Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar (Autonomous)

(Affiliated to Savitribai Phule Pune University, Pune)

Choice Based Credit System (CBCS)

Bachelor of Vocation in Printing Technology

Syllabus of

T. Y. B. VOC Printing Technology

Implemented from

Academic Year 2023 – 24

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar (Autonomous)

Board of Studies in Printing Technology

Sr. No.	Name	Designation
1.	Prof. Priyamvada Patil	Chairman
2.	Hon. Prof. A. D. Gangarde	Member
3.	Hon. Prof. Abhijit Jadhav	Member
4.	Hon. Dr. Kamal Chopra	Academic Council Nominee
5.	Hon. Prof. Parag Hase	Academic Council Nominee
6.	Hon. Prof. Madhura Mahajan	Vice-Chancellor Nominee
7.	Hon. Mr. Vineet V. Chhajed	Alumni
8.	Hon. Mr. Narendra Firodia	Industry Expert
9.	Prof. A.P. Gadhave	Member (co-opt)
10.	Prof. N.D. Kulkarni	Member (co-opt)
11.	Prof. S. V. Pekhale	Invitee
12.	Prof. V. R. Ekshinge	Invitee

Programme Structure and Course Titles: (All academic years)

Sr. No.	Class	Semester	Course Code	Course Title	Credits
1.	FYBVOC PT	I	BVOC-PT 101 T	Elements of Printing Technology	04
2.	FYBVOC PT	I	BVOC-PT 102 T	Fundamentals of ICT	03
3.	FYBVOC PT	I	BVOC-PT 103 T	Graphic Design – I	03
4.	FYBVOC PT	I	BVOC-PT 104 P	LAB –I Screen Printing Techniques	04
5.	FYBVOC PT	I	BVOC-PT 105 P	LAB –II Fundamentals of ICT	04
6.	FYBVOC PT	I	BVOC-PT 106 P	LAB –III Graphic Design - I	04
7.	FYBVOC PT	I	BVOC-PT 107 P	LAB –IV Communication Skills	02
8.	FYBVOC PT	I	BVOC-PT 108 P	Field Work	02
9.	FYBVOC PT	II	BVOC-PT 201 T	Advanced Printing Technologies	03
10.	FYBVOC PT	II	BVOC-PT 202 T	Web Designing	03
11.	FYBVOC PT	II	BVOC-PT 203 T	Graphic Design & Advertisement	04
12.	FYBVOC PT	II	BVOC-PT 204 P	LAB –I Offset Machines	04
13.	FYBVOC PT	II	BVOC-PT 205 P	LAB –II Web Designing	04
14.	FYBVOC PT	II	BVOC-PT 206 P	LAB –III Graphic Design- II	04
15.	FYBVOC PT	II	BVOC-PT 207 P	LAB –IV Personality Development	02
16.	FYBVOC PT	II	BVOC-PT 208 P	Field Work	02
17.	SYBVOC PT	III	BVOC-PT 301 T	Image Carrier Generation	04
18.	SYBVOC PT	III	BVOC-PT 302 T	Web Offset Printing Process	04
19.	SYBVOC PT	III	BVOC-PT 303 T	Ink Technology	04
20.	SYBVOC PT	III	BVOC-PT 304 P	LAB – I Graphic Design - III	03
21.	SYBVOC PT	III	BVOC-PT 305 P	LAB –II Sheet- Fed Offset Printing	03
22.	SYBVOC PT	III	BVOC-PT 306 P	LAB –III Ink Mixing & Shade Matching	03

23.	SYBVOC PT	III	BVOC-PT 307 P	LAB –IV Cost Estimation	03
24.	SYBVOC PT	III	BVOC-PT 308 P	Field Work	05
25.	SYBVOC PT	III	BVOC-PT 309 T	AECC -02- Technical English - I (MIL)	2
26.	SYBVOC PT	III	BVOC-PT 310 T	AECC-I Critical Thinking / Scientific Temper	2
27.	SYBVOC PT	IV	BVOC-PT 401 T	Print Finishing Techniques	04
28.	SYBVOC PT	IV	BVOC-PT 402 T	Basic Packaging Technology	04
29.	SYBVOC PT	IV	BVOC-PT 403 T	Gravure, Flexography & Digital Printing	04
30.	SYBVOC PT	IV	BVOC-PT 404 P	LAB –I Print Finishing Techniques	03
31.	SYBVOC PT	IV	BVOC-PT 405 P	LAB –II Graphic Design – IV	03
32.	SYBVOC PT	IV	BVOC-PT 406 P	LAB –III Advanced Screen Printing	03
33.	SYBVOC PT	IV	BVOC-PT 407 P	LAB –IV Seminar and Technical Communication	03
34.	SYBVOC PT	IV	BVOC-PT 408 P	Field Work	05
35.	SYBVOC PT	IV	BVOC-PT 409 T	AECC -02- Technical English – II (MIL)	2
36.	SYBVOC PT	IV	BVOC-PT 410 T	AECC- I Environmental Awareness	2
37.	TYBVOC PT	V	BVOC-PT 501 T	Package Designing and Development	03
38.	TYBVOC PT	V	BVOC-PT 502 T	Security Printing, Copyrights & Ethics	03
39.	TYBVOC PT	V	BVOC-PT 503 T	Color Science and Measurement	03
40.	TYBVOC PT	V	BVOC-PT 504 T	Material Science	03
41.	TYBVOC PT	V	BVOC-PT 505 P	LAB -I Package Design & Development	03

42.	TYBVOC PT	V	BVOC-PT 506 P	LAB –II Paper & Ink Testing	03
43.	TYBVOC PT	V	BVOC-PT 507 P	LAB -III Troubleshooting & Machine Maintenance	03
44.	TYBVOC PT	V	BVOC-PT 508 P	LAB- IV Project Stage –I	04
45.	TYBVOC PT	V	BVOC-PT 509 P	Field Work	04
46.	TYBVOC PT	VI	BVOC-PT 601 P	Industrial Internship/ Industrial Training	15
47.	TYBVOC PT	VI	BVOC-PT 602 P	Project Stage – II	10

1. Introduction of the programme

The B. Voc. program is of three-year duration. It has a specific feature of multi point entry and multi point exit provision. Hence a student, who completes one year, shall be awarded Certificate in Diploma subject to the condition of earning the required credit points. Similarly, after completing the second year, Advance Diploma shall be awarded. On successful completion of third year, candidate shall be awarded the degree of Bachelor in Vocational (Printing Technology). If any student desire to take admission to other university at any other stage i.e., on completing first year, he/she may be permitted to take admission to second year in same branch. Similarly, on completing the second year, one can be admitted to the third year of the program.

2. Programme outcomes

In first year students shall be equipped with the subject knowledge and required skills and training on pre-press technology, offset printing process, printing material science, packaging technology.

In second year students shall learn the subjects of digital pre-press technology, Gravure printing process, Packaging technology, software's in printing with the required practical's in these areas.

In third year, students shall learn the subjects of printing, finishing technology, flexographic printing process, digital and security printing, mechanical maintenance, cost estimation, entrepreneurship with the required practical knowledge in these areas. The practical exposure and training will be provided through a compulsory industrial training, project work, case studies etc.

3. Eligibility:

1. The eligibility condition for admission to B. Voc. Program shall be **10+2** or **MCVC** (any subject) or equivalent in any stream from **any recognized board or university**

2. 10+2 ITI course in any branch or **10+ 2 duration diploma** in any discipline of agricultural/ non-agricultural/ technical or any governmental/ autonomous educational university/ Board.

3. Students who have completed **3 Years of Diploma in Printing Technology** from a recognized board or university are eligible for admission to **Direct 2nd Year in B. Voc. Printing Technology.**

4. Any students who have completed SSC or equivalent examinations and having minimum five years' experience in public or private printing press is eligible to take admission for B. Voc. Printing Technology. However, for this criteria college will conduct written qualifying test of basic skill prerequisites and accordingly candidate is admitted for first year B. Voc. Printing Technology.

5. Admissions are given as per the merit acquired in qualifying examination.

F.Y. B. VOC. PT

Semester-I

Course Type	Course Code	Course Title	Credits
T 01	BVOC-PT 101 T	Elements of Printing Technology	04
T 02	BVOC-PT 102 T	Fundamentals of ICT	03
T 03	BVOC-PT 103 T	Graphic Design – I	03
P 04	BVOC-PT 104 P	LAB –I Screen Printing Techniques	04
P 05	BVOC-PT 105 P	LAB –II Fundamentals of ICT	04
P 06	BVOC-PT 106 P	LAB –III Graphic Design - I	04
P 07	BVOC-PT 107 P	LAB –IV Communication Skills	02
P 08	BVOC-PT 108 P	Field Work	02

F.Y. B. VOC. PT

Semester – II

Course Type	Course Code	Course Title	Credits
T 01	BVOC-PT 201 T	Advanced Printing Technologies	03
T 02	BVOC-PT 202 T	Web Designing	03
T 03	BVOC-PT 203 T	Graphic Design & Advertisement	04
P 04	BVOC-PT 204 P	LAB –I Offset Machines	04
P 05	BVOC-PT 205 P	LAB –II Web Designing	04
P 06	BVOC-PT 206 P	LAB –III Graphic Design- II	04
P 07	BVOC-PT 207 P	LAB –IV Personality Development	02
P 08	BVOC-PT 208 P	Field Work	02

FY B.VOC PRINTING TECHNOLOGY

SEMESTER – I

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Semester – I	**PAPER – I**
Course Code: BVOC PT 101 T	**Title of the Course: ELEMENTS OF PRINTING TECHNOLOGY**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a) To learn and understand the basic concepts of the printing technology.
b) Understand various basic printing principles with their applications.
c) Understand basics of paper and ink technology.

Detailed Syllabus:

Unit 1	**Introduction of Basic Elements**	**12 Hrs.**
Printing History, Need of Printing, Types of printing process, Scope of printing technology etc. ink history, types of inks , importance of ink in printing industry etc. paper history, its types importance.		
Unit 2	**Printing Principals**	**10 Hrs.**
Study of working principle, (relief, planography, and intaglio), offset, gravure, flexography, screen printing, digital and letterpress printing etc. Construction Image carriers, advantages and disadvantages and Limitations.		
Unit 3	**Offset & Screen Printing**	**14 Hrs.**
Offset: Introduction, Sheet fed machine units- feeding, inking, damping, printing and delivery unit. Definition of Web machine, Difference between sheet-fed and web-fed. Configuration- Blanket to Blanket, Common Impression Cylinder, Stack, Inline Applications and Limitations of offset process. **Screen Printing:** Introduction, cloth, clamp, screen stretching, squeegee, off contact. Stencil- Direct, indirect Screen printing- Manual operation. Applications and limitations.		
Unit 4	**Paper & Printing substrate**	**12 Hrs.**

Page layout and margin, print area and type-setting, different publications. Paper; its different types and sizes available, gsm, suitability factors for printing process, ISO paper sizes. Imposition; definition, classification and general rules, regular schemes up to 16 page.		
Unit 5	**Basic of Ink technology**	**12 Hrs.**
Introduction, definition, types of ink, contains of ink, basic color theory, types of ink,(solvent base, water base), different types of ink, characteristic properties.		

Reference and Text Books:

Sr. No	Title	Author	Publisher
1	Printing Technology	Adams, Faux and Rieber	Delmar publishers
2	Art and Production	N. N. Sarkar	Sagar publishers
3	Screen Printing B. D. Mendiratta	B. D. Mendiratta	

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Semester – I	**PAPER – II**
Course Code: BVOC PT 102 T	**Title of the Course: FUNDAMENTALS OF ICT (Information and Communication Technology)**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

a) To learn and understand the basic concepts of the Computer Systems and its concepts.
b) Understand various Operating systems used on computers.
c) Understand various word processors and communication systems.

