFSET PRINTING PROCESS

Course Code : 323322

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Plate Making	CO1	10	4	8	4	16
2	II	Lithographic Offset Printing Process	CO2	8	4	4	4	12
3	III	Major units in offset printing machine	CO3	10	4	4	8	16
4	IV	Webfed offset printing machines	CO4	10	4	4	8	16
5	V	Troubleshooting in offset printing process	CO5	7	2	2	6	10
Grand Total				45	18	22	30	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Each practical will be assessed considering 60% weightage to process and 40% weightage to output.
- Two unit tests of 30 marks each and average of two unit tests out of 30 marks.

Summative Assessment (Assessment of Learning)

- End semester assessment of 70 marks through offline examination.
- Actual performance in Internal Practical Examination of 25 marks.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	2	2	2	3	3	3	2			
CO2	2	2	1	2	1	2	1			
CO3	2	2	2	3	3	3	2			
CO4	2	2	2	3	3	3	2			
CO5	2	3	3	3	2	2	1			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	L. C. Young	Materials in printing processes	Focal Press, London ISBN 13 – 978-0240507569
2	Prof. Dr. Helmut Kipphan	Handbook of print media	Springer-Verlag Berlin Heidelberg New York ISBN 3-540-67326-1
3	Michael Barnard	Print Production Manual	Pira International, United Kingdom ISBN 1 85802 238 X
4	Peter Oresik	The GAFT Guide to Troubleshooting for The Web Offset Press	Printing Industries Pr; Spi edition (1 November 2003), ISBN-13: 978-0883624678

XIII . LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=V-ILkTe03yI	Computer-To-Plate (CTP) Image-Setter Process Working
2	https://youtu.be/P3VAc2gi2sY	Technova CTP Machine CTP Machine Working Processes
3	https://www.youtube.com/watch?v=Bbjha8xzfe8	Heidelberg XL105 Offset Press Animation
4	https://www.youtube.com/watch?v=fiMJN-RGxfY	KBA-MetalPrint - Mailänder 280 working
5	https://www.youtube.com/watch?v=m0uZzIuN0oI	MAN Roland Lithoman webfed press running
Note : <ul style="list-style-type: none">Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

PREPRESS IN DIGITAL PRINTING**Course Code : 323323**

Programme Name/s : Printing Technology
Programme Code : PN
Semester : Third
Course Title : PREPRESS IN DIGITAL PRINTING
Course Code : 323323

I. RATIONALE

This course deals with the basic knowledge about color, color separation and correction, measurement. For any printing process, the knowledge of prepress in graphic reproduction is essential.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

Convert the artwork in color separated digital format.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - Classify the given color original
- CO2 - Convert the original into digital format using scanner
- CO3 - Apply the principles of color separation and correction
- CO4 - Identify the color model and gamut
- CO5 - Measure the attributes of color

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			Total			Practical		SLA								
												FA-TH	SA-TH	FA-PR	SA-PR	Max	Min	Max	Min			
323323	PREPRESS IN DIGITAL PRINTING	PDP	DSC	3	-	4	1	8	4	3	30	70	100	40	25	10	25@	10	25	10	175	

