

**Curriculum
of
Diploma Programme
in
Printing Technology**



**State Board of Technical Education (SBTE)
Bihar**

Semester – III

Teaching & Learning Scheme

Board of Study	Course Codes	Course Titles	Teaching & Learning Scheme (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
	2427301	Printing Process - I	3	-	4	2	9	6
	2427302	Printing Material Science	3		-	4	7	5
	2427303	Graphic Design and Typography	3	-	-	2	5	4
	2427304	Paper & Ink Technology	3	-	4	2	9	6
	2427305	Letter Assembly	3	-	4	2	9	6
	2400207	Indian Constitution	1	-	-	-	1	1
	2400108	Essence of Indian Knowledge System and Tradition	1	-	-	-	1	1
	2400110	Community/ Society Development	1	-	-	-	1	1
Total			18		12	12	42	30

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial(T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, work shop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits= (1x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.
For Non exam course institute have option to choose any one course (Cisco/KYP/ST)

Semester - III

Assessment Scheme

Board of Study	Course Codes	Course Titles	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term work& Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
	2427301	Printing Process - I	30	70	20	30	20	30	200
	2427302	Printing Material Science	30	70	20	30			150
	2427303	Graphic Design and Typography	30	70	20	30			150
	2427304	Paper & Ink Technology	30	70	20	30	20	30	200
	2427305	Letter Assembly	30	70	20	30	20	30	200
	2400207	Indian Constitution	25	-	25	-			50
	2400108	Essence of Indian Knowledge System and Tradition	25	-	-	-	-	-	25
	2400110	Community/ Society Development	25	-	-	-	-	-	25
Total			225	350	125	150	60	90	1000

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

- ETA & ELA are to be carried out at the end of the term/ semester.
- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- A) **Course Code** : 2427301(T2427301/P2427301/S2427301)
- B) **Course Title** : Printing Process - I
- C) **Pre-requisite Course(s)** : NA
- D) **Rationale** :

This subject deals with the Historical developments in printing technology as well as to impart the basic knowledge of Printing processes and classifications of types of printing machines. It helps to identify the suitable printing process for the assigned jobs as well as elaborate the career in Printing Technology.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/industry.

After completion of the course, the students will be able to-

- CO-1 Historical Background of Printing Technology.
- CO-2 Introduction of Various Printing Processes.
- CO-3 Classifications of Printing M/c and its Principles.
- CO-4 Introduction of Tools & Equipment's used for Printing Processes.
- CO-5 Careers in Printing Technology.

- F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional.

- G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+ SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
Printing Technology	2427301	Printing Process - I	03	-	04	02	09	06

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
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Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

H) Assessment Scheme:

Board of Study	Course Code	Course Title	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term Work & Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
Printing Technology	2427301	Printing Process - I	30	70	20	30	20	30	200

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

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- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- I) Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

J) Theory Session Outcomes (TSOs) and Units: T2427301

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO1.1 Explain about the step by step historical developments in printing history.	Unit 1.0 - Historical Background of Printing Tech. 1.1 Historical Background of Printing Technology	CO1
TSO 2.1 Explain the various types of printing process. TSO 2.2 Explain about Relief printing process and its types. Letterpress, Flexo and others types. TSO 2.3 Explain about Planography printing process and its types like Lithography and Offset. TSO 2.4 Explain about Intaglio printing process and its types like sheet fed and Roto Gravure. TSO 2.5 Explain about Screen printing process and preparation of stencil process. TSO 2.6 Explain about Pre -make-ready and make-ready operations in various printing process. TSO 2.7 Explain about the selection of suitable printing process for assigned jobs.	Unit 2.0 – Introduction of Various Printing Processes and make-ready operations 2.1 Relief Printing Process 2.2 Planography Printing Process 2.3 Intaglio Printing Process, 2.4 Screen Printing Process. 2.5 Digital printing 2.6 Pre -make-ready and make-ready operations. 2.7 Selection of suitable printing process .	CO2
TSO 3.1 Explain the classification of letterpress Ptg machines; like Plane to Plane, Plane to Cylinder and Rotary type, TSO 3.2 Describe the types of offset press like Sheet fed and web fed presses. Same like in Gravures presses also. TSO 3.3 Explain about Types of Flexo machines like, In-line, Stack and CI – Press. TSO 3.4 Describe the unwinder, rewinder and printing units in details for Flexo and Gravure presses.	Unit 3.0 – Classifications of Printing M/c and its Principles: 3.1 Classification of Letterpress printing machines and their Principles. 3.2 Classification of Offset & Gravure printing machines. 3.3 Classification of Flexo printing machines. 3.4. Unwinding and rewinding and printing units of Flexo and Gravure Printing M/c.	CO3
TSO4.1 Explain about various tools used in printing departments.. TSO4.2 Explain about various Equipment's used in printing departments..	Unit 4.0 – Introduction of Tools & Equipment's used for Printing Processes 4.1 Tools used in printing department. 4.2 Equipment's used in printing department	CO4
TSO 5.1 Describe about various aspect and scope in Printing Technology TSO 5.2 Explain about the job scope of Printing Technology in Private sector, Public Sector and Governments sectors. TSO 5.3 Explain about the Ptg. Industries and positions to be achieve by Printing Technologist	Unit 5.0 – Careers in Printing Technology 5.1 Careers in operating of Printing M/c & Equipment's. 5.2 Supervisor level at Printing Houses, Publishing houses, Advertising agencies, Print Media Industries, Packaging Industries and a lot more 5.3 Managements & Top level managements careers in printing and allied Trades. 5.4 Governments Jobs in various sectors like, Security press, Mint, state & Centre university press, state & Centre Government press, DRDO, Teaching and many mores.	CO5

Note: One major TSO may require more than one theory session/ period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2427301

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/ Practical Titles	Relevant Cos Number (s)
LSO 1.0 Students will be able to know about types of Printing Process and Suitability of jobs to specific printing process	1.	Types of printing, identification and decision of appropriate printing for assigned job	CO2
LSO 2.0 Students will be hands on about screen printing process to print Visiting cards, Letterheads and Marriage cards etc.	2.	Printing through Screen printing Process	CO2
LSO 3.0 Students will be able to identify the tools and equipment's to be used in which printing Process.	3.	Familiar with Tools & Equipment used in specific Printing Process	CO4

L) Suggested Term Work and Self-learning: S2427301 Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. Assignments: Questions/ Problems/ Numerical/ Exercises to be provided by the course teacher in line with the targeted COs.

1. Questionnaire about Historical development in printing Technology.
2. Enlist the Tools and materials required for screen printing by Manual process.
3. Write the step by step process involved to print the visiting card /Letter heads by screen printing process.

b. Micro Projects:

1. Print Visit card and Letter Heads by Screen printing process.
2. Prepare the presentation (PPT) of Types of Printing process.
3. Prepare the presentation (PPT) of Types of Printing Machines.

c. Other Activities:

1. Seminar Topics:
 - Historical Developments of Printing
 - Types of printing Process.
 - Classification of Printing Machines
 - Careers in Printing Technology
2. Visits: Visit nearby Printing Presses to know about the various steps of printing process and how to execute to reproduce a Job in the press.
3. Self-learning topics:
 - Easily identify the suitability of printing process for the assigned Jobs.
 - Hands on exposure to print the jobs through Screen printing Process.

- M) Suggested Course Evaluation Matrix:** The Course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate CO attainment.

COs	Course Evaluation Matrix						
	Theory Assessment(TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Semester Test	End Theory Assessment (ETA)	Term Work & Self-Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	15%	10%	15%	-	-	10%	20%
CO-2	25%	25%	25%	25%	25%	10%	20%
CO-3	20%	20%	25%	25%	25%	40%	20%
CO-4	20%	20%	15%	25%	25%	20%	20%
CO-5	20%	25%	20%	25%	25%	20%	20%
Total Marks	30	70	20	20	10	20	30
			50				

Legend:

*: Other Activities include self- learning, seminar, visits, surveys, product development, software development etc.

**: Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

- N) Suggested Specification Table for End Semester Theory Assessment:** Specification table represents the reflection of sample representation of assessment of cognitive domain of full course.

Unit Title and Number	Total Classroom Instruction (CI) Hours	Relevant COs Number (s)	Total Marks	ETA (Marks)		
				Remember (R)	Understanding (U)	Application & above (A)
Unit 1.0 - Historical Background of Printing Technology	05	CO1	08	4	4	0
Unit 2.0- Introduction of Various Printing Processes	14	CO2	20	8	8	4
Unit 3.0 - Classifications of Printing M/c and its Principles.	14	CO3	20	7	7	6
Unit 4.0- Introduction of Tools & Equipment's used for Printing Processes.	10	CO4	12	4	4	4
Unit 5.0 - Careers in Printing Technology.	5	CO5	10	4	3	3
Total	48	-	70	27	26	17

Note: Similar table can also be used to design class/ mid-term/ internal question paper for progressive assessment.

