West Bengal State Council of Technical & Vocational Education and Skill Development
(Technical Education Division)

Syllabus
of

Diploma in Printing Technology [DP]

Part-II (4th Semester)

Revised 2022

Name of the course: Printing Image Carrier Preparation

Course Code:	Semester: Fourth
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./ week	Class Test (Two class tests will be conducted) : 20
Tutorial: NIL	Quizzes/ Assignments/ Student Activity: 10
Practical: NIL	Class Attendance: 10
Credit: 3	End semester examination: 60

Aim:
The aim of teaching "Printing Image Carrier Preparation " is to acquaint the students with the making of an image carrier or for various Impact printing techniques and highlight the area where rapid changes are deeply involved in the modern printing industry.

Course Outcomes:
1. Describe the various essential consumables and equipment that are required in the image carrier making
2. Describe the conventional method and modern process of various image carrier making
3. Analyze the several factors that are deeply associated with the different types of image carrier making
4. Apply strategies to resolve the troubles related to various image carriers during the print production

Prerequisite: Basic engineering for Printing

Contents:

UNIT	CONTENT DETAILS	HOURS/ UNIT	MARKS
Unit 1: Introduction to offset plate making	● Basic Lay out for any offset plate making Department ● Discussion on different types of equipment & tools for offset plate making process ● Different types of Illuminants and their impact on Offset plate making process ● Factors governing the Light source ● Plate making variables ● Discussion on different types of chemicals that require in a plate making department ● Discussion on Plate metals and their characteristics	6	8
Unit 2: Manual Surface Plate making process	● Positive working & Negative working plate ● Discussion on general steps of surface plate making (Main steps) 　○ Graining - Types & processes 　○ Counter etching & purposes 　○ Coating preparation, Dark Reaction & Continuing Reaction 　○ Exposure technique, 21 step Sensitivity guide 　○ Application of Lacquer & developing ink 　○ Development 　○ Water wash 　○ Gumming purpose & process ● Wipe on Plate making 　○ Generals steps including coating making materials	6	8
Unit 3:Manual Subsurface / Deep-etch Plate making process	● Introduction to subsurface plate and its characteristics ● Different types of deep etch plate & their preparation technique - Gum Deep etch and PVA deep etch, Highlight the different stages of deep etch plate making ● Difference between surface & subsurface plate ● Advantages of Deep etch plates	3	5
Unit 4: Other types of Offset Plates	● Concept of Multi metal Plate ● Choice of metal ● Bi metal plate ● Tri metal plate ● Advantages & Disadvantages ● Waterless offset Plate	3	5

Unit	Topics		
Unit 5: Discussion on Pre-sensitized Plates	- General Structure of PS plate - PS Plate characteristics - Anodizing process - Coating of Negative working & Positive working PS Plate - Additive & Subtractive type plate - Process of Analog PS Plate preparation (Positive / Negative) - Photopolymer PS Plate - Different Process of Photopolymer coating based PS Plate making (Positive / Negative) - Discussion of Developing technique in Plate processor - Advantages of PS Plates	6	8
Unit 6: Digital Offset Plate	- Introduction to Computer to plate technology - Construction of Flatbed, Internal and External drum plate setter - Raster Image Processing - Laser technology, laser head - Brief discussion on Plate calibration technique - Violet Plate - Thermal Plate - Process-less thermal Plate - Inkjet Plate	9	10
Unit 7: Flexographic Plate making	- General Structure of a Relief Plate - Process of plate making through negative or Direct-Imaged Plate - Molded Rubber Plate making process - Photopolymer Plate making process - Recent Developments - Plate considerations - Plate mounting & Proofing	6	8
Unit 8 : Gravure Cylinder making	- General structure of a gravure cylinder - Copper plating of Gravure cylinder - Cylinder preparation by Carbon tissue method / Diffusion etch - Cylinder preparation by Electro chemical etching - Diamond Stylus process - Electronic Engraving / Direct Laser	6	8

