
Curriculum of Diploma Programme

in

Computer Aided Costume Design & Dress Making



**Department of Science, Technology and Technical Education
(DSTTE), Govt. of Bihar**

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

Semester – II

Teaching & Learning Scheme

Course Codes	Category of course	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				
2450201	PCC	Basic Pattern Making For CACDDM	03	-	04	02	09	06
2452101	PCC	Textile Science (GT, CACDDM)	02	01	-	02	05	04
2450202	PCC	Traditional Embellishments of India	03	-	04	02	09	06
2400102C	ASC	Applied Physics -C (TE, CACDDM, FPP, GT)	03	-	04	02	09	06
2400104	HSC	Communication Skills (English) (Common for all Programmes)	03	-	04	02	09	06
2400006	NRC	Environmental Education and Sustainable Development (Common for All Programmes)	01	-	01	01	03	02
Total			15	1	17	11	44	30

Note: Prefix will be added to Course Code if applicable (T for Theory, P for Practical Paper and S for Term Work)

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.

Semester - II Assessment Scheme

Course Codes	Category of course	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)	
2450201	PCC	Basic Pattern Making For CACDDM	30	70	20	30	20	30	200
2452101	PCC	Textile Science (GT, CACDDM)	30	70	20	30	-	-	150
2450202	PCC	Traditional Embellishments of India	30	70	20	30	20	30	200
2400102C	ASC	Applied Physics -C (TE, CACDDM, FPP, GT)	30	70	20	30	20	30	200
2400104	HSC	Communication Skills (English) (Common for all Programmes)	30	70	20	30	20	30	200
2400006	NRC	Environmental Education and Sustainable Development (Common for All Programmes)	15	-	10	-	10	15	50
Total			165	350	110	150	90	135	1000

Note: Prefix will be added to Course Code if applicable (T for Theory, P for Practical Paper and S for Term Work)

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** : 2450201 (T2450201/P2450201/S2450201)
 B) **Course Title** : Basic Pattern Making for CACDDM
 C) **Pre- requisite Course(s)** :
 D) **Rationale** :

Pattern Making involves the process of taking measurements of dress form or human body and preparing the basic sloper patterns. These slopers are then used as a base to create patterns for complex designs. It provides a blueprint of design of the garment. It is a crucial skill for the students of Diploma in Fashion & Clothing Technology as it acts as a bridge between design and production. It serves as a common language between designers, pattern makers and apparel manufacturers. It enables the designer to transform his/ her design concept to three dimensional garments. It is a fundamental skill that empowers students to bring their creative vision to life and excel in their field. This course provides the students the essential skills of pattern making.

- 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** Measure the vertical and horizontal elements of body/ dress form accurately.
CO-2 Prepare the basic sloper patterns as per the given measurements.
CO-3 Develop pattern variations by using the techniques of Flat Pattern Making.
CO-4 Develop patterns for different type of necklines, collars & yokes.
CO-5 Develop patterns for different type of sleeves.

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	-	-
CO-2	3	1	1	1	-	-	1	-	-
CO-3	3	2	2	1	-	1	1	-	-
CO-4	3	2	2	1	-	1	1	-	-
CO-5	3	2	2	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:

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				
2450201	Basic Pattern Making for CACDDM	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= (1xCIhours) + (0.5xLI hours) + (0.5xNotionalhours)

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:

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)	
2450201	Basic Pattern Making for CACDDM	30	70	20	30	20	30	200

Legend:

PTA: Progressive Theory Assessment in classroom (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: T2450201**

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p><i>TSO 1a.</i> Explain the methods of Pattern Making.</p> <p><i>TSO 1b.</i> Differentiate between drafting and flat patternmaking.</p> <p><i>TSO 1c.</i> Differentiate between basic and final pattern.</p> <p><i>TSO 1d.</i> Explain step by step the process of taking body measurements.</p> <p><i>TSO 1e.</i> Describe the use of different tools required for pattern making.</p> <p><i>TSO 1f.</i> Identify the given symbols used in pattern making</p> <p><i>TSO 1g.</i> Enlist the measurements required for basic bodice sloper with sleeve, skirt sloper and trouser sloper.</p> <p><i>TSO 1h.</i> Enumerate the points that should be taken care of while taking vertical, horizontal and girth measurements of human body.</p>	<p>Unit-1.0 Introduction to Pattern Making</p> <p>1.1 Methods of Pattern Making:</p> <ol style="list-style-type: none"> Drafting. Flat Pattern Making. Draping. <p>1.2 Types of Pattern: Basic pattern, Working pattern and Final pattern.</p> <p>1.3 Taking Body Measurements of Human Body and Dress Form.</p> <ol style="list-style-type: none"> Girth Measurements. Vertical Measurements. Horizontal Measurements. <p>1.4 Standard Body Measurement Chart for women's wear, kids wear and men's wear.</p> <p>1.5 Tools and terminologies of Pattern making</p> <ul style="list-style-type: none"> - Hip Curve, Grading ruler, French Curve, Scissors, Leg Curve, Tracing wheel, Measuring Tape, Notcher, Muslin, Dress form, Paper pattern, Selvedge, Grain line, L Square, Slopers, Single dart pattern, Two dart pattern, Seam allowance, Ease etc. <p>1.6 Symbols and abbreviations.</p>	<p>CO1</p>
<p><i>TSO 2a.</i> Enlist the basic sloper pattern set.</p> <p><i>TSO 2b.</i> Write the step-by-step drafting of basic bodice sloper pattern (front and back) using the given body measurements.</p> <p><i>TSO 2c.</i> Write the step-by-step drafting of basic sleeve sloper pattern (short, elbow and 3/4th length) using the given measurements.</p> <p><i>TSO 2d.</i> Write the step-by-step drafting of basic skirt sloper pattern of the given measurement (front and back).</p> <p><i>TSO 2e.</i> Write the step-by-step step by step drafting of basic trouser sloper pattern of the given measurement (front and back).</p> <p><i>TSO 2f.</i> Elucidate the points to be taken care of while drafting the given sloper pattern.</p>	<p>Unit-2.0 Drafting of Basic Slopers Patterns</p> <p>2.1 Basic Bodice Slopers: Front & Back.</p> <p>2.2 Basic Sleeve Slopers:</p> <ul style="list-style-type: none"> • Short • Elbow length • 3/4th, Full <p>2.3 Basic Skirt Slopers: Front & Back.</p> <p>2.4 Trouser Slopers: Front & Back.</p>	<p>CO1, CO2</p>
<p><i>TSO 3a.</i> Enumerate the techniques of Flat Pattern Making.</p>	<p>Unit-3.0 Techniques of Flat Pattern Making</p> <p>3.1 Dart Manipulation:</p>	<p>CO2, CO3</p>