Unit 1	**Computer Basics**	**10 Hrs.**
Computer: Definition, Characteristics of Computers, Basic Applications of Computer, Generations of computers. Components of Computer System: Central Processing Unit (CPU), input/output Devices, computer Memory: primary and secondary memory, magnetic and optical storage devices, Concepts of Hardware and Software. Data processing: concepts of data processing, Definition of Information and data, Basic data types, Storage of data/Information as files, Representation of data/Information. Number Systems, Decimal, Binary, Octal, Hexadecimal, Arithmetic's and inter conversions		
Unit 2	**Peripherals of Computer**	**09 Hrs.**
Primary storage devices – RAM, ROM, PROM, EPROM Secondary Storage Devices – HDD, CD, DVD, Pen drive I/O Devices- Keyboards, Scanners, Digitizers, Plotters, LCD, Plasma Display, Pointing Devices –Mouse, Joystick, Touch Screens Introduction to Network devices – Hubs, Switches, Routers, NAS, MODEM, Access		
Unit 3	**Operating System and Application Software**	**10 Hrs.**
Definition of Software, Types of software: System Software, Application Software. System Software: Operating System. Types of O.S., Basic Commands in DOS, Introduction to		

GUI: Desktop Icons, File and Directory structure, Menu Items, Control Panel, File and Directory Search Utility programs: Anti-plagiarism software, Anti-virus, Disk Cleaning, Defragmentation, Compression/Decompression of files. Application software: Examples of commercial software with brief introduction Unit IV Editors, Word Processors, Spreadsheets & Presentation Tools		
Unit 4	**Editors, Word Processors, Spreadsheets & Presentation Tools**	**08 Hrs.**
Editors and Word Processors: Features and functionalities, examples of basic and advanced editors like notepad, vi and Emacs, Introduction to desktop publishing – Features and functionalities Spreadsheets: Features and functionalities, Spreadsheet Applications Introduction to Google Apps: Google Docs, Sheets and Forms and its applications Presentation Tools: Design Slides (using Text, images, charts, clipart), Slide Animation, Template and theme creation		
Unit 5	**Computer communication and Networking**	**08 Hrs.**
Basic of Computer networks: LAN, WAN, MAN. Introduction to Network devices – Hubs, Switches, Routers, NAS, MODEM, Access points. Internet: Introduction to internet and its application/services. Service on Internet: WWW and web-sites, Electronic mails, Communication on Internet. Web Browsers: Internet Explorer, Netscape Communicator. Surfing the Internet: Giving the URL address, Search, Moving Around in a web-site, Printing or saving portion of web pages, down loading Chatting on Internet		

Reference and Text Books:

Sr. No	Title	Author	Publisher
1	Computer Fundamentals	P.K. Sinha & Priti Sinha,	3rd edition, BPB pub
2	Computer Fundamentals	Anita Goel	Pearson Education India
3	PC/HARDWARE	Join Josh	O'Reilly Publication

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Semester – I	**PAPER – III**
Course Code: BVOC PT 103 T	**Title of the Course: GRAPHIC DESIGN – I**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

a) To learn and understand the basic concepts of the graphic design system.
b) Understand various concepts color theory and file formats of different graphics software's along with color management systems.
c) Understand various design processes and medias used for advertising.

Unit 1	**Basics of Design**	**12 Hrs.**

1.1 Introduction to graphic design, fundamental of design, principle of design, Types of design – natural, conventional, decorative, geometric, and abstract, Basic concepts of designing, Creativity, steps in creativity;

1.2 Typography; Visual ingredients of graphic design; Design consideration; Symbols and logos, proof-reading, proof-reading marks, house- style, fonts, etc.

1.3 Layout – purpose & advantages; layout styles; layout components; stages in preparing a layout; marking-up; Dummy, Stages of layout, thumbnails, rough layout, comprehensive layout, artwork, Design for magazines, newspaper, catalogues, cartons, commercial stationary, flexible pouche

Unit 2	**Graphics and Color**	**12 Hrs.**

2.1 Concept of Raster Graphics, Concept of vector graphics, file formats compatible with different with graphic design softwares – PNG, JPEG, GIF, TIFF, CDR, AI, PDF.

2.2 Color Definition of color, Light, Electromagnetic spectrum, Additive color theory, subtractive color theory, Colour originals for reproduction. reproduction objectives, resolution, bit depth, grey levels, relationship between grey levels and resolution, dimensions of color, color schemes, color symbolism

Unit 3	**Design Process**	**12 Hrs.**

3.1 Methods of preparing design in various stages. Design for books, magazines, Newspapers, Catalogues, cartoons and commercial stationary. 3.2 Materials and tools used in preparing layouts and artwork. Copy preparation. Casting off and marking up.		
Unit 4	**Color Management**	**12 Hrs.**
4.1 Definition of color management, color profile, color depth, color mode, color models – RGB, CMYK, Grayscale, LAB, Duotone, etc., Color management and standardization, Color matching systems- PANTONE, FOCALTONE, Spot color, etc. 4.2 Digital proofing systems – color proofing process, quality control process and its limitations.		
Unit 5	**Softwares and Media**	**10 Hrs.**
5.1 Features of different softwares used in graphic design- Adobe Photoshop, Quark Express, Corel Draw, Adobe Illustrator, Adobe InDesign, etc. and plugins used for these softwares. 5.2 Designing for Print Media- indoor and outdoor media, electronic media- TV, Youtube or Social Media.,		

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Semester – I	**PAPER – IV**
Course Code: BVOC PT 104 P	**Title of the Course: SCREEN PRINTING TECHNIQUES**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Contents

Exercise
1. Study of screen-printing equipment and materials. 2. Screen Frame Making 3. Determining optimum exposure for various stencil methods. 4. Screen preparation and printing by direct method. 5. Screen preparation and printing by indirect method. 6. Manual Registration Method 7. To print single color image by screen printing on paper 8. To print two color images by screen printing on paper 9. Product printing: Visiting card, Letterhead, Office File, Pen, Envelope Textile - T-Shirt, Nonwoven. 10. Factors related to Screen Printing Problems and solutions

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Semester – I	**PAPER – V**
Course Code: BVOC PT 105 P	**Title of the Course: FUNDAMENTAL OF ICT (INFORMATION AND COMMUNICATION TECHNOLOGY)**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Contents

Practical Exercise

1. Create a new folder and do the following:
    1. Make a word document in it.
    2. Make an Excel document in it.
    3. Make a new folder in it
    4. Rename the initial folder
    5. Move the initial folder
    6. Copy the initial folder.
    7. Delete the initial folder
2. Implement the various well known features of Windows operating system such as Notepad, WordPad, Paint, System tools, Entertainment etc. enclosed in Start→Programs→Accessories.
3. Implement various display properties by right clicking on the Windows Desktop.
4. Explore the taskbar of Windows, Set the wall paper and screen saver, Set the data/time.

MS Word

5. Create a document and
    a. Put Bullets and Numbers
    b. Apply various Font parameters.
    c. Apply Left, Right, and Centre alignments.
    d. Apply hyperlinks

e. Insert pictures
f. Insert ClipArt
g. Show the use of WordArt
h. Add Borders and Shading
i. Show the use of Find and Replace.
j. Apply header/footers

6. Create any document and show the difference between paste and paste special.
7. Create a document to show the use of Watermark.
8. Implement the concept of mail merge.
9. Implement the concept of macros.
10. Implement the concept of merging the documents.
11. Crate a student table and do the following:
    a) Insert new row and fill data
    b) Delete any existing row
    c) Resize rows and columns
    d) Apply border and shading
    e) Apply merging/splitting of cells
12. Create your resume using General Templates.

MS PowerPoint Presentation

13. Make a presentation of College Education System using
    1. Blank Presentation
    2. From Design Template
    3. From Auto Content Wizard
14. Make a presentation on "Wild Life" and apply the following:
    1. Add audio and video effects
    2. Apply various Color Schemes
    3. Apply various animation schemes.
    4. Apply Slide Show

MS Excel Spreadsheets

15. Compute the division of each and every student of a class.
16. Generation of Electricity Bill
17. Generation of Telephone Bill
18. Generation of Salary statement of an employee

19. Generation of Mark Sheet of a student.
20. To compute mean/median/mode.

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Semester – I	**PAPER – VI**
Course Code: BVOC PT 106 P	**Title of the Course: GRAPHIC DESIGN – I**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Contents

Exercise
1. Introduction of **Adobe Photoshop** photo editing software , workspace tour, Toolbar, Menu-bar 2. Basics of image and color, Resizing of image, crop, import, color palettes, color models, color and image mode. 3. Working with layers, create, manage, group, lock layers, layer opacity, blending, layer masks, smart filters, smart objects, vector mask 4. Working with selections, make selections with different tools, pixel selections. 5. Background changing, change background with solid color, image adjustments, tonal adjustments. 6. Image transformation, Selective color change, scaling, transform, content-aware, wrap, rotate, Free transform, crop 7. Image adjustments, Perspective wrap, image sharpness & blur, color adjustments, brightness/ contrast, level, hue, saturation, black and white to color and color to black and white 8. Filters, Blur, Clipping mask 9. Image repair, content aware, Move, Image retouch, correct image distortion & Noise. 10. Drawing shapes, Gradient, Brush presets. 11. Text 12. Face/ Image retouch 13. Banner, Poster, Hoarding design,

14. Product design
15. Certificate design
16. Passport size photograph design
17. Theme/ Background Design
18. Design an Advertisement
19. Invitation cards, Cards, etc
20. Logo Design

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Semester – I	**PAPER – VII**
Course Code: BVOC PT 107 P	**Title of the Course: COMMUNICATION SKILLS**
Credits: 02	**Total Lectures: 60 Hrs.**

Course Contents

Exercise
1. Communication: Meaning of communication: definition, objectives and Importance of communication Elements/Process of communication Types of communication: Formal, Informal, Verbal, Nonverbal, vertical, Horizontal, Diagonal Barriers of Communication: Physical, Mechanical, Psychological, Language Principles of effective communication **2. Formal Written Communication** Develop notices, circulars and emails: I. Office Drafting: Notice, Memo, Circulars and e-mails II. Job application and resume Draft letters on given topics Business correspondence: Enquiry, Reply to an enquiry order, complaint, adjustment Analytical writing: Language of specification writing, Technical writing, Report generation including graphs, pie charts, bar charts, comparatives, etc. **3. Speaking Skills Develop formal conversational techniques:** Conversations : Meeting & Parting, Introducing and influencing requests, Agreeing & disagreeing, Formal enquiries, Types of speech- Welcome Speech, Farewell speech, Vote of thanks **4. Telephone Skills Basics of Telephone communication** How to handle calls- telephone manners Leaving a message Greeting and Leave Taking over phone(etiquette)

5. Verbal/ Non Verbal Communication

Group Discussion, Oral Presentation with/without audio visual aids, Listening to any recorded or live material and asking oral questions for listening comprehension, Making conversation and taking turns , Oral description or explanation of a common object, situation or concept, Giving interviews

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Semester – I	**PAPER – VIII**
Course Code: BVOC PT 108 P	**Title of the Course: FILED WORK**
Credits: 02	**Total Lectures: 60 Hrs.**

	Exercise	

- Students should visit and work full 10 days, 5 hours each day on field suggested or appointed by college authority.
- Students should complete given task by company/ printing press/establishment.
- At last students have to produce field work report including attendance report signed by concerned authority.
- Students must complete 50 hours at the appointed organization.

FY B.VOC PRINTING TECHNOLOGY

SEMESTER – II

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Semester – II	**PAPER – I**
Course Code: BVOC PT 201 T	**Title of the Course: ADVANCED PRINTING TECHNOLOGIES**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

a) To learn and understand the basic concepts of the printing technology.
b) Understand various basic printing principles with their applications.
c) Understand basics of paper and ink technology.