Total IKS Hrs for Sem. : 2 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	<p>TLO 1.1 Describe requirements of different types of graphic originals.</p> <p>TLO 1.2 Describe requirements of color measurement and specification.</p> <p>TLO 1.3 Identify standard light sources for color viewing.</p>	<p>Unit - I Handling Graphic Original</p> <p>1.1 Original - definition, classification based on - physical and digital, type of image (line and tone), number of colors (single, multi, full), additive and subtractive color reproduction theories, optical density in graphic reproduction.</p> <p>1.2 Definition of light and color, attributes of color – hue, value, chroma, color viewing requirements – object, observer, light source spectral properties such as line spectrum, continuous spectrum, spectral - reflection, transmission & absorption of light, difference between light and color, visible spectrum, rods & cones in human vision, metamerism and adaptation.</p> <p>1.3 Definition of color temperature, standard light sources such as D50, D65 and viewing conditions, ISO standard for color viewing in press. IKS: Concept of atoms by sage Kanad. Use of wireless communication by Sanjaya in Mahabharat. Security Protocols used by sage Changdeva to communicate with sage Dnyaneshwar.</p>	<p>Video Demonstrations Presentations Chalk-Board</p>
2	<p>TLO 2.1 Explain the construction and working of flatbed scanner.</p> <p>TLO 2.2 Classify image capturing elements used in prepress devices.</p> <p>TLO 2.3 Elaborate terminology related to the prepress.</p>	<p>Unit - II Image Capturing</p> <p>2.1 Flatbed scanners - working principle, components of scanner, color separation, factors affecting scan resolution, magnification and bit depth of color.</p> <p>2.2 Image capturing elements and introduction to their working principle, comparison between CCD, CMOS.</p> <p>2.3 Output terms - resolution, dpi, ppi and lpi. screen angles, screen ruling, AM, FM & Hybrid screening techniques, Process and spot colors, moire defect, dot shapes.</p>	<p>Video Demonstrations Chalk-Board Chalk-Board</p>
3	<p>TLO 3.1 Explain the digital workflow of file processing.</p> <p>TLO 3.2 Convert file formats.</p> <p>TLO 3.3 Use of preflight check.</p>	<p>Unit - III Image Preparation</p> <p>3.1 Vector, raster, bitmap, RGB to CMYK – need, limitations of CMY process inks, ideal and actual reflection of CMY process inks, proportionality failure, additivity failure.</p> <p>3.2 Use of under color removal (UCR), gray component replacement (GCR).</p> <p>3.3 Use of PostScript format and Page Description Language (PDL), PDF formats for printing industry, Purpose of preflight and Raster Image Processing (RIP).</p>	<p>Chalk-Board Presentations Video Demonstrations</p>
4	<p>TLO 4.1 Explain color based on device.</p> <p>TLO 4.2 Explain color gamut and color profiles.</p> <p>TLO 4.3 Describe Pantone color specification system.</p>	<p>Unit - IV Color Specification</p> <p>4.1 Color models – CIE Lab, RGB, CMYK, device dependent and device independent colors.</p> <p>4.2 Color gamut - definition, color gamut comparison of CMYK, RGB, human vision.</p> <p>4.3 Scope of International color consortium (ICC), CIP4, Pantone color specification system.</p>	<p>Video Demonstrations Presentations Chalk-Board</p>

PREPRESS IN DIGITAL PRINTING

Course Code : 323323

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
5	TLO 5.1 Explain construction and applications of color measuring instruments TLO 5.2 Identify printing problems related to color TLO 5.3 Select screen angle for different jobs	Unit - V Color Measurement 5.1 Spectrophotometer, Colorimeter, Densitometer - Working principle, Construction and Applications. 5.2 Calculating color difference (Delta E), ink trapping 5.3 Maximum printable LPI for different printing processes, screen angles for different processes, substrates and LPI relation.	Chalk-Board Video Demonstrations Presentations

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES.

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
LLO 1.1 Use of digital magnifier.	1	*Classify the originals using digital magnifier and identify screening, dot shapes.	4	CO1
LLO 2.1 Use of flatbed scanner.	2	Setting of flatbed scanner for full color graphic original.	4	CO2
LLO 3.1 Use of graphic software for color separation.	3	*Change image resolution of given file and suggest required correction using graphic software.	4	CO2
LLO 4.1 Convert color models.	4	*Edit, resize and convert the image from RGB to CMYK and vector to bitmap using software.	4	CO2
LLO 5.1 Control the color adjustment.	5	*Color adjustment - hue, contrast, balance, tone using graphic software.	4	CO1
LLO 6.1 Use of special color specification tool.	6	*Use of Pantone shade catalog and conversion to CMYK.	4	CO2
LLO 7.1 Prepare print file.	7	*Prepare print ready file with preflight check for given job.	4	CO3
LLO 8.1 Apply RIP software concepts to a print file.	8	*Use of RIP software for changing screen angles, ruling, screening.	4	CO4
LLO 9.1 Use of densitometer and density based calculations.	9	Measure density values using densitometer and calculate ink trapping, hue error, dot gain, dot area, print contrast, efficiency, vivacity.	4	CO5
LLO 10.1 Calculate color difference using spectrophotometer.	10	*Measure Lab values using spectrophotometer and calculate Delta E.	4	CO5
LLO 11.1 Color calibration of a monitor.	11	Calibrate the color monitor using colorimeter.	4	CO5
LLO 12.1 Use of special purpose color monitors.	12	Understand the working of special purpose color monitors.	4	CO4
LLO 13.1 Use of Pantone color swatch.	13	Use Pantone color swatch to for coated and uncoated substrates to formulate the ink.	4	CO4
LLO 14.1 Use of spectrophotometer in colorimetry.	14	Calculate ink trapping and dot gain on coated and uncoated substrates using spectrophotometer.	4	CO5
LLO 15.1 Use of spectrophotometer in densitometry.	15	Plot dot gain curves for coated and uncoated substrates using spectrophotometer and suggest solid ink density according to the substrate.	4	CO5