O) Suggested Assessment Table for Laboratory (Practical):

S. No.	Laboratory Practical Titles	Relevant Cos Number (s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
1.	Students will be able to know about types of Printing Process.	CO2	60	30	10
2.	Students will be able to understand the suitability of printing process for particular jobs.	CO2	40	50	10
3.	Students will be hands on about screen printing process to print Visiting cards, Letterheads and Marriage cards etc.	CO2	50	40	10
4.	Students will be able to identify the tools and equipment's to be used in which printing Process.	CO4	30	60	10

Legend:

PRA*: Process Assessment

PDA**: Product Assessment

Note: This table can be used for both end semester as well as progressive assessment of practical. Rubrics need to be prepared by the course teacher for each experiment/ practical to assess the student performance.

- P) Suggested Instructional/ Implementation Strategies:** Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/ outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Portfolio Based Learning, Role-Play, Live Demonstrations in Classrooms, Lab, Field, Information and Communications Technology (ICT) Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Sessions, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

Q) List of Major Laboratory Equipment, Tools and Software:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/ Practical Number
1.	a. Offset Printing Machine b. Flexo Printing Machine c. Gravure Printing Machine	All three machines required to understand the types of printing process a. Offset printing machine of 18*24 size. b. Flexo machine of 32" size c. Gravure Printing Machine of 22" size.	1
2	Screen Printing Machine,	Students hands on about screen printing process and machines. Required Semi-automatic machine of 15*20 size or Materials for Manual screen printing Process to print Visiting Cards, Letter Heads and Marriage Cards	2

R) Suggested Learning Resources:**(a) Books:**

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Letter Press Printing Part 1, 2	C.S. Misra	Anupam Prakashan, Shivakuti, Allahabad
2.	Technology of Offset Printing	C.S. Misra	Anupam Prakashan, Shivakuti, Allahabad
3	Printing Technology	Adams, Faux	
4.	Writing for the Web: A Practical Guide	Cynthia L. Jeney	

(b) Online Educational Resources:

1. <https://youtu.be/fsoQaCuc-Tk?si=vGRkttX-2T-0ji1C>
2. <https://youtu.be/TAO4mIYnCw?si=MNZINwU-wF1mlaX6>
3. <https://printwiki.org>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. Lithographers Manual
2. Handbook of Print Media

- A) **Course Code** : 2427302(T2427302/S2427302)
- B) **Course Title** : Printing Material Science
- C) **Pre-requisite Course(s)** : NA
- D) **Rationale** :

This subject deals with the Different types of printing materials used in Printing Industry. The subject will make the student to learn about the chemical reaction involved in various stage of reproduction photography and Surface preparations.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/industry.

After completion of the course, the students will be able to-

- CO-1 Materials used in Printing Technology.
- CO-2 Photographic Films and Photographic Materials.
- CO-3 Uses of Light sensitive materials for surface preparations.
- CO-4 Polymers and colloids
- CO-5 Acids, Alkalis and pH

- F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

- G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
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Printing Technology	2427302	Printing Material Science	03	-	-	04	7	05

Legend:

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Printing Technology	2427302	Printing Material Science	30	70	20	30	-	-	150

Legend:

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J) Theory Session Outcomes (TSOs) and Units: T2427302

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO1.1 Explain about materials used for surface preparation in Relief Process Like: Metal alloys, Zn, Cu for Blocks, Stereo and electro Plates TSO1.2 Explain about materials used for surface preparation in Planography Plates: ZN, AL, Bimetallic and Tri-metallic, PS plates, Photo polymer TSO1.3 Explain about materials used for surface preparation in Intaglio: Metal used for Gravure Cylinder and Plating. TSO1.4 Explain about Material Used for other Process Ex. Flexo, Screen and Dry offset. TSO1.5 Explain about materials specification like hardness, specific gravity, and metallurgy property.	Unit 1.0 - Materials used in Printing Technology. 1.1 Relief Process : Metal alloys, Zn, Cu for Blocks, Stereo and electro Plates 1.2 Planography Plates: ZN, AL, Bimetallic and Tri-metallic, PS plates, Photo polymer. 1.3 Intaglio: Metal used for Gravure Cylinder and Plating. 1.4 Material Used for other Process Ex. Flexo, Screen and Dry offset.	CO1
TSO 2.1 Explain the various types of Photographic Films. TSO 2.2 Explain about various layers of Films structure, TSO 2.3 Explain about Dark reaction on Photographic films. TSO 2.4 Explain about emulsion and its properties. TSO 2.5 Explain about developers and its reactions on films. TSO 2.6 Explain about Developer solution ingredients and its reactions. TSO 2.7 Explain about the chemical used for treatments.	Unit 2.0 Photographic Films and Photographic Materials 2.1 Types and layers of Photographic Films. 2.2 Basic ingredients of emulsion and their functions 2.3 Emulsion process, Control of sensitometric quality and its property, Emulsion structure. 2.4 Developer ingredients and their functions 2.5 Chemicals for after Treatments.	CO2
TSO 3.1 Explain Light sensitive material used for Relief plates TSO 3.2 Light sensitive material used for offsets plates. TSO 3.3 Light sensitive material used for Gravure Cylinder preparations. TSO 3.4 Light sensitive material used for stencil preparation.	Unit 3.0 – Uses of Light sensitive materials for surface preparations 3.1 Light sensitive material used for Relief plates. 3.2 Light sensitive material used for offsets plates. 3.3 Light sensitive material used for Gravure Cylinder preparations. 3.4. Light sensitive material used for stencil preparation.	CO3
TSO4.1 Explain about various Types of Polymers. TSO4.2 Explain about Types of Polymerization Reactions. TSO4.3 Explain about Types of Polymers used in Printing Industries. TSO4.4 Explain about Applications of Colloids used in Printing Industries. TSO4.5 Explain about Preparation of Colloids.	Unit 4.0 Polymers and colloids 4.1 Monomers and Polymers, Homo polymers and Co-polymers. 4.2 Types of Polymerization reaction: Addition Polymerization and condensations Polymerizations. 4.3 Types of Polymers : Plastic, Rubbers and Fibers 4.4 Application of Polymers in Printing: Ink, Resin, Vehicles, Adhesive, Cellulose Films. 4.5 Colloids: characteristics, methods of preparation and properties. 4.6 Application of Colloids materials in Printing Industries.	CO4

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO 5.1 Describe about PH Scale, range of acidity and alkalinity. TSO 5.2 Explain about the Uses of PH meter to measure of fountain solutions data. TSO 5.3 Explain about the Used of PH in paper, Ink and Adhesive	Unit 5.0 – Acids, Alkalies and pH 5.1 PH Scale, range of acidity and alkalinity. 5.2 Uses of PH meter to measure of fountain solutions data. 5.3 Used of PH in paper, Ink , Adhesive	CO5

Note: One major TSO may require more than one theory session/ period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: NA

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/ Practical Titles	Relevant Cos Number (s)

L) Suggested Term Work and Self-learning: S2427302 Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. Assignments: Questions/ Problems/ Numerical/ Exercises to be provided by the course teacher in line with the targeted COs.

1. Questionnaire about Various Metals used for surface preparations with their properties.
2. Ink and water balance in offset printing.
3. Reaction of Developers in Photographic Films.

b. Micro Projects:

1. Stencil preparation with for Screen printing
2. Titration Project of PH and conductivity in Fountain Solution..

c. Other Activities:

1. Seminar Topics:
 - Types of Light sensitive material used in Printing Industries
 - Colloids used in Printing Industries.
 - Developers Reaction in Photographic Films.
2. Visits: Visit nearby Printing Presses to know about the preparation of surface for printing and also be familiar about Fountain Titration process.
3. Self-learning topics:
 - Learning about various types of light sensitive coating for surface preparation.
 - Self-learning about Colloids and polymers used in Printing Industries.

- M) Suggested Course Evaluation Matrix:** The Course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate CO attainment.

COs	Course Evaluation Matrix						
	Theory Assessment(TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Semester Test	End Theory Assessment (ETA)	Term Work & Self-Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	15%	10%	15%	-	-		
CO-2	25%	25%	25%	25%	25%		
CO-3	20%	20%	25%	25%	25%		
CO-4	20%	20%	15%	25%	25%		
CO-5	20%	25%	20%	25%	25%		
Total Marks	30	70	20	20	10		
			50				

Legend:

*: Other Activities include self- learning, seminar, visits, surveys, product development, software development etc.

**: Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

- N) Suggested Specification Table for End Semester Theory Assessment:** Specification table represents the reflection of sample representation of assessment of cognitive domain of full course.