Detailed Syllabus :

Unit 1	**Conventional and Digital Printing**	**10 Hrs.**
Conventional: Definition, Impact- non impact printing process, Examples, contact printing and non-contact printing, advantages & disadvantages, limitations Digital Printing: Introduction, definitions, Types (Electrophotography, Magnetography, Inography, Xerography), types of printers, , advantages & disadvantages, limitations		
Unit 2	**Rotogravure**	**09 Hrs.**
Principles, quality factor of printing cylinder, ink transfer, features of rotogravure, factors affecting in ink transfer, concept of ESA, requirements of paper properties, heat-set web offset vs rotogravure		
Unit 3	**3D Printing and Holographic Printing**	**10 Hrs.**
Concept of hologram, reconstruction of hologram, types of hologram, considerations of hologram, applications of holographic printing, Concept of 3D printing, types of 3D printing, components of 3D printing, Applications of 3D Printing and Future		
Unit 4	**Paper Technology**	**08 Hrs.**
Basics of paper technology, pulping process, types of pulp, fourdriner machines, paper manufacturing process, paper finishing operations, paper properties and testing properties, application areas for different types of paper.		

Unit 5	Applications of Print Industry	08 Hrs.
Print publications, advertising, branding, food & beverage packaging, Label printing, sticker printing, pharmaceutical packaging, future of printing industry		

Reference and Text Books:

Sr. No	Title	Author	Publisher
1	Rotogravure printing	BDJA60A1300	UPM
2	3D printing	Richard Home	Kalyanikirkhausam

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Semester – II	**PAPER – II**
Course Code: BVOC PT 202 T	**Title of the Course: WEB DESIGNING**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

a) To learn and understand the basic concepts of the fundamentals of the web applications.
b) Understand various languages to write the codes for the web pages.

Detailed Syllabus:

Unit 1	**Web Fundamentals**	**10 Hrs.**
Introduction to WWW: Protocols and programs, secure connections, application and development tools, the web browser, what is server, Client Server Architecture, dynamic and Static Web Design: Web site design principles, planning the site and navigation.		
Unit 2	**HTML**	**09 Hrs.**
Introduction to HTML, What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags Heading-Paragraphs, Line Breaks, HTML Tags. Elements of HTML,, Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.		
Unit 3	**CSS**	**10 Hrs.**
Style sheets : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2		

Unit 4	Javascript	08 Hrs.
Javascript: Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, Operators, functions, conditions, loops and repetition		
Unit 5	**XML and Advanced tools**	**08 Hrs.**
XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application, Advances in Web Design, Hosting Website, Introduction to Web Design Tools, Introduction to Google Site		

Reference or study material:

Sr. No	Title	Author	Publisher
1	HTML & CSS: design and build websites (Vol. 15)	Duckett, J	(2011). Indianapolis, IN: Wiley
2	Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics.	. Robbins, J. N.	2 (2012). " O'Reilly Media, Inc.".
3	https://www.w3schools.com		

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar (Autonomous)

Syllabus of F. Y. B.VOC Printing Technology
under
Faculty of Science

Semester – II	**PAPER – III**
Course Code: BVOC PT 203 T	**Title of the Course: GRAPHIC DESIGN AND ADVERTISEMENT**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a) To learn and understand the basic concepts of the graphic design.
b) Understand basic concepts of advertisement and market research.
c) Understand various medias and multi medias used for advertisement.
d) Understand the electronic publishing methods.

Detailed Syllabus:

Unit 1	Basics of Graphic Design	12 Hrs.
1.1 Concept of Raster Graphics, Concept of vector graphics, file formats compatible with different with graphic design software's – PNG, JPEG, GIF, TIFF, CDR, AI, PDF. 1.2 Introduction to graphic design, fundamental of design, principle of design, Types of design – natural, conventional, decorative, geometric, and abstract, Basic concepts of designing, Creativity, steps in creativity; 1.3 Layout – purpose & advantages; layout styles; layout components; stages in preparing a layout; marking-up; Dummy, Stages of layout, thumbnails, rough layout, comprehensive layout, artwork, Design for magazines, newspaper, catalogues, cartons, commercial stationary, flexible pouche		
Unit 2	**Introduction to Advertisement**	**14 Hrs.**
2.1 Introduction – Advertising as a tool of communication, Role of Advertising in marketing mix- personal selling, sales promotion, public relations & marketing. 2.2 Types of Advertising – Product Advertising- industrial and consumer products, Product Life Cycle, Service Advertising, Institutional Advertising, Public Relations advertising, Public Service advertising, financial advertising.		

Unit 3	Market Research and Segmentation	10 Hrs.

3.1 Research – Definition, Types/ Scope of research,

3.2 Market Research – market surveys, Audience surveys, marketing mix- 7p's of Marketing- product, price, place, promotion, packaging, people, processes.

3.3 Market segmentation - Branding- brand and brand equity – personality, positioning, Target market, market strategies – introductory, growth, maturity, decline, repositioning, diversification.

3.4 Advertising process- research, objective, strategies, communication, evaluation, ADGMAR approach, types of advertising evaluation.

Unit 4	Media & Multimedia	12 Hrs.

3.1 Types of Media- print media, electronic media, outdoor media, digital media, Broadcast media, direct mail- internet, New media- Social media (Facebook, Twitter, Youtube, Instagram, Linkedin, Google Plus, Pinterest) – Characteristics, benefits and drawbacks.

3.2 Multimedia: Origin, definition, elements, Hardware and software tools, file formats, image and graphics, video, audio & animation, resolution, file size ratio, Aspect ratio, etc.

Unit 5	Digital Advertising	12 Hrs.

4.1 Digital Advertising: - definition, scope, importance, measuring effectiveness of digital advertising

4.2 Tools used for digital advertising: E-mail ads, Banner ads, interstitial ads, pop-up ads, floating ads and paid search terms

Difference in between Digital and Social Advertising.

Unit 6	Electronic Publishing	12 rs.

6.1 Electronic Publishing: Introduction, definition, working of e- publishing, basic principles of e-publishing, e- book reader, steps involved in E- book creation, Marketing strategies.

6.2 Information regarding E-publications formats like e-pubs. Also E-pub readers like Adobe Digital

Editions, mobile readers etc in brief (since this is a worldwide used e-publishing solution used on a large scale), rules and regulations for e-publishing use of business models in the development and evaluation of an e-commerce application, Style-sheets, XSL, XSLT, CSS Layout and workflow for cross media devices, POD, Mobile, Tablets, CD, Websites, File extension and Compatibility.

Reference and Text Books:

Sr. No	Title	Author	Publisher
1	Foundations, Foundations of advertising theory & practice	Chunawalla, Sethia	Himalaya Publishing
2	Advertising Management	Batra, Myers, Aaker,	Prentice Hall
3	Handbook of Multimedia		

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Semester – II	**PAPER – IV**
Course Code: BVOC PT 204 P	**Title of the Course: OFFSET MACHINES**
Credits: 04	**Total Lectures: 60 Hrs.**

List of Exercise:

1) Introduction to offset machine.

2) Feeder setting for various stocks.

3) Mounting of plate with packing.

4) Mounting of blanket with packing.

5) Gripper setting of impression cylinder.

6) Setting of dampening roller.

7) Preparation of fountain solution.

8) Cleaning & washing of Dampening and Inking system.

9) Inking unit setting according to job.

10) Setting – joggers, skeleton wheels, delivery anti set-off spray.

11) Single Color printing.

12) Multicolor printing.

13) Troubleshooting

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Semester – II	**PAPER – V**
Course Code: BVOC PT 205 P	**Title of the Course: WEB DESIGNING**
Credits: 04	**Total Lectures: 60 Hrs.**

List of Exercise:

Practical Exercise
1. Introduction to HTML. Create a basic HTML file0 2. Create a static webpage using table tags of HTML 3. Create a static web page which defines all text formatting tags of HTML in tabular format 4. Create webpage using list tags of HTML 5. Create webpage to include image using HTML tag 6. Create your class timetable using table tag. 7. Create user Student feedback form (use textbox, text area , checkbox, radio button, select box etc.) 8. Create employee registration webpage using HTML form objectsWrite html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color. 9. Create your resume using HTML tags also experiment with colors, text , link , size and also other tags you studied. **CSS** Apply style sheet in Web page. [inline, embedded and linked] 2. Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS). 3. Use Inline CSS to format your resume that you created. 4. Use External CSS to format your class timetable as you created. 5. Use External, Internal, and Inline CSS to format college web page that you created.

JavaScript

Develop a JavaScript to display today's date.

2. Develop simple calculator for addition, subtraction, multiplication and divisionoperation using JavaScript

3. Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.

4. Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.

5. Create simple site by using any tool

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Semester – II	**PAPER – VI**
Course Code: BVOC PT 206 P	**Title of the Course: GRAPHIC DESIGN - II**
Credits: 04	**Total Lectures: 60 Hrs.**

List of Exercise:

Exercise
6. Software Introduction, workspace tour, Toolbar, Menu-bar, standard toolbox, property bar, status bar
2. Working with shapes, Lines and Outlines, symmetrical drawing, shape objects
3. Working with objects, select, transform, clone, copy, position, align and distribute objects, scale, rotate, group, combine and lock objects
4. layers, local & master layers, symbols, Generate & scan QR Code and BARCODE
5. Color fills, uniform, pattern, texture, transparencies, uniform, pattern, texture, object transparency,
6. Special Effects, lenses, 3D, Mosaics
7. Text and Font, Templates and styles
8. Tables and Bitmaps
9. Logo Design
10. Visiting Card design
11. Clip Arts Design
12. Banner, pamphlet, flyer, leaflet design
13. Poster, Magazine cover page
14. Product design
15. Package design
16. Branding
17. Vector Illustrations

18. Background design
19. Theme design
20. Character design
21. 3D design with Corel Draw
22. Design an advertisement all by own
23. Animation

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Semester – II	**PAPER – VII**
Course Code: BVOC PT 207 P	**Title of the Course: PERSONALITY DEVELOPMENT**
Credits: 02	**Total Lectures: 60 Hrs.**

Course Contents

Exercise
1. Definition and Basics of Personality 2. Business Etiquettes and Public Speaking 3. Making a presentation. 4. Coping management, working on Attitudes.

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Semester – II	**PAPER – VIII**
Course Code: BVOC PT 208 P	**Title of the Course: FILED WORK**
Credits: 02	**Total Lectures: 60 Hrs.**

Course Contents

Exercise
➢ Students should visit and work full 10 days, 5 hours each day on field suggested or appointed by college authority. ➢ Students should complete given task by company/ printing press/establishment. ➢ At last students have to produce field work report including attendance report signed by concerned authority. ➢ Students must complete 50 hours at the appointed organization.

SY B.VOC PRINTING TECHNOLOGY

SEMESTER – III

S.Y. B. VOC. PT

Semester -III

Course Type	Course Code	Course Title	Credits
T 01	BVOC-PT 301 T	Image Carrier Generation	04
T 02	BVOC-PT 302 T	Web Offset Printing Process	04
T 03	BVOC-PT 303 T	Ink Technology	04
P 04	BVOC-PT 304 P	LAB – I Graphic Design - III	03
P 05	BVOC-PT 305 P	LAB –II Sheet- Fed Offset Printing	03
P 06	BVOC-PT 306 P	LAB –III Ink Mixing & Shade Matching	03
P 07	BVOC-PT 307 P	LAB –IV Cost Estimation	03
P 08	BVOC-PT 308 P	Field Work	05
AECC -01	BVOC-PT 309 T	AECC-I Critical thinking and Scientific Temper	2
AECC -02	BVOC-PT 310 T	AECC -02-MIL	2

S.Y. B. VOC. PT

Semester -IV

Course Type	Course Code	Course Title	Credits
T 01	BVOC-PT 401 T	Print Finishing Techniques	04
T 02	BVOC-PT 402 T	Basic Packaging Technology	04
T 03	BVOC-PT 403 T	Gravure, Flexography & Digital Printing	04
P 04	BVOC-PT 404 P	LAB –I Print Finishing Techniques	03
P 05	BVOC-PT 405 P	LAB –II Graphic Design – IV	03
P 06	BVOC-PT 406 P	LAB –III Advanced Screen Printing	03
P 07	BVOC-PT 407 P	LAB –IV Environmental Science	03
P 08	BVOC-PT 408 P	Field Work	05
AECC -01	BVOC-PT 409 T	AECC-I Critical thinking and Scientific Temper	2
AECC -02	BVOC-PT 410 T	AECC -02-MIL	2

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Semester – III	**PAPER – I**
Course Code: BVOC PT 301 T	**Title of the Course: IMAGE CARRIER GENERATION**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a) To learn and understand the imposition concept.
b) Understand various plate imaging technologies and distinguish the plate types
c) Understand various quality control parameters and their significance in platemaking.