PREPRESS IN DIGITAL PRINTING**Course Code : 323323**

Practical / Tutorial / Laboratory Learning Outcome (LLO)	Sr No	Laboratory Experiment / Practical Titles / Tutorial Titles	Number of hrs.	Relevant COs
Note : Out of above suggestive LLOs -				
<ul style="list-style-type: none"> • '*1 Marked Practicals (LLOs) Are mandatory. • Minimum 80% of above list of lab experiment are to be performed. • Judicial mix of LLOs are to be performed to achieve desired outcomes. 				

VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)**Micro project**

- Collect samples of daily newspapers to analyze print variation and quality checks.
- Prepare color samples printed by various printing processes.
- Print and display information about Colorimeter.
- Print and display information about Spectrophotometer.
- Enlist various graphic software and state their workflow.
- Collect the information of various prepress departments setup in the local area.
- Collect printed color charts.
- Compare density of process colors printed on coated and uncoated substrates.

Assignment

- Collect specifications of flatbed scanners
- Collect specifications of densitometer
- Collect specifications of colorimeter
- Collect specifications of spectrophotometer
- Collect specifications of special purpose monitors
- Collect specifications of various graphic software

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicial mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED

Sr.No	Equipment Name with Broad Specifications	Relevant LLO Number
1	Computer - PC / Mac, Digital Magnifier	1,2
2	Digital printer, Special purpose monitor	1,4,5,12
3	Flatbed scanner - A4 size, 8 bit, Min. 1200 dpi	2
4	Graphic software – Free Open Source Software	3,4,5,6,7
5	Raster Image Processor software	7,8
6	Densitometer, Spectrophotometer, Colorimeter	8,9,10,11

IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
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PREPRESS IN DIGITAL PRINTING**Course Code : 323323**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Handling Graphic Original	CO1	7	8	4	4	16
2	II	Image Capturing	CO2	8	4	4	6	14
3	III	Image Preparation	CO3	10	4	4	6	14
4	IV	Color Specification	CO4	10	4	4	2	10
5	V	Color Measurement	CO5	10	4	4	8	16
Grand Total				45	24	20	26	70

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Two unit tests of 30 marks each and average of two unit tests out of 30 marks.

Summative Assessment (Assessment of Learning)

- End semester assessment of 70 marks through offline examination.

XI. SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	3	3	3	3	1	1	1			
CO2	3	2	3	3	2	1	2			
CO3	2	3	3	3	1	2	1			
CO4	3	3	2	3	2	3	3			
CO5	2	3	3	3	1	2	3			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	Hugh M. Speirs	Introduction to Prepress	PIRA Intentional, ISBN:1858029015
2	Michael Barnard	Print and Production Manual	Pira International, United Kingdom ISBN 1 85802 238 X
3	Kelvin Triton	Color Control in Lithography	PIRA Intentional, ISBN:1858020360
4	Gary J. Field	Color & Its Reproduction	GATF Press, ISBN-13: 978-0883622018

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	https://www.youtube.com/watch?v=EmB0X28TVM0	Screening Techniques
2	https://www.youtube.com/watch?v=TjugZ223R1E	Flatbed scanner working
3	https://www.youtube.com/watch?v=PHq0c7BXGrU	RIP software workflow
4	https://www.youtube.com/watch?v=Omcglx6jBMo	Use of colorimeter
5	https://www.youtube.com/watch?v=s-ewBEWk13g	Use of spectrophotometer
6	https://www.youtube.com/watch?v=IWmg_yr5nAo	Use of special purpose monitor

PREPRESS IN DIGITAL PRINTING**Course Code : 323323**

Sr.No	Link / Portal	Description
7	https://www.youtube.com/watch?v=9GSC15LPaWk	Understanding Pantone system
8	https://www.youtube.com/watch?v=qCVoUbfOyGg	Color separation and correction