Unit Title and Number	Total Classroom Instruction (CI) Hours	Relevant COs Number (s)	Total Marks	ETA (Marks)		
				Remember (R)	Understanding (U)	Application & above (A)
Unit 1.0 - Materials used in Printing Technology.	8	CO1	10	4	4	2
Unit 2.0- Photographic Films and Photographic Materials	14	CO2	20	8	8	4
Unit 3.0 - Uses of Light sensitive materials for surface preparations	14	CO3	20	7	7	6
Unit 4.0- Polymers and colloids	6	CO4	10	4	4	2
Unit 5.0 - Acids, Alkalis and pH	6	CO5	10	4	3	3
Total	48	-	70	27	26	17

Note: Similar table can also be used to design class/ mid-term/ internal question paper for progressive assessment.

O) Suggested Assessment Table for Laboratory (Practical): NA

S. No.	Laboratory Practical Titles	Relevant Cos Number (s)	PLA/ELA		
			Performance		Viva- Voce (%)
			PRA* (%)	PDA** (%)	

Legend:

PRA*: Process Assessment

PDA**: Product Assessment

Note: This table can be used for both end semester as well as progressive assessment of practical. Rubrics need to be prepared by the course teacher for each experiment/ practical to assess the student performance.

- P) Suggested Instructional/ Implementation Strategies:** Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/ outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Portfolio Based Learning, Role-Play, Live Demonstrations in Classrooms, Lab, Field, Information and Communications Technology (ICT) Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Sessions, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

Q) List of Major Laboratory Equipment, Tools and Software:NA

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/ Practical Number

R) Suggested Learning Resources:**(a) Books:**

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Material in Printing Process	L C Young	
2.	Material Science	Dr. M Arumugam	
3	Science and Technology of Printing Materials	Prakash Shetty	MJP Publishers

(b) Online Educational Resources:

1. <https://youtu.be/fKV7Waah47Y?si=giG-WCs466XFSwM2>
2. <https://youtu.be/HZXC8N-LmBg?si=g0m5S-tUdBSW6DsR>
3. <https://printwiki.org>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. Printing Technology by Adam Faux
2. Lithographers Manual

- A) **Course Code** : 2427303(T2427303/S2427303)
- B) **Course Title** : Graphic Design and Typography
- C) **Pre-requisite Course(s)** : NA
- D) **Rationale** :

Printing production is based on the proper designing and typographic planning. Introduction of graphic design and typography subject is essential to impart basic knowledge and skills in preparation of layouts, dummy as per requirements.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/industry.

After completion of the course, the students will be able to-

- CO-1** Various Kind of printing products and formats and its design factors.
- CO-2** Design and Typographic Elements
- CO-3** Originals and Illustrative Elements
- CO-4** Introduction of Typography. Selection of Type Face on base of printing surface.
- CO-5** Table and Tabular setting and type setting techniques

- F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

- G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+ SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
Printing Technology	2427303	Graphic Design and Typography	03	-	-	02	05	04

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term Work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits = (1 x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

H) Assessment Scheme:

Board of Study	Course Code	Course Title	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term Work & Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
Printing Technology	2427303	Graphic Design and Typography	30	70	20	30			150

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

- ETA & ELA are to be carried out at the end of the term/ semester.
- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- I) Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

J) Theory Session Outcomes (TSOs) and Units: T2427303

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO1.1 Explain about various types of printed products like: a) Leaflets, Pamphlets, Booklets, Catalogues, Brochures, manuals, Books b) Magazines and Newspapers c) Labels, Cartons, hording, Posters TSO1.2 Factors to be consider in print planning, such as purpose, budget and materials etc.	Unit 1.0 - Various Kind of printing products and formats and its design factors. 1.1 Various types of Printed products and formats 1.2 Factors consider for print planning of printed product such as Budget, purpose of use and type of material selection.	CO1
TSO 2.1 Explain the various types of Design Elements as: Point, Line, white space, shape, size, scale, colour ,tone, shade, Tint, Texture, Patterns, geometrical centers, Optical centers TSO 2.2 Explain about Typographical point of view during design as: Type Face, Type font, Point Size, X- height. TSO 2.3 Explain about Typographical Impact by Legibility and Readability TSO 2.3 Explain about the Logotype, Monogram, Trademark	Unit 2.0 Design and Typographic Elements 2.1 Design elements 2.2 Typographic Elements 2.3 Legibility, Readability 2.4 Logotype, Monogram, Trademark	CO2
TSO 3.1 Explain the types of original; Line original, half tone original and continuous tone original, Black and white and Colour original TSO 3.2 Explain about methods of preparation of line & Continuous tone original. TSO 3.3 Explain about Characteristics of line and continuous tone original TSO 3.4 Explain about various steps involved for improving the quality of Illustration. As Masking, Scaling, Cropping, Retouching And Enlargements.	Unit 3.0 – Originals and Illustrative Elements 3.1 Types of original for Illustration and reproduction. 3.2 Preparation and characteristics of originals. 3.3 Improving quality of Illustrations	CO3
TSO4.1 Explain about Introduction of Typography TSO4.2 Explain about selection of type face and family as per printing process. TSO4.3 Explain about tools and equipment's for type setting as : Types, composing sticks, spacers, thread, camera, Film, Computer	Unit 4.0 Introduction of Typography. Selection of Type Face on base of printing surface. 4.1 Introduction of Typography 4.2 Relationship among type face, printing process and printing substrate.. 4.3 Typesetting material tools and equipment's required.	CO4
TSO 5.1 Describe about various types of table and tabular settings by manual and by the use of software's.	Unit 5.0 – Table and Tabular setting and type setting techniques 5.1 Table and tabular setting of text by soft wares	CO5

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO 5.2 Explain about tools and equipment's for type setting as: Hand composing, Mechanical composing, Photo composing, Digital composing.	5.2 Various techniques used for composing process	

Note: One major TSO may require more than one theory session/ period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical:

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/ Practical Titles	Relevant Cos Number (s)
LSO 1.0 Students will be able to know about the variety of printed materials and details information about them	1.	Collection and study of all variety of Printed materials	CO1
LSO 2.0 Students will be hands on practices for preparation and designing of Logotype, Monograms , trademarks Visiting cards, letterheads, envelops, advertisements and invitation cards	2.	Designing of Logotype, Monograms , trademarks , Visiting cards, letterheads, envelops, advertisements and invitation cards	CO2
LSO 3.0 Students will be hands on practices for preparation the line original for reproduction	3.	Preparing of Line original for reproduction	CO3
LSO 4.0 Students will be hands on practices for Improving the quality of Illustrations.	4	Improving the quality of Illustrations	CO3

L) Suggested Term Work and Self-learning: S2427303 Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. Assignments: Questions/ Problems/ Numerical/ Exercises to be provided by the course teacher in line with the targeted COs.

1. Enlist the Tools and Equipment's required for preparation of Line original.
2. Write the process involved in the improving of the illustrations.
3. Enlist the characteristics of line original and preparation of line original.

b. Micro Projects:

1. Collection and study of all variety of printed materials
2. Study of selection of type face & family for suitable printing process with given substrate.

c. Other Activities:

1. Seminar Topics:
 - Types of Original , preparations of Line original and characteristics of original
 - Logotype, Trademark and monogram
 - Techniques for improving the quality of Illustrations.
2. Visits: Visit nearby press in his prepress section to learn the designing, layout, and house style of the job.
3. Self-learning topics:
 - Selection of suitable type face and family with appropriate printing process.
 - Selection of correct type and design of original for reproduction.

- M) Suggested Course Evaluation Matrix:** The Course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate CO attainment.

COs	Course Evaluation Matrix						
	Theory Assessment(TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Semester Test	End Theory Assessment (ETA)	Term Work & Self-Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	15%	10%	15%	-	-	10%	20%
CO-2	25%	25%	25%	25%	25%	10%	20%
CO-3	20%	20%	25%	25%	25%	40%	20%
CO-4	20%	20%	15%	25%	25%	20%	20%
CO-5	20%	25%	20%	25%	25%	20%	20%
Total Marks	30	70	20	20	10	20	30
			50				

Legend:

*: Other Activities include self- learning, seminar, visits, surveys, product development, software development etc.

**: Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

- N) Suggested Specification Table for End Semester Theory Assessment:** Specification table represents the reflection of sample representation of assessment of cognitive domain of full course.

Unit Title and Number	Total Classroom Instruction (CI) Hours	Relevant COs Number (s)	Total Marks	ETA (Marks)		
				Remember (R)	Understanding (U)	Application & above (A)
Unit 1.0 - Various Kind of printing products and formats and its design factors.	05	CO1	08	4	4	0
Unit 2.0- Design and Typographic Elements	14	CO2	20	8	8	4
Unit 3.0 - Originals and Illustrative Elements	14	CO3	20	7	7	6
Unit 4.0- Introduction of Typography. Selection of Type Face on base of printing surface.	10	CO4	12	4	4	4
Unit 5.0 - Table and Tabular setting and type setting techniques	5	CO5	10	4	3	3
Total	48	-	70	27	26	17

Note: Similar table can also be used to design class/ mid-term/ internal question paper for progressive assessment.