References

1. Handbook of Print media – by Helmut Kipphan
2. Platemaking Department – by M H Bruno
3. Chemistry for the Graphic Arts – by Nelson Richards Eldred
4. GATF Computer-To-Plate Performance Study - by Gregory M. Radencic and John T. Lind
5. Flexography: Principles & Practices by FTA
6. Gravure: Process and Technology

<h1 align="center">Name of the course: Color Technology for Printing</h1>

Course Code:	Semester: Fourth
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./ week	Class Test (Two class tests will be conducted): 20
Tutorial: NIL	Quizzes/ Assignments/ Student Activity: 10
Practical: NIL	Class Attendance: 10
Credit: 3	End semester examination: 60

Aim:

Color is perhaps one of the most important metric that determines the fidelity of the printed reproduction with the original. Color being perceptual in nature and not tangible, the study of color as a complex phenomenon. To ensure that the printing process reproduces the colors that are expected, the fundamentals of color and its technology needs to be learnt by the aspiring printing technologist. This course offers an insight into illumination, standard illuminants, color mixing theories, color perception and colorimetry. This subject will provide the basic idea on color and the various metric through which it can be quantified, which will ultimately help control the process of color reproduction.

Course Outcomes:

1. Identify the metrics used for quantifying color
2. Compare between the different color spaces used in colorimetry
3. Determine the viewing & measurement conditions for specific process control
4. Determine the appearance of printed reproduction using appropriate mathematical model
5. Determine color correction strategy for a given reproduction requirement

Prerequisite: Prepress repro technique, Paper & Ink technology

Contents

UNIT	CONTENT DETAILS	HOURS/ UNIT	MARKS
Unit 1	• The nature of light • EM Spectrum • Perception of color in humans • The Human Color Vision System and its elements • Theories of color vision	3	5
Unit 2	• Color mixing models • Metrics for quantifying color • Color order systems • Color Spaces • CIE colorimetry	7	12

	• Standard Illuminants and their spectral behaviour • Color Temperature and CCT • Metameric failures in color vision • Color difference		
Unit 3	• Measurement of color • Spectrophotometers • Standards in Viewing conditions • Standards in Measurement conditions	7	10
Unit 4	• The appearance of color • Substrate properties affecting appearance of color • Colorant properties affecting appearance of color • Additivity & Proportionality failures • Theories in halftone dot appearance modelling • Theories in mathematical color correction • Color matching theories	12	15
Unit 5	• Metrics for tone reproduction • Masking • Problems with four color inks • Black printer & black generation • Color correction strategies in printing	10	10
Unit 6	• Chromatic adaptation • Color appearance phenomena • Color constancy	6	8

References

1 Phil Green, Understanding Digital Color, GATF Press

2 Gary G. Field, Color and its Reproduction, 3rd edition, GATF Press, 2004

John A.C. Yule, Principles of color reproduction applied to photomechanical reproduction, Color photography and ink, paper and other related industries, John
3 Wiley & Sons, U.K., 2001

Berns R S, Billmeyer & Saltzman 's Principle of Color Technology, 3rd Edition, Wiley,
4 2000

Name of the course: Digital Prepress

Course Code:	Semester: Fourth
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./ week	Class Test (Two class tests will be conducted): 20
Tutorial: NIL	Quizzes/ Assignments/ Student Activity: 10
Practical: NIL	Class Attendance: 10
Credit: 3	End semester examination: 60

Aim:

Most premedia workflow today is digitized. This course aims to develop theoretical and practical knowledge and skill among students on digital prepress. Students already have knowledge of film and plate making through analog prepress techniques. This course will continue developing their knowledge and skill on the same techniques using digital methods. They will also be taught on the aspects and usage of different software and equipment that is essential for digital page layout and ultimately obtaining output on a plate/film. Further, a great emphasis will also be given on developing concepts for data exchange (PDF) for the purpose of dissemination of the same for print production.