Detailed Syllabus:

Unit 1	Imposition	12 Hrs.

1.1 Introduction to imposition concept, terminologies about imposition, page layout and different types of margins

1.2 Imposition Schemes: half sheet work, sheet-wise, work and tumble, work and turn, perfecting imposition

1.3 Folding techniques, different types of folds: half, double, parallel, gate, etc., Folders & types of folders, buckle folder, knife folder, combination folder.

Unit 2	Halftone Reproduction	12 Hrs.

2.1 concept of Original, types of originals: line, continuous tone and halftone original, color original

2.2 Contact Screen, Screen Frequency, Screen Angle, Moire pattern, dot shapes

2.3 Screening Methods: Amplitude Modulation Screening, Frequency Modulation Screening Methods advantages and disadvantages.

2.4 Electronic Dot Generation-

Unit 3	Image Carrier Generation for different printing processes	14 Hrs.

3.1 Offset Platemaking process: CTP components, Introduction to concept of CTP technique

3.1.1 Types of image setter principles: External drum image setter, Internal drum image setter, Flatbed image setter, Direct to plate imaging technique, Violet CTP technique, Thermal CTP technique

3.1.2 Types of plates: Pre-sensitized plates, deep etch, Wipe on plates, Bimetal and Tri-metal plates, waterless plates.

3.2 Gravure image carrier Generation Process (cylinder preparation technique):

3.2.1 Gravure image carrier introduction, cylinder bases sleeve, cylinder shaft cylinder, base materials; copper, chrome, Principle of electroplating and its variables

3.2.2 Cylinder preparation methods: Ballard Shell Method, Etching & engraving (electromechanical engraving), LASER engraving, Cylinder corrections- plus and minus corrections

3.3 Flexo plate making Process

3.3.1 Flexo plate construction, plate requirements

3.3.2 Rubber plate making process

3.3.3 Photopolymer plate making process: sheet photopolymer and liquid photopolymer process, Direct imaged plates: Direct to laser engraving, Direct to plate imaging

3.3.4 Negative requirement for flexographic plate making

3.3.5 quality control aids for flexographic platemaking

3.4 Screen Printing Screen making process

3.4.1 Process overview

3.4.2 Direct screen making process, indirect screen making process

3.4.3 Process variables

Unit 4	**Quality Control**	**12 Hrs.**

4.1 Quality control aids: Star target, slur target, step wedge, printer's marks, UGRA/ FOGRA plate control wedge, dot gain measures, pH scale, Continuous tone Step wedge, dot gain scale, etc.

4.2 Inspection and basic checks of paper, ink, fountain and washes required for production, Environmental problems due to waste generated from press room, storage & disposal of ink, Disposal of founts and washes, use of color control strip for achieving target solid ink densities, tone value increase, trapping and conformance to various standards such as GRACoL, SWOP, FOGRA and ISO. Study of various test chart elements. Use of color characterization data charts.

4.3 Quality control at screen coating, screen exposing, screen developing, Quality control aids for screen printing operation, QC at screen decorative applications, Environmental and special working

consideration for screen process, Waste disposal.		
Unit 5	**Basics of color**	**10 Hrs.**
Quality Management – Quality challenges, Fundamental concepts of Quality, Quality Cost, Specification of Quality, Quality Assurance, Concepts of Six Sigma & its implementation in Printing Industry		

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	Helmutt Kipphan, (2000)	Handbook of Print Media	Springer, Heidelberg
2	Daniel G. Wilson	Sheet Fed- Press Operating	(2003), 5th Edition, GATF press USA
3	C.S. Mishra	Technology of Offset Printing	1st printing, Anupam Prakasham, India
4	James Crouch	Flexography Primer	GATF 4
5	GATF, USA	Gravure Primer	GATF 5
6	GATF, USA	Gravure Process & Technology	GAA 6
7	Flexographic Technical Association	Flexography: Process and Technology	FTA

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Semester – III	**PAPER – II**
Course Code: BVOC PT 302 T	**Title of the Course: WEB OFFSET PRINTING**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):
a) Understand the working of Web offset machines and structures of machines.
b) Understand the system of inking and dampening used on various types of web offset machines.
c) Understand web handling, register control systems and web guiding systems.
d) Understand working of dryers, chill rollers and folders on web machines.

Detailed Syllabus:

Unit 1	**Introduction to Web Offset Machines**	**12 Hrs.**
1.1 Introduction to offset printing used for commercial and packaging printing, Web fed process flow diagram, Construction & Design – Common impression cylinder (Satellite), Blanket to blanket, Inline, I, Y, H, N configurations, paper path and color combinations, 5 and 7 o'clock geometry, Packing requirements for plate and blanket cylinders, 1.2 Comparison with sheet-fed machines based on feeding, dampening, Inking, Printing, Delivery, wastage percentage.		
Unit 2	**Inking and Dampening Systems**	**12 Hrs.**
2.1 Reel stands- Single, Multiple, revolving; locations such as inline, perpendicular, basement, Automatic Splicers- Need, types, comparison a. Zero speed- festoons b. Flying splicer (match speed) 2.2 Web tension - Dancer roller & its types, factors influencing web tension, web tension zones such as unwind zone, intermediate tension zone, rewind tension zone. 2.3 Infeed metering rollers; tension spans, draw, slip, tension control principles Surface speed - unwind and rewind Angle bar, Turner bar 2.4 study of different inking systems used on web presses, principle of ink transfer and ink splitting mechanism, different ink metering systems, temperature control for inking unit.		

2.5 Construction of dampening system used on web offset presses, roller material, fountain solution and its characteristics, role of each ingredient from the fountain solution.		
Unit 3	**Web Handling, Web Guiding and Register Control**	**14 Hrs.**
3.1 Web handling and need of web handling, web tension control, load cells, factors affecting tension, 3.2 Register control; lateral and circumferential register control by web movement and cylinder movement, use of compensator roller for circumferential register, register marks and its specification, auto registration control used on web presses, closed loop systems for register control, 3.3 Web guiding: web guiding systems and correction mechanisms, imbalance; static and dynamic balancing, Web guide rollers.		
Unit 4	**Dryers, Chill Rollers and Folders**	**12 Hrs.**
4.1Need of dryer & chill rollers, temperature settings of dryers and chill rollers as per ink coverage and substrate used, Types of dryers; Open flame, High velocity hot air, radiation-UV, EB, IR curing, combination, Chill Rollers operations and types- Baffle plates, Jacketed (Embedded); Silicone application 4.2 Folders and types of folders: Former & its types, Jaw, Chopper, Combination; cut-off and different products, collect cylinders, conveyor mechanisms, and folding techniques, Folders for commercial publication, newspaper industry, continuous stationery.		
Unit 5	**Web Viewing and Auxiliary Equipments**	**10 Hrs.**
5.1 Auxiliary equipment used on web offset presses: remoisturizes unit, antistatic devices, temperature control, Stackers, Bundlers, Sheeters, Perforators and Imprinters. oscillators 5.2 Web Viewing: purpose and working of Stroboscope, Video inspection system, oscillating mirrors		

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name

1	E. J. Kelly	Web Offset- Press Operating	GATF, USA
2	W. R. Durrant	Web Control	Focal Press, London
3	Daniel G. Wilson	Web Offset- Press Operating	(2003), 5th Edition, GATF press USA
4	C.S. Mishra	Technology of Offset Printing	1st printing, Anupam Prakasham, India

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Semester – III	**PAPER – III**
Course Code: BVOC PT 303 T	**Title of the Course: INK TECHNOLOGY**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a) To evaluate effect of pigments properties, additives, and resin on printability
b) To differentiate printing inks based on printing process and their end use application.
c) To analyze parameters affecting ink Rheology and effect of ink rheology on printability.
d) To Understand ink drying mechanism and different methods of ink drying
e) To prepare formulation of inks for various application.

Detailed Syllabus:

Unit 1	**Introduction to Ink Technology**	**12 rs.**

1.1 Different types of printing processes,

1.2 Types of inks used for printing processes: Liquid inks and paste inks

1.3 Raw materials used in an ink:

1.1.1 Pigment: pigment function, types: organic, inorganic, white, black, extenders, pigment properties

1.1.2 Vehicles - Function &Types - Drying vehicles, Non-Drying vehicles

1.1.3 Resins -Natural resins, Synthetic Resins

1.1.4 Solvents - Hydrocarbons, Aliphatic, Alcohols, Wash up solvents

1.1.5 Additives - Plasticizers, Waxes, wetting agents, Anti set off compounds, Shortening compounds, Reducers, Stiffening agents, Driers - Liquid driers, Paste driers, Inhibitors, Accelerators.

Unit 2	**Inks for Different Printing Processes**	**12 Hrs.**

2.1 Classification of inks based on printing processes:

2.1.2 Offset inks - General formulation, properties

2.1.3 Gravure inks - General formulation, properties

2.1.4 Flexographic inks - General formulation, properties

2.1.5 Screen Inks - General formulation, properties

2.1.6 Specialty inks - Toners, Ink jet inks, magnetic inks, OCR inks, Scratch off inks, water washable inks, Water sensitive inks, Invisible inks, Thermo - chromic ink, fluorescent inks, metallic inks.

Unit 3	Manufacturing and Drying Methods in Ink Manufacturing	14 Hrs.

3.1 Liquid Ink Manufacture –Mixing & milling - ball mill,

3.2 Paste Ink Manufacture –Mixing & milling - three roll mills, bead mill, attritor mill and grinding media types and its function.

3.3 Preparation of varnishes, Ink Pigment Dispersion Process: Wetting of the Pigment Particles, Breakdown of the Pigment Particles, Stabilization of the Dispersion; The influence of various process parameters on the pigment dispersion.

3.4 Ink drying methods: Absorption, oxidation & polymerization, evaporation, precipitation, heat set, cold set, radiation drying or curing i.e. ultra violet curable, electron beam curable, Infrared curable, Radio frequency drying and radiation curable equipment.

3.5 End use properties - Rub and scuff resistance, Adhesion flexibility block resistance, Skid & product resistance, Light fastness, heat seal resistance, lamination tests; Optical properties- Opacity, Gloss.

Unit 4	Rheology of Printing Ink	12 Hrs.

4.1 Introduction to Rheology, Shear Flow, Shear Rate, Shear Stress, Newtonian fluids, non-Newtonian fluids , Shear Thinning Liquids, Shear Thickening Liquids, Thixotropy of Ink, Visco-Elasticity, loss modulus and elastic moulus.

4.2 Factors that have effect on Rheological Behavior of Printing Ink, Influence of Ink Rheology on Printing Quality.

4.3 Study of measuring equipment's such as viscometer, B4 ford cup, Zahn cup.

Unit 5	Testing Methods of Printing Ink	10 Hrs.

5.1 Ink Tests and Measurement: Ink proofing, Tests for color, shade & strength, viscosity, solids content, ink compatibility, ink adhesion test, COF, Rub resistance, Gloss, Mottle, Wet and Dry Abrasion resistance,

5.2 Testing methods for printing smoothness, ink receptivity, picking and runnability.

5.3 Quality Control for Paste and Liquid inks.

5.4 Troubleshooting in various printing processes.

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	L. C. Young	Materials in Printing Processes.	Focal Press Ltd, , London.
2	D. E. Visset	The Printing Ink Mannual	Northwood Books London
3	Dr. Nelson R. Eldered	What Printer Should Know About Ink	Third Edition, (2001), Published by GATF Press, Pittsburgh
4	Chris H. Williams,	Printing Ink Technology,	Third Edition (2001), Pira International

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Semester – III	**PAPER – IV**
Course Code: BVOC PT 304 P	**Title of the Course: GRAPHIC DESIGN - III**
Credits: 03	**Total Lectures: 35 Hrs.**

Course Outcomes (COs):

a) To understand working of vector graphics software

b) To design various kinds of jobs on vector graphics software.

c) Understand importance of logo in branding and kind of design types need for branding.