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**

Programme Name/s	: Architecture Assistantship/ Automobile Engineering./ Artificial Intelligence/ Agricultural Engineering/ Artificial Intelligence and Machine Learning/ Automation and Robotics/ Architecture/ Cloud Computing and Big Data/ Civil Engineering/ Chemical Engineering/ Computer Technology/ Computer Engineering/ Civil & Rural Engineering/ Construction Technology/ Computer Science & Engineering/ Fashion & Clothing Technology/ Dress Designing & Garment Manufacturing/ Digital Electronics/ Data Sciences/ Electrical Engineering/ Electronics & Tele-communication Engg./ Electrical Power System/ Electronics & Communication Engg./ Electronics Engineering/ Food Technology/ Computer Hardware & Maintenance/ Hotel Management & Catering Technology/ Instrumentation & Control/ Industrial Electronics/ Information Technology/ Computer Science & Information Technology/ Instrumentation/ Interior Design & Decoration/ Interior Design/ Civil & Environmental Engineering/ Mechanical Engineering/ Mechatronics/ Medical Laboratory Technology/ Medical Electronics/ Production Engineering/ Printing Technology/ Polymer Technology/ Textile Technology/ Electronics & Computer Engg./ Travel and Tourism/ Textile Manufactures
Programme Code	: AA/ AE/ AI/ AL/ AN/ AO/ AT/ BD/ CE/ CH/ CM/ CO/ CR/ CS/ CW/ DC/ DD/ DE/ DS/ EE/ EJ/ EP/ ET/ EX/ FC/ HA/ HM/ IC/ IE/ IF/ IH/ IS/ IX/ IZ/ LE/ ME/ MK/ ML/ MU/ PG/ PN/ PO/ TC/ TE/ TR/ TX
Semester	: Third
Course Title	: ESSENCE OF INDIAN CONSTITUTION
Course Code	: 313002

I. RATIONALE

This course will focus on the basic structure and operative dimensions of Indian Constitution. It will explore various aspects of the Indian political and legal system from a historical perspective highlighting the various events that led to the making of the Indian Constitution. The Constitution of India is the supreme law of India. The document lays down the framework demarcating the fundamental political code, structure, procedures, powers, and sets out fundamental rights, directive principles, and the duties of citizens. The course on constitution of India highlights key features of Indian Constitution that makes the students a responsible citizen. In this online course, we shall make an effort to understand the history of our constitution, the Constituent Assembly, the drafting of the constitution, the preamble of the constitution that defines the destination that we want to reach through our constitution, the fundamental right constitution guarantees through the great rights revolution, the relationship between fundamental rights and fundamental duties, the futurist goals of the constitution as incorporated in directive principles and the relationship between fundamental rights and directive principles.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME

The aim of this course is to help the student to attain the following industry /employer expected outcome – Abide by the Constitution in their personal and professional life.

III. COURSE LEVEL LEARNING OUTCOMES (COS)

Students will be able to achieve & demonstrate the following COs on completion of course based learning

- CO1 - List salient features and characteristics of the constitution of India.
- CO2 - Follow fundamental rights and duties as responsible citizen of the country.
- CO3 - Analyze major constitutional amendments in the constitution.
- CO4 - Follow procedure to cast vote using voter-id.

ESSENCE OF INDIAN CONSTITUTION

Course Code : 313002

IV. TEACHING-LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme						Credits	Paper Duration	Assessment Scheme										Total Marks
				Actual Contact Hrs./Week			SLH	NLH	Theory			Based on LL & TL				Based on SL						
				CL	TL	LL			FA-TH			SA-TH	Total	Practical		SLA						
							FA-PR	SA-PR						Max	Min	Max	Min					
313002	ESSENCE OF INDIAN CONSTITUTION	EIC	VEC	1	-	-	1	2	1	-	-	-	-	-	-	-	-	50	20	50		

Total IKS Hrs for Sem. : 0 Hrs

Abbreviations: CL- Classroom Learning , TL- Tutorial Learning, LL-Laboratory Learning, SLH-Self Learning Hours, NLH-Notional Learning Hours, FA - Formative Assessment, SA -Summative assessment, IKS - Indian Knowledge System, SLA - Self Learning Assessment

