

Department of Printing Technology ,
New Arts, Commerce and Science College, Ahmednagar(Autonomous) NEP 2.0

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce, and Science College
Ahmednagar (Autonomous)
(Affiliated to Savitribai Phule Pune University, Pune)



National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Framework
B.Voc Printing Technology

Implemented from
Academic Year 2024-25

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

Board of Studies in B.Voc Printing Technology

Sr. No.	Name	Designation
1.	Prof. Priyamvada U. Patil	Chairman
2.	Hon.Prof.A.D.Gangarde	Member
3.	Hon.Prof.Abhijeet Jadhav	Member
4.		Member
5.		Member
6.	Hon. Dr.Kamal Chopra	Academic Council Nominee
7.	Hon.Prof.Parag Hase	Academic Council Nominee
8.	Hon.Prof.Madhura Mahajan	Vice-Chancellor Nominee
9.	Hon.Mr.Vineet Chahajed	Alumni
10.	Hon.Mr.Narendra Firodia	Industry Expert

1. Prologue/ Introduction of the programme:

2. 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.
3. This program aims to :

4. 1:To provide teaching/learning facilities in Printing Technology for easy adaptation to Printing industry and higher Education.
5. 2:Provide a platform for self learning to meet the challenges of changing technology .
6. 3:Inculcate Ethical values, Entrepreneur and Encourage innovation, team spirit and leadership qualities to succeed in professional career.
7. 4:Comprehend the societal needs and environmental concerns in the field of Printing Technology.
8. 5:Every student is exposed to the computer lab at the I & II Semesters itself in order to familiarize himself with skills required for keyboard/mouse operation, Internet usage and e-mailing.

2. Programme Outcomes (POs)

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. On completion of the Course students will :

- 1: Get Knowledge of pre-press technology, offset printing process, printing material science, packaging technology with the practical aspects involved with it.
- 2: Have the skill of Offset printing process and they will reach the level of Diploma in printing Tech.
- 3: Get knowledge about digital pre-press technology, Gravure printing process, screen,

sublimation printing process, packaging technology, Computer science applicable to printing with the practical aspects involved with it.

- 4: Be involved in projects right from project planning to final outcome ready for client Delivery.
- 5: Develop Entrepreneurship skills. Student can gain the skills of setting up their own business.

B. Voc. Printing Technology Programme Framework: Credit Distribution

Level / Difficulty	Sem	Subject-1 (Selected as Major)						Subject-2		Subject-3		(SEC)	GE/OE		IKS	AEC	VEC	CC	Total
		T		P				T	P	P	T	P	T	P					
Certificate 4.5 / 100	I	02		02				02	02	02	02	-	02		02	02	02	02	22
	II	02		02				02	02	02	02	02	-	02	--	02	02	02	22
		Credits Related to Major						Selected as Minor											
		Core		Elective		VSC	FP / OJT/ CEP/RP												
		T	P	T	P	P	P	T	P	-	P	T	P	-	-	-	-	-	
Diploma 5.0 / 200	III	04	02	--		02	02	02	02	-	02	02		-	02	-	02	22	
	IV	04	02	--		02	02	02	02	-	02		02	--	02	-	02	22	
Degree 5.5 /300	V	06	04	02	02	2	2	02	-	-	-	-		02	-	-	-	22	
	VI	06	04	02	02	2	4	02	-	-	-	-		-	-	-	-	22	
Total		24	16	04	04	08	10	10	08	04	04	06	08	04	08	04	08	132	
6.0/400 Honours	VII	08	06	02	02	-	RM-04											22	
	VIII	08	06	02	02		OJT-04											22	
6.0/400 Honours with Research	VII	06	04	02	02		RM-04 RM-04											22	
	VIII	06	04	02	02		RM-08											22	
Total		40/36	28/24	08	08	08	18/26	10	08	04	04	06	04	04	04	08	04	08	176