	List of Exercises	

- Vector Graphics Software introduction, workspace organizing, tool bar, menu bar
- Basics of vector graphics
- Working with the text; Artistic text, Paragraph text, Text wrap, etc.
- Working with object
- Working with color modes, color channels, color swatches and print resolution.
- Working with Effect menu
- Working with Image
- Clip Art design
- Outdoor Advertising: Banners, Posters , Hoardings, Pamphlets, leaflets, flyers
- Indoor Advertising: Brochure (Cover & Inner pages), Magazine pages (Cover & Inner pages), Flyers, etc.
- Social Media Advertising: Webinar Posters, Event posters, social media ad of a product for every platform.

- Branding: Logo design, product design, package design, T-shirt design, Bag pack design, visiting card, Employee ID card, etc.
- Logo design (symbolic, letter, circular, etc.)
- Abstract background design
- Gradient background design
- Vector illustration design
- Infographic design (use of graphs)
- Character design
- Event Invitation card
- Vector Art of a photograph

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Semester – III	**PAPER – V**
Course Code: BVOC PT 305 P	**Title of the Course: SHEET – FED OFFSET PRINTING**
Credits: 03	**Total Lectures: 35 Hrs.**

Course Outcomes (COs):

a) Understand feeder, delivery unit on sheet fed machines.
b) Understand inking unit and ink transfer path.
c) Understand plate mounting technique, fountain solution system, dampening unit, and blanket setting on sheet fed machines.
d) Understand makeready and printing operations, single color, two color, etc. on sheet fed offset machine.

	Exercise	
• Setting of feeder unit in single color offset printing process. • Setting of Delivery unit in single color offset printing process. • Setting of ink duct and ink tracking path in inking unit of single-color offset printing process. • Setting of Dampening system • To measure and prepare the fountain solution • Mounting of plate • Mounting of blanket-on-blanket cylinder • Make ready procedure for single color printing • Two color printing with perfect registration • Cleaning of inking and dampening unit • Troubleshooting		

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Semester – III	**PAPER - VI**
Course Code: BVOC PT 306 P	**Title of the Course: INK MIXING AND SHADE MATCHING**
Credits: 03	**Total Lectures: 35 Hrs.**

Course Outcomes (COs):

a) Understand ink mixing and shade matching techniques on various substrates.
b) Understand color mixing ratio and calculations for total quantity of ink being used.
c) Understand drawdown, and ink shade comparison with standard.

	Exercise	

- Take a sample color from printed absorbent paper and match the color using same absorbent paper using same color, write down the ratio of colors used. Attach a drawdown.
- Take a sample color from printed glossy paper and match the color using same glossy paper using same color, write down the ratio of colors used. Attach a drawdown.
- Take a sample color from printed non- absorbent substrate and match the color using same non-absorbent substrate using same color, write down the ratio of colors used. Attach a drawdown.
- Take a wet color sample and match the color using any substrate, write down the ratio of colors used. Attach a drawdown.
- Take a wet color sample and match the color using any substrate, write down the ratio of colors used. Attach a drawdown.
- Take a PANTONE process color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.

- Take a PANTONE process gray color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
- Take a PANTONE SPOT Color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
- Take a PANTONE Metallic color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
- Take a PANTONE Solid color and match the color using any substrate, write down the ratio of colors used. Attach a drawdown.

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Semester – III	**PAPER – VII**
Course Code: BVOC PT 307 P	**Title of the Course: COST ESTIMATION**
Credits: 03	**Total Lectures: 35 Hrs.**

Course Outcomes (COs):

a. Understand costing of a job according to printing process.

b. Understand costing of material for a job by considering a printing process.

c. Understand costing of book work type of a job considering all prepress, press and post press activities.

	Exercise	

- Find a cost of total paper required (quantity wise) if a job is getting printed by offset printing technology.
- Find a cost of total ink required (quantity wise) if a job is getting printed by offset printing technology.
- Find a machine cost required (quantity wise) if a job is getting printed by offset printing technology.
- Find a labor cost required (quantity wise) if a job is getting printed by offset printing technology.
- Costing and estimation of various job types considering a printing process; total cost for a job type (*visiting card*, including paper, ink, materials, labor, quantity, etc.).
- Costing and estimation of various job types considering a printing process; total cost for a job type (*Bookwork publication*, including paper, ink, materials, labor, quantity, etc.).

- Find a cost for Design (Prepress Cost) required (Consider any printing process).
- Find a cost for finishing operations (post press cost) required (Consider any printing and finishing process).
- Cost Estimation for Print and Package finishing: Estimating book sizes and thickness, estimating material consumption of book binding material, Estimation for finished job including paper, other raw material, processing charge.
- Costing and estimating of various packages, Wastage calculations and remedy, substrate requirements and strength calculations.

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Semester – III	**Paper - VIII**
Course Code: BVOC PT 308 P	**Title of the Course: FIELD WORK**
Credits: 05	**Total Lectures: 75 Hrs.**

Course Outcomes (COs):

- Students should visit and work full 15 days, 5 hours each day on field suggested or appointed by college authority.
- Students should complete given task by company/ printing press/establishment.
- At last students have to produce field work report including attendance report signed by concerned authority.
- Students must complete 75 hours at the appointed organization.

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Semester – III	**Paper – IX**
Course Code: 309T	**Title of the Course: TECHNICAL ENGLISH – I (MIL)**
Credits: 02 Credits	**Total Lectures: 30 Hrs.**

Course Outcomes (COs):

a. Acquaint and enlighten with the speaking skill in various contexts.
b. Acquaint and familiarize with advanced writing skills in different contexts.
c. Acquaint and familiarize with soft skills through listing and speaking practice.
d. Minimize the gap between the existing communicative skills and acquire the skills they require at professional level.
e. Acquire the use of grammar effectively (vocabulary and so on) through extensive coursework on writing reports and reading comprehensions, articles, essays, general discussion etc.

Detailed Syllabus:

	Unit 1	**12 Hrs.**
Grammar: Sentence and Sentence Construction Vocabulary: Homophones, Homographs, Homonyms Listening: Listening for gist and detailed meaning and to identify the attitudes and opinions of the speakers. Speaking: Mini-presentations on a business theme and giving information and expressing opinions. Reading: Reading for detailed comprehension of detailed material; Skimming and Scanning. Writing: Writing to deal with requests, giving information about a product.		
	Unit 2	**12 Hrs.**
Grammar: Concord, Modal Auxiliary, Question Tags. Vocabulary: Business Vocabulary. Listening: Answering multiple choice questions on short conversations or monologues.		

Speaking: Expressing opinions, Agreeing and Disagreeing, Talking about oneself, one's current situations and plans. Reading: Reading for Understanding Vocabulary and grammar in a short text Writing: Writing for functional/ communicative task- e.g., Re-arranging appointments, asking for permission, giving instructions, apologizing and offering compensation.		
Unit 3	**INTERVIEW TECHNIQUES**	**14 Hrs.**
1. Job Application Letter 2. Resume Writing 3. GDPI 4. Presentations *Practice and Discussion Sessions		

Suggested Readings:

1. Whitby, N., Business Benchmark. Cambridge English,2013.

2. Hughes, J. and Newton, J., Business results – Intermediate,2021

3. Frank, M. Writing as Thinking: A Guided Process Approach. Prentice Hall Reagents.

4. Hamp-Lyons, L. and B. Heasely, Study Writing; A Course in Written English for Academic and Professional Purposes. Cambridge UP.

5. Quirk, R. S., Greenbaum, G. Leech and J. Svartik, A Comprehensive Grammar of the English Language. Longman.

6. Riordan, Daniel G. and Steven A., Panley. Technical Report Writing Today. Biztaantra.

7. Gerson, S., Gerson, S., Technical Writing: Process and Product. Pearson, 2011.

8. Board of Editors, Horizons: English in Multivalent Context, Orient Black Swan.

WEB REFERENCES:

1. www.cambridgeenglish.org

SY B.VOC PRINTING TECHNOLOGY

SEMESTER – IV

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Semester – IV	**Paper – I**
Course Code: BVOC PT 401 T	**Title of the Course: PRINT FINISHING PROCESS**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a) Understand the working of various Imposition Schemes in the print finishing techniques.
b) Apply various imposition schemes.
c) Understand book production method and various binding techniques.
d) Calculate cost of book binding as per the material requirement of the jobs.

Detailed Syllabus:

Unit 1	Introduction to Print Finishing Processes	12 Hrs.

1.1 Introduction to print finishing concept, Application areas of print finishing, Introduction to binding and its types, Binding and finishing tools, equipment, machinery and its applications, Classification of book binding techniques - – Quarter bound book, Half bound book – old style and new style, Full bound book, Case binding, Case making machine - Parts, Function Covering- Full, Limp & Library style binding. Boarding methods- pasting down, split, drawn in work, cut flush, extra square, ASTI (all sides turned in). Thread securing methods. Wire-o-wire, spiral, comb binding techniques, machine construction & working, Loose leaf binding – Thong binder, Universal style,

1.2 Industrial binding techniques - Adhesive/Perfect Binding, Hardcover binding, Wire stitching, Office stationery binding techniques - Loose leaf binding, spiral, ring, comb binding etc., Stitching schemes such as french, kettle, Adhesive binding process - spine preparation, adhesive application, creasing, nipping, Hardcover binding process – end paper, case making, book block making, casing in, finishing.

Unit 2	Materials in Print Finishing	12 Hrs.

2.1 Adhesives - Hot melt adhesives, animal (protein) glues, water based adhesives, PUR hot-melts, Theory of adhesion, Prevention and deterioration of adhesive, Application of adhesives in various print finishing processes - lamination, sealing, tipping, gluing off of spine, side glue application, case making, casing in, Securing materials - threads, wire, Reinforcing and lining materials - mull, kraft, gauze, covering materials - printed and laminated materials, rexin, leather etc.,

2.2 Material testing and QC procedures for book binding materials.

Unit 3	**Book Binding Techniques**	**14 Hrs.**

3.1 Imposition schemes for various signature schemes - saddle stitch, perfect bound, Imposition schemes for odd signatures, insertions and wrap around signatures, Book cover planning for soft cover and hard cover case, 2-up imposition schemes, come and go imposition scheme, Package Step and repeat work.

3.2 Major operations performed in binding- pre-forwarding and forwarding, Detailed study of pre-forwarding operation- jogging & knocking, removing mis-registrered sheets, counting, folding, bundling, gathering, collating, sewing, etc. Detailed study of forwarding operations- removing the swell, fixing end papers, fraying out the slips, gluing the back, trimming, rounding and backing, fixing head & tail bands, lining the back, edge decoration, cutting the boards, capping up, squaring the board, lacing in, covering, setting the joints, pasting down, pressing, jacketing.

Unit 4	**Book Production Methods and Machinery**	**12 Hrs.**

4.1 Folding - folding schemes and mechanisms (buckle folding, knife folding), equipment configurations - All Buckle folding, combination folding machines, terminology in use, (KTL, KLL etc.), Problem involving folding, Gathering - automated gathering process, working of gathering machine, signature inspections systems, collating marks, Sewing process and sewing equipment mechanisms, Perfect binding process and inline/offline perfect binding operations, Gluing and case making process, and working of equipment, hardcover book manufacturing, and working of equipment, 4.2 Working of single knife trimmer, Three knife trimming, and working of three knife trimmer, working of nipping machine, working of perforating machine, Troubleshooting of book binding, cutting machine- operational procedure of sensors and hydraulic systems; problems and remedies during cutting.

Unit 5	**Print Finishing Techniques**	**10 Hrs.**

5.1 Study of finishing operations performed on screen, flexography and gravure printed products or substrates. Study of types and applications of lamination and varnishing operations. Laminating films used and their required properties. Troubles and remedies associated with lamination operation. Study of construction and working principle of creasing and die cutting machine. Study of design and materials used in cutting rules. Troubles and remedies with regard to creasing and die cutting operation. Applications of die cutting.