O) Suggested Assessment Table for Laboratory (Practical):

S. No.	Laboratory Practical Titles	Relevant Cos Number (s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
1.	Collection and study of all variety of Printed materials	CO1	40	40	20
2.	Designing of Logotype, Monograms , trademarks , Visiting cards, letterheads, envelopes, advertisements and invitation cards	CO2	40	50	10
3.	Preparing of Line original for reproduction	CO3	70	20	10
4.	Improving the quality of Illustrations	CO3	60	30	10

Legend:

PRA*: Process Assessment

PDA**: Product Assessment

Note: This table can be used for both end semester as well as progressive assessment of practical. Rubrics need to be prepared by the course teacher for each experiment/ practical to assess the student performance.

P) Suggested Instructional/ Implementation Strategies: Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/ outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Portfolio Based Learning, Role-Play, Live Demonstrations in Classrooms, Lab, Field, Information and Communications Technology (ICT) Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Sessions, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

Q) List of Major Laboratory Equipment, Tools and Software:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/ Practical Number
1.	Pencil, Colour, Scale, Paper	All tools and materials used for making of Trademark, logotype, Monograms	1
2	Computer and Photoshop, CorelDraw soft ware	All hardware and software required for drawing and editing of designs and layouts.	2

R) Suggested Learning Resources:**(a) Books:**

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Elements of Design & Typography	B D Mendiratta	Asian Books Pvt. Ltd
2.	The Lithographers Manual	Charles Shapiro	The graphic Art Technical Foundation
3	Printing Technology	Adams, Faux	

(b) Online Educational Resources:

1. <https://youtu.be/UPCldtrDagc?si=oTaq2D6A6UW-kxDj>
2. <https://youtu.be/a5KYIHnkQB8?si=8EZK6HiCcRzgTDML>
3. <https://printwiki.org>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. The History of graphic Design
2. Design, typography, etc A handbook By Damien Gautier

- A) **Course Code** : 2427304(T2427304/P2427304/S2427304)
- B) **Course Title** : Paper and Ink Technology
- C) **Pre-requisite Course(s)** : NA
- D) **Rationale** :

This subject deals with the manufacturing of Pulp for making of paper and board. Also explain about run ability and printability property of paper as well as rheological properties of Ink. Ink curing and drying process also cover under this course curriculums

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/industry.

After completion of the course, the students will be able to-

- CO-1** Fibrous and Non Fibrous Raw materials used in Paper and Board Manufacturing
- CO-2** Manufacturing and finishing process of Paper and Board.
- CO-3** Definition and ingredients of various types of Inks
- CO-4** Formulation of Various types of Ink.
- CO-5** Type's and properties of various types of Substrate and Inks.

- F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

- G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+ SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
Printing Technology	2427304	Paper and Ink Technology	03	-	04	02	09	06

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term Work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits = (1 x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

H) Assessment Scheme:

Board of Study	Course Code	Course Title	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term Work & Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
Printing Technology	2427304	Paper and Ink Technology	30	70	20	30	20	30	200

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

- ETA & ELA are to be carried out at the end of the term/ semester.
- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- I) Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

J) Theory Session Outcomes (TSOs) and Units: T2427304

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO1.1 Explain about the Types of Fibrous and Non fibrous Materials. Fibers Materials: Seed Fibers, Grass Fibers, Leaf Fibers, waste Fiber TSO1.2 Describe about Characteristics and classification of Fibrous & Non – Fibrous materials. : TSOI 1.3 Purpose and Function of Non – Fibrous Materials: Sizing, Coating, Loading and optical bleaching materials	Unit 1.0 - Fibrous and Non Fibrous Raw materials used in Paper and Board Manufacturing 1.1 Types of Fibrous and Non fibrous Materials 1.2 Characteristics and classification of Fibrous & Non – Fibrous materials 1.3 Purpose and Function of Non – Fibrous Materials	CO1
TSO 2.1 Explain the various types of Pulps. Like Mechanical, Chemical, Acidic and alkaline pulps. TSO 2.2 Explain about Manufacturing process of Pulp, virgin Pulp, Recycled Pulp, De inking, Beating & Hydration, Engine sizing, . TSO 2.3 Explain about Manufacturing process of paper and Board.: Water Mark, wire and felt side, TSO 2.4 Finishing Operations of paper manufacturing: Surface sizing, Coating, Loading, Calendaring, Super calendaring etc.	Unit 2.0 Manufacturing and finishing process of Paper and Board. 2.1 Types of Pulps 2.2 Pulp Preparations Methods 2.3 Manufacturing of Paper and board. 2.4 Finishing Operations of paper manufacturing process.	CO2
TSO 3.1 Explain the Function of Printing Inks TSO 3.2 Describe In details about the ingredients of printing inks. . Like Pigments, Vehicles, Resin, Solvents and various types of Additives used in various types of Inks with respect to printing Process.	Unit 3.0 – Definition and ingredients of various types of Inks 3.1 Function of Printing Inks 3.2 Ingredients of Printing Inks in Details Like: Pigments, Vehicles, resin, solvent and additives etc.	CO3
TSO4.1 Explain about formulations of ink on basis of rheology property TSO4.2 Explain about Various types of Ink Curing & drying process. Drying Process: Penetration, Oxidation, Polymerizations and Evaporation. Curing process: UV curing, LED Curing and IR Curing. TSO4.3 Explain about formulations of special purpose ink like Heat set, Metallic, Florescent Ink, UV Ink, IR Inks with their applications.	Unit 4.0 Formulation of Various types of Ink and Ink Drying Process. 4.1 Formulations of ink on basis of rheology property 4.2 Various types of Ink Curing & drying process. 4.3 Special purpose Ink Formulation: Heat set, Metallic, Florescent Ink, UV Ink, IR Inks with their applications.	CO4
TSO 5.1 Describe about various Printability and run ability property of paper like – Tensile strength, tearing strength, Bursting strength, Opacity, Brightness, Gloss etc. TSO 5.2 Explain about the Rheological property of ink like, Viscosity, tack, Thixotropic, Flow etc TSO 5.3 Explain about Various types of Substrate used	Unit 5.0 – Type's and properties of various types of Substrate and Inks and its Testing Method. 5.1 Printability and run ability properties of Substrate. 5.2 Rheological properties of Ink; Viscosity, Tack, Thixotropic, Flow etc 5.3 Various types of Substrate used in Printing	CO5

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
in Printing Industries Like Paper, Polyester, BOPP, Poly, Met Pet, PVC, Foil etc. TSO 5.4 Explain about various testing methods used for various property of paper and Ink Like Tensile strength, Tearing strength, GSM, Viscosity tester, Opacity tester, ink Density etc	Industries. 5.4 Various testing methods used for testing the property of Ink and paper like: Tensile strength, Tearing strength, GSM, Viscosity tester, Opacity tester, ink Density etc.	

Note: One major TSO may require more than one theory session/ period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2427304

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/ Practical Titles	Relevant Cos Number (s)
LSO 1.0 Students will be able to know about the run ability testing properties of Paper.	1.	Run ability Testing of Paper: Grain direction, Tensile strength, Tearing strength, Bursting strength.	CO1
LSO 2.0 Students will be able to know about the Print ability testing properties of Paper.	2.	Print ability Testing of Paper: Opacity, Brightness, Surface smoothness, Folding & Calendaring Test	CO5
LSO 3.0 Students will be able to know about the Rheological Property of Ink.	3.	Rheology Property test of Ink: Viscosity, Tack, Light fastness Test,	CO5

L) Suggested Term Work and Self-learning: S2427304 Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. Assignments: Questions/ Problems/ Numerical/ Exercises to be provided by the course teacher in line with the targeted COs.

1. Enlist the Tools and Equipment's required for paper and ink testing Methods.
2. Write the step by step process involved in pulp manufacturing process for making of paper & Board
3. Enlist the all finishing operation of paper making process..

b. Micro Projects:

1. Tensile strength and GSM testing of Paper.
2. Viscosity testing of various types of Inks.
3. Grain Direction Test.

c. Other Activities:

1. Seminar Topics:
 - Fibrous and Non Fibrous raw materials of paper
 - Ink curing & Drying Method of Inks.
 - Printability and Run ability properties of paper
 - Manufacturing of Pulp.
2. Visits: Visit nearby Paper making Industry to know about the manufacturing of Pulp and paper.
3. Self-learning topics:
 - Familiar about Printability and run ability property of Paper
 - Various types of ink curing and drying methods.

- M) Suggested Course Evaluation Matrix:** The Course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate CO attainment.

COs	Course Evaluation Matrix						
	Theory Assessment(TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Semester Test	End Theory Assessment (ETA)	Term Work & Self-Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	15%	10%	15%	-	-	10%	20%
CO-2	25%	25%	25%	25%	25%	10%	20%
CO-3	20%	20%	25%	25%	25%	40%	20%
CO-4	20%	20%	15%	25%	25%	20%	20%
CO-5	20%	25%	20%	25%	25%	20%	20%
Total Marks	30	70	20	20	10	20	30
			50				

Legend:

*: Other Activities include self- learning, seminar, visits, surveys, product development, software development etc.

