

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
S. Y. B. VOC Printing Technology

Implemented from
Academic Year 2022 - 23

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
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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

3. 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	Modern Trends in Printing	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

SEMESTER – III

Unit 03 Image Carrier Generation for Different Printing Processes 21 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 flexo plate making

3.3.5 quality control aids for flexo 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 04**Quality Control****10 Hrs**

4.1 Importance of quality control in plate making

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

Unit 05**Plate Making Department and Storage Conditions****09 Hrs**

5.1 Room layout, lighting, ventilation, flooring, air conditioning, temperature and humidity, coloring, waste disposal

5.2 Storing methods, care and precaution, dark reaction, shelf life and pot life.

Suggested Readings:

Sr. No.	Author	Title of Book	Publishers name
1	Helmuth Kipphan, (2000)	Handbook of Print Media	Springer, Heidelberg
2	Daniel G. Wilson	Sheet Fed- Press Operating	(2003), 5 th Edition, GATF press USA
3	C.S. Mishra	Technology of Offset Printing	1 st 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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**Syllabus of S. Y. B.VOC Printing Technology
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Semester – III	PAPER – II
Course Code: BVOG 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 01 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 02 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.

5.1 Auxiliary equipment used on web offset presses: remoisturizer 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), 5 th Edition, GATF press USA
4	C.S. Mishra	Technology of Offset Printing	1 st 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 01 Introduction to Ink Technology 12 Hrs**

- 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:
 - 1.3.1 Pigment: pigment function, types: organic, inorganic, white, black, extenders, pigment properties
 - 1.3.2 Vehicles - Function &Types - Drying vehicles, Non Drying vehicles
 - 1.3.3 Resins -Natural resins, Synthetic Resins
 - 1.3.4 Solvents - Hydrocarbons, Aliphatic, Alcohols, Wash up solvents
 - 1.3.5 Additives - Plasticizers, Waxes, wetting agents, Anti set off compounds, Shortening compounds, Reducers, Stiffening agents, Driers - Liquid driers, Paste driers, Inhibitors, Accelerators

Unit 02**Inks for Different Printing Process****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 03**Manufacturing and Drying Methods in Ink Manufacturing****12 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 04**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 modulus.

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 05**Testing Methods of Printing Ink****12 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. Elderred	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

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

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

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Semester – III	PAPER – V
Course Code: BVOC PT 305 P	Title of the Course: SHEETFED 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.

List of Exercises

1. Setting of feeder unit in single color offset printing process.
2. Setting of Delivery unit in single color offset printing process.
3. Setting of ink duct and ink tracking path in inking unit of single color offset printing process.
4. Setting of Dampening system
5. To measure and prepare the fountain solution
6. Mounting of plate
7. Mounting of blanket on blanket cylinder
8. Make ready procedure for single color printing
9. Two color printing with perfect registration
10. Cleaning of inking and dampening unit

11. Troubleshooting

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Semester – III	PAPER - VI
Course Code: BVOG 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.

List of Exercises

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 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.
3. 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.
4. Take a wet color sample and match the color using any substrate, write down the ratio of colors used. Attach a drawdown.
5. Take a wet color sample and match the color using any substrate, write down the ratio of colors used. Attach a drawdown.

6. Take a PANTONE process color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
7. Take a PANTONE process gray color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
8. Take a PANTONE SPOT Color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
9. Take a PANTONE Metallic color and match the color using substrate, write down the ratio of colors used. Attach a drawdown.
10. 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.

List of Exercises

1. Find a cost of total paper required (quantity wise) if a job is getting printed by offset printing technology.
2. Find a cost of total ink required (quantity wise) if a job is getting printed by offset printing technology.
3. Find a machine cost required (quantity wise) if a job is getting printed by offset printing technology.
4. Find a labor cost required (quantity wise) if a job is getting printed by offset printing technology.
5. 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.).
6. 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.).

7. Find a cost for Design (Prepress Cost) required (Consider any printing process).
8. Find a cost for finishing operations (post press cost) required (Consider any printing and finishing process).
9. 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.
10. 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):

- 1 Students should visit and work full 15 days, 5 hours each day on field suggested or appointed by college authority.
- 2 Students should complete given task by company/ printing press/establishment.
- 3 At last students have to produce field work report including attendance report signed by concerned authority.
- 4 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 listening 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: I

(10)

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: II**(10)**

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:III INTERVIEW TECHNIQUES**(10)**

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 Regents.
4. Hamp-Lyons, L. and B. Heasley, 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

SEMESTER – IV

Unit 02**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****12 Hrs**

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. Major operations performed in binding- pre-forwarding and forwarding, Detailed study of pre-forwarding operation- jogging & knocking, removing mis-registered 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, 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****12 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

Unit 2 **Package Design & Marketing** **16 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** **16 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****04 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

Unit 02 **Flexography: Print Unit & Ink Metering** **14 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 03 **Inking and Drying System of Gravure & Flexography** **10 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 04 **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 05**Direct Imaging (Digital Printing)****12 Hrs.**

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

**Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar (Autonomous)**

**Syllabus of S. Y. B.VOC Printing Technology
under
Faculty of Science**

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

1. To prepare folded signatures using right angle folds - Folding - standard folding schemes up to 16 pages.
2. To prepare folded signatures using zigzag folds and other types of folding styles
3. Loose leaf binding method: spiral binding, wiro binding.
4. To prepare saddle stitched booklet
5. To prepare side stitched booklet
6. Perform Perforation and numbering
7. Preparing a quarter bound cut flush book using French sewing
8. Preparation of quarter bound tuned-in book using tape sewing
9. Preparing a half bound old style book using recessed cord sewing
10. Preparation of full bound new style book using raised cord sewing
11. Preparing a case bound book
12. 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

1. Page layout software introduction
2. Creating templates/master page for the given layout (setting grid, margin and columns)
3. Importing, linking and saving files for text and graphics
4. Print, proof and correct the saved page
5. Creating Title Page
6. Creating Style Sheets and table of contents
7. Designing Bills/ vouchers
8. Designing 20 page book using master page with all the margins & linking text and graphics.
9. Designing Newspaper cover page and inside pages.
10. Designing Brochure
11. 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

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

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**Syllabus of S. Y. B.VOC 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.

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.

Course Outcomes (COs):

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

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Syllabus of S. Y. B.C.A. Science
Under
Faculty of Science

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:

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 Groupblogs, Corporate or Organisational 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 – PictureMessages

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