5.2 Study of types and applications of foil stamping and embossing operation. Foil stamping films used and their required properties. Troubles and remedies associated with foil stamping, operation.

5.3 Utility operations - Ruling, edge decoration, index cutting, numbering, punching, perforating, corner cutting, tag stringing, calendar rimming, eye-letting, die punching, velvet printing, Post-press material flow and inventory management processes, Hybrid finishing formats and equipment, Trends and developments in finishing operations.

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	A. G. Martin, (1980),	Finishing process in Printing	Focal Press, London
2	Arthur W. Johnson, (1986)	Manual of Book Binding	Thames and Hudson.
3	Ralp Lyman, (1993)	Binding and Finishing	GATF Press
4	Helmutt Kipphan, (2000)	Handbook of Print Media	Springer, Heidelberg
5	T. J. Tedesco, (1999)	Binding, Finishing and Mailing: The Final World”	GATFPress, Pittsburgh

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Semester – IV	**PAPER – II**
Course Code: BVOC PT 402 T	**Title of the Course: BASIC PACKAGING TECHNOLOGY**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a) Understand the need and requirements of packaging.
b) Know the design elements required for a package.
c) Understand role of packaging as a marketing tool.
d) Correlate between product and package.
e) Understand the need for quality checks for a package.

Detailed Syllabus:

Unit 1	**Introduction to Packaging**	**12 Hrs.**

1.1 Definition of packaging, Need of Packaging, Basic requirements of packaging- protection, Preservation, Containment, Machinability, Communication, Re-use and Recycability, Types of Packaging – Flexible , semi rigid and rigid packaging, classification- Primary / Secondary / Tertiary, Unit/intermediate/Bulk,

1.2 Function of Packaging - physical, barrier, Agglomeration, information, marketing, security and convenience.

1.3 Packaging Hazards – Storage, Transportation, Chemical, Climatic, Biologic, Interaction of package and its contents.

Packaging Material – Paper and paper board, Plastics, Wood, Metals, Glass, Textile and properties of same materials, Cushioning Materials – Plastic sheets, fiber foam, sponge, grass, and its properties, etc., Ancillary Materials - Purpose, Advantage, Types and properties

Unit 2	**Package Design & Marketing**	**12 Hrs.**

2.1 Package Design, elements used for design of package, significance of elements & principles of design - shape, size, font, colour, texture, lines balance and unity, symmetry and harmony, etc.
2.2 Types of design, structural, graphics, factors influencing design, structural designs – folding cartons, corrugated boxes, cans, bottles of glass and plastic, Types of load, unit load and safe stacking load.
2.3 Target Market and market considerations, Importance of Demography, Psychography, Retail Market, Brand Loyalty.

Unit 3	**Manufacturing Process**	**14 Hrs.**

3.1 Type of Boards: Multiply boards, food grade boards, and corrugated boards. Corrugated board: Corrugated board manufacturing Machine, Types of flutes, gluing, etc.
3.2 Carton making: Carton designing – consideration while designing, information on carton, Carton styles – STE, RTE, display carton, hanging, folding carton manufacturing –Cutting; creasing; die making -punching - for single die, jigged die. Rotary Die making, punching machine, carton making for Universal cartons, stitching machine, scoring machine, automatic gluing machine, types of glue applicators. Cartoning Machineries - types, flexible pouches forming machines, Rigid boxes manufacturing process, Drums – types, applications; Molded pulp containers; Three piece and two piece can; seam treatment types.

Unit 4	**Testing and Quality Control in Packaging**	**12 Hrs.**

4.1 Package Testing for transportation: Physical Damage, Stack test, Drop test, Selling strength, Rolling Test, t, inclined impact, Horizontal impact, vibration testing, stacking and compression test, bursting strength, pin adhesion, ring crush, Tests on Raw Materials.
4.2 Need and importance of Quality Control in packaging, Significance of specifications; Significance of Testing, Packaging Standards, Conditioning, Sampling.

Unit 5	**Advancements in Packaging**	**10 Hrs.**

5.1 RFID in Packaging, Eco-friendly Packaging, Export Packaging, Labels-Types, functions, Cushion Packaging-Need, types, Design Requirements; Wooden Packaging-Types, Requirements.

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	Soroka W., (2002)	Fundamentals of Packaging Technology	3 rd Ed, IoPP.
2	Byett J. et al., (2001)	Packaging Technology	2 nd Ed, The Institute of Packaging (SA)
3	Joseph F. H, Robert J. K, Hallie F, (1998)	Handbook of Package Engineering	3 rd Ed., Technomic Publishing
4	Yam K. L., (2009)	The Encyclopedia of Packaging Technology	3 rd Ed. Wiley

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Semester – IV	**PAPER- III**
Course Code: BVOC PT 403 T	**Title of the Course: GRAVURE, FLEXOGRAPHY & DIGITAL PRINTING**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

a. Understand gravure print unit and working of each component within the print unit.

b. Understand flexographic print unit and working of each component within the print unit.

c. Understand digital printing methods and various methods and machines for digital printing method.

Detailed Syllabus:

Unit 1	Gravure Machine: Print Unit	12 Hrs.

1.1 Gravure Doctor Blade:

1.1.1 Materials for doctor blade

1.1.2 Assembly of doctor blade – angle, force, deflection, wear and causes & remedies of wear

1.1.3 Holder configuration, wiping angle & contact angle, pressure control

1.1.4 Setting and make ready

1.2 Impression Roller:

1.2.1 Functions, Materials and Hardness

1.2.2 Configuration: pressure, conductivity, balance and types, deflection and compensation

1.2.3 Roller setting and effects on web tension

1.2.4 Electrostatic Assist (ESA) - need of ESA, principle of ESA, Working of ESA, functions, effects of ESA system on gravure print quality, impression roller requirements for ESA, advantages and disadvantages.

Unit 2	Flexography: Print Unit & Ink Metering	12 Hrs.

2.1 Principles of flexographic printing machine – Stack press, Inline press, Common Impression press, Hybrid press, Sheetfed presses, sections of flexo press.

2.2 Plate cylinder – construction, types – integral, demountable, sleeves, and magnetic plates, plate mounting devices and tapes.

2.3 Impression Cylinder – Construction, tension control, Tympan bar, loading methods- hydraulic and pneumatic.

2.4 Ink metering System of Flexography:

2.4.1 Need of ink metering

2.4.2 Ink metering systems- Standard Two roll ink metering, two roll inking system with doctor blade, Reverse angle doctor blade, Chambered doctor blade

2.5 Anilox Roll used in Flexography – construction, materials, cell wall, land area, cell depth, cell opening, cell count, cell volume, cell angle, cell depth to opening ratio, Anilox roll coverings- ceramic and chrome, Types of Engraving used for anilox roll and methods of engraving, considerations for choosing right anilox roll, storage of anilox roll.

2.6 Fountain Roll – Construction, functions, materials used, types of roll coverings, requirements of fountain roll, Storage.

Unit 3	Inking and Drying System of Gravure & Flexography	14 Hrs.

3.1 Gravure Printing Process: Types of Inking system, Viscosity Control, Viscosity and Gravure print quality, Types of Dryers used on Gravure press and Efficiency of dryers.

3.2 Flexography printing process: Flexo Inking system, Types of dryers used on flexo press, efficiency of dryers used.

Unit 4	Digital Printing	12 Hrs.

4.1 File formats- PS, PDF. Raster Image processing – concept, CIP3, CIP4.

4.2 Digital Workflow: workflow of digital printing, Comparison between conventional and digital printing, Elements of workflow, Job ticket, Preflight check, proofing, imposition, JDF, PDF concept.

4.3 Image processing: OCR concept, fundamentals of image processing, proofing, soft proofing, hard proofing.

4.4 Large or Wide format printing- Concept, Substrates and print techniques used, Variable Data printing (VDP)- concept, working and applications, Print on Demand- concept, working and applications.

Unit 5	Direct Imaging (Digital Printing)	10 Hrs.

5. 1 Direct Imaging Techniques - Direct Imaging- Principle, Features, Applications, Once imagable masters- Principle, Types, Press Configurations, Re-imageable masters - Principle, Types, Press Configurations,

Inkjet presses-Continuous flow, Drop on demand-Principle, types, Press configuration, ink types, ink properties, Thermal Transfer printing.

5.2 Toner based process: Ionography- Principle and Applications, Magnetography - Principle and Applications, Electrophotography- Principle and Applications.

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers Name
1	Bob Thompson	Printing Materials: Science and Technology	PIRA International
2	James Crouch	Flexography Primer	GATF 4
3	GATF, USA	Gravure Primer	GATF 5
4	GATF, USA	Gravure Process & Technology	GAA 6
5	Flexographic Technical Association	Flexography: Process and Technology	FTA
6	N. Y. Flexographic Technical Association	Flexography principles and Practices	FTA
7	Phil Green, (1995)	Understanding Digital Color	Blueprint
8	Helmutt Kipphan, (2000)	Handbook of Print Media	Springer, Heidelberg
9	Michel L. Kleper, (2001),	The hand book of Digital Publishing	(Volume1) PH, Second Edition, PTR publishing

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Semester – IV	**PAPER – IV**
Course Code: BVOC PT 404 T	**Title of the Course: PRINT FINISHING PROCESS**
Credits: 03	**Total Lectures: 35 Hrs.**

Course Outcomes (COs):

a. Understand and perform folding operations.
b. Understand and perform loose leaf binding methods using folding and imposition schemes.
c. Prepare half bound, quarter bound books using hand sewing and stitching machines.
d. Prepare a case bound, full bound book.

List of Exercises

	Exercise	

- To prepare folded signatures using right angle folds - Folding - standard folding schemes up to 16 pages.
- To prepare folded signatures using zigzag folds and other types of folding styles
- Loose leaf binding method: spiral binding, wiro binding.
- To prepare saddle stitched booklet
- To prepare side stitched booklet
- Perform Perforation and numbering
- Preparing a quarter bound cut flush book using French sewing
- Preparation of quarter bound tuned-in book using tape sewing
- Preparing a half-bound old-style book using recessed cord sewing
- Preparation of full bound new style book using raised cord sewing
- Preparing a case bound book
- To prepare various document files.

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Semester – IV	**PAPER - V**
Course Code: BVOC PT 405 T	**Title of the Course: GRAPHIC DESIGN – IV**
Credits: 03	**Total Lectures: 35 Hrs.**

Course Outcomes (COs):

a. Learn and understand page layout software.

b. Understand master page concept in a page layout software.

c. Design various kinds of jobs using page layout software.

List of Exercises

	Exercise	

- Page layout software introduction
- Creating templates/master page for the given layout (setting grid, margin and columns)
- Importing, linking and saving files for text and graphics
- Print, proof and correct the saved page
- Creating Title Page
- Creating Style Sheets and table of contents
- Designing Bills/ vouchers
- Designing 20 page book using master page with all the margins & linking text and graphics.
- Designing Newspaper cover page and inside pages.
- Designing Brochure
- Designing Magazine inside pages.

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Semester – IV	**PAPER -VI**
Course Code: BVOC PT 406 T	**Title of the Course: ADVANCED SCREEN PRINTING**
Credits: 03	**Total Lectures: 35Hrs.**

Course Outcomes (COs):

a. Understand Screen printing methods, materials and tools required for screen printing.

b. Print on irregular substrates using screen printing.

c. Print on fabric, PCB, etc, using screen printing.

List of Exercises

	Exercise	

- Study of various types of screen-printing materials
- Make ready for Screen Printing – Printing of Letterheads and Visiting Cards
- Printing on various substrates – wood, leather, textile, acrylic, metal, paper & paper products, plastics.
- Screen printing on Irregular Surfaces – Bottles, Ceramics, Glass.
- Screen printing on printed circuit boards (PCB)
- Screen Reclamation
- Screen printing of files covers and other presswork jobs.
- Print signboards, cloth, backlit board with screen printing technology.
- Print Multi color Invitation card using Screen printing technology.
- Print Multi color letterhead using Screen printing technology.