**: Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

- N) Suggested Specification Table for End Semester Theory Assessment:** Specification table represents the reflection of sample representation of assessment of cognitive domain of full course.

Unit Title and Number	Total Classroom Instruction (CI) Hours	Relevant COs Number (s)	Total Marks	ETA (Marks)		
				Remember (R)	Understanding (U)	Application & above (A)
Unit 1.0 - Fibrous and Non Fibrous Raw materials used in Paper and Board Manufacturing	05	CO1	08	4	4	0
Unit 2.0- Manufacturing and finishing process of Paper and Board.	14	CO2	20	8	8	4
Unit 3.0 - Definition and ingredients of various types of Inks	14	CO3	20	7	7	6
Unit 4.0- Formulation of Various types of Ink.	10	CO4	12	4	4	4
Unit 5.0 - Type's and properties of various types of Substrate and Inks.	5	CO5	10	4	3	3
Total	48	-	70	27	26	17

Note: Similar table can also be used to design class/ mid-term/ internal question paper for progressive assessment.

O) Suggested Assessment Table for Laboratory (Practical):

S. No.	Laboratory Practical Titles	Relevant Cos Number (s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
1.	Students will be able to know Tensile strength of paper.	CO1	40	40	20
2.	Students will be able to understand GSM Testing of Paper.	CO1	40	50	10
3.	Students will be hands on about Opacity and Light fastness test of paper.	CO5	70	20	10
4.	Students will be able to understand the rheological test of printing Inks Like Viscosity, Tack and thixotropy.	CO5	30	60	10

Legend:

PRA*: Process Assessment

PDA**: Product Assessment

Note: This table can be used for both end semester as well as progressive assessment of practical. Rubrics need to be prepared by the course teacher for each experiment/ practical to assess the student performance.

- P) Suggested Instructional/ Implementation Strategies:** Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/ outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Portfolio Based Learning, Role-Play, Live Demonstrations in Classrooms, Lab, Field, Information and Communications Technology (ICT) Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Sessions, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

Q) List of Major Laboratory Equipment, Tools and Software:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/ Practical Number
1.	a. GSM Tester b. Tensile Tester c. Bursting Tester d. Caliper Gauge	All three Equipment's required to test the below mentioned property of paper. a. Measure the paper substance b. Measurements of Tensile strength of paper. c. Measurements of Bursting strength of paper d. Measure the paper thickness	1
2	a. Viscos meter b. Densitometer	Below equipment's used to measure the Printing Inks properties as below: a. Measure the viscosity of Ink b. Measure the Ink density of Printed sample as well as measure the opacity of paper.	2

R) Suggested Learning Resources:**(a) Books:**

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Printing Paper and Ink	Charles Finley	Deemar Publishers
2.	The Lithographers Manual	Charles Shapiro	The graphic Art Technical Foundation
3	Printing Technology	Adams, Faux	
4.	Printing Inks and Paper	C S Mishra	

(b) Online Educational Resources:

1. <https://www.youtube.com/live/lqsLRKO3Nps?si=VAKjgsnrhdZhFJs0>
2. <https://youtu.be/0jZt4Ndnh5s?si=3rT-SJZG4d9wQwao>
3. https://youtu.be/LKACUsKM9-g?si=f12nQUloR6KFIV_P
4. <https://youtu.be/ZgMsvN01RVk?si=HArMr2h1gOa66QRf>
5. <https://printwiki.org>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. Ink Manual
2. The complete Technology book on Printing Ink

- A) **Course Code** : 2427305(T2427305/P2427305/S2427305)
- B) **Course Title** : Letter Assembly
- C) **Pre-requisite Course(s)** :
- D) **Rationale** :

Every printed product consist of text portion and illustration, with the formal occupying mechanical type setting knowledge of text setting methods and equipment's used for setting text, which is broadly term letter assembly .

This subject will cover developments of typesetting methods, preparation for type setting input and output, page assembly, proofing ,imposition and planning.

The aim is to further developed the students understanding and knowledge of letter assembly equipment's particularly in the areas of online integrated system, Image generation system, editing, correction , electronic page assembly, digital storage and output.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/industry.

After completion of the course, the students will be able to-

- CO-1** Historical development of Type setting and Preparation for Type setting
- CO-2** Type setting Techniques
- CO-3** Input and output device used in type setting techniques
- CO-4** Page assembly and Proofing
- CO-5** Imposition and Planning.

F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

G) Teaching & Learning Scheme:

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+ SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
Printing Technology	2427305	Letter Assembly	03	-	04	02	09	06

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term Work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits = (1 x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

H) Assessment Scheme:

Board of Study	Course Code	Course Title	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term Work & Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
Printing Technology	2427305	Letter Assembly	30	70	20	30	20	30	200

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

- ETA & ELA are to be carried out at the end of the term/ semester.
- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- I) **Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

J) **Theory Session Outcomes (TSOs) and Units: T2427305**

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO1.1 Explain about Historical developments of Type Setting from Hand composing to Digital Composing. TSO1.2 Explain about various system and their relationship with current production as: Unit of Set, Point System TSO1.3 Explain about: Preparation of Type setting as: i) Typographical Measurement System. ii) House Style iii) Proof Reading iv) Casting – off, Copy Fitting and Casting – up.	Unit 1.0 - Historical development of Type setting and Preparation for Type setting 1.1 Historical developments of Type Setting from Gutenberg to Present. 1.2 Review of various system and their relationship with current production. 1.3 Preparation for type setting: a) Typographical Unit Measurement system. b) Preparation of copy and House style c) Proof Reading	CO1
TSO 2.1 Explain about Hand composition, Mechanical composing (: Lino Type & Mono type), Type writer. TSO 2.2 Explain about photocomposing and its Generation: i) First generation of Photocomposing ii) Second generation of Photocomposing iii) Third generation of Photocomposing iv) Fourth generation of Photocomposing TSO 2.3 Explain about Digital Type setting : Input, information storage, Editing, Composition and Output.	Unit 2.0 Type setting Techniques 2.1 Hand composing ,Mechanical composing, Typewriter 2.2 Photo composing and its generations. 2.3 DTP	CO2
TSO 3.1 Explain the various input devices used in composing system: Keyboard, OCR, ICR, Image scanner, TSO 3.2 Explain the various Storage devices used in composing system: Punch Card, Paper tape, Magnetic tape, Magnetic Disc (floppy Disc & Hard Disc). TSO 3.3 Explain the various Output devices used in composing system: Printer – Dot matrix, Ink jet and Laser printer, Plotter, Image setter. Film Processor, RIP (Raster Image Processing)	Unit 3.0 – Input, Storage and output device used in type setting techniques 3.1 Input devices. 3.2 Storage devices 3.2 Output devices.	CO3

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO 4.1 Explain the details about page makeup process for reproduction of books, magazines, newspapers, and general printing.	Unit 4.0 Page assembly and Proofing 4.1 Make- up of photo-type setting products for books, magazine, newspapers and general printing. 4.2 Proofing techniques – matrix printer, Diazo, Electrostatic, Diffusion transfer and photographic.	CO4
TSO 4.2 Explain about various types of proofing Techniques: (A) Press proof (B) Photo Mechanical Proof –(i) Single colour photomechanical proofing – Blue print Paper, Brown line, Diazo, Instant image proof, (ii) Multiple Colour photomechanical proofing- Transparent colour proof & Opaque colour proof (C) Digital Proof		
TSO 5.1 Explain about the page shape and size with respect to paper size for execution of jobs in a proper manner. TSO 5.2 Explain about rules of imposition. TSO 5.3 Accommodation of job in press with requirements like: Sheet work, Half sheet work, work and turn, Work and tumble and work and twist.	Unit 5.0 – Imposition and Planning 5.1 Page – shape, margins and size in relation to paper size. 5.2 Rule for imposition up to 32 pages. 5.3 Accommodation of press and finishing requirements	CO5

Note: One major TSO may require more than one theory session/ period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2427305

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/ Practical Titles	Relevant Cos Number (s)
LSO 1.0 Students will be able to know about hand composing process.	1.	Hand composing	CO2
LSO 2.0 Students will be hands on practices for preparation and designing of art work through DTP.	2.	Desk Top Publishing	CO2
LSO 3.0 Students will be hands on practices for page make up and preparation.	3.	Page make up	CO4
LSO 4.0 Students will be aware for imposition and its help a lot before execution of the job.	4	Imposition	CO5

L) Suggested Term Work and Self-learning: S2427305 Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. **Assignments:** Questions/ Problems/ Numerical/ Exercises to be provided by the course teacher in line with the targeted COs.