Course Outcomes:

1. Distinguish between conventional and digital prepress operations
2. Determine the scanning resolution for a given artwork
3. Determine halftoning parameters for a given job with specific output quality requirement
4. Design a digital page ready for imaging through image or plate setter
5. Create soft proof of a print job

Prerequisite:

Basic Printing, Graphic Reproduction

Contents

UNIT	CONTENT DETAILS	HOURS/ UNIT	MARKS
Unit 1	• Fundamentals of Digital Prepress • Conventional v/s Digital Prepress • Major steps involved in Digital Prepress • Software and Hardware requirements for Digital workflow	3	5
Unit 2	• Image Acquisition • Sensors: PMT, CCD, CMOS • Scanners: Working Principle	5	5

		• Digital Camera: Working Principle • Optical Character Recognition and other scanning devices: Working Principle		
Unit 3		• Basic Concept of Digital Prepress • Digital Image Formation processes • Classification of digital image: Object based and Pixel based • Image quality dependencies • Pixel, pixel size • Bit Depth • Resolution: ppi, lpi, dpi • Sampling factor, scaling factor, halftoning factor • Determination of optimum scanning resolution • Image storage size calculation	10	15
Unit 4		• Making of a Digital Page (supported through practical demonstration) • Image manipulation and enhancement using software • Image histogram analysis • Gray Balance • Black Addition: UCR, GCR • Dot Gain: TVI Curve analysis • Knockout and overprint • Trapping • Fonts: PostScript, TrueType and OpenType • Digital Font Management Systems • Page Margin determination • Printer's Marks in a digital page • Page Imposition	12	15
Unit 5		• Soft proofing • Working with PDFs • Standards and specifications for PDF • Proofreading • Preflighting • Considerations and checks for Images, Color, Fonts, Page during preflighting • Color separation • Color management considerations • Embedding ICC Profiles • Standards for soft proofing	10	10
Unit 6		• Output Devices • Imagesetters: Classification and Working Principle • Platesetters: Classification and Working Principle	5	10

References

1. Kaj Johansson, Peter Lundberg, Robert Ryberg, A Guide to Graphic Print Production, Wiley,3rd edition, 2011
2. Helmut Kipphan, Handbook of Print Media, Springer-Verlag, 2001
3. Gerald F. Marshall and Glenn E. Stutz, Handbook of Optical and Laser Scanning, CRC Press, 2004
4. Daniel L. Lau, Gonzalo R. Arce, Modern Digital Halftoning, CRC Press, Second Edition, 2001

Name of the course: Offset Printing Technology

Course Code:	Semester: Fourth
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./ week	Class Test (Two class tests will be conducted): 20
Tutorial: NIL	Quizzes/ Assignments/ Student Activity: 10
Practical: NIL	Class Attendance: 10
Credit: 3	End semester examination: 60

Aim:

To impart knowledge about offset printing and mechanisms of sheetfed & Web offset printing.

Course Outcomes:
1. Identify each unit present in a sheetfed offset machine and Web offset press
2. Identify factors influencing print quality
3. Demonstrate the sequence of press operating procedures
4. Analyze the trouble that may arise from the machine during the press run various image carriers during the print production

Prerequisite:

Basic engineering for Printing

Contents:

UNIT	CONTENT DETAILS	HOURS/ UNIT	MARKS
Unit 1: Introduction to Offset Printing	• About sheetfed press • Press configuration: Single color press, multi-color press, Perfecting press • Different sections of a sheet fed offset machine	3	4
	• About Web offset Press • Press configuration: 'U' type, 'H' type, 'Y' type, Satellite etc. • Different sections of a web offset machine		
Unit 2: Feeder of	• Sheet separation unit, Types of feeders: Frictional & pneumatic feeder, Operational process of different types of feeders • Pile table: Positioning the table, checking stock, Loading the feeder, continuous feeder	9	10