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p><i>TSO 3b.</i> Describe diagrammatically the techniques of dart manipulation.</p> <p><i>TSO 3c.</i> Use techniques of dart manipulation and prepare pattern by changing the waist dart to the given location.</p> <p><i>TSO 3d.</i> Write the step-by-step process of creating dart cluster at shoulder.</p> <p><i>TSO 3e.</i> Write the step-by-step process of creating dart cluster at waist.</p> <p><i>TSO 3f.</i> Describe the process of adding fullness to a pattern.</p> <p><i>TSO 3g.</i> Write the step-by-step process of creating fullness at yoke.</p> <p><i>TSO 3h.</i> Write the step-by-step process of creating fullness at dart legs.</p> <p><i>TSO 3i.</i> Prepare Contour guide pattern</p> <p><i>TSO 3j.</i> Develop designs for wrap, off shoulder and halter bodice using contour guide pattern.</p>	<p>a. Charting Dart Locations</p> <p>b. Techniques of dart manipulation: Slash & Spread technique, Pivotal technique</p> <p>c. Single Dart Series</p> <p>d. Two Dart Series</p> <p>e. Dart Clusters: Shoulder & Waist cluster</p> <p>3.2 Adding Fullness:</p> <p>a. Types of adding fullness: Equal, One-sided and Unequal fullness</p> <p>b. Fullness at yoke</p> <p>c. Fullness at dart leg</p> <p>3.3 Contouring</p> <p>a. Preparing contour guide patterns</p> <p>b. Using contour guide pattern for wrap, off shoulder and halters</p>	
<p><i>TSO 4a.</i> Use the basic bodice sloper and create pattern for the given neckline.</p> <p><i>TSO 4b.</i> Use the basic bodice sloper and create pattern for the given collar.</p> <p><i>TSO 4c.</i> Use the basic bodice sloper and create pattern for the front and back yoke.</p> <p><i>TSO 4d.</i> Prepare pattern for yoke with inverted box pleat.</p> <p><i>TSO 4e.</i> Prepare pattern for yoke with added fullness.</p> <p><i>TSO 4f.</i> Prepare pattern for waist yoke of the given shape.</p>	<p>Unit-4.0 Necklines, Collars & Yokes</p> <p>4.1 Necklines:</p> <p>a. Round</p> <p>b. Sweetheart</p> <p>c. V- shape</p> <p>d. Cowl,</p> <p>e. Halter</p> <p>f. Off-shoulder</p> <p>4.2 Collars:</p> <p>a. Peterpan</p> <p>b. Mandarin collar</p> <p>c. Shirt Collar</p> <p>4.3 Yokes:</p> <p>a. Bodice Yoke:</p> <ul style="list-style-type: none"> • Basic front & back yoke • Yoke with inverted box pleat • Yoke with Added Fullness <p>b. Waist Yoke: Yoke with different shapes.</p>	CO2, CO3, CO4
<p><i>TSO 5a.</i> Explain diagrammatically the different types of cuff.</p> <p><i>TSO 5b.</i> Prepare pattern for the given cuff.</p> <p><i>TSO 5c.</i> Differentiate between set-in-sleeve, extended sleeve and raglan sleeve.</p> <p><i>TSO 5d.</i> Write the drafting of the given sleeve.</p> <p><i>TSO 5e.</i> Differentiate between kimono and dolmon sleeves.</p> <p><i>TSO 5f.</i> Classify sleeve including their subtypes.</p> <p><i>TSO 5g.</i> Describe diagrammatically the procedure of manipulation of basic sleeve sloper to prepare the given sets in sleeves.</p> <p><i>TSO 5h.</i> Differentiate between plain sleeve and sleeve with extended caps.</p>	<p>Unit-5.0 Sleeves</p> <p>5.1 Sleeve Cuffs:</p> <p>a. Basic shirt cuff</p> <p>b. French cuff</p> <p>c. Contoured cuff</p> <p>d. Roll up cuff</p> <p>5.2 Set-in-Sleeves:</p> <p>a. Cap sleeve</p> <p>b. Circular hemline sleeves</p> <p>c. Bell sleeve</p> <p>d. Petal sleeve</p> <p>e. Sleeves with extended caps</p> <p>f. Cowl sleeve</p> <p>g. Bishop sleeve</p> <p>5.3 Extended Sleeves:</p> <p>a. Kimono</p> <p>b. Dolmon</p> <p>5.4 Raglan Sleeve</p>	CO2, CO5

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

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2450201

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<p><i>LSO 1.1.</i> Use the patternmaking symbols and abbreviations to record the given dress form/ body measurements.</p> <p><i>LSO 1.2.</i> Use pattern making tools to take the measurements of body or dress form.</p>	1.	Demonstrate the process of taking dress form/ body measurements: <ul style="list-style-type: none"> • Vertical • Horizontal • Girth 	CO1
<p><i>LSO 2.1.</i> Use the standard measurements / body measurements to prepare pattern for the given sloper.</p> <p><i>LSO 2.2.</i> Use the appropriate pattern making tools to prepare the pattern for the given sloper.</p> <p><i>LSO 2.3.</i> Use appropriate symbols and abbreviation to mark the given pattern.</p>	2.	Prepare the sloper patterns of the following using the given measurements: <ul style="list-style-type: none"> • Basic bodice • Basic sleeve • Basic skirt • Trouser Sloper 	CO1, CO2
<p><i>LSO 3.1.</i> Develop different patterns of single dart series without changing the fit of the given pattern.</p> <p><i>LSO 3.2.</i> Use precisely the techniques of dart manipulation.</p>	3.	Prepare pattern of Single Dart Series by changing the waist dart to given location using the following techniques of dart manipulation: <ul style="list-style-type: none"> • Slash and Spread • Pivotal 	CO2, CO3
<p><i>LSO 4.1.</i> Develop different patterns of double dart series without changing the fit of the given pattern.</p> <p><i>LSO 4.2.</i> Use precisely the techniques of dart manipulation.</p>	4.	Prepare pattern of following Double dart series by using slash and spread or pivotal technique of dart manipulation: <ul style="list-style-type: none"> • Waist dart and shoulder dart • Waist dart and French dart • Waist dart and armhole dart 	CO2, CO3
<p><i>LSO5.1</i> Use dart manipulation techniques to create pattern for designs with dart cluster at the given location.</p>	5.	Prepare pattern for dart cluster at following location: <ul style="list-style-type: none"> • Shoulder • Waist 	CO2, CO3
<p><i>LSO 6.1</i> Choose appropriate techniques of adding fullness as per the given design.</p>	6.	Create patterns of added fullness using appropriate techniques at following locations: <ul style="list-style-type: none"> • At yoke • At dart legs 	CO3
<p><i>LSO7.1</i> Use contour guide pattern to create pattern for the given design.</p>	7.	Create patterns for the following using contour guide: <ul style="list-style-type: none"> • Wrap dress • Off shoulder dress • Halter dress 	CO3
<p><i>LSO8.1</i> Use basic bodice sloper to develop the pattern of given necklines.</p> <p><i>LSO 8.2</i> Use slash and spread/ pivotal technique to develop pattern for the given cowl and halter neckline.</p>	8.	Prepare pattern of following necklines: <ul style="list-style-type: none"> • Round • Sweetheart • V- shape • Cowl, • Halter • Off-shoulder 	CO2, CO3, CO4
<p><i>LSO 9.1</i> Use basic bodice sloper to develop the pattern of the given collars.</p>	9.	Prepare pattern of following collars: <ul style="list-style-type: none"> • Peterpan • Mandarin • Shirt 	CO2, CO4

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<p><i>LSO 10.1</i> Manipulate basic bodice sloper to create pattern of the given bodice yoke.</p> <p><i>LSO 10.2</i> Manipulate basic skirt sloper to create pattern of the given bodice yoke.</p>	10.	Prepare pattern of following yokes: <ul style="list-style-type: none"> • Basic front & back yoke • Yoke with inverted box pleat • Yoke with Added Fullness • Waist Yoke of given shape 	CO2, CO4
<p><i>LSO 11.1</i> Use basic sleeve sloper to develop the pattern of the given cuff.</p>	11.	Prepare pattern for following cuffs: <ul style="list-style-type: none"> • Basic shirt cuff • French cuff • Contoured cuff • Roll up cuff 	CO2, CO5
<p><i>LSO 12.1</i> Manipulate basic sleeve sloper to create the pattern of the given set in sleeve.</p>	12.	Prepare patterns for following Set-in-sleeves: <ul style="list-style-type: none"> • Cap sleeve • Circular hemline sleeves • Bell sleeve • Petal sleeve • Sleeves with extended caps • Cowl sleeve • Bishop sleeve 	CO2, CO3, CO5
<p><i>LSO 13.1</i> Manipulate basic bodice and sleeve sloper to create pattern of the given extended sleeve.</p>	13	Prepare patterns for Extended sleeves: <ul style="list-style-type: none"> • Kimono • Dolmon 	CO2, CO5
<p><i>LSO 14.1</i> Manipulate basic bodice and sleeve sloper to create pattern of the given raglan sleeve.</p>	14	Prepare patterns for Raglan sleeve.	CO2, CO5

L) Suggested Term Work and Self Learning: S2450201

Some sample suggested assignments, micro project and other activities are mentioned here for reference.

a. Assignments: Prepare a portfolio file of patterns mentioned in Unit 2,3,4,5.

b. Micro Projects:

1. Develop 2 novel patterns using Contour guide pattern.
2. Search 3 designs based on origami pattern, observe them and create patterns using your own body measurements.
3. Create a novel sleeve pattern (other than those mentioned in unit 5) using basic sleeve sloper.

c. Other Activities:

1. Seminar Topics:
 - Digital Pattern Making.
 - Twisted Pattern of Garments.
2. Visits: Visit a nearby apparel manufacturing unit to explore the industrial methods of pattern making and prepare the report.
3. Self-Learning Topics:
 - Explore new designs and develop its pattern.