1. Enlist the developments of composing process from hand to Digital.
2. Write in details about input, storage and output device used for composing process.
3. Enlist the imposition schemes with relation to Sheet work and half sheet work. .

b. Micro Projects:

1. Page make up and proofing of some assigned jobs
2. Composing and designing of Visiting cards, letter heads, and some other jobs through DTP.

c. Other Activities:

1. Seminar Topics:
 - Mechanical Composition
 - Photocomposition and its generation
 - DTP
 - Imposition
2. Visits: Visit nearby press aware of various types of composition methods and to learn about proper selection of way to print like sheet work or half sheet work as per m/c size and print run.
3. Self-learning topics:
 - Learning about proofing process, Types of proofing.
 - Learning about DTP process and Imposition Scheme.

M) Suggested Course Evaluation Matrix: The Course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate CO attainment.

COs	Course Evaluation Matrix						
	Theory Assessment(TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Semester Test	End Theory Assessment (ETA)	Term Work & Self-Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	15%	10%	15%	-	-	10%	20%
CO-2	25%	25%	25%	25%	25%	10%	20%
CO-3	20%	20%	25%	25%	25%	40%	20%
CO-4	20%	20%	15%	25%	25%	20%	20%
CO-5	20%	25%	20%	25%	25%	20%	20%
Total Marks	30	70	20	20	10	20	30
			50				

Legend:

*: Other Activities include self- learning, seminar, visits, surveys, product development, software development etc.

**: Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

- N) Suggested Specification Table for End Semester Theory Assessment:** Specification table represents the reflection of sample representation of assessment of cognitive domain of full course.

Unit Title and Number	Total Classroom Instruction (CI) Hours	Relevant COs Number (s)	Total Marks	ETA (Marks)		
				Remember (R)	Understanding (U)	Application & above (A)
Unit 1.0 - Historical development of Type setting and Preparation for Type setting	06	CO1	10	4	3	3
Unit 2.0- Type setting Techniques	14	CO2	20	8	8	4
Unit 3.0 - Input and output device used in type setting techniques	8	CO3	15	7	4	4
Unit 4.0- Page assembly and Proofing	8	CO4	10	5	3	2
Unit 5.0 - Imposition and Planning	12	CO5	15	6	6	3
Total	48	-	70	30	24	16

Note: Similar table can also be used to design class/ mid-term/ internal question paper for progressive assessment.

- O) Suggested Assessment Table for Laboratory (Practical):**

S. No.	Laboratory Practical Titles	Relevant Cos Number (s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
1.	Hand composing	CO2	40	40	20
2.	Desk Top Publishing	CO2	50	40	10
3.	Page make up	CO4	70	20	10
4.	Imposition	CO5	60	30	10

Legend:

PRA*: Process Assessment

PDA**: Product Assessment

Note: This table can be used for both end semester as well as progressive assessment of practical. Rubrics need to be prepared by the course teacher for each experiment/ practical to assess the student performance.

- P) Suggested Instructional/ Implementation Strategies:** Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/ outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Portfolio Based Learning, Role-Play, Live Demonstrations in Classrooms, Lab, Field, Information and Communications Technology (ICT) Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Sessions, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

Q) List of Major Laboratory Equipment, Tools and Software:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/ Practical Number
1.	Composing stick, threads, spacer, Lower and upper case,	All tools and materials used for hand composing	1
2	Computer and Photoshop, CorelDraw soft ware	In DTP process all hardware and software required for drawing, composing and editing of designs and layouts for reproduction	2

R) Suggested Learning Resources:**(a) Books:**

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Composing & typography Today	B D Mendiratta	Asian Books Pvt. Ltd
2.	Theory & practice of composition	A.C. Goel	
3	Printing Technology	Adams, Faux	
4	Art & Print Production	N.N. Sarkar	

(b) Online Educational Resources:

1. <https://youtu.be/OdMXo9XsP6Y?si=xIYdhjiduuX3AEnd>
2. <https://printwiki.org>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. Lithographers Manual – A GATF Books
2. Design, typography, etc A handbook By Damien Gautier

- A) **Course Code** : 2400207 (T2400207)
- B) **Course Title** : Indian Constitution (Common for all Programmes)
- C) **Pre-requisite Course(s)** :
- D) **Rationale** :

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

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/ industry.

After completion of the course, the students will be able to-

CO-1 List salient features and characteristics of the constitution of India.

CO-2 Follow fundamental rights and duties as responsible citizen and engineer of the country.

CO-3 Analyze major constitutional amendments in the constitution.

- F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

- G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+ SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
	2400207	Indian Constitution	01	-	-	-	01	01

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture(L), Tutorial(T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term Work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits= (1 x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

H) Assessment Scheme:

Board of Study	Course Code	Course Title	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term Work & Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
	2400207	Indian Constitution	25	-	25	-	-	-	50

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

- ETA & ELA are to be carried out at the end of the term/ semester.
- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- I) Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

J) Theory Session Outcomes (TSOs) and Units: T2400207

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO 1a. Explain the meaning of preamble of the constitution. TSO 1b. List the salient features of constitution. TSO 1c. List the characteristics of constitution.	Unit-1.0 Constitution and Preamble 1.1 Meaning of the constitution of India. 1.2 Historical perspective of the Constitution of India.	CO1

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
	1.3 Salient features and characteristics of the Constitution of India. 1.4 Preamble to the Constitution of India.	
TSO 2a. Enlist the fundamental rights. TSO 2b. Identify fundamental duties in general and in particular with engineering field. TSO 2c. identify situations where directive principles prevail over fundamental rights.	Unit-2.0 Fundamental Rights and Directive Principles 2.1 Fundamental Rights under Part-III. 2.2 Fundamental duties and their significance. 2.3 Relevance of Directive Principles of State Policy under part-IV.	CO2
TSO 3a. Enlist the constitutional amendments. TSO 3b. Analyze the purposes of various amendments.	Unit-3.0 Governance and Amendments 3.1 Amendment of the Constitutional Powers and Procedure 3.2 Major Constitutional Amendment procedure - 42nd, 44th, 74th, 76th, 86th and 91st	CO3

Note: One major TSO may require more than one Theory session/Period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: (Not Applicable)

L) **Suggested Term Work and Self Learning:** Some sample suggested assignments, micro projects and other activities are mentioned here for reference.

a. **Assignments:** Questions/Problems/Numerical/Exercises to be provided by the course teacher in line with the targeted COs.

b. Micro Projects:

1. Role of Media in Spreading Awareness regarding Fundamental Rights
2. Analysis of Situations where directive principle of State policy has prevailed over Fundamental rights
3. Analyze 42nd and 97th Amendment of Indian Constitution

c. Other Activities:

1. Seminar Topics:
 - Democracy and Political Participation in India
 - Situations where directive principles prevail over fundamental rights.
2. Visits:
 - Arrange Mock Parliament.
3. Design games and simulation on emergencies declared in last thirty years.
4. Group discussions on current print articles.
 - Adoption of Article 365 in India.
 - Need of amendments in the constitution.
5. Prepare collage/posters on current constitutional issues.
 - Emergencies declared in India
 - Seven fundamental rights

6. Cases: Suggestive cases for usage in teaching:

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

7. Self-learning topics:

- Parts of the constitution and a brief discussion of each part.
- Right to education.
- Right to equality.

M) Suggested Course Evaluation Matrix: The course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate **CO attainment**.

COs	Course Evaluation Matrix						
	Theory Assessment (TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Sem Test	End Theory Assessment (ETA)	Term Work & Self Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	30%	-	30%	-	-	-	-
CO-2	40%	-	40%	50%	50%	-	-
CO-3	30%		30%	50%	50%		
Total Marks	25	-	5	10	10	-	-
			25				

Legend:

- *: Other Activities include self-learning, seminar, visits, surveys, product development, software development etc.
 **: Mentioned under point- (N)
 #: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

- N) Suggested Specification Table for End Semester Theory Assessment: (Not Applicable)**
- O) Suggested Assessment Table for Laboratory (Practical): (Not Applicable)**
- P) Suggested Instructional/Implementation Strategies:** Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Field Trips, Portfolio Based, Learning, Role Play, Live Demonstrations in Classrooms, Lab, Field Information and Communications Technology (ICT) Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Session, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.
- Q) List of Major Laboratory Equipment, Tools and Software: (Not Applicable)**
- R) Suggested Learning Resources:**

(a) Books:

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	The Constitution of India	P.M.Bakshi	Universal Law Publishing, New Delhi 15th edition, 2018, ISBN: 9386515105
2.	Introduction to Indian Constitution	D.D.Basu	Lexis Nexis Publisher, New Delhi, 2015, ISBN:935143446X
3.	Introduction to Constitution of India	B. K. Sharma	PHI, New Delhi, 6th edition, 2011, ISBN:8120344197
4.	The Constitution of India	B.L. Fadia	Sahitya Bhawan, Agra, 2017, ISBN:8193413768
5.	The Constitutional Law of India	Durga Das Basu	LexisNexis Butterworths Wadhwa, Nagpur 978-81-8038-426-4

(b) Online Educational Resources:

1. <https://www.coursera.org/learn/principles-of-management>
2. <http://www.legislative.gov.in/constitution-of-india>
3. https://en.wikipedia.org/wiki/Constitution_of_India
4. <https://www.india.gov.in/my-government/constitution-india>
5. <https://eci.gov.in/about/about-eci/the-setup-r1/>
6. <https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/>
7. <https://main.sci.gov.in/constitution>
8. <https://nios.ac.in/media/documents/srsec317newE/317EL8.pdf>
9. <https://legallaffairs.gov.in/sites/default/files/chapter%203.pdf>
10. https://www.concourt.am/armenian/legal_resources/world_constitutions/constit/india/india-e.htm
11. <https://constitutionnet.org/vl/item/basic-structure-indian-constitution>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

- A) **Course Code** : **2400108(T2400108)**
- B) **Course Title** : **Essence of Indian Knowledge System and Tradition**
(Common for all Programmes)
- C) **Pre- requisite Course(s)** :
- D) **Rationale** :

This course will survey the basic structure and operative dimensions of Indian knowledge system. With the new education policy-NEP 2020 focusing on Indian Knowledge Systems (IKS) and Traditions of India. This course introduces the learners to the rich and varied knowledge traditions of India from antiquity to the present. This also helps the learner to know and understand their own systems and traditions which are imperative for any real development and progress. Also, it helps the learner to think independently and originally adopting Indian frameworks and models for solving the problems related to world of work where the student is supposed to perform.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course out comes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/ industry.

After completion of the course, the students will be able to-

CO-1 Identify the rich heritage and legacy residing in our Indian Knowledge systems.

CO-2 Correlate the technological & philosophical concepts of IKS with engineering domain specific problems and local problems for finding out possible solutions.

- F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

- G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)					
			Classroom Instruction (CI)		Lab Instruction (LI)	Notional Hours (TW+ SL)	Total Hours (CI+LI+TW+SL)	Total Credits (C)
			L	T				
	2400108	Essence of Indian Knowledge System and Tradition	01	-	-	01	01	01

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture(L), Tutorial(T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term Work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits= (1 x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

H) Assessment Scheme:

Board of Study	Course Code	Course Title	Assessment Scheme (Marks)						Total Marks (TA+TWA+LA)
			Theory Assessment (TA)		Term Work& Self-Learning Assessment (TWA)		Lab Assessment (LA)		
			Progressive Theory Assessment (PTA)	End Theory Assessment (ETA)	Internal	External	Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)	
	2400108	Essence of Indian Knowledge System and Tradition	25	-	-	-	-	-	25

Legend:

- PTA: Progressive Theory Assessment in class room (includes class test, mid-term test and quiz using online/offline modes)
- PLA: Progressive Laboratory Assessment (includes process and product assessment using rating Scales and rubrics)
- TWA: Term work & Self Learning Assessment (Includes assessment related to student performance in assignments, seminars, micro projects, industrial visits, self-learning, any other student activities etc.)

Note:

- ETA & ELA are to be carried out at the end of the term/ semester.
- Term Work is to be done by the students under the guidance of internal faculty but its assessment will be done **internally (40%)** as well as **externally (60%)**. Assessment related to planning and execution of Term Work activities like assignment, micro project, seminar and self-learning is to be done by internal faculty (Internal Assessment) whereas assessment of output/product/ presentation related to these activities will be carried out by external faculty/expert (External Assessment). However, criteria of internal as well as external assessment may vary as per the requirement of respective course. For valid and reliable assessment, the internal faculty should prepare checklist & rubrics for these activities.

- I) Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

J) Theory Session Outcomes (TSOs) and Units: T2400108

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<i>TSO 1a.</i> Explain the architecture of the Ancient Indian Knowledge Systems. <i>TSO 1b.</i> List the salient features of IKS. <i>TSO 1c.</i> Comprehend the given IKS model. <i>TSO 1d.</i> Identify the role and relevance of the given IKS model in contemporary society.	Unit-1.0 Introduction to Indian Knowledge Systems 1.1 Overview of IKS 1.2 Organization of IKS – चतुर्दश-विद्यास्थानं 1.3 Conception and Constitution of Knowledge in Indian Tradition 1.4 The Oral Tradition 1.5 Models and Strategies of IKS	CO1
<i>TSO 2a.</i> Enlist the importance of Veda, Vedanga, Visaya, Siksha. <i>TSO 2b.</i> Describe the given IKS domain. <i>TSO 2c.</i> Identify elements of mentioned IKS domains that are relevant to Technical Education System. <i>TSO 2d.</i> Correlate the elements of mentioned IKS domains with given engineering domain.	Unit-2.0 Overview of IKS Domains and Relevance in Current Technical Education System. 2.1 The Vedas as the basis of IKS 2.2 Overview of all the six Vedāṅgas 2.3 Relevance of following IKS domains in present Technical Education System: • Arthashastra (Indian economics and political systems) • Ganita and Jyamiti (Indian Mathematics, Astronomy and Geometry) • Rasayana (Indian Chemical Sciences) • Ayurveda (Indian Biological Sciences / Diet & Nutrition) • Jyotish Vidya (Observational astronomy and calendar systems) • Prakriti Vidya (Indian system of Terrestrial/ Material Sciences/ Ecology and Atmospheric Sciences) • Vastu Vidya (Indian system of Aesthetics- Iconography and built-environment /Architecture) • Nyaya Shastra (Indian systems of Social Ethics, Logic and Law) • Shilpa and Natya Shastra (Indian Classical Arts: Performing and Fine Arts) • Sankhya and Yoga Darshna (Indian psychology, Yoga and consciousness studies) • Vrikshayurveda (Plant Science / Sustainable agriculture/food preservation methods)	CO1, CO2

Note: One major TSO may require more than one Theory session/Period.

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: (Not Applicable)

L) Suggested Term Work and Self Learning: Some sample suggested assignments, micro project and other activities are mentioned here for reference.

- a. Assignments:** Questions/Problems/Numerical/Exercises to be provided by the course teacher in line with the targeted COs.

b. Micro Projects:

1. Write a report on any IKS domain highlighting the correlation with one domain specific engineering course.

c. Other Activities:

1. Seminar Topics: discuss any one IKS domain in details a highlighting the eminent works in the area.
2. Visits:
 - Visit any nearby ancient temple and correlate the geomatical, Shilpa and Vaastu on IKS dimensions specified in each domain.
3. Self-learning topics:
 - Sustainable practices adopted in ancient India that can be applied for current engineering situations.

M) Suggested Course Evaluation Matrix: The course teacher has to decide and use appropriate assessment strategy and its weightage in theory, laboratory and Term Work for ensuring CO attainment. The response/performance of each student in each of these designed activities is to be used to calculate **CO attainment**.

COs	Course Evaluation Matrix						
	Theory Assessment (TA)**		Term Work Assessment (TWA)			Lab Assessment (LA)#	
	Progressive Theory Assessment (PTA) Class/Mid Sem Test	End Theory Assessment (ETA)	Term Work & Self Learning Assessment			Progressive Lab Assessment (PLA)	End Laboratory Assessment (ELA)
			Assignments	Micro Projects	Other Activities*		
CO-1	-	-	-	-	-	-	-
CO-2	100%	-	100%	100%	100%	-	-
Total Marks	25	-	5	10	10	-	-
			25				

Legend:

*: Other Activities include self- learning, seminar, visits, surveys, product development, software development etc.

**.: Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentage given are approximate
- In case of Micro Projects and End Laboratory Assessment (ELA), the achieved marks will be equally divided in all those COs mapped with total experiments.
- For CO attainment calculation indirect assessment tools like course exit survey need to be used which comprises of questions related to achievement of each COs.

N) Suggested Specification Table for End Semester Theory Assessment: (Not Applicable)

O) Suggested Assessment Table for Laboratory (Practical): (Not Applicable)

P) Suggested Instructional/Implementation Strategies: Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Field Trips, Portfolio Based, Learning, Role Play, Live Demonstrations in Classrooms, Lab, Field Information and Communications Technology (ICT)Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Session, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

Q) List of Major Laboratory Equipment, Tools and Software: (Not Applicable)

R) Suggested Learning Resources:**(a) Books:**

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Introduction to Indian Knowledge System: Concepts and Applications	Archak, K.B. (2012).	Kaveri Books, New Delhi
2.	Introduction to Indian Knowledge System: Concepts and Applications	Mahadevan, B. Bhat, Vinayak Rajat Nagendra Pavana R.N.	PHI, ISBN: 9789391818203
3.	Glimpse into Kautilya's Arthashastra	Ramachandrudu P. (2010)	Sanskrit Academy, Hyderabad
4.	"Introduction" in Studies in Epics and Purāṇas, (Eds.)	KM Munshi and N Chandrashekara Aiyer	Bhartiya Vidya Bhavan

(b) Online Educational Resources:

1. <http://bhavana.org.in>
2. www.academia.edu/23254393/Science_in_Ancient_India_-_an_educational_module
3. www.academia.edu/23305766/Technology_in_Ancient_India_-_Michel_Danino
4. www.hamsi.org.nz/http://insaindia.res.in/journals/ijhs.php
5. www.nisair.res.in/sciencecommunication/ResearchJournals/rejour/ijtk/ijtk0.asp
6. www-history.mcs.st-andrews.ac.uk/Indexes/Indians.html

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. Swami Harshananda. "A bird's eye view of vedas". R K Math. Bangalore., <http://rkmathbangalore.org/Books/ABirdsEyeViewOfTheVedas.pdf>.
2. Sanskrit Prosody, https://en.wikipedia.org/wiki/Sanskrit_prosody.
3. Vartak, P.V. (1995). "Veda and Jyotish," Part II, Chapter 2, in Issues in Veda and Astrology, H Pandya (Ed.), pp 65 – 73.
4. Sundaram, A.V. (1995). "Astrology: Its usefulness and Limitations in ModernTimes", Part II, Chapter 9, in Issues in Veda and Astrology, H Pandya (Ed.), pp 129 – 135.
5. Archak, K.B. (2012), "The Vedāṅga Literature", Chapter VIII in Essentials of Vedic Literature, Kaveri Books, New Delhi, pp 330 – 391.
6. Vasant Lad (1996), "Ayurveda: A Brief Introduction and Guide", (whole article).