Sheetfed & Infeed of web press	• Feed board and its component, Feed board setting; Double sheet detector; Safety bar; Suction devices; No sheet detector • 3 Point registration System, Front lay & Side lay		
	• Infeed Section: Single reel, Double Reel, Revolving rotating Stand • Splicer Unit: Auto Splicer & Zero speed splicer • Web turner		
Unit 3: Printing Unit	• Plate cylinder • Blanket cylinder • Impression cylinder • Cylinder setting: Bearer to bearer, non-contact bear • Cylinder Undercut, Impression nip, Plate and Blanket packing • Maintenance • B2B Printing Unit in Web press	3	4
Unit 4: Offset Printing Blanket	• Construction of blanket • Conventional vs compressible • Blanket properties & characteristics • Grades of blanket • Mounting on cylinder • Blanket damaging • Restoring of blanket from minor smashes • Blanket wash	5	8
Unit 5: Sheet control & Web control mechanism	• Types of insertion mechanism • Paper controls • Gripper design & assembly • Gripper setting • Transfer cylinder • Sheet transfer section: Chain, single drum, 3 drum	5	8
	• Web tension control • Tilt box Mechanism: web steering • Side lay sensors • Bustle Wheel: Controlling fan out • Compensator roller: controlling the cut off length • Web break detectors		
Unit 6: Dampening Unit & Inking Unit	• Dampening solution ingredients, IPA VS IPA Substitute • PH & Conductivity of fount • Machine settings for IPA free dampening solution • Factors which determine the amount of solution to a plate • Types of dampening systems: Intermittent flow, Continuous, Combination continuous, non-contacted dampening systems • Roller setting for a dampening system • Problems associated with dampening solution • Operational problems related to dampening system	9	10

	• Function of Ink roller system • Construction of inking system: Ink duct, Ink roller train • Ink distribution • Types of Inking system: Multi-roller, Drum-roller • Ink roller maintenances • Ink roller setting • Ink setting curves • Dryer System for UV inks & Heat-set inks • Chill roll design for Heat-set inks		
Unit 7: **Delivery Unit of Sheetfed & Folder of web Press**	• Delivery Cylinder: Skeleton wheel and star wheel • Components of Delivery section: Delivery board, joggers, de-curlers • Delivery assist devices • Anti-set off powder system • Folding Principles • Folder design • Folding Operational procedure • Folder Maintenance	5	8
Unit 8: **Make Ready & Common Problems in Offset Printing**	• Importance of Make Ready • Pre-Make Ready • Types of Make Ready • Problems & Remedies – Misregistration/ Scumming/ Tinting / Slurring / Doubling/ Ghosting/ Set off/ Chalking/ Picking / Piling/ Mottling/ Hickeys/ Plate Blinding / Roller Stripping/ Strike through/ Saw through/ Gear streaks/ Blistering/ Chill roll condensation etc.	6	8

References
1. Handbook of Print media – by Helmut Kipphan
2. Web Offset Press Operating – GATF Press
3. Sheetfed Offset Press Operating – GATF Press
4. Guide to Troubleshooting for the Sheetfed Offset Press – GATF Press
5. Guide To Troubleshooting For The Web Offset Press – GATF Press
6. The Lithographers Manual - Raymond N. Blair

Name of the course: Elective I – Digital & Security Printing

Course Code:	Semester: Fourth
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./ week	Class Test (Two class tests will be conducted): 20
Tutorial: NIL	Quizzes/ Assignments/ Student Activity: 10
Practical: NIL	Class Attendance: 10
Credit: 3	End semester examination: 60

Aim: This course aims to impart knowledge about various trendsetting digital printing processes in modern printing industries. Further, the students will also be familiarized on ideas of various security features that are associated with print and package production.

Course Outcomes:
1. Explain the steps involved in digital printing processes: electrophotography, inkjet, thermography
2. Determine the process of printing required for a given print job
3. Identify the security print feature from a given print sample
4. For a given print job, determine the security print methodology that will be suitable for making the print secure
5. Differentiate between security printing features used on a print

Prerequisite:

Basic engineering for Printing

Contents:

UNIT	CONTENT DETAILS	HOURS/ UNIT	MARKS
Unit 1: The Electrophotographic Process	• The Electrophotographic Process • Charge – Corona discharge mechanism; Evolution of Corona device • Expose – Photoconductor drum; PIDC; Light source • Development – Cascade; Magnetic Brush • Transfer • Fusing- Types of fusing • Cleaning • Toner & Carrier – Ingredients; Manufacturing Process • Media & Consumables	9	12