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	5%	5%	5%	-	-	10%	20%
CO-2	20%	20%	20%	-	-	15%	20%
CO-3	15%	15%	15%	33%	33%	10%	20%
CO-4	35%	35%	35%	33%	33%	35%	20%
CO-5	25%	25%	25%	34%	34%	30%	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 percentages 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 Introduction to Pattern Making	4	CO1	6	2	3	1
Unit-2.0 Drafting of Basic Sloper Patterns	10	CO1, CO2	12	4	3	5
Unit-3.0 Techniques of Flat Pattern Making	8	CO2, CO3	10	3	3	4
Unit-4.0 Necklines, Collars & Yokes	14	CO2, CO3, CO4	22	6	6	10
Unit-5.0 Sleeves	12	CO2, CO5	20	5	6	9
Total	48	-	70	20	21	29

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.	Demonstrate the process of taking dress form/ body measurements: <ul style="list-style-type: none"> Vertical Horizontal Girth 	CO1	30	60	10
2.	Prepare the sloper patterns of the following using the given measurements: <ul style="list-style-type: none"> Basic bodice Basic sleeve Basic skirt Trouser Sloper 	CO1, CO2	40	50	10
3.	Prepare pattern of Single Dart Series by changing the waist dart to given location using the following techniques of dart manipulation: <ul style="list-style-type: none"> Slash and Spread Pivotal 	CO2, CO3	50	40	10
4.	Prepare pattern of following Double dart series by using slash and spread or pivotal technique of dart manipulation: <ul style="list-style-type: none"> Waist dart and shoulder dart Waist dart and French dart Waist dart and armhole dart 	CO2, CO3	50	40	10
5.	Prepare pattern for dart cluster at following location: <ul style="list-style-type: none"> Shoulder Waist 	CO2, CO3	50	40	10
6.	Create patterns of added fullness using appropriate techniques at following locations: <ul style="list-style-type: none"> At yoke At dart legs 	CO3	40	50	10
7.	Create patterns for the following using contour guide: <ul style="list-style-type: none"> Wrap dress Off shoulder dress Halter dress 	CO3	50	40	10
8.	Prepare pattern of following necklines: <ul style="list-style-type: none"> Round Sweetheart V- shape Cowl, Halter Off-shoulder 	CO2, CO3, CO4	50	40	10
9.	Prepare pattern of following collars: <ul style="list-style-type: none"> Peterpan Mandarin Shirt 	CO2, CO4	40	50	10
10.	Prepare pattern of following yokes: <ul style="list-style-type: none"> Basic front & back yoke Yoke with inverted box pleat Yoke with Added Fullness Waist Yoke of given shape 	CO2, CO4	40	50	10
11.	Prepare pattern for following cuffs: <ul style="list-style-type: none"> Basic shirt cuff French cuff Contoured cuff Roll up cuff 	CO2, CO5	40	50	10

S. No.	Laboratory Practical Titles	Relevant COs Number(s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
12.	Prepare patterns for following Set-in-sleeves: <ul style="list-style-type: none"> • Cap sleeve • Circular hemline sleeves • Bell sleeve • Petal sleeve • Sleeves with extended caps • Cowl sleeve • Bishop sleeve 	CO2, CO3, CO5	50	40	10
13.	Prepare patterns for Extended sleeves: <ul style="list-style-type: none"> • Kimono • Dolmon 	CO2, CO5	40	50	10
14.	Prepare patterns for Raglan sleeve	CO2, CO5	40	50	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, 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:

S. No.	Name of Equipment & Tools	Broad Specifications	Relevant Experiment/Practical Number
1.	Pattern cutting table	Height- 3 feet, Size- 2400X1200X900MM	All
2.	Pattern Maker Fashion Designing Ruler and Multi-Purpose Marking Curve	43X19cm, Thickness- 3mm	All
3.	French Curve with cm markings	--	All
4.	Hip Curve Ruler	Dimensions- 600 x 40 x 5 mm Graduation Range 0-24 Inches	All
5.	Leg Curve Ruler	Dimensions - 750 x 40 x 5 mm, Graduation Range 0-30 Inches	All
6.	L Scale	14X24 inches	All
7.	Tailor's Scissors	11" anti rust stainless steel scissors with alloy steel blade material	All
8.	Measuring Tape	60 inches long	All
9.	Pattern Paper/ Brown Paper	-	All

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

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Pattern Making For Fashion Design	Helen Joseph Armstrong	Pearson, 2014, Fifth edition ISBN: 978-93-325-1811-7
2.	Basic Pattern Making In Fashion	Lucia Mors	Taschen, 2009 ISBN: 3836517213, 978-3836517218
3.	Principles of Flat Pattern Design	Nora M. Mac Donald	Fairchild Publications, 4 th Edition, 2019 ISBN: 9781501353529
4.	Patternmaking: A Comprehensive Reference for Fashion Design	Sylvia Rosen	Pearson, 2004 ISBN: 978-0130262431
5.	Pattern Making by the Flat Pattern Method	Norma. R. Hollen, Carolyn. J. Kundel	Pearson, 8 th edition, 1998 ISBN: 978-0139380938

(b) Online Educational Resources:

1. <https://www.youtube.com/watch?v=0WVOhnq1cro>
2. <https://www.youtube.com/watch?v=bbhlvYjDMg8>
3. <https://www.youtube.com/watch?v=5M7HyHjjZY>
4. <https://www.youtube.com/watch?v=leSGoOVbY5A>
5. https://www.youtube.com/watch?v=V_gA4RIKGLI
6. https://www.youtube.com/watch?v=HohIMuBY_eM
7. <https://www.youtube.com/watch?v=P1bvkscWnw>
8. <https://www.youtube.com/watch?v=biraYMOKck8>

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

- A) **Course Code** : 2452101 (T2452101/S2452101)
 B) **Course Title** : Textile Science (GT, CACDDM)
 C) **Pre- requisite Course(s)** :
 D) **Rationale** :

Rapid changes and progress in the textile industry have led to the advancement in the fabrics selected for manufacturing garments. Manufacturing fibre and textiles for apparel, household, and industrial use is a great business opportunity. This course provides in-depth knowledge of different fibres, yarns and fabrics available in the market, their manufacturing processes and their properties as well as develop requisite competency and skills in dyeing, printing and its operations, materials, equipment and processes. This course will provide a comprehensive foundation for students undertaking the course in Garment Technology.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of the 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** Select suitable type of textile fibre for various applications.
CO-2 Suggest suitable yarns and fabrics for various uses.
CO-3 Identify fabrics based on the type of yarns, weaves and manufacturing processes.
CO-4 Select the appropriate dyeing process for different fibres, yarns and fabrics.
CO-5 Use various printing styles for different applications.

- 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	-	-	3	-	2		
CO-2	3	2	-	-	3	-	2		
CO-3	3	2	-	-	3	-	2		
CO-4	3	2	-	-	3	-	2		
CO-5	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:**

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				
2452101	Textile Science	02	01	-	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:

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)	
2452101	Textile Science	30	70	20	30	-	-	150

Legend:

- PTA: Progressive Theory Assessment in classroom (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: T2452101

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO 1a. Explain the different terms related to textiles. TSO 1b. Differentiate between types of yarns. TSO 1c. Differentiate between types of fabrics. TSO 1d. Classify the different type of garments. TSO 1e. Explain the importance of textile science in our life.	Unit-1.0 Fundamentals of Textile 1.1 Textile, Textile Science 1.2 Fibres, Filaments 1.3 Yarns: spun yarns, filament yarns 1.4 Sewing threads 1.5 Fabrics: woven, knitted, non-woven 1.6 Garment. 1.7 Importance of textile science in our life.	CO1, CO2
TSO 2a. Explain the term 'Textile Fibre'. TSO 2b. Classify different types of textile fibres. TSO 2c. Describe the properties of the given fibre. TSO 2d. Identify the given fibre on basis of the feeling and burning	Unit-2.0 Textile Fibres 2.1 Textile fibres, Classification of fibres, General fibre properties. 2.2 Sources of different fibres, physical & chemical properties, their suitability in garment of following textile fibres: Cotton, Silk, Wool, Polyester, Viscose rayon, Acrylic, Nylon. 2.3 Identification of important textile fibres: Feeling and burning test	CO1
TSO 3a. Explain the term 'yarn'. TSO 3b. Describe the process involved in conversion of the given fibres into yarn. TSO 3c. Suggest suitable yarn for the given application with justification. TSO 3d. Explain the use of yarn twist and yarn count.	Unit-3.0 Yarns 3.1 Conversion of fibres into yarn. 3.2 Types of yarn, their properties and suitability for the garment. 3.3 Yarn Twist, Yarn count	CO2, CO3
TSO 4a. Identify various woven fabrics and their uses. TSO 4b. Explain the stated weaving and related terminologies. TSO 4c. Explain basic loom operations. TSO 4d. Classify various types of weaves and their application. TSO 4e. Draft peg plans of various weaves.	Unit-4.0 Conversion of Yarn into Fabric 4.1 Fabric formation- weaving, knitting, non-woven 4.2 End use of fabrics produced by these methods 4.3 Woven fabric: Warp and weft yarn, loom, loom mechanism and function of its various parts 4.4 Woven design fundamentals: classification of woven structure, methods of weave representation, weave repeat, basic elements of woven design, types of draft plan and peg plans of weaves 4.5 Basic weaves and its modification (Plain weave, Twill weave, Satin and sateen weaves), decorative weaves.	CO3
TSO 5a. Explain the given wet-processing of textile materials. TSO 5b. Classify the various types of dyes. TSO 5c. Describe the given dyeing techniques. TSO 5d. Explain the working of the given dyeing machineries. TSO 5e. Select suitable dyeing process for the given fibre, yarn, and fabric with justification.	Unit-5.0 Chemical Processing of Textile 5.1 Wet-processing treatments: Singeing, de-sizing, scouring, bleaching, mercerization. 5.2 Dyeing: Dyes & its classification, Principles & Properties of dyes, Application of natural and Synthetic dyes on different fibres and their blends	CO4, CO5

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
TSO 5f. Explain the given method of printing. TSO 5g. Explain the given style of printing. TSO 5h. Describe the given type of Textile finish. TSO 5i. Differentiate between types of mechanical and chemical finishes. TSO 5j. Recommend a chemical processing method for the specific job order with justification.	5.3 Different dyeing techniques, dyeing machinery, Defects in dyeing and their remedies. 5.4 Textile Printing: dyeing and printing, Methods of Printing such as Block Printing, Stencil Printing, Screen Printing, and Roller printing. Styles of Printing: Direct style of Printing, Resist style of Printing, Tie & dye, Batik Printing, Discharge style of Printing. 5.5 Finishing of fabrics: Principle of finishing of natural, man-made fibres and blended fabrics. Wash-n-wear, crease-resistant anti-shrink, water-repellent, rot and mildew proofing, flame-proofing finishes, etc.	