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Semester – IV	**PAPER - VIII**
Course Code: BVOC PT 407 P	**Title of the Course: SEMINAR & TECHNICAL COMMUNICATION**
Credits: 03	**Total Lectures: 35Hrs.**

Course Outcomes (COs):

a) Understand effective Power point presentation skills.
b) Understand report writing skills.
c) Understand and perform presentation of a technical subject in a effective and standard way.

	Exercise	

Detailed Guidelines:

a) Student should select a subject for seminar from the printing industry.
b) Power point presentation should be prepared for the seminar as per presentation standard.
c) Report on the same subject should be submitted to the department.

Seminar will be performed in two phases:

Seminar Phase – I :

- In the first phase, it is expected to select a subject from the printing industry. Prepare a power point presentation on the same.
- Weekly present the subject in front of the subject guide and make the corrections suggested by the subject guide.
- Internal Evaluations will be on the weekly presentations and progress regarding correction suggested.

Seminar Phase – II :

- In the second phase, the seminar report shall be based on material, mainly collected and analysed from research work in the field of printing published in technical and research journals (national and international).
- The report shall be about 20 pages of A4 size, including figures. The seminar report shall include a certificate, synopsis and references.
- The presentation is expected to be in front of audience which must include two internal examiners one of them being the guide. Both examiners shall be University approved teachers.
- The distribution of marks shall be equally divided between the report and the oral presentation.

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Semester – IV	**Paper - VIII**
Course Code: BVOC PT 408 P	**Title of the Course: FIELD WORK**
Credits: 05	**Total Lectures: 75 Hrs.**

	Exercise	

- Students should visit and work full 15 days, 5 hours each day on field suggested or appointed by college authority.
- Students should complete given task by company/ printing press/establishment.
- At last students have to produce field work report including attendance report signed by concerned authority.
- Students must complete 75 hours at the appointed organization.

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Semester – IV	**Paper – IX**
Course Code: 409T	**Title of the Course: TECHNICAL ENGLISH – II (MIL)**
Credits: 02 Credits	**Total Lectures: 30 Hrs.**

Course Outcomes (COs):

a. Familiarize students with the process of writing for the media
b. Make them familiar the specific use of English in the field of media
c. Generate interest in various aspects of media and thereby to equip them with the basic writing skills required for the same.
d. Enable the students to take up jobs in the media industry- both in the print, broadcast and the new media.
e. Promote their writings with the help of the new medium

Detailed Syllabus:

	Exercise	

UNIT I Introduction

1.1 Internet: use and its significance, advantages and disadvantages

1.2 Common uses of internet: email, world wide web, file sharing, streaming media

1.3 Different kinds of New Media:

1.3.1 E-newspapers- history of e-newspaper, how does e-paper work, and trends in e-newspapers

1.3.2 E-books, E-magazines, E-journals: definition, scope and significance and how does these work

1.4 Fundamentals of Cyber Media

1.4.1 Cyber Space: what is cyber space

1.4.2 Cyber Journalism: concept, definition and its advantages and disadvantages

UNIT II : Writing for Web Media

2.1 Guidelines, Planning, Structure and Style- Headlines, Blurbs, Lead

2.2 Technical Writing – Copywriting

2.3 Web Copy preparation- Profile Writing, Editing, Caption Writing and Online Interviewing

2.4 Blogs –Types of blogs –Personal blogs, Collaborative or Group blogs, Corporate or Organizational blogs, Aggregated blogs, Reverse blogs, Vlog, Photo blog– Micro blogging

UNIT III: Digital Correspondence

3.1 e-mails, Instant Messaging, SMS Text– Language and Grammar of SMS– Emoticons – Picture Messages

3.2 Writing the Perfect Email

3.2.1 Steps to the Perfect E-Mail

3.2.2 Formal and Informal Greetings

3.2.3 Requests through an E-Mail

3.2.4 Writing an Apology, Complaint and Seeking Help and Information in an E-Mail

3.2.5 Informing about a File Attached in an Email, Writing the Formal Ending of an E-Mail

Suggested Readings:

1. Ceramella, Nick and Elizabeth Lee. Cambridge English for the Media. CUP, 2008.
2. Raman, Usha. Writing for the Media.OUP, 2009.
3. Ryan, Michael and James W Tankard.Writing for Print and Digital Media.McGraw-Hill,
4. Writing form Mass Media by James Glen Stovall, Pearson Publication
5. Web journalism: practice and promise of a new medium by James Glen Stovall

TY B.VOC PRINTING TECHNOLOGY

SEMESTER – V

T.Y. B. VOC. PT

Semester –V

Course Type	Course Code	Course Title	Credits
T 01	BVOC-PT 501 T	Package Design and Development	03
T 02	BVOC-PT 502 T	Security Printing, Copyrights & Ethics	03
T 03	BVOC-PT 503 T	Color Science and Measurement	03
T 04	BVOC-PT 504 T	Material Science	03
P 05	BVOC-PT 505 P	LAB -I Package Design & Development	03
P 06	BVOC-PT 506 P	LAB –II Paper & Ink Testing	03
P 07	BVOC-PT 507 P	LAB -III Troubleshooting & Machine Maintenance	03
P 08	BVOC-PT 508 P	LAB- IV Project	04
P 09``	BVOC-PT 509 P	Field Work	04

T.Y. B. VOC. PT

Semester –VI

Course Type	Course Code	Course Title	Credits
P 01	BVOC-PT 601 P	Industrial Internship/ Industrial Training	15
P 02	BVOC-PT 602 P	Project Work	10

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Semester – V	**Paper – I**
Course Code: BVOC PT 501 T	**Title of the Course: Package Design and Development**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

a. Students able to know the all types of Packaging and how it works, importance of packaging**.**

b. Students able to know the Design Concepts and bond of Packaging and Designing. Different types designs on different type of material.

c. Growth of Packaging and Designing, Latest trends in packaging and designing.

Detailed Syllabus:

Unit 1	**Introduction of Package Design**	**10 Hrs.**
Packaging History, Need of Package Design, Types of packaging, - Rigid/ Semi Rigid /flexible packages etc. Functions of package designing. Packaging classification-Primary, Secondary, Tertiary. Shelf life of packaging. Packaging hazards- Storage, Transportation, Chemical, Climatic, Biological.		
Unit 2	**Importance of Package Design**	**09 Hrs.**
Study of working principle different types of packages designing, Design Fundamentals, Steps in packages designing. Features in effective design, Packaging Graphic and its importance. Color Scheme for package development. Graphic design elements – Significance of shape, Size, Color, Font, Texture, Lines. Chemical and biological properties of packaging material.		
Unit 3	**Packaging Development**	**10 Hrs.**

Need of changes in package design, Package development strategies, Difference between package design and Package development. Different materials of packaging- paper board, plastic, board, etc. in detailed study of Plastic packaging and rigid packaging . Accepting packaging, Freeze packaging and protection. Binding types of different packaging. Different types of cartons and material.		
Unit 4	**Metal Packaging**	**08 Hrs.**
Types of metal cans- single piece cans ,double piece cans, triple piece can ,Types of metal packaging .Mechanical properties of metal cans, Glass Packaging, Glass packaging forms, Requirements of glass containers, uses of glass containers. Closures for glass containers. Wooden packaging, types of wooden containers, wooden crates. Packaging Perspectives – Packaging Cost, Packaging Considerations & Wastage Management.		
Unit 5	**Growth of Design and Development in Packaging**	**08 Hrs.**
Packaging Scenario – world & India, Comparison of Design and Development. Scope of Packaging, Packaging Growth in India. Target and Competition's in packaging. Latest trends in packaging, Customers satisfactions in packaging by area wise depends on different product. Laws and regulations in packaging.		

Suggested Readings:

Sr. No	Title	Author	Publisher
1	Packaging Technology	IOM Training Academy	Woodhead publishers
2	Packaging Design	Marianne Rosner And Sandra A. Krasovec.	Sagar publishers
3	Handbook of Printing Packaging And Lamination	Shrikant P. Athavale	Google Books

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Semester – V	**Paper – II**
Course Code: BVOC PT 502 T	**Title of the Course: SECURITY PRINTING, COPYRIGHTS AND ETHICS**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

a. Students able to know the different types of Security Printing, Importance of Security Printing.

b. Students able to know the Machines and Software's used for Security Printing.

c. Students able to know the rules and regulations and need of copyrights and Ethics.

Detailed Syllabus:

Unit 1	**Introduction of Security Printing**	**10 Hrs.**
Introduction of security printing- Basic Concepts, Requirement of security printing, Counterfeiting creation graphics . Types of security product .Overt & Covert features, Vector images/designing for Security Printing. Printing Processes such as Gravure, Offset, Intaglio, Flexo, Letterpress, Screen, Variable Data Printing. Software and Digital printing equipment used for variable data printing. Recent trends and developments in security printing		
Unit 2	**Security Printing Inks**	**09 Hrs.**
Type of Security Printing Inks, Migrating Heat reactive Ink, Erasable & Fugitive Inks, Copy protection & Thermo chromic Ink , Penetrating Ink, OVI & UV Curing Ink , IR Ink , Monochromic Ink, Water Resistant &Invisible Phosphorescent Ink tech		
Unit 3	**Operating System and Application Software**	**10 Hrs.**
Definition of Software, Types of software: System Software, Application Software. System Software: Operating System. Types of O.S., Basic Commands in DOS, Introduction to GUI: Desktop Icons, File and Directory structure, Menu Items, Control Panel, File and Directory Search Utility programs: Anti-plagiarism software, Anti-virus, Disk Cleaning, Defragmentation, Compression/Decompression of files. Application software: Examples of		

commercial software with brief introduction Unit IV Editors, Word Processors, Spreadsheets & Presentation Tools		
Unit 4	**Printing Electronic**	**08 Hrs.**
Materials in Printed Electronics – Electric circuit, Computer Designs etc.Basic Electronic components, Printing Process used for printing electronics, Impact Printing Processes: Offset, Screen, Gravure, Flexography (v) Non-impact printing processes-Inkjet Drop on demand for production of PE, scope and limitations, Printed Electronics Applications, Advances and Future Trends.		
Unit 5	**Copyrights and Ethics**	**08 Hrs.**
Copyright introduction. Copyright Registration procedure, International Copyrights protection. Notice of Copyright, Transfer of Copyright, International Copyright Protection, Managing Secondary and Third Party Rights, Managing Primary Rights, Grant of rights and Specification. Payments to authors and other creators, other publisher issues. Publisher`s Responsibilities in Negotiating Agreements.		

Reference and Text Books:

Sr. No	Title	Author	Publisher
1	Introduction to Security Printing	Warner and Richard M, AdamsII	2nd edition, PIA GAIF Press
2	Security Printing	Blodkdyk Gerard	2nd Edition
3	Copy Rights Basics	United States	Copyright Office

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Semester – V	**Paper – III**
Course Code: BVOCPT 503 T	**Title of the Course: Color Science and Measurement**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

1. To understand human vision perception
2. To identify the effect of Illuminant and standard observer for the perception of color.
3. Application of various color systems for color measurement.
4. To perform the visual and instrumental color assessment.