Unit	Content		
Unit 2: **The Inkjet Process**	• Inkjet Process • Detailed Classification of Inkjet – CIJ, DOD • Droplet generation • Inkjet Printhead • Inkjet Inks • Future Developments	6	8
Unit 3: **Thermography**	• Introduction to Thermal Printing • Direct Thermal Printing – Color formers; Developers; Sensitizers; Multi-color thermal paper • D2T2 process - Dye Sheet; Receiver Sheet; D2T2 dyes • Thermal Melt Transfer – Dye sheet; Melt-transfer colorants; Receiver sheets • Thermal head Design	6	8
Unit 4: **Concept of Hybrid Printing & Digital Offset**	• Combination variants with hybrid printing systems – with conventional Printing technologies; with NIP technologies • Hybrid Printing for In-line & Off-line Production • Digital Offset – Image Transfer process; Electro ink; Media & Consumables • Advantages of Digital Printing	6	8
Unit 5: **Security Printing: Visible & Machine-readable security features**	• Introduction & Purpose of Security Printing • Substrate – Paper, Polymer & other media • Some Visible security features – watermarks, Guilloché pattern, Microprinting, optically variable ink, Hologram, Security threads, Prismatic Coloration, Registration of features on both sides, Thermochromatic ink, Serial numbers etc. • Security features detectable with simple tools – Halo, Latent images, False-positive testing, Fluorescent dyes, Infrared characteristics • Machine readable security features – Magnetic ink, Phosphorescent dyes, Anti-copying marks	6	8
Unit 6: **Lenticular Printing & Holography**	• Lenticular Printing – Process, Construction, Types of lenticular prints, Manufacturing process, Common notable products, Defects (Design defects, Prepress defects, Printing defects) • Hologram – Working Process, Light source, Recording medium, Apparatus, Physics of holography, Applications of hologram in Printing (Hologram labels, stamping foils, High security seals, Shrink sleeves etc.)	6	8

Unit 7: Product Identification Codes	• Bar code – Symbologies, Barcode Readers, Barcode encoding & decoding, Types of Barcodes, Quality Control & Verification, Application, Advantages and Limitations • QR code – Design, Anatomy of QR Code, QR Code encoding & decoding, QR code variants, Application, Advantages and Limitations • RFID tag – Design, RFID frequencies, RFID Types, RFID Readers, Advantages and Limitations, Application in Print production & Packaging	6	8

References

1. Handbook of Print media – by Helmut Kipphan
2. Electrophotography & Development Physics – by L.B. Schein
3. Color Desktop Printer Technology – edited by Mitchell Rosen & Noboru Ohta
4. Chemistry and Technology of Printing and Imaging Systems – edited by P. Gregory
5. Fundamentals of Inkjet Printing - edited by Stephen D. Hoath
6. Introduction to Security Printing – by Richard D Warner, Dr. Richard M Adams
7. Basics of Hologarphy – by P. Hariharan
8. Multiresonator-Based Chipless RFID - by Stevan Preradovic, Nemai Chandra Karmakar
9. RFID Handbook – by Dr Klaus Finkenzeller
10. ISO/IEC 18004 – Information technology – Automatic identification and data capture techniques – QR Code bar code symbology specification
11. The Bar code book – by Roger C Palmer
12. Security Engineering – by Ross Anderson

Name of the course: Programme Elective I (Electronic Imaging)

Course Code:	Semester: Fourth
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Maximum Marks: 100
Teaching Scheme	**Examination Scheme**
Theory: 3 hrs./ week	Class Test (Two class tests will be conducted): 20
Tutorial: NIL	Quizzes/ Assignments/ Student Activity: 10
Practical: NIL	Class Attendance: 10
Credit: 3	End semester examination: 60

Aim:

This elective course aims to develop a holistic knowledge on the processes of digital imaging in devices used for printing. For students aiming to pursue the field of prepress, it is pertinent for them to know technologies like halftoning, output devices and their characteristics, PDFs and file formats. While preparing a digital file in the prepress domain, there are many pitfalls that the print technologist might face. However, a technologist who is skilled and knowledgeable in this domain will also know how to overcome and prevent such problems from occurring in the future.