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: S2452101

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.

- i. Use internet resources to collect different types of textiles and prepare a collage. Prepare a report.
- ii. Prepare a library research assignment on different types of fibres. Present it before the class.
- iii. Prepare a summary of environmental sustainable processes for conversion of yarn into fabric.
- iv. List entrepreneurship and self-employment opportunities in the area of chemical processing of textile.

b. Micro Projects:

- i. Collect different types of yarns from different resources and make a comparative chart.
- ii. Download 5 videos on Fibres and Yarns, watch them and write a report to detail out the steps involved.
- iii. Prepare a document for sustainable practices in textile sciences. Convert it into a street play and conduct few street shows for social awareness. Video shoot it and make it viral.

c. Other Activities:

i. Seminar Topics:

- Durable textiles with sensor.
- Technological advancements in textile manufacturing.

ii. Visits:

- Visit nearby textile, garment, printing industry. Prepare report of visit.
- Visit an industry and chart the process flow for manufacturing of fabric and chemical processing of textile.

iii. Self- learning topics:

- Natural Fibres.
- New spinning system
- Organic dyeing
- Organic printing of textiles.

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	15%	20%	15%	-	-	-	-
CO-2	10%	20%	10%	25%	-	-	-
CO-3	15%	20%	15%	25%	33%	-	-
CO-4	30%	20%	30%	25%	33%	-	-
CO-5	30%	20%	30%	25%	34%	-	-
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 percentages 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	COs Number (s)	Marks	ETA (Marks)		
				Remember (R)	Understanding (U)	Application & above (A)
Unit-1.0 Fundamentals of Textile	8	CO1	12	3	3	6
Unit-2.0 Textile Fibres	8	CO2	12	3	3	6
Unit-3.0 Yarns	8	CO3	12	3	3	6
Unit-4.0 Conversion of yarn into fabric	12	CO4	17	5	4	8
Unit-5.0 Chemical Processing of Textile	12	CO5	17	6	4	7
Total	48	-	70	20	17	33

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): (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, 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: (Not Applicable)

R) Suggested Learning Resources:

(a) Books:

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Textile Science	Gohl and Vilensky	CBS ISBN: 9788123910383
2.	Principles of Textile Testing	Booth J. E.	Athithi Books ISBN: 9789388327473
3.	Textile Science A Practical Manual	Dr. Deepali Rastogi Dr. Chanchal Dr. Sheetal Chopra Dr. Chitra Arora	Elite Publishing ISBN:9788188901678
4.	Textiles Science	Rastogi Deepali (Author), Chopra Sheetal	Orient Blackswan Private Limited ISBN:9789386392664

(b) Online Educational Resources:

1. <https://www.youtube.com/watch?v=yStM8evK6HE>
2. <https://www.youtube.com/watch?v=PDuiSnBYCQc>
3. <https://www.youtube.com/watch?v=CNDtsSWDIS0>
4. <https://www.arts.ac.uk/subjects/textiles-and-materials/short-courses/fashion-textiles/introduction-to-textiles-online-short-course-lcf>

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** : 2450202 (T2450202/P2450202/S2450202)
 B) **Course Title** : Traditional Embellishments of India
 C) **Pre-requisite Course(s)** :
 D) **Rationale** :

This course will provide knowledge of the traditional embellishment of various regions of India. Embellishment adds value to the article, which in turn would give more profit. This course will provide hands-on experiences to develop skills in surface embellishment which will be helpful to design and embellish garments/articles for different regions of India as per local needs/customs/traditions. This course will provide a base to make garments aesthetically beautiful. Students will also appraise different types of Traditional embellishments in India.

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of the 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 the classroom/ laboratory/ workshop/ field/ industry.

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

- CO-1 Develop skills in traditional embellishment techniques of Northern India.
 CO-2 Develop skills in traditional embellishment techniques of Western India.
 CO-3 Develop skills in traditional embellishment techniques of Central India.
 CO-4 Develop skills in traditional embellishment techniques of Southern India.
 CO-5 Develop skills in traditional embellishment techniques of Eastern India.

- 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	2	2	2	2	3		
CO-2	3	2	2	2	2	2	3		
CO-3	3	2	2	2	2	2	3		
CO-4	3	2	2	2	2	2	3		
CO-5	3	2	2	2	2	2	3		

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

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

G) Teaching & Learning Scheme:

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				
2450202	Traditional Embellishments of India	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 the teacher to ensure the outcome of learning.

H) Assessment Scheme:

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)	
2450202	Traditional Embellishments of India	30	70	20	30	20	30	200

Legend:

PTA: Progressive Theory Assessment in the classroom (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 assignments, micro-projects, seminars, 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 for internal as well as external assessment may vary as per the requirement of the respective course. For valid and reliable assessment, the internal faculty should prepare a 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 the 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: T2450202

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p><i>TSO 1a.</i> Appraise traditional embellishment of the Northern region of India.</p> <p><i>TSO 1b.</i> Select appropriate tools and accessories for the given embellishment.</p> <p><i>TSO 1c.</i> Identify embellishment techniques of various regions of Northern India</p> <p><i>TSO 1d</i> Suggest the appropriate type of fabrics, motifs, styles, and colors for the given embellishment.</p>	<p>Unit-1.0- Traditional Embellishment of Northern India</p> <p>1.1 Historical background, Techniques, Motifs, Styles, and colours of the following.</p> <p>1.1.1 Kashida of Kashmir</p> <p>1.1.2 Phulkari from Punjab</p> <p>1.1.3 Chamba Rumal from Himachal Pradesh</p>	CO1
<p><i>TSO 2a.</i> Appraise traditional embellishments of the western region of India.</p> <p><i>TSO 2b.</i> Select appropriate tools and accessories for the given embellishment.</p> <p><i>TSO 2c.</i> Identify embellishment techniques of various regions of Western India</p> <p><i>TSO 2d.</i> Suggest the appropriate type of fabrics, motifs, styles, and colours for given embellishments.</p>	<p>Unit-2.0- Traditional Embellishment of Western India:</p> <p>2.1 Historical background, Techniques, Motifs, Styles, and colours of the following.</p> <p>2.1.1 Embroidery from Gujarat</p> <p>2.1.2 Gota patti of Rajasthan</p> <p>2.2 Resist embellishment</p> <p>2.2.1 Bandhani</p> <p>2.2.2 Lehriya & Mothra</p> <p>2.2.3 Batik</p> <p>2.3 Patola</p> <p>2.4 Painted Textile</p> <p>2.4.1 Rogan art</p> <p>2.4.2 Mata- ni – Pachhedi</p> <p>2.4.3 Pichhwai</p> <p>2.4.4 Pabuji-ki phad</p>	CO2
<p><i>TSO 3a.</i> Appraise traditional embellishments of the central region of India.</p> <p><i>TSO 3b.</i> Select appropriate tools and accessories for the given embellishment.</p> <p><i>TSO 3c.</i> Identify embellishment techniques of various regions of central India.</p> <p><i>TSO 3d</i> Suggest the appropriate type of fabrics, motifs, styles, and colours for given embellishment.</p>	<p>Unit-3.0- Traditional Embellishment of Central India:</p> <p>3.1 Historical background, Techniques, Motifs, Styles, and colours of the following.</p> <p>3.1.1 Chikankari from Uttar Pradesh</p> <p>3.1.2 Phool Patti ka Kaam from Uttar Pradesh</p> <p>3.1.3 Zardozi works from Uttar Pradesh</p>	CO3
<p><i>TSO 4a.</i> Appraise traditional embellishments of Southern India.</p> <p><i>TSO 4b.</i> Select appropriate tools and accessories for the given embellishment.</p> <p><i>TSO 4c.</i> Identify embellishment techniques of various regions of Southern India</p> <p><i>TSO 4d</i> Suggest the appropriate type of fabrics, motifs, styles, and colours for given embellishment.</p>	<p>Unit-4.0- Traditional Embellishment of Southern India:</p> <p>4.1 Historical background, Techniques, Motifs, Styles, and colours of the following.</p> <p>4.1.1 Kasuti from Karnataka</p> <p>4.1.2 Lambadi embroidery from Andhra Pradesh</p> <p>4.2 Resist embellishment</p> <p>4.2.1 Teli Rumal</p> <p>4.2.2 Pochampalli</p>	CO4
<p><i>TSO 5a.</i> Appraise traditional embellishments of Eastern India.</p> <p><i>TSO 5b.</i> Select appropriate tools and accessories for the given embellishment.</p> <p><i>TSO 5c.</i> Identify embellishment techniques of various regions of Eastern India</p> <p><i>TSO 5d</i> Suggest the appropriate type of fabric, Motifs, Styles, and colours for given embellishment.</p>	<p>Unit-5.0 Traditional Embellishment of Eastern India:</p> <p>5.1 Historical background, Techniques, Motifs, Styles, and colours of the following.</p> <p>5.1.1 Kantha from West Bengal</p> <p>5.1.2 Sujani from Bihar</p> <p>5.1.3 Pipli appliqué from Orissa</p> <p>5.1.4 Manipur embroidery</p> <p>5.2 Painted textile</p> <p>5.2.1 Tankha painting</p>	CO5