Detailed Syllabus:

Unit 1	**Human Color Vision Mechanism**	**10 Hrs.**
1.1 Color Perception, Human vision mechanism – Trichromancy, Opponency; Human Adaption techniques, 1.2 Human Vision Deficiency, Color perception test for human vision, 1.3 Concept of CIE standard observer, CIE 20 and 100 observer, color matching experiment		
Unit 2	**Color Systems**	**09 Hrs.**
2.1 Color systems &color spaces, Basic perceptual attributes of color, Color Systems based on color mixing, Color Systems based on uniform Color perception – the munsell color system, the natural color system, OSA uniform color scale system, 2.2 Color Systems based on Color matching – The CIE color systems, Concept of standard observer, Standard Illuminant, color matching experiment, CIE, xyY, Luv, Hunter Lab, CIELAB		
Unit 3	**Measuring Instruments**	**08 Hrs.**

3.1 Color measurement, Basic principles of color measurement systems, Color Charts, 3.2 Color Measuring Instruments: Densitometer, Tri-stimulus colorimeter, Spectrophotometer, Types of spectrophotometers; Illuminating and Viewing Geometry, Gloss meter		
Unit 4	**Introduction to Color Management**	**10 Hrs.**
4.1 Color Management Module, Device dependent (conventional) workflow, device independent (modern) workflow, international color consortium (ICC), Four c's of color management, 4.2 Test charts for different devices, Production of different color profiles, Comparison of profiles, gamut mapping, rendering indent, perceptual, rendering indent, Relative & Absolute colorimetric intent, saturation intent, 4.3 Metamerisam- Definition of metamerisam, cause and effect		
Unit 5	**Color Management Systems**	**10 Hrs.**
5.1 Color management for input devices - Role of Input Profile, 4C's for Digital Camera, RGB Color Space profile, Processing of Raw camera files, 4C's for Scanner, Test Charts for Scanner, Making a scanner profile, Application of Input profile. 5.2 Color management for Monitor: - Concept of Monitor Profiling, Monitor Basics, 4C's for Monitor, Monitor Calibration, Profile tags for Monitor, Reference file for Monitor, Making a Monitor Profile, Checking a monitor profile, Video cards and Lookup tables, Application of Monitor profile, Concept of Soft proofing, Conditions required for soft proofing. 5.3 Color Management for Printer: - Concept of Printer profile, Four C's for Printer, Test charts for Printer 5.4 Proof to Press color management, 4C's for Proofer, Proofer calibration, Proofer Profiling 5.5 Concept of Hard Proof, Hard proofing process, Spot color Printing and Proofing		

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	E.P. Danger, (1987)	The Color Handbook	Gower Publication, England.
2	Phil Green, (1999)	Understanding Digital Color	Second Edition, GATF Press
3	Gray G. Field, (1998)	Color & its Reproduction	GATF Foundation, Pittsburgh.
4	Roy S. Berns, Fred W.Billmeyer, Jr. Max Saltzman's, (2000),	Principles of Color Technology	Third Edition, John Wiley & sons, A Wiley Inter Science Publication
5	R.W.G Hunt, (1987)	The Reproduction of Color	Fountain Press, Kings Langley, England.

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Semester – V	**Paper – IV**
Course Code: BVOCPT 504 T	**Title of the Course: Material Science**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

At the end of this course, students will be able to:
1. Apply the knowledge to use of metals and polymers in printing and allied industry.
2. Apply the knowledge to select the appropriate consumable for the effective use in printing and converting applications.
3. Analyse the characteristics of various raw material used in printing ink and to formulate the best suitable ink for the printing application.
4. Analyse the properties and testing methods of printing ink for runnability, printability and shelf life.
5. Analyse the characteristics of various raw materials used to manufacture paper and its properties for runnability, printability and shelf life.
6. Understand the various methods and instruments used for material analysis.

Detailed Syllabus:

Unit 1	**Polymers**	**10 Hrs.**
1.1 Introduction: - Definition, Classification/ Types- Plastic, Thermoplastic, Thermosetting plastic, Elastomers- Natural and Synthetic Rubber. 1.2 Physical, Chemical and Mechanical properties of polymers, Characteristics of polymers 1.3 Manufacturing of polymeric substrates, Extrusion, Co-extrusion, Injection Molding, etc. 1.4 Application of polymers in Printing- ink, resin and gelatin – its composition and characteristics. 1.5 Surface treatments- need, methods – corona, plasma and flame and effects of treatment on the polymer substrates.		
Unit 2	**Paper Manufacturing, Properties and Testing**	**09 Hrs.**

2.1 Raw Materials: Fibrous & non fibrous materials

2.2 Pulping process: - Mechanical Pulping, Chemical pulping- acid and alkaline, Combined chemical and mechanical pulping, Screening, Cleaning, bleaching, sizing agents, fillers and loadings, coloring matters.

2.3 Stock Preparation, Beating & Refining, sizing, different types of paper making machines, drying, calendaring, super calendaring, Embossing, etc.

2.4 Different surface finishes obtained in paper, selection criteria of paper substrate for printing and converting applications

2.5 Surface and Physical properties & testing methods of paper such as GSM, thickness, density etc., strength properties of paper such as tensile, tearing, folding strength etc., chemical and optical properties of paper like pH, color, gloss, brightness and opacity, Importance of BIS & TAPPI standards for paper & its relation to printing industry.

Unit 3	**Board Manufacturing Process**	**10 Hrs.**

3.1 Paper board making process, Multi-ply board m/c finishing processes

3.2 Physical, Mechanical and optical properties, physical characteristics.

3.3 Corrugated box raw materials, types of corrugated boards, types of flutes, manufacturing process and machines, Creasing & cutting printing & slotting, stitching, gluing or taping, closing and sealing, advantages & disadvantages, applications and uses. Solid fibre-board boxes, honeycomb boards.

3.4 Folding cartons- Raw materials, Types of boxes: reverse tuck carton, sealed end cartons, shell & slide carton, lid and tray type designing, manufacturing processes & machines.

Unit 4	**Packaging Materials**	**08 Hrs.**

4.1 Glass: Raw Materials used for manufacturing glass, properties, types of glass, glass bottle design, Applications, advantages, Limitations of glass as a packaging material

4.2 Metals: Aluminum and steel- properties, applications Aluminum based: Conversion processes for Sheets - Aluminum Foil, properties and their applications. Metal cans: Types, applications, specifications

4.3 Collapsible Tubes: Types, applications, advantages, disadvantages, Aerosol containers: Design, advantages, disadvantages

Unit 5	**Printing Inks, Properties & Testing**	**08 Hrs.**

5.1 Classification & General characteristics of printing inks for various printing processes

5.2 Ingredients of printing ink such as pigments, Vehicles, solvents and additives etc, Manufacturing of printing ink

5.3 Drying and curing mechanism of printing inks, rheological properties of ink like viscosity, shear, yield, thixotropy, length and tack

5.4 Subjective & objective ink testing methods, Various ink problems like Set off, trapping, filling, caking, end use properties of ink.

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	R. H. Leach & R. J. Pierce	The Printing Ink Manual	Fifth Addition (2007), Published by Springer
2	Apps E. A,	Printing Ink Technology	First Edition (1958), Leonard Hill (Books) Ltd. Efen Street, London
3	Chris H. Williams	Printing Ink Technology	Third Edition (2001), Pira International
4	Dr. Nelson R. Eldered	What Printer Should Know About Ink	Third Edition, (2001), Published by GATF Press, Pittsburgh,
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Semester – V	**Paper – V**
Course Code: BVOC PT 505 P	**Title of the Course: LAB – I Package Design & Development**
Credits: 03	**Total Lectures: 45 Hrs**

Course Outcomes (COs):

a. Students able to know the software's used for designing and important things to design.

b. Students able to know design Sense and typical activities in designing.

c. Students able to know how to impact of design on different type of substrate.

Course Contents

Exercise
1. Study of Flexible & Rigid Package Designs, their colors , fonts, color scheme & Printing Considerations. 2. Study of Classifications of Packaging. 3. Preparing Artwork for various Packaging applications i,e – Cosmetic, Cartons , Corrugations ,Pharmaceuticals etc. 4. Study of Designing Software 's for various package design and sizing, mashing & Cropping of Originals 5. Study of printing considerations for typical designs 6. Study & Design of Stationary and small sales literature 7. Study of direct mail, folders - Single fold & Double Fold 8. Study of color, color wheel and color matching and logo designing on computer. 9. Study and practice of knowledge of different computer commands. 10. Study of designing of visiting card, Letterhead, Envelop, bill form, Receipt, Invitation card, Posters, Title Page of Book , Magazine cover page.

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Semester – V	**Paper – VI**
Course Code: BVOCPT 506 P	**Title of the Course: Paper & Ink Testing**
Credits: 03	**Total Lectures: 45 Hrs.**

	Course Outcome (CO):	

Testing of Paper:

1. To check the Bursting Strength of the sample paper.
2. To check the basis weight and grammage of the sample paper.
3. To check the Tensile strength of the sample paper.
4. To check the Folding endurance of the sample paper.
5. To check the Moisture content and relative humidity of the sample paper.
6. To check the wire and felt sides of the sample paper.

Testing of Ink:

1. Take a sample color from printed absorbent paper and match the color using same absorbent paper using same color, write down the ratio of colors used. Attach a drawdown.
2. Take a wet color sample and match the color using any substrate, write down the ratio of colors used. Attach a drawdown.
3. Take a PANTONE process color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
4. Take a PANTONE process gray color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
5. Take a PANTONE SPOT Color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.

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Semester – V	**Paper – VIII**
Course Code: BVOCPT 507 P	**Title of the Course: Troubleshooting and Machine Maintenance**
Credits: 03	**Total Lectures: 45 Hrs.**

Course Contents

Exercise
1. Study of Different mechanical drives and component that constitute various Printing machines. 2. Study of Different electrical drives of sheet fed offset machine that constitute various printing machines. 3. Study of every solid-state electronic element that are vital in printing machine control and automation. 4. The students will be able to identify reasons of machine maintenance. 5. Study of machine maintenance in different machine on every unit 6. Study of identify every problem of machine and how to cover it or how to repair it. 7. Study of Electrical circuit and how to repair it. 8. Study of Common machine maintenance. 9. Study of how to cover all types of troubleshoots. 10. Study of preventive maintenance schedule.

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Semester – V	**Paper – VIII**
Course Code: BVOCPT 508 P	**Title of the Course: Project**
Credits: 04	**Total Lectures: 45 Hrs.**

Course Outcomes (COs):

Project Phase - I is an integral part of the project. The project should be based on the knowledge acquired by the student during the coursework and should contribute to the needs of the society. The project aims to provide an opportunity of designing and building complete system or subsystems in an area where the student likes to acquire specialized skills.

For seminar and Technical Communication students are expected to select an area from the printing and packaging technology. The case study for the same subject is expected with the help of some research papers and reference books, magazines, blogs, websites, etc.
Preparation of the Power point presentation on the same topic is expected and detailed report of the same topic is also expected.

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Semester – V	**Paper – IX**
Course Code: BVOCPT 509 P	**Title of the Course: Field Work**
Credits: 04	**Total Lectures: 60 Hrs.**

Course Outcomes (COs):

- Students should visit and work full 10 days, 5 hours each day on field suggested or appointed by the college authority.
- Students should complete given task by company/ printing press/ establishment.
- At last students should have to produce a field work report including attendance report signed by the concerned authority.
- Students must complete 50 hours at the appointed organization and issue certificate from the same company signed by the concerned authority.

TY B.VOC PRINTING TECHNOLOGY

SEMESTER – VI

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Semester – VI	**Paper – I**
Course Code: BVOCPT 601 P	**Title of the Course: Industrial Internship/ Industrial Training**
Credits: 15	**Total Lectures: 300 Hrs.**

Course Outcomes (COs):

- Students should visit and work full 4 months, each day on field suggested or appointed by the college authority.
- Students should complete given task by company/ printing press/ establishment.
- At last students should have to produce an internship report including attendance report signed by the concerned authority.
- Students must complete 4 months at the appointed organization and issue certificate from the same company signed by the concerned authority.

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Semester – VI	**Paper – I**
Course Code: BVOCPT 602 P	**Title of the Course: Project Work**
Credits: 10	**Total Lectures: Hrs.**

	Course Outcomes (COs):	
Project stage – II/ Project work is an integral part of the course. The project should be based on the knowledge acquired by the student during the coursework and should contribute to the needs of the society. The project aims to provide an opportunity of designing and building complete system or subsystems in an area where the student likes to acquire specialized skills. The student shall complete the Project that will consist of problem statement, literature review; project overview, scheme of implementation (Methodology) and Layout & Design of Setup. The student shall submit the report of Project work completed partly in standard format approved by the University. Preparation of the Power point presentation on the same topic is expected.		