Course Outcomes:

1. Determine the parameters that drive image quality in an imaging system
2. Determine the screening frequency for a given output device of a specific addressable resolution
3. Determine the dot structure parameters for a given print job and output device
4. Write a simple PostScript code and create a PDF file after normalizing it
5. From a given pixel block, perform data compression based on specific technique

Prerequisite: Graphic Reproduction

Contents

UNIT	CONTENT DETAILS	HOURS/ UNIT	MARKS
Unit 1	• Introduction to some imaging systems: Conventional and Digital • Imaging technologies used in digital systems • Imaging technologies used for printing output devices • Quality parameters for images from various devices	3	5
Unit 2	• Digital Halftoning	10	15

	• Differences between analog and digital halftoning techniques • Concepts on Thresholding, Screen Cells, Super Cells, Screen angles • Digital Halftoning: Rational, Irrational, Dithering • Digital Halftoning considerations: Dot shape, angles, screen ruling • Comparison of digitial halftoning output quality		
Unit 3	• Relationship between ppi, lpi, dpi • Determination of optimum screening resolution • Number of gray levels • Addressable resolution • Tonal Range of Halftone Reproduction • Optical Transfer Functions	10	12
Unit 4	• Page Description Languages • PostScript language • Programming in PostScript • Normalizer • Development of PDF file format • Basic structure of the PDF format	7	10
Unit 5	• Raster Image Processor (RIP) • Concept of BLIT • Stages of RIP • Processing color data through RIP • Classification of RIPs based on execution • Classification of RIPs based on workflow	10	10
Unit 6	• Image file formats used in the graphic communications • Displaying color data • Data compression • Redundancies in data compression • Lossless compression: Huffman, LZW • Lossy compression: JPGE (Computational)	5	8

References

1. Handbook of Print Media: Technologies and Production Methods, Helmut Kipphan Springer Science & Business Media, 2001
2. Henry R. Kang, Digital Color Halftoning (SPIE PRESS Monograph Vol. PM68), SPIE--The International Society for Optical Engineering
3. Daniel L. Lau and Gonzalo R. Arce, Modern Digital Halftoning, Marcel Dekker
4. PDF Reference sixth edition Adobe® Portable Document Format
5. PostScript® LANGUAGE REFERENCE third edition, Adobe Systems Incorporated, Addison-Wesley Publishing Company
6. Digital Image. Processing. Third Edition. Rafael C. Gonzalez. University of Tennessee. Richard E. Woods. Nled Data Interactive. Pearson International Edition

Name of the course: Printing Image Carrier Preparation Laboratory

Course Code:	Semester: Fourth	
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Total Marks: 100	
Teaching Scheme	**Examination Scheme**	
Theory & Tutorial: NIL	**Internal Assessment: 60**	**End Semester Assessment: 40**
Practical: 3 hrs./week	Continuous Evaluation: 50	Assignment on the day of Viva-voce & Practical report submission: 20
Credit: 1.5	Class Attendance: 10	Viva voce: 20

Aim:

The aim of "Printing Image Carrier Preparation Laboratory" is to familiarize the students with the making of an image carrier or for various Impact printing techniques and highlight the area where rapid changes are deeply involved in the modern printing industry.

Course Outcomes:

1. Demonstrate the various essential consumables and equipment that are required in the image carrier making
2. Prepare the Offset plates by using the conventional method and modern techniques
3. Demonstrate on the Flexographic image carrier and Gravure cylinder
4. Solve the troubles related to various image carriers during the image carrier preparation

Elementary Knowledge:
1. Basic engineering for Printing
2. Graphics Reproduction
3. Material Science for Printing

Course Content:
1) Introductory session
    i. Identify each chemical and consumable which is required to prepare the plate making and describe their purposes
    ii. Demonstrate each tool and equipment which are important in the laboratory
    iii. Prepare a lay-out of the laboratory
    iv. Note all the concerned factors which are necessary in the process of image carrier preparation
    v. Design the layout of an original (Negative and Positive)
    vi. Adopt safety Practices while working on the laboratory

2) Offset Plate making (Conventional Plate making)
    i. Measure the thickness, size of the plate, Identify the dent less aluminium plate
    ii. Prepare the graining process (Description only)
    iii. Prepare the Coating solution for the plate
    iv. Prepare the conventional plate by using Egg Albumin Process
    v. Prepare the conventional plate by using Wipe on Process
    vi. Demonstrate the Addition and deletion methods while rechecking a prepared Plate