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

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2450202

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<p><i>LSO1.1</i> Select suitable tools and materials for the given embellishment.</p> <p><i>LSO1.2</i> Design the motif for the given embellishment.</p> <p><i>LSO1.3</i> Create samples of Traditional embellishment of Northern India</p>	1.	<p>Prepare samples of the following traditional embellishment of Northern India on 8"/8" fabric. (One sample of each)</p> <p>1.1 Kashida of Kashmir</p> <p>1.2 Phulkari from Punjab</p> <p>1.3 Chamba Rumal from Himachal Pradesh</p>	CO1
<p><i>LSO 2.1.</i> Select suitable tools and materials for the given embellishment.</p> <p><i>LSO 2.2.</i> Design the motif for the given embellishment.</p> <p><i>LSO 2.3.</i> Create samples of Traditional embellishment in Western India</p>	2	<p>Prepare samples of the following Traditional embellishment of Western India on 8"/8" fabric. (One sample of each)</p> <p>2.1 Embroidery from Gujarat</p> <p>2.2 Gota patti of Rajasthan</p> <p>2.3 Bandhani</p> <p>2.4 Lehriya & Mothra</p> <p>2.5 Batik</p>	CO2
<p><i>LSO 3.1.</i> Select suitable tools and materials for the given embellishment.</p> <p><i>LSO 3.2.</i> Design the motif for the given embellishment.</p> <p><i>LSO 3.3.</i> Create samples of Traditional embellishment of Central India</p>	3	<p>Prepare samples of the following Traditional embellishment of Central India on 8"/8" fabric. (One sample of each)</p> <p>3.1. Chikankari from Uttar Pradesh</p> <p>3.2 Phool Patti ka Kaam from Uttar Pradesh</p> <p>3.3 Zardozi works in Uttar Pradesh</p>	CO3
<p><i>LSO 4.1</i> Select suitable tools and materials for the given embellishment.</p> <p><i>LSO 4.2</i> Design the motif for the given embellishment.</p> <p><i>LSO 4.3</i> Create samples of Traditional embellishment of Southern India</p>	4	<p>Prepare samples of the following Traditional embellishment of Southern India on 8"/8" fabric. (One sample of each)</p> <p>4.1 Kasuti from Karnataka</p> <p>4.2 Lambadi embroidery from Andhra Pradesh</p>	CO4
<p><i>LSO 5.1.</i> Select suitable tools and materials for the given embellishment.</p> <p><i>LSO 5.2.</i> Design the motif for the given embellishment.</p> <p><i>LSO 5.3.</i> Create samples of Traditional embellishment of Eastern India</p>	5	<p>Prepare samples of the following Traditional embellishment of Eastern India on 8"/8" fabric. (One sample of each)</p> <p>5.1 Kantha from West Bengal</p> <p>5.2 Sujani from Bihar</p> <p>5.3 Pipli appliqué from Orissa</p> <p>5.4 Manipur embroidery</p>	CO5

L) Suggested Term Work and Self-Learning: S2450202

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.

1. Collect the picture of the traditional embellishment of Northern India.
2. Collect the picture of traditional embellishment of Western India
3. Collect the picture of traditional embellishment of Central India
4. Collect the picture of traditional embellishment of Southern India

5. Collect the picture of traditional embellishment of Eastern India

b. Micro Projects:

1. Prepare a mobile cover with the embellishment of north India.
2. Prepare a report consisting historical background, techniques, motifs, styles, and colours of Patola of Gujarat.
3. Prepare a report consisting historical background, techniques, motifs, styles, and colours of Rogan art of Gujarat.
4. Create a sample of border (3" X 5") with any one traditional embellishment of Central India
5. Create one product/ article or any one traditional embellishment of Southern India.
6. Create one product/ article with any one traditional embellishment of Eastern India.

c. Other Activities:

Seminar Topics:

1. Presentation on Traditional embellishment of Northern India
2. Presentation on Traditional embellishment of Western India
3. Presentation on Traditional embellishment of Central India
4. Presentation on Traditional embellishment of Southern India
5. Presentation on Traditional embellishment of Eastern India
6. Visits: Visit to an exhibition of traditional textiles/ mall/State wise emporium/ Patola or other such traditional art and craft units etc.

7. Self-Learning Topics:

- Different techniques of Batik.
- History of traditional embellishment of India

M) Suggested Course Evaluation Matrix: The course teacher has to decide and use the 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	15%	15%	15%	20%	15%	15%	15%
CO-2	30%	30%	30%	20%	30%	30%	30%
CO-3	15%	15%	15%	20%	15%	15%	15%
CO-4	20%	20%	20%	20%	20%	20%	20%
CO-5	20%	20%	20%	20%	20%	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 percentages 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 The Traditional Embellishment of Northern India	6	CO1	10	3	3	4
Unit-2.0 Traditional Embellishment of Western India:	14	CO2	20	6	4	10
Unit-3.0 Traditional Embellishment of Central India:	8	CO3	10	3	3	4
Unit-4.0 Traditional Embellishment of Southern India:	10	CO4	15	4	4	7
Unit-5.0 Traditional Embellishment of Eastern India:	10	CO5	15	4	4	7
Total	48	-	70	20	18	32

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.	Prepare samples of following traditional embellishment of Northern India on 8"/8" fabric. (One sample of each) 1.1 Kashida of Kashmir 1.2 Phulkari from Punjab 1.3 Chamba Rumal from Himachal Pradesh	CO1	30	60	10
2.	Prepare samples of following Traditional embellishment of Western India on 8"/8" fabric. (One sample of each) 2.1 Embroidery from Gujarat 2.2 Gota patti of Rajasthan 2.3 Bandhani 2.4 Lehriya & Mothra 2.5 Batik	CO2	30	60	10
3.	Prepare samples of following Traditional embellishment of Central India on 8"/8" fabric. (One sample of each) 3.2. Chikankari from Uttar Pradesh 3.4 Phool Patti ka Kaam from Uttar Pradesh 3.5 Zardozi work from Uttar Pradesh	CO3	30	60	10
4.	Prepare samples of following Traditional embellishment of Southern India on 8"/8" fabric. (One sample of each) 4.3 Kasuti from Karnataka	CO4	30	60	10

S. No.	Laboratory Practical Titles	Relevant COs Number(s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
	4.4 Lambadi embroidery from Andhra Pradesh				
5.	Prepare samples of following Traditional embellishment of Eastern India on 8"/8" fabric. (One sample of each) 5.1 Kantha from West Bengal 5.2 Sujani from Bihar 5.3 Pipli appliqué from Orissa 5.4 Manipur embroidery	CO5	30	60	10

Legend:

PRA*: Process Assessment

PDA**: Product Assessment

Note: This table can be used for both the end semester as well as progressive assessment of practicals. Rubrics need to be prepared by the course teacher for each experiment/practical to assess the student's 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, Tutorials, Case Methods, Group Discussions, Industrial visits, Industrial Training, Field Trips, Portfolio Based, Learning, Role Play, Live Demonstrations in Classrooms, Labs, 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:

S. No.	Name of Equipment, Tools, and Software	Broad Specifications	Relevant Experiment/Practical Number
1.	Embroidery kit	All tools used for embroidery	All

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

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Traditional Embroideries of India	Dr. Shailaja D. Naik,	A.P.H.Publishing Corporation 1996 ISBN-9788170247319
2.	Textiles and embroidery of India	Kamladevi Chattopadhyay & Jasleen Dhamecha	Mark Publications, 34-38 Bank Street, Bombay, India.
3.	Indian Embroidery	Savitri Pandit	1st edition 1976
4.	Bhartiya Kashidakari	Dr. Amita Patel & Anita Patel	Avichl Science Foundation V.V.Nagar
5.	Ethnic Embroidery of India by	Usha Shrikant	Honesty Publisher & Distributors
6.	The coats book of Embroidery	Mary Gostelow David & Charles	Newton Abbot London Vancouver