Legends: @ Internal Assessment, # External Assessment, *# On Line Examination , @\$ Internal Online Examination

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. If candidate is not securing minimum passing marks in SLA of any course then the candidate shall be declared as fail and will have to repeat and resubmit SLA work.
4. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 15 Weeks
5. 1 credit is equivalent to 30 Notional hrs.
6. * Self learning hours shall not be reflected in the Time Table.
7. * Self learning includes micro project / assignment / other activities.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
1	TLO 1.1 Explain the meaning of preamble of the constitution. TLO 1.2 Explain the doctrine of basic structure of the constitution. TLO 1.3 List the salient features of constitution. TLO 1.4 List the characteristics of constitution.	Unit - I Constitution and Preamble 1.1 Meaning of the constitution of India. 1.2 Historical perspectives of the Constitution of India. 1.3 Salient features and characteristics of the Constitution of India. 1.4 Preamble of the Constitution of India.	Presentations Blogs Hand-outs Modules Flipped classrooms Case studies
2	TLO 2.1 Enlist the fundamental rights. TLO 2.2 . Identify fundamental duties in general and in particular with engineering field. TLO 2.3 Identify situations where directive principles prevail over fundamental rights.	Unit - II Fundamental Rights and Directive Principles 2.1 Fundamental Rights under Part-III. 2.2 Fundamental duties and their significance under part-IV-A. 2.3 Relevance of Directive Principles of State Policy under part-IV A.	Presentations Blogs Hand-outs Modules Case Study Flipped Classroom

ESSENCE OF INDIAN CONSTITUTION

Course Code : 313002

Sr.No	Theory Learning Outcomes (TLO's) aligned to CO's.	Learning content mapped with Theory Learning Outcomes (TLO's) and CO's.	Suggested Learning Pedagogies.
3	TLO 3.1 Enlist the constitutional amendments. TLO 3.2 Elaborate the elements of Centre-State Relationship TLO 3.3 Analyze the purposes of various amendments.	Unit - III Governance and Amendments 3.1 3.1 Amendment procedure of the Constitution and their types - simple and special procedures. 3.2 The Principle of Federalism and its contemporary significance along with special committees that were setup. 3.3 Major Constitutional Amendment procedure - 1st, 7th, 42nd, 44th, 73rd & 74th, 76th, 86th, 52nd & 91st, 102nd	Cases of Federal disputes with relevant Supreme court powers and Judgements Presentations Blogs Hand-outs Problem based learning
4	TLO 4.1 Explain the importance of electoral rights. TLO 4.2 Write the step by step procedure for process of registration TLO 4.3 Explain the significance of Ethical electoral participation TLO 4.4 Explain the steps to motivation and facilitation for electoral participation TLO 4.5 Enlist the features of the voter's guide TLO 4.6 Explain the role of empowered voter TLO 4.7 Write the steps of voting procedure TLO 4.8 Write steps to create voter awareness TLO 4.9 Fill the online voter registration form TLO TLO 4.10 Follow procedure to cast vote using voter-id.	Unit - IV Electoral Literacy and Voter's Education 4.1 Electoral rights , Electoral process of registration 4.2 Ethical electoral participation 4.3 Motivation and facilitation for electoral participation 4.4 Voter's guide 4.5 Prospective empowered voter 4.6 Voting procedure 4.7 Voter awareness 4.8 Voter online registration https://www.ceodelhi.gov.in/ELCdetails.aspx	Presentations Hand-outs Modules Blogs Problem based Learning

VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL / TUTORIAL EXPERIENCES : NOT APPLICABLE.**VII. SUGGESTED MICRO PROJECT / ASSIGNMENT/ ACTIVITIES FOR SPECIFIC LEARNING / SKILLS DEVELOPMENT (SELF LEARNING)****Assignment**

- Outline the procedure to submit application for Voter-id
- Assignments are to be provided by the course teacher in line with the targeted COs.

A1. Prepare an essay on Constitution of India .