3) Offset Plate making (Deep-etch method)
    i. Prepare the plate by using Gum Arabic or PVA coating

4) Offset Plate making (PS Plate)
    i. Identify the differences between a positive working and negative working PS Plate
    ii. Describe the General specifications of PS plate and the related chemicals
    iii. Prepare a Positive working PS Plate
    iv. Prepare a Negative working PS Plate
    v. Demonstrate the working procedure of a Plate processor

vi.   Demonstrate the process of Plate treatment, care and storage

5) Demonstrate on CTP & Digital offset Plates
    i.   Demonstrate the process of making Violet Offset Plate
    ii.   Demonstrate the process of making Thermal Offset Plate

6) Demonstrate on Flexographic Plates
    i.   Demonstrate the process of making a rubber flexo plate (Stereo)
    ii.   Demonstrate the process of making Photopolymer flexo plate

7) Demonstrate on Gravure Cylinder making
    i.   Demonstrate the gravure cylinder making by using carbon tissue method
    ii.   Demonstrate the gravure cylinder making by using modern techniques (Diamond stylus / Direct Laser etc.)

Name of the course: Color Technology for Printing Lab

Course Code:		Semester: Fourth	
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)		Total Marks: 100	
Teaching Scheme		**Examination Scheme**	
Theory & Tutorial: NIL		**Internal Assessment: 60**	**End Semester Assessment: 40**
Practical: 3 hrs./week		Continuous Evaluation: 50	Assignment on the day of Viva-voce & Practical report submission: 20
Credit: 1.5		Class Attendance: 10	Viva voce: 20

Aim:

For a correct color reproduction that bears strong fidelity to the original, the print technologist must assess and modify the parameters during pre-press and press that affect color reproduction. In many cases, it is also required to perform various color correction either prior or during print production. Hence, it is imperative that for a successful color reproduction the print technologist should determine the appropriate the optimal device and software settings along with tonal corrections to the print job.

Course Outcomes:
1. Identify tools in an image editing software interface
2. Apply changes to the curve of an image for editing
3. Apply masks for color correction
4. Using a spectrophotometer, analyze the quality of a print

Pre-Requisites: Graphic Reproduction, Electronic Composing

Course Content (Experiments):
1. Introduction to interface of image editing software: Adobe Photoshop, GIMP
2. Color Image acquisition using scanners
3. Electronic color separation
4. Color adjustment of images
5. Analysis of an image histogram and its equilization
6. Analysis of tone reproduction curve
7. Manipulation of tone reproduction curve for color correction
8. Black Separation, UCR, GCR
9. Masking for color correction
10. Measurement of color prints using spectrophotometer
11. Measurement of color difference between two color patches using spectrophotometer
12. Color reproduction analysis using quality control tools and on different substrates
13. Measurement of trapping, dot gain

Name of the course: Digital Prepress Laboratory

Course Code:	Semester: Fourth	
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Total Marks: 100	
Teaching Scheme	**Examination Scheme**	
Theory & Tutorial: NIL	**Internal Assessment: 60**	**End Semester Assessment: 40**
Practical: 3 hrs./week	Continuous Evaluation: 50	Assignment on the day of Viva-voce & Practical report submission: 20
Credit: 1.5	Class Attendance: 10	Viva voce: 20

Aim:

This course will enable to impart skill on using different image editing, graphic editing and page layout software and related image acquisition devices. Using this skill the students will be able to edit, design and successfully create digital pages, graphics, etc. Further, this will enable them to acquire skill on digital imposition of jobs and preflight digital files before they are sent for image carrier generation.