B. Voc. Printing Technology Programme Framework: Course Distribution

Level / Difficulty	Sem	Subject-1 (Selected as Major)						Subject-2		Subject-3		(SEC)	GE/OE		IKS	AEC	VEC	CC	Total
		T		P				T	P	P	T	P	T	P					
Certificate 4.5 / 100	I	01		01				01	01	01	01	-	01		01	01	01	01	11
	II	01		01				01	01	01	01	01	-	01	--	01	01	01	11
		Credits Related to Major						Selected as Minor											
		Core		Elective		VSC	FP / OJT / CEP / RP												
		T	P	T	P	P	P	T	P	-	P	T	P	-	-	-	-	-	
Diploma 5.0 / 200	III	02	01	--		01	FP-01	01	01	-	01	01		-	01	-	01	11	
	IV	02	01	--		01	CEP-01	01	01	-	01		01	--	01	-	01	11	
Degree 5.5 / 300	V	03	02	01	01	01	FP-01	01	-	-	-	-		01	-	-	-	11	
	VI	03	02	01	01	01	OJT-01	01	-	-	-	-		-	-	-	-	10	
Total		12	08	02	02	04	04			02	02	03	04	02	04	02	04	65	
6.0/400 Honours	VII	03	03	01	01	-	RM-01											09	
	VIII	03	03	01	01		OJT-01											09	
6.0/400 Honours with Research	VII	02	02	01	01		RM-01 RM-01											08	
	VIII	02	02	01	01		RM-01											07	
Total		18/16	14/12	04	04	04	06/07	06	04	02	02	03	04	02	04	02	04	83/80	

B. Voc. Printing Technology: Credit and Course Distribution in Brackets

Level / Difficulty	Sem	Subject-1							Total
		T		P					
4.5	I	02 (01)		02 (01)					04(02)
	II	02 (01)		02 (01)					04(02)
		Credits Related to Major							
		Core		Elective		VSC	FP / OJT/ CEP	IKS	
		T	P	T	P	P	P	T	
5.0	III	04(02)	02(01)	--		02(01)	FP-02(01)		10(05)
	IV	04(02)	02(01)	--		02(01)	CEP-02(01)		10(05)
5.5	V	06(03)	04(02)	02(01)	02(01)	02(01)	FP-02(01)	02(01)	20 (10)
	VI	06(03)	04(02)	02(01)	02(01)	02(01)	OJT-04(01)		20(09)
Total		12	08	(02)	(02)	04	04	(01)	33
6.0	VII	03	03	(01)	(01)	-	RM-04(01)		22(09)
	VIII	03	03	(01)	(01)		OJT-04(01)		22(09)
6.0	VII	(02)	(02)	(01)	(01)		RM-04(01) RP-04(01)		22(08)
	VIII	(02)	(02)	(01)	(01)		RM-08(01)		22(07)
		18/16	14/12	04	04	04	06/07	(01)	51/48

Programme Framework (Courses and Credits): B.Voc. Printing Technology

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	DSC-01	BVC 111T	Fundamentals of Printing Technology	02
2.	I	I	4.5	DSC-02	BVC 112P	Laboratory on Offset Machines	02
3.	I	II	4.5	DSC-03	BVC 121T	Sheet-fed Offset Printing Process	02
4.	I	II	4.5	DSC-04	BVC 122P	Laboratory on Screen Printing	02
5.	II	III	5.0	DSC-05	BVC 231T	Gravure and Flexography Printing Process	02
6.	II	III	5.0	DSC-06	BVC 231T	Web offset Printing Process	02
7.	II	III	5.0	DSC-07	BVC 231P	Laboratory on Gravure Printing Process	02
8.	II	III	5.0	VSC-01	BVC 234P	Laboratory on Advance Screen Printing	02
9.	II	III	5.0	FP-01	BVC 235T	Field Project-01	02
10.	II	IV	5.0	DSC-08	BVC 241T	Digital Printing and Basics of Color	02
11.	II	IV	5.0	DSC-09	BVC 242T	Basic Packaging Technology	02
12.	II	IV	5.0	DSC-10	BVC 243P	Laboratory on Digital Printing	02
13.	II	IV	5.0	VSC-02	BVC 243T	Laboratory on Basic Packaging Technology	02
14.	II	IV	5.0	CEP-01	BS-ZO 245P	Community Engagement Project	02
15.	III	V	5.5	DSC-11	BVC 351T	Print Finishing	02
16.	III	V	5.5	DSC-12	BVC 352T	Color Science and Measurement	02
17.	III	V	5.5	DSC-13	BVC 353T	Security Printing	02
18.	III	V	5.5	DSC-14	BVC 354P	Laboratory on Print Finishing	02
19.	III	V	5.5	DSC-15	BVC 355P	Laboratory on Color Science and Measurement	02
20.	III	V	5.5	DSE-01	BVC 356T	Advertising and Multimedia	02
21.	III	V	5.5	DSE-02	BVC 357P	Laboratory on Advertising and Multimedia	02
22.	III	V	5.5	VSC-03	BVC 358P	Laboratory on Security Printing	02
23.	III	V	5.5	FP-02	BVC 359P	Field Project-02	02
24.	III	V	5.5	IKS-02	BVC 360T	IKS (Major Specific)	02