- A) **Course Code** : **2400110 (T2400110)**
- B) **Course Title** : **Community/ Society Development (Non-Exam Course)**
(AIML, AE, CSE, ELX (R), CHE, EE, ME, ME (Auto), MIE, FTS, CACDDM)
- C) **Pre- requisite Course(s)** :
- D) **Rationale** :

Community development is a process in which community members collectively generate solutions to common problems/concerns for improvement in the quality of life of the people. The course in community and society development is essential so that students can be prepared for taking up activities for the welfare and social well-being of the community and society around them. This course has been designed to develop requisite competencies and skills in students so that they can address social problems, develop sustainable solutions that are tailored to local needs and resources, engage with local communities and civil society organizations to promote people's participation in decision-making and accountability, and apply them to community development.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of following course outcomes by the learners. For this, the learners are expected to perform various activities related to three learning domains (Cognitive, Psychomotor and Affective) in classroom/laboratory/workshop/field/ industry.

After completion of the course, the students will be able to-

- CO-1** Identify the issues and problems faced by local communities/societies that can be addressed through community development schemes for sustainable development.
- CO-2** Prepare an action plan for an identified issue under community development scheme for a selected area.

F) **Suggested Course Articulation Matrix (CAM):**

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

Legend: High (3), Medium (2), Low (1) and No mapping (-)

* PSOs will be developed by respective programme coordinator at institute level. As per latest NBA guidelines, formulating PSOs is optional

G) **Teaching & Learning Scheme:**

Board of Study	Course Code	Course Title	Scheme of Study (Hours/Week)				
			Classroom Instruction (CI)		Notional Hours (TW/ Activities+ SL)	Total Hours (CI+TW/ Activities)	Total Credits (C)
			L	T			
	2400110	Community/ Society Development	01	-	-	01	01

Legend:

- CI: Classroom Instruction (Includes different instructional/implementation strategies i.e. Lecture (L), Tutorial (T), Case method, Demonstrations, Video demonstration, Problem based learning etc. to deliver theoretical concepts)
- LI: Laboratory Instruction (Includes experiments/practical performances /problem-based experiences in laboratory, workshop, field or other locations using different instructional/Implementation strategies)
- Notional Hours: Hours of engagement by learners, other than the contact hours for ensuring learning.
- TW: Term Work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)
- SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.
- C: Credits = (1 x CI hours) + (0.5 x LI hours) + (0.5 x Notional hours)

Note: TW and SL have to be planned by the teacher and performed by the learner under the continuous guidance and feedback of teacher to ensure outcome of learning.

- H) Course Curriculum Detailing:** This course curriculum detailing depicts learning outcomes at course level and session level and their attainment by the students through Classroom Instruction (CI), Laboratory Instruction (LI), Term Work (TW) and Self Learning (SL). Students are expected to demonstrate the attainment of Theory Session Outcomes (TSOs) and Lab Session Outcomes (LSOs) leading to attainment of Course Outcomes (COs) upon the completion of the course. While curriculum detailing, NEP 2020 related reforms like Green skills, Sustainability, Multidisciplinary aspects, Society connect, Indian Knowledge System (IKS) and others must be integrated appropriately.

I) Theory Session Outcomes (TSOs) and Units: T2400110

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<i>TSO 1a.</i> Explain the concept of to Community/Society in Indian Context <i>TSO 1b.</i> Explain the concept of Rural and Urban Society <i>TSO 1c.</i> Differentiate between Rural and Urban Societies. <i>TSO 1d.</i> Differentiate between Underdevelopment and development. <i>TSO 1e.</i> Describe the different components of community development	Unit-1.0 Community and Society Development Framework 1.1 Concept of Community/Society Development 1.2 Difference between Rural and Urban Societies 1.3 Characteristics of Underdevelopment and development 1.4 Components of Community Development	CO1
<i>TSO 2a.</i> Prepare a brief report on Community Development Programmes in India considering the given criteria <i>TSO 2b.</i> Prepare a brief report on institutions engaged in community development programmes considering the given criteria <i>TSO 2c.</i> Explain the framework of sustainable community development	Unit-2 Community Development Initiatives 2.1 Community Development Programmes in India- Historical perspective 2.2 Institutions Engaged in Community Development Programmes 2.3 Contemporary Community Development Initiatives. 2.4 Sustainable Community Development	CO1, CO2
<i>TSO 3a.</i> Explain Role of Technical Institutions in Community/Society development. <i>TSO 3b.</i> Summarise the activities undertaken by technical institutions under community development through polytechnic scheme <i>TSO 3c.</i> Prepare a plan for undertaking project to support Unnat Bharat Abhiyan	Unit-3.0 Community Development Schemes 3.1 Role of polytechnics in Community development. 3.2 Scheme of Community Development through Polytechnics 3.3 Unnat Bharat Abhiyan	CO3, CO4

Note: One major TSO may require more than one Theory session/Period.

J) Suggested Term Work/ Activities and Self Learning: Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. Assignments: Specific assignments will be given to students for preparing report on community development programmes and institutions engaged in community development programmes.

b. Micro Projects:

1. Suggest solution for flowing water near a water source.
2. Identify locally available construction materials in a village.
3. Suggest a plan for disposal of solid waste in a village.
4. Prepare a plan for use of solar light equipments at streets and public places.

c. Other Activities:

1. Seminar Topics:
 - Issues of development for a village near to the institution.
 - Activities to be undertaken by the polytechnic in a village.
 - Characteristics of Development and underdevelopment.
2. Visits: Visit to nearby village may be arranged and students may be asked to prepare list of development activities in different Discipline.
3. Self-learning topics:
 - Community Development programmes in India after independence.
 - Schemes of GOI for Community /society Development.

K) Suggested Instructional/Implementation Strategies: Different Instructional/ Implementation Strategies may be appropriately selected, as per the requirement of the content/outcome. Some of them are Improved Lecture, Tutorial, Case Method, Group Discussion, Industrial visits, Industrial Training, Field Trips, Portfolio Based, Learning, Role Play, Live Demonstrations in Classrooms, Lab, Field Information and Communications Technology (ICT)Based Teaching Learning, Blended or flipped mode, Brainstorming, Expert Session, Video Clippings, Use of Open Educational Resources (OER), MOOCs etc.

L) List of Major Laboratory Equipment, Tools and Software:(Not Applicable)

M) Suggested Learning Resources:

(a) Books and Reports:

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Module on Rural Development: Indian Context	IGNOU, New Delhi	Published by IGNOU, New Delhi
2.	Module on Rural Development Programmes	IGNOU, New Delhi	Published by IGNOU, New Delhi
3.	Module on Rural development planning and management	IGNOU, New Delhi	Published by IGNOU, New Delhi
4.	India's Developing Villages	G R Madan	Allied Publishers, 1990
5.	Five year plans, Plan Documents, Policy and Reports	Planning Commission of India publications	Planning Commission of India
6.	Scheme of Community Development through Polytechnics	Ministry of Human Resource Development, Shastri Bhavan ,New Delhi	Ministry of Human Resource Development, Govt of India, New Delhi

(b) Online Educational Resources:

1. https://www.google.co.in/books/edition/Rural_Development/hABduOX-X-gC?hl=en&gbpv=1&dq=rural+development+latest+books&printsec=frontcover
2. <https://www.india.gov.in/my-government/documents/plan-document>
3. <https://www.india.gov.in/website-planning-commission>

Note: Teachers are requested to check the creative commons license status/ financial implications of the suggested, online educational resources before use by the students.

(c) Others:

1. Project Reports Available in the office of CEO, Zila Parishad of the District.
2. Schemes of various departments of Bihar Government for Community/Social Development