Course Outcomes:
1. Acquire images using an image scanner
2. Use tools available in the interface of the image editing, graphic designing and page layout software
3. Edit and perform corrections on the acquired images using image editing software
4. Create an imposed digital file from exported images, text, graphics
5. Perform preflight check on a digital file and determine methods to rectify errors if any

Pre-Requisites:
Electronic Composing

Course Content:
1. Introduction to interface of software: Photoshop, Illustrator, InDesign, CorelDraw, GIMP, InkScape
2. Acquire and digitize images from an image scanner
3. Manipulate parameters in the scanning interface for basic image quality correction
4. Using tools in the image editing software, edit the acquired image: Masks, filters, USM, black point, white point correction, etc
5. Create a new file in an image editing software, place images, text, etc, perform necessary corrections to the images and export the file
6. Create a graphic/logo in an object based editing software. Perform necessary manipulation, correction on the design and export the file
7. Export the edited image files and graphic files to a page layout software and create a PDF file (brochure or booklet)
8. Impose the brochure or booklet
9. Perform preflight checks on the PDF file and rectify errors if any

Name of the course: Offset Printing Technology Workshop

Course Code:		Semester: Fourth	
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)		Total Marks: 100	
Teaching Scheme		**Examination Scheme**	
Theory & Tutorial: NIL		**Internal Assessment: 60**	**End Semester Assessment: 40**
Practical: 3 hrs./week		Continuous Evaluation: 50	Assignment on the day of Viva-voce & Practical report submission: 20
Credit: 1.5		Class Attendance: 10	Viva voce: 20

Aim:
To impart practical knowledge in Work Shop/Laboratory related with course of study.

Course Outcome:
1. Interpret the Print Production Workflow.
2. Select of various tools for a specific job preparation.
3. Produce jobs as per specified dimensions with Planographic Printing Processes.
4. Adopt safety practices (tools, jobs & personal) while working on various machines.

Course Contents:
1. i) Shop talk & Familiarization with Offset Printing Machine
    ii) Identify, select, & use of various tools related with this workshop

2. i) Application of different chemicals in Offset
    ii) Preparation of Dampening Solution
    iii) Color mixing and matching

3. i) Mounting plate on plate cylinder with properly adjusted packing.
    ii) Fitting of offset blanket – checking the levelness of the blanket – preparing it for blanket

4. i) Setting of Dampening Form rollers
    ii) Setting of Ink Form rollers

5. i) Setting of Feeding mechanism
    ii) Adjustment of Delivery unit

6. i) Moleton cover changing method in dampening system
    ii) Ink roller wash up and damper cleaning

7. i) Demonstrating the Make Ready operation and printing a single color and multi-color job
    ii) Troubleshooting while performing the printing process

Name of the course: Minor Project

Course Code:	Semester: Fourth	
Duration: 17 weeks (out of 17 weeks, 2 weeks are to be allotted for class tests)	Total Marks: 100	
Teaching Scheme	**Examination Scheme**	
Theory & Tutorial: NIL	**Internal Assessment: 60**	**End Semester Assessment: 40**
Practical: 4 hrs./week	Continuous Evaluation: 50	Assignment on the day of Viva-voce & Practical report submission: 20
Credit: 2	Class Attendance: 10	Viva voce: 20

Aim:

Students will use their knowledge earned during the course of their study and apply the skills developed in the time in developing solutions to real-life industry-oriented problems. Students will form into groups and work under the guidance of a faculty member. Students under the guidance of a faculty member may choose to select a suitable topic that should be practical oriented and address some real-life problem. The students will have to demonstrate the work they have done and also submit a detailed report as part of assessment.

Outcomes:

1. Students will be able to apply their knowledge and skill to develop solutions to real-world printing problems.
2. Students will be able to determine the timeline and plan accordingly for successful completion of a project.
3. Apply knowledge earned in printing technology to solve real-life problems of the industry.
4. Evaluate the feasibility of a project that is to be undertaken.
5. Prepare a technical report to summarize and present the results of a project in a meaningful manner.

Evaluation criteria:

The report submitted at the end of the course will be evaluated on the basis of following criteria (as applicable):

SI No	Criteria for evaluation of Report
1	Originality
2	Adequacy and purposeful write-up
3	Organization, format, drawings, sketches, style, language
4	Practical applications and relationships with basic theory
5	Concepts taught in the course outcome
6	Practical applications, relationships with basic theory and concepts taught in the course
7	Attendance record, daily diary, quality of the Report
8	Ability to solve real-life industry oriented problems