7.	Complete guide to needlework	-	Reader 's Digest publication, 1979 ISBN-10:0895770598/13: 9780895770592
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(b) Online Educational Resources:

1. <https://ncert.nic.in/textbook/pdf/ievh101.pdf>
2. https://cbseacademic.nic.in/web_material/Curriculum/Vocational/2015/Traditional_India_Textile_and_Basic_Pattern_Dev_XII/CBSE_Traditional_Indian_Textiles%20XII.pdf
3. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SFDA1301.pdf

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

(c) Others:

1. <https://youtu.be/QKpgK6VjX0w>
2. <https://youtu.be/xJzJXSvT1tw>
3. <https://youtu.be/Woup2yPwO5E>
4. Lab Manuals

- A) **Course Code** : 2400102C (T2400102C/P2400102C/S2400102C)
 B) **Course Title** : Applied Physics – C (FPP, GT, CACDDM, TE)
 C) **Pre- requisite Course(s)** :
 D) **Rationale** :

As a subject Physics includes large numbers of diverse topics, related to materials, energy and their interactions that exists in the world around us. It empowers us to explain the different physical phenomena by observation and prediction. Engineering Diploma graduates are required to use of principles of physics in various fields of engineering and technology are given prominence in the course content. This course will help the diploma engineers to apply the basic concepts and principles of physics for solving various broad-based engineering problems and comprehend different state of art technology-based applications.

- 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** Estimate the errors in measurements of physical quantity with precision.
CO-2 Apply the concept of force, work and energy in different engineering situations
CO-3 Apply the concepts and principles of rotational and wave motion in various textile and allied engineering problems.
CO-4 Select relevant materials for industrial applications based on its physical properties.
CO-5 Apply the basic concepts of modern physics for solving engineering problems.

- 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		
CO-2	3	2	2	1	-	1	1		
CO-3	3	2	2	1	1	1	1		
CO-4	3	2	2	1	1	1	1		
CO-5	3	1	1	2	-	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:**

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				
2400102C	Applied Physics - C	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:

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)	
2400102C	Applied Physics - C	30	70	20	30	20	30	200

Legend:

PTA: Progressive Theory Assessment in classroom (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: T2400102C

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p><i>TSO 1a.</i> Distinguish between fundamental and derived physical quantity.</p> <p><i>TSO 1b.</i> Estimate the errors in the measurement of given physical quantity.</p> <p><i>TSO 1c.</i> Derive dimensional formula of a given physical quantity.</p> <p><i>TSO 1d.</i> Apply dimensional analysis for inter conversion of units.</p>	<p>Unit-1.0 Unit and Measurements</p> <p>1.1 Physical quantities, fundamentals and derived units and system of units</p> <p>1.2 Accuracy, precision and errors (systematic and random) in measurements, Method of estimation of errors (absolute and relative) in measurement, propagation of errors, significant figures</p> <p>1.3 Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimension in an equation</p> <p>1.4 Applications of dimensions: conversion from one system of units to other, corrections of equations and derivation of simple equations.</p> <p>1.5 Ancient astronomical instruments: Chakra, Dhanuryatra , Yasti and Phalaka yantra . (IKS)</p>	CO1
<p><i>TSO 2a.</i> Explain the terms force, impulse and momentum.</p> <p><i>TSO 2b.</i> Apply the concept of conservation of linear momentum in various situations.</p> <p><i>TSO 2c.</i> Apply the concept of friction in various engineering situations.</p> <p><i>TSO 2d.</i> Calculate the net work done conservative and non-conservatives forces</p> <p><i>TSO 2e.</i> Apply the concept of conservation of energy in various situations.</p> <p><i>TSO 2f.</i> Derive the expression for power in terms of force and velocity.</p>	<p>Unit-2.0 Force, Work, Power & Energy</p> <p>2.1 Force, momentum, impulse, conservation of linear momentum, recoil of gun & rocket propulsion</p> <p>2.2 Friction: coefficient of friction, static, kinetic and limiting friction, law of friction, Advantages and limitations due to friction. methods to remove friction</p> <p>2.3 Work: Types (zero work, positive & negative work), work done by conservative and non-conservatives force</p> <p>2.4 Energy: Kinetic energy, work energy theorem, potential energy, conservation of energy and its applications.</p>	CO2
<p><i>TSO 3a.</i> Explain circular motion and various terms related to circular motion.</p> <p><i>TSO 3b.</i> Distinguish between translational and rotational motion.</p> <p><i>TSO 3c.</i> Explain the terms torque and angular momentum.</p> <p><i>TSO 3d.</i> Apply the principle of conservation of angular momentum in given situation.</p> <p><i>TSO 3e.</i> Differentiate between periodic motion and oscillatory motion.</p> <p><i>TSO 3f.</i> Explain the various terms related to SHM.</p> <p><i>TSO 3g.</i> Derive an expression for total energy of particle executing SHM.</p>	<p>Unit-3.0 Circular, Rotational and SHM</p> <p>3.1 Circular motion, angular displacement, angular velocity, frequency, time period, angular acceleration, relation between angular & linear velocity and linear acceleration & angular acceleration</p> <p>3.2 Translational and rotational motion, torque and angular momentum, conservation of angular momentum</p> <p>3.3 Periodic and Oscillatory Motion</p> <p>3.4 Simple Harmonic Motion (SHM): Displacement, velocity, acceleration, time period, frequency and their interrelation, Kinetic and potential energy of particle executing SHM</p>	CO3

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p><i>TSO 4a.</i> Explain the stress-strain curve of a given elastic or plastic body.</p> <p><i>TSO 4b.</i> Apply the concepts of surface tension and viscosity to solve a given engineering problems.</p> <p><i>TSO 4c.</i> Explain the behavior of given fluids on the basis of their viscosity.</p> <p><i>TSO 4d.</i> Determine the various modes heat transfer in a given engineering problem.</p> <p><i>TSO 4e.</i> Apply the principle of calorimetry in various engineering situations.</p>	<p>Unit-4.0 Physical Properties of Matter and Calorimetry</p> <p>4.1 Elasticity: Hooke's law, Coefficient of elasticity, Young's modulus, Bulk Modulus and modulus of rigidity, stress-strain curve,</p> <p>4.2 Surface tension: cohesive and adhesive forces, Surface Tension, angle of contact, applications of surface tension, capillary action, effect of temperature and impurity on surface tension</p> <p>4.3 Viscosity: Viscosity and coefficient of viscosity, Critical Velocity, Reynold's number, streamline and turbulent flow, Terminal velocity, Stokes law and effect of temperature on viscosity.</p> <p>4.4 Calorimetry: concept of heat and its unit, principal of calorimetry, specific heat capacity, latent heat (fusion and vaporization), mechanical equivalence of heat.</p>	CO4
<p><i>TSO 5a.</i> Apply the concept of photoelectric effect to explain the of photonic devices.</p> <p><i>TSO 5b.</i> Explain Laser, components of laser and its various engineering applications.</p> <p><i>TSO 5c.</i> Explain propagation of light in optical fiber and applications of optical fiber.</p> <p><i>TSO 5d.</i> Describe the properties of nanomaterials and its various applications related to textile industries.</p>	<p>Unit-5.0 Modern Physics</p> <p>5.1 Photoelectric effect; threshold frequency, work function, Stopping Potential, Einstein's photoelectric equation.</p> <p>5.2 Lasers: Properties of Laser, Energy levels, ionization and excitation potentials; spontaneous and stimulated emission; population inversion, pumping methods, types of lasers: Ruby laser, engineering and medical applications of lasers.</p> <p>5.3 Optical fibers: Total internal reflection, acceptance angle and numerical aperture, Optical fiber types, applications in telecommunication, medical field and sensors.</p> <p>5.4 Nanotechnology: Properties (optical, magnetic and dielectric properties) of Nanomaterials and its application, Bhasma (Ancient Ayurveda, IKS)</p>	CO5

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

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2400102C

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<p><i>LSO 1.1.</i> Use Vernier caliper to measure the known and unknown dimensions of a given small object.</p> <p><i>LSO 1.2.</i> Estimate the mean absolute error up to two significant figures.</p>	1.	Vernier caliper	CO1
<p><i>LSO 2.1.</i> Use screw gauge to measure the diameter/ thickness of a given object.</p> <p><i>LSO 2.2.</i> Estimate the mean absolute, relative and percentage errors up to three significant figures.</p>	2.	Screw gauge	CO1
<p><i>LSO 3.1.</i> Use Spherometer to measure radius of curvature of given convex and concave mirror/surface.</p> <p><i>LSO 3.2.</i> Estimate errors in the measurement.</p>	3.	Spherometer	CO1