A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA

- Assignments are to be provided by the course teacher in line with the targeted COs. A1. Prepare an essay on Constitution of India . A2 Prepare a comparative chart of Unique features of Indian Constitution of India and Constitution of USA A3. Self-learning topics: Parts of the constitution and a brief discussion of each part Right to education and girl enrollment in schools. GER of Girls and Boys. Right to equality. Social Democracy. Women Representation in Parliament and State Assemblies. LGBTQIA+

Micro project

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

- 1. Organize a workshop-cum discussions for spreading awareness regarding Fundamental Rights of the citizen of the country
- 2. Prepare elaborations where directive principle of State policy has prevailed over Fundamental rights with relevant Supreme Court Judgements.
- 3. Organize a debate on 42nd, 97th and 103rd Constitutional Amendment Acts of Constitution of India.

Seminar

- 1 Differences in the ideals of Social democracy and Political democracy.
- 2 Democracy and Women's Political Participation in India.
- 3 Khap Panchayat - an unconstitutional institution infringing upon Constitutional ethos.
- 4 Situations where directive principles prevail over fundamental rights.

Group discussions on current print articles.

-
- Art 356 and its working in Post-Independent India.
- Women's Resrvation in Panchayat leading to Pati Panchayats - Problems and Solutions.
- Adoption of Article 365 in India.
- Need of Amendments in the constitution.
- Is India moving towards a Unitary State Model ?

Activity

- Arrange Mock Parliament debates.
- Prepare collage/posters on current constitutional issues.
- i. National (Art 352) & State Emergencies (Art 356) declared in India.
 - ii. Seven fundamental rights.
 - iii. Land Reforms and its effectiveness - Case study of West-Bengal and Kerala.

Cases: Suggestive cases for usage in teaching:

- A.K. Gopalan Case (1950) :SC contented that there was no violation of Fundamental Rights enshrined in Articles 13, 19, 21 and 22 under the provisions of the Preventive Detention Act, if the detention was as per the procedure established by law. Here, the SC took a narrow view of Article 21.
- Shankari Prasad Case (1951) : This case dealt with the amendability of Fundamental Rights (the First Amendment's validity was challenged). The SC contended that the Parliament's power to amend under Article 368 also includes the power to amend the Fundamental Rights guaranteed in Part III of the Constitution.
- Minerva Mills case (1980) :This case again strengthens the Basic Structure doctrine. The judgement struck down 2 changes made to the Constitution by the 42nd Amendment Act 1976, declaring them to violate the basic structure. The judgement makes it clear that the Constitution, and not the Parliament is supreme.
- Maneka Gandhi case (1978) :A main issue in this case was whether the right to go abroad is a part of the Right to Personal Liberty under Article 21. The SC held that it is included in the Right to Personal Liberty. The SC also ruled that the mere existence of an enabling law was not enough to restrain personal liberty. Such a law must also be "just, fair and reasonable."

Other cases:

1. Kesavananda Bharati Case (1973) : In this case the Hon. SC laid down a new doctrine of the 'basic structure' (or 'basic features') of the Constitution. It ruled that the constituent power of Parliament under Article 368 does not enable it to alter the 'basic structure' of the Constitution. This means that the Parliament cannot abridge or take away a Fundamental Right that forms a part of the 'basic structure' of the Constitution.
2. Mathura Rape Case(1979) : A tribal woman Mathura (aged 14 to 16 years) was raped in Police Custody. The case raised the questions on the idea of 'Modesty of Woman' and here it was was a tribal woman who succumbs to multiple patriarchies. Custodial rape was made an offence and was culpable with the detainment of 7 years or more under Section 376 of Indian Penal Code. The weight of proofing the allegations moved from the victim to the offender, once sexual intercourse is established. The publication of the victim's identity was banned and it was also held that rape trials should be conducted under the cameras.
3. Puttswamy vs Union of India (2017) : In this landmark case which was finally pronounced by a 9-judge bench of the Supreme Court on 24th August 2017, upholding the fundamental right to privacy emanating from Article 21. The court stated that Right to Privacy is an inherent and integral part of Part III of the Constitution that guarantees

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fundamental rights. The conflict in this area mainly arises between an individual's right to privacy and the legitimate aim of the government to implement its policies and a balance needs to be maintained while doing the same.

4. Navtej Singh Johar & Ors. v. Union of India (2018) : Hon. SC Decriminalised all consensual sex among adults, including homosexual sex by scrapping down section 377 of the Indian penal code (IPC). The court ruled that LGBTQ community are equal citizens and underlined that there cannot be discrimination in law based on sexual orientation and gender.