25.	III	VI	5.5	DSC-16	BVC 361T	Material Science	02
26.	III	VI	5.5	DSC-17	BVC 362T	Package Design and Development	02
27.	III	VI	5.5	DSC-18	BVC 363T	Copyright and Ethics	02
28.	III	VI	5.5	DSC-19	BVC 364P	Laboratory on Paper and Ink Testing	02
29.	III	VI	5.5	DSC-20	BVC 365P	Laboratory on Cost and Estimation	02
30.	III	VI	5.5	DSE-03	BVC 366T	Electronic Publishing	02
31.	III	VI	5.5	DSE-04	BVC 367P	Laboratory on Electronic Publishing	02
32.	III	VI	5.5	VSC-04	BVC 368T	Laboratory on Package Designing and Development	02
33.	III	VI	5.5	OJT-01	BVC 369T	On Job Training	04

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

B.Voc. Printing Technology

Title of the Course: Fundamentals of Printing Technology							S1	
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-01	BVC 111T	02	00	02	30	15	35	50

Learning Objectives:

1. The primary goal is to prepare students for a successful professional career in the Printing Technology.
2. To get good knowledge of printing process. During the course we can learn various types of printing process, methods of surface preparation, color theory, proofing techniques etc.
3. Also you can learn different types of new devices used in printing technology like image setter.

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	07 Hrs.
Printing – Definitions, Brief History and Introduction Pre-Press - Printing Workflow, Typography, 2D and 3D Typefaces, Family, Series of Type, Legibility and Readability of Type, Type Measurement, Type Alignment and Arrangement, DTP, Camera Processing, Types of Originals, Conversion to Film Output - Negative, Positive and Tracing, CTP Technology Press		
Unit 2	Printing Principals	08 Hrs.
Press: 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.		

Post-Press - Binding Techniques, Hard Binding, Paperback Binding, Mechanical Loose Leaf Binding, Finishing Techniques such as Punching, Embossing, Foiling, Lamination, Varnishing, Spot UV		
Unit 3	Offset & Screen Printing	09 Hrs.
<p>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.</p> <p>Screen Printing Process: Basics of Screen Printing –Introduction to Screen Printing, Important Elements Affecting the Process, Frames - Purpose and Requirements , Types of Materials, Types of Sections, Frame Size Selection Criteria, Squeeze – Purpose and Requirements, Types of Squeezes, Applications</p>		
Unit 4	Basics of Design, Layout and Color	06 Hrs.
<p>Design - Introduction to Graphic Design, Fundamentals of Design, Principles of Design Layout – Purpose and Advantages, Layout Styles, Layout Components, Stages in Preparing a Layout, Marking-Up, Dummy, Stages of Layout, Thumbnails, Rough Layout, Comprehensive Layout.</p> <p>Color - Definition of Color, Light, Electromagnetic Spectrum, Additive Color Theory, Subtractive Color Theory</p>		
<p>Unit 5 Printing Materials</p> <p>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.</p> <p>Imposition; definition, classification and general rules, regular schemes up to 16 page.</p>		

Suggested Readings/Material:

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	

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

B.Voc. Printing Technology

Title of the Course: Laboratory on Offset Machines						S1 Lab		
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-02	BVC 112P	00	02	02	60	15	35	50

Learning Objectives:

1. Define the offset printing technique
2. Explain the importance of the services before printing
3. Explain the importance of graining plate surfaces
4. Explain important point about printing plate exposing system and printing plate exposing standardization
5. Explain the roles of printing fountain solution and water pH

Course Outcomes (Cos):

After Completion of the course student will gain knowledge in :

1. Offset Printing Production
2. Exposing system methods of plate, and plate exposing standardization
3. Paper of Offset printing and Types of offset printing inks
4. Web offset and sheet feed offset printing machines
- 5.