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<i>LSO 4.1.</i> Determine the spring constant of a given spring.	4.	Spring Oscillator	CO2
<i>LSO 5.1.</i> Use mixture method to determine the specific heat capacity of given solid	5.	Specific heat of Solid	CO2
<i>LSO 6.1.</i> Use Searle's apparatus to determine the Young's modulus of a given wire	6.	Searle's apparatus	CO4
<i>LSO 7.1.</i> Apply Stokes law to determine the coefficient of viscosity of a given viscous liquid.	7.	Stokes law	CO3
<i>LSO 8.1.</i> Determine the inverse square law relation between the distance of photocell and light source v/s intensity of light source.	8.	Photo-electric cell experiment	CO3
<i>LSO 9.1.</i> Determine the Numerical Aperture (NA) of a given step index optical fiber	9.	Numerical Aperture of an optical fiber	CO5
<i>LSO 10.1.</i> Measure wavelength of a He-Ne/diode laser by using a plane diffraction grating.	10.	He-Ne/diode laser	CO5
<i>LSO 11.1.</i> Plot the graph between KE of Photo electron v/s frequency of incident light <i>LSO 11.2.</i> Determine the value of Plank's Constant (h) from the Graph between KE v/s frequency of incident light. <i>LSO 11.3.</i> Determine the variation of stopping potential w.r.t frequency of incident photon	11	Photo electric effect (virtual lab experiment)	CO5
<i>LSO 12.1.</i> Determine the wave length of different spectral lines of Hydrogen spectra	12	Emission Spectra of Hydrogen (virtual lab experiment)	CO5

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 such as:

1. Use dimensional analysis to check the validity of equations or derive relationships between physical quantities.
2. Explain the importance of using consistent units in calculations and the consequences of unit errors.
3. Find the value of heat produced in a body due to loss of mechanical energy in different situation.
4. Explain the **conservation of PE to KE** and vice versa in a given physical situation.
5. Find the temperature of the mixture of two different liquids in thermal equilibrium for a given conditions.
6. Prepare a chart on lasers mentioning different characteristics along with applications(online)

b. Micro Projects:

1. Make prototype Vernier calipers and screw gauge of desired LC.
2. Collect wires/ fibers different materials and find the fracture point for required applications
3. Fiber optics: Demonstrate the phenomenon of total internal reflection.
4. LASER: Prepare model to demonstrate the properties and applications of LASER.
5. Viscosity: Collect 3 to 5 liquids and prepare a working model to differentiate liquids based on viscosity and demonstrate their applications.

6. Motion: Prepare model of ball rolling down on inclined plane to demonstrate the **conservation of energy** and motion of an object in inclined plane.
7. Prepare prototype Atwood machine
8. Use smartphone to measure the different physical quantity with the sensor applications.
9. Prepare list of photonic materials used for engineering applications.

c. Other Activities:

1. Seminar Topics:

- Needs of measurements in engineering and science.
- Applications of circular motions in daily life and engineering.
- LASER: Production & applications in science, industry, medical and defense, holography.
- Optical fibers: Construction and application in communication systems.
- Synthesis and applications of nanomaterials in textile industry.
- Applications of lasers in textile

2. Visits:

- Visit nearby industry with Instrumentation, production and Laser/optical fibers facilities. Prepare report of visit with special comments Instrumentation technique and material used.
- Visit planetarium, Science city and research institutions for exploring the experimental and research facilities available.

3. Self-Learning Topics:

- Vectors and its properties with applications.
- types of fundamental units, system of units
- Newton's Laws of motion, momentum, inertia, impulse.
- derivation of formula for moment of inertia
- Force, work, energy, power, work-energy theorem, law of **conservation of energy**
- Frictions and its types
- Electromagnetic waves
- Pressure, density, Pascal's law, atmospheric and gauge pressure
- Work done in various Processes, Adiabatic constant ($C_p/C_v = \gamma$), Mayer's formula ($C_p - C_v = R$)
- CO₂ Laser, Semiconductor LASER, He Ne laser.
- CNT, Graphene, C₆₀

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	12%	12%	20%	20%	10%	30%	20%
CO-2	22%	22%	20%	20%	10%	15%	20%
CO-3	24%	24%	30%	20%	30%	25%	20%
CO-4	22%	22%	15%	20%	20%	10%	20%
CO-5	20%	20%	15%	20%	30%	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 percentages 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 Unit and Measurements	8	CO1	10	4	4	2
Unit-2.0 Force, Work, Power & Energy	10	CO2	14	4	4	6
Unit-3.0 Circular, Rotational and SHM	8	CO3	16	4	6	6
Unit-4.0 Physical Properties of Matter and calorimetry	12	CO4	16	4	6	6
Unit-5.0 Modern Physics	10	CO5	14	4	4	6
Total	48	-	70	20	24	26

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.	Vernier caliper	CO1	60	30	10
2.	Screw gauge:	CO1	60	30	10
3.	Spherometer.	CO1	60	30	10
4.	Spring Oscillator	CO3	50	40	10
5.	Specific heat of Solid	CO2	50	40	10
6.	Searle's apparatus	CO3	60	30	10
7.	Stokes law	CO3	50	40	10
8.	Photo-electric cell experiment	CO3	60	30	10
9.	Numerical Aperture of an optical fiber	CO5	40	50	10
10.	He-Ne/diode laser	CO5	50	40	10
11.	Photo electric effect (virtual lab experiment)	CO5	70	20	10
12.	Emission Spectra of Hydrogen (virtual lab experiment)	CO4	70	20	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, 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:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/Practical Number
1.	Vernier-Caliper	Range: 0-15 cm, Resolution 0.01 cm.	1,8
2.	Micrometer screw gauge	Range 0-25 mm, Resolution 0.01 mm	2,7,8
3.	Spherometer	Vertical scale range -10mm to 10 mm, Graduation resolution 0.01 mm	3
4.	Spring oscillator	A spring, a measuring ruler, mass hanger and variable masses (50 gram, 100 gram) .	4
5.	Specific heat of solid	Calorimeter with stirrer, balance, thermometer and mass box	5
6.	Searle's apparatus	Two long steel wires of the same length and diameter, Brass rods, stopwatch, meter scale, 0.5 kg slotted masses, hanger	6
7.	Stokes law	A long cylindrical glass jar, Transparent viscous fluid, stop watch, bob, glycerin, tube clamp stand, Meter scale, Spherical ball, Thread	7
8.	Photo-electric cell experiment	Photo cell mounted in the metal box, Lamp holder with 60W bulb, analog meters (500 μ A & 1000mV), wooden bench fitted with scale and connecting wires	8
9.	Numerical Aperture of an optical fiber	Laser Diode (2- 3 mW, 632nm) Objective(10X), Optical fiber (1-meter-long), detector with BNC connector Auto arranging Multimeter, Screen with circular graduations, one circular base with linear and circular motion and optical bench	9
10.	He-Ne/diode laser	He-Ne Laser (output 0.5 –5.0mW, wavelength 632.8 nm power supply 240V, 50Hz) Or diode laser (2- 3 mW, 632nm), Transmission grating 15000 lines/inch, photo detector with BNC connector and holder, screen with clamp type holder, knife edge with micrometer movement, digital multimeter, scale with mount	10
11.	Photo electric effect (virtual lab experiment)	https://vlab.amrita.edu/?sub=1&brch=195&sim=840&cnt=1	11
12.	Emission Spectra of Hydrogen (virtual lab experiment)	https://vlab.amrita.edu/?sub=1&brch=195&sim=359&cnt=1	12

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

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Concept of physics-1	H.C. Verma	Bharti Bhawan Publications, 2021 ISBN: 8177091875, 978-8177091878
2.	Concept of physics-2	H.C. Verma	Bharti Bhawan Publications, 2021 ISBN: 8177092324, 978-8177092325
3.	Text Book of Physics for Class XI (Part-I, Part-II)	N.C.E.R.T., Delhi	N.C.E.R.T., Delhi, 2019 ISBN: 81-7450-508-3(Part-I) & ISBN: 81-7450-566-0 (Part-II)
4.	Text Book of Physics for Class XII (Part-I, Part-II)	N.C.E.R.T., Delhi	N.C.E.R.T., Delhi, 2019 ISBN: 81-7450-631-4 (Part-I) & ISBN: 81-7450-671-3 (Part II)
5.	Engineering Physics	P. V. Naik	Pearson Education Ltd., 1993 ISBN: 817758362X,978-8177583625
6.	Applied Physics-I	Dr. Mina Talati & Vinod Kumar Yadav	Khanna Book Publishing (2021) ISBN : 978-93-91505-43-1
7.	Applied Physics-II	Dr. Hussain Jeevakhan	Khanna Book Publishing (2021) ISBN: 978-93-91505-57-8
8.	Engineering Physics	D. K. Bhattacharya & Poonam Tandon	Oxford University Press, ISBN: 0199452814, 978-0199452811

(b) Online Educational Resources:

1. <https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype>
2. www.nanowerk.com
3. <https://www.open2study.com/courses/basic-physics-150315/>
4. <https://nptel.ac.in/courses/122107035>
5. <https://nptel.ac.in/courses/122104016>
6. <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>
7. <https://www.physicsclassroom.com/>
8. <https://phys.org/>
9. <https://vlab.amrita.edu/?sub=1>
10. <https://www.olabs.edu.in/?pg=topMenu&id=40>
11. <https://www.khanacademy.org/science/physics>

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

(c) Others:

1. Fundamentals of Physics, David Halliday, Robert Resnick and Jearl Walker
2. Engineering Physics, R.K. Gaur and S. L. Gupta
3. University Physics with Modern Physics, Sears and Zemansky
4. Physics for Scientists and Engineers with Modern Physics by Raymond A. Serway and John W. Jewett
5. Physics Laboratory Manual, David H Loyd

- A) **Course Code** : 2400104 (T2400104/P2400104/S2400104)
 B) **Course Title** : Communication Skills (English) (Common for all Programmes)
 C) **Pre-requisite Course(s)** :
 D) **Rationale**

Communication forms a crucial element in the success of any organization or industry in the globalized economy. The global village gives due weightage to the English language and it enjoys a privileged status. Engineering students with English as a communicative language are open to many opportunities across the globe. This course will develop Listening, Speaking, Reading, and Writing Skills (LSRW) in the students for effective dissemination of their ideas, projects, patents, and research in the form of presentations, reports, research papers, memos, circulars, etc. Additionally, it will help students of diploma in engineering to present concepts and designs effectively along with writing CVs, Group Discussions, and Mock Interview sessions in placements and job recruitments. Though communication skills in SBTE, Bihar largely emphasizes to communicate effectively in English communication in Hindi is also focused to some extent at the diploma level. **Effective Communication can be easily learned through Indian mythological scriptures like Bhagwat Geeta, Ramayana, Mahabharata, and others. (IKS)**

- E) **Course Outcomes (COs):** After the completion of the course, teachers are expected to ensure the accomplishment of the 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** Communicate contextually in different situations.
CO-2 Use Verbal Communication Effectively
CO-3 Deploy Non-Verbal Communication Contextually.
CO-4 Write various texts using vocabulary and correct grammar.
CO-5 Draft effective business correspondence with brevity and clarity.

- 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	-	-	-	-	3	3		
CO-2	-	-	-	-	-	3	3		
CO-3	-	-	-	-	-	3	3		
CO-4	-	-	-	-	3	3	3		
CO-5	3	-	-	-	-	3	3		

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:

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				
2400104	Communication Skills (English)	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 the teacher to ensure the outcome of learning.

H) Assessment Scheme:

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)	
2400104	Communication Skills (English)	30	70	20	30	20	30	200

Legend:

PTA: Progressive Theory Assessment in classroom (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 the 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: T2400104

The details of TSOs and units for communication in English is mentioned in Part – A while communication in Hindi is mentioned in Part – B in the following table.

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p>Part -A (English)</p> <p>TSO1.a Define communication and its different forms.</p> <p>TSO1.b Explain the elements of communication with Case Studies from Bhagwat Geeta's conversation between Krishna and Arjun before the war. (IKS)</p> <p>TSO1.c Explain the linkages between different stages of communication with the help of a diagram.</p> <p>TSO1.d Apply the principles of effective communication and state two examples of communication from Ramayana (IKS)</p> <p>TSO1.e State eight for explaining different types of barriers to communication Case Studies from Mahabharata - the conversation between Kauravas and Pandavas in the war field (IKS)</p> <p>TSO1.f Identify the barriers to communication.</p> <p>TSO1.g Suggest the ways to overcome/minimize communication barriers.</p>	<p>Unit-1.0 Communication</p> <p>1.1 Communication: Role, Relevance, Elements (Context-Sender-Message-Channel-Receiver-Feedback)</p> <p>1.2 Process / Stages: Ideation- Encoding, Selecting Proper Channel, Transmission, Receiving, Decoding, Giving Feedback</p> <p>1.3 7 Cs / Principles of Effective Communication: Considerate, Correct, Concrete, Concise, Clear, Complete. Courteous</p> <p>1.4 Barriers to Communication: Physiological, Physical, Psychological, Mechanical, Semantic/Language, Cultural. Overcome/ minimize Barriers.</p> <p>1.5 Case Studies from:</p> <ul style="list-style-type: none"> Bhagwat Geeta's conversation between Krishna and Arjun before the war (IKS) Mahabharata the conversation between Kauravas and Pandavas in the war field (IKS) 	<p>CO1</p> <p>CO2</p>
<p>TSO 2a. Distinguish between formal and informal communication Case Studies from Bhagwat Geeta and the different conversations of Krishna and Arjun during the war (IKS).</p> <p>TSO 2b. Illustrate the types of Formal Communication with examples.</p> <p>TSO 2c. Define verbal & non-verbal communication.</p> <p>TSO 2d. TSO 2d. Explain the advantages of oral and written Communication.</p> <p>TSO 2e. Interpret non-verbal codes from Mahabharata (IKS)</p> <p>TSO 2f. Explain the role of tables, charts & graphs in communication.</p> <p>TSO 2g. Differentiate Intrapersonal and Interpersonal Communication with Case Studies</p> <p>TSO 2h. List the advantages and disadvantages of Group Communication.</p>	<p>Unit- 2.0 Types of Communication</p> <p>2.1 Based on organizational structure: Formal (Vertical, Horizontal, Diagonal), Informal (Grapevine)</p> <p>2.2 Based on the method of expression: Verbal-Oral & Written communication. Non-verbal communication and its Codes- Kinesics, Chronemics, Proxemics, Haptics, Vocalics/Paralanguage, Artifacts, Graphic and Visual Communication</p> <p>2.3 Based on the number of people involved: Interpersonal, and Group Communication.</p> <p>2.4 Case Studies from Bhagwat Geeta's different conversations with Krishna and Arjun during the war (IKS).</p>	<p>CO3</p>
<p>TSO 3a. Prepare a glossary of new words from the given texts.</p>	<p>Unit-3.0 Reading Comprehension</p> <p>Comprehension, vocabulary enhancement and grammar exercises based on the reading of the</p>	<p>CO4</p> <p>CO5</p>

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p>TSO 3b. Summarize the given texts in your own words.</p> <p>TSO 3c. Recognize the types of sentences in the given texts.</p> <p>TSO 3d. Find out idioms and phrases used in the given texts.</p> <p>TSO 3e. Write a short biography of the given writers.</p> <p>TSO 3f. Identify the figures of speech used in the given texts.</p> <p>TSO 3g. Classify the forms of poetry.</p> <p>TSO 3h. Elaborate the central idea / theme of the given poems in your own words.</p>	<p>following texts:</p> <p style="text-align: center;">Section-1 (Prose)</p> <p>3.1 An Astrologer's Day by R K Narayan 3.2 Indian Civilization and Culture by M K Gandhi 3.3 The Secret of Work by Swami Vivekanand 3.4 My Struggle for an Education by Brooker T Washington</p> <p style="text-align: center;">Section-2 (Poetry)</p> <p>3.5 Where the Mind is without Fear by R N Tagore 3.6 Ode on Solitude by Alexander Pope 3.7 Stopping by Woods on a Snowy Evening by Robert Frost 3.8 A Psalm of Life by H W Longfellow</p>	
<p>TSO 4a. Form new words adding prefix and suffix to the given root words.</p> <p>TSO 4b. Write synonyms and antonyms of the given words.</p> <p>TSO 4c. Use the given idioms and phrases in your own sentences.</p> <p>TSO 4d. Distinguish between acronym and abbreviation.</p> <p>TSO 4e. Prepare a list of technical jargons of your respective branch.</p> <p>TSO 4f. Identify the parts of speech of the specific words in the given sentences.</p> <p>TSO 4g. Fill in the blanks with suitable verb forms in the given sentences.</p> <p>TSO 4h. Transform the given sentences as directed.</p> <p>TSO 4i. Punctuate the given paragraphs.</p>	<p>Unit-4.0 Vocabulary and Grammar</p> <p>4.1 Word Formation: Prefix, Suffix, Acronym 4.2 Synonyms, Antonyms, Homonyms, One Word Substitution, Idioms and Phrases 4.3 Technical Jargons -Related to the respective program 4.4 Parts of speech 4.5 Time and Tense 4.6 Transformation: Voice, Narration, Removal of 'Too', Question Tag 4.7 Punctuation</p>	CO4, CO5
<p>TSO 5a. Write the precis of the given passage with suitable title.</p> <p>TSO 5b. Draft letters and applications for the given purpose.</p> <p>TSO 5c. Compose E-mails, Notices, Memos, and Circulars.</p> <p>TSO 5d. Prepare reports of the projects of your respective branch.</p> <p>TSO 5e. Write a report on