5. Anuradha Bhasin Judgement (2020) : The Supreme Court of India ruled that an indefinite suspension of internet services would be illegal under Indian law and that orders for internet shutdown must satisfy the tests of necessity and proportionality. The Court reiterated that freedom of expression online enjoyed Constitutional protection, but could be restricted in the name of national security. The Court held that though the Government was empowered to impose a complete internet shutdown, any order(s) imposing such restrictions had to be made public and was subject to judicial review.

Note :

- Above is just a suggestive list of microprojects and assignments; faculty must prepare their own bank of microprojects, assignments, and activities in a similar way.
- The faculty must allocate judicious mix of tasks, considering the weaknesses and / strengths of the student in acquiring the desired skills.
- If a microproject is assigned, it is expected to be completed as a group activity.
- SLA marks shall be awarded as per the continuous assessment record.
- If the course does not have associated SLA component, above suggestive listings is applicable to Tutorials and maybe considered for FA-PR evaluations.

VIII. LABORATORY EQUIPMENT / INSTRUMENTS / TOOLS / SOFTWARE REQUIRED : NOT APPLICABLE**IX. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE (Specification Table)**

Sr.No	Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	I	Constitution and Preamble	CO1	4	0	0	0	0
2	II	Fundamental Rights and Directive Principles	CO2	4	0	0	0	0
3	III	Governance and Amendments	CO3	4	0	0	0	0
4	IV	Electoral Literacy and Voter's Education	CO4	3	0	0	0	0
Grand Total				15	0	0	0	0

X. ASSESSMENT METHODOLOGIES/TOOLS**Formative assessment (Assessment for Learning)**

- Assignment, Self-learning and Terms work Seminar/Presentation

Summative Assessment (Assessment of Learning)**XI. SUGGESTED COS - POS MATRIX FORM**

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Course Code : 313002

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)		
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2	PSO-3
CO1	1	-	-	-	2	-	-			
CO2	1	-	-	-	2	-	-			
CO3	1	2	-	-	2	-	1			
CO4	-	-	-	1	-	-	-			

Legends :- High:03, Medium:02,Low:01, No Mapping: -
*PSOs are to be formulated at institute level

XII. SUGGESTED LEARNING MATERIALS / BOOKS

Sr.No	Author	Title	Publisher with ISBN Number
1	P.M.Bakshi	The Constitution of India	Universal Law Publishing, New Delhi 15th edition, 2018, ISBN: 9386515105 (Check the new edition)
2	D.D.Basu	Introduction to Indian Constitution	Lexis Nexis Publisher, New Delhi, 2015, ISBN:935143446X
3	B. K. Sharma	Introduction to Constitution of India	PHI, New Delhi, 6th edition, 2011, ISBN:8120344197
4	MORE READS :	Oxford Short Introductions - The Indian Constitution by Madhav Khosla. The Indian Constitution: Cornerstone of a Nation by Granville Austin. Working a Democratic Constitution: A History by Garnville Austin Founding Mothers of the Indian Republic: Gender Politics of the Framing of the Constitution by Achyut Chetan. Our Parliament by Subhash C. Kashyap. Our Political System by Subhash C. Kashyap. Our Constitution by Subhash C. Kashyap. Indian Constitutional Law by Rumi Pal.	Extra Read
5	B.L. Fadia	The Constitution of India	Sahitya Bhawan, Agra, 2017, ISBN:8193413768

XIII. LEARNING WEBSITES & PORTALS

Sr.No	Link / Portal	Description
1	http://www.legislative.gov.in/constitution-of-india	Constitution overview
2	https://en.wikipedia.org/wiki/Constitution_of_India	Parts of constitution
3	https://www.india.gov.in/my-government/constitution-india	Constitution overview
4	https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/	Fundamental rights and duties
5	https://main.sci.gov.in/constitution	Directive principles
6	https://legalaffairs.gov.in/sites/default/files/chapter%203.pdf	Parts of constitution

ESSENCE OF INDIAN CONSTITUTION**Course Code : 313002**

Sr.No	Link / Portal	Description
7	https://www.concourt.am/armenian/legal_resources/world_constitutions/constit/india/india-e.htm	Parts of constitution
8	https://constitutionnet.org/vl/item/basic-structure-indian-constitution	Parts of constitution

Note :

- Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students

MSBTE Approval Dt. 02/07/2024**Semester - 3, K Scheme**