Detailed Syllabus:

Assignment 1	Introduction of Offset Machine	12 Hrs.
<ol style="list-style-type: none"> a) Introduction to offset machine. b) Feeder setting for various stocks. c) Mounting of plate with packing. d) Mounting of blanket with packing. 		
Assignment 2	Offset Printing Principals	16 Hrs.
<ol style="list-style-type: none"> a) Gripper setting of impression cylinder. b) Setting of dampening roller. c) Preparation of fountain solution. d) Cleaning & washing of Dampening and Inking system. 		
Assignment 3	Machine Settings and Printing	12 Hrs.

a) Inking unit setting according to job. b) Setting – joggers, skeleton wheels, delivery anti set-off spray. c) Single Color printing.		
Assignment 4	Multicolor printing and Trouble shooting	10 Hrs.
a) Multicolor printing. b) Troubleshooting c) Registration		
Assignment 5	Skills On Offset	10 Hrs.
a) Printing on both sides of sheet. b) Maintenance of entire offset machine c) Registration for Multicolor printing.		

Suggested Readings/Material:

Sr. No	Title	Author	Publisher
1	Offset Masters	Sheinjor	Sulekha publishers
2	Rides on Offset	C.D Onirona	Nitin publishers
3	Offset Printing B. D. Mendiratta	B. D. Mendiratta	

S-2 - 1T & 1P BCA - ICT (T&P)

S-3 - From Communication Studies (BVC-JM 111T – Introduction to Comm. Studies
& BVCJM -112P – Media Skills)

SEC- P –NA

GE/OE- Depends on students

IKS - 01

AEC- English

VEC – 01

CC- 01

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Syllabus

B.Voc. Printing Technology

Title of the Course: Ink Technology							S1	
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-03	BVC 121T	02	00	02	30	15	35	50

Learning Objectives:

1. A process in which the image is in relief above a printing plate, and ink applied to the plate.
2. Ink is manufactured in two stages: first varnish (a mixture of solvent, resins and additives) is made and then pigments are mixed into it.
3. Varnish is a clear liquid that solidifies as a thin film.

Course Outcomes (Cos)

1. Ink Manufacturing Production
2. Ink Mixing and Shade Matching
3. Panton Matching types of Shades

Detailed Syllabus:

Unit 1	Introduction to Ink Technology	08 Hrs.
<p>1.1 Different types of printing processes,</p> <p>1.2 Types of inks used for printing processes: Liquid inks and paste inks</p> <p>1.3 Raw materials used in an ink:</p> <p>1.3.1 Pigment: pigment function, types: organic, inorganic, white, black, extenders, pigment properties</p> <p>1.3.2 Vehicles - Function &Types - Drying vehicles, Non Drying vehicles</p> <p>1.3.3 Resins -Natural resins, Synthetic Resins</p> <p>1.3.4 Solvents - Hydrocarbons, Aliphatic, Alcohols, Wash up solvents</p> <p>1.3.5 Additives -, Waxes, wetting agents, Anti set off compounds, Shortening compounds, Reducers, Plasticizers Stiffening agents</p> <p>1.3.6 Driers - Liquid driers, Paste driers, Inhibitors, Accelerators</p>		
Unit 2	Inks for Different Printing Processes	08 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 of Printing Ink	04 Hrs.
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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 Inks	07 Hrs.
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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 5	Testing Methods Of Printing Ink	03 Hrs.
<p>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.</p> <p>5.3 Quality Control for Paste and Liquid inks.</p> <p>5.4 Troubleshooting in various printing processes.</p>		

Suggested Readings/Material:

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 Manual	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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Syllabus

B.Voc. Printing Technology

Title of the Course: Laboratory Ink Mixing and Shade Matching							S1 Lab	
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-04	BVC 122P	00	02	02	60	15	35	50

Learning Objectives:

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

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

Detailed Syllabus:

	Assignments	60Hrs.
	<ol style="list-style-type: none"> 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.

S-2 - BCA –Web Designing

S-3 - From Communication Studies (BVC-JM 121T – Visual Communication
& BVC-JM -112P – Mobile Photography)

SEC – 01 – Laboratories on Screen Printing

GE/ OE – P Only – Depends on students

IKS – NA

AEC- 01 English

VEC – 01 –

CC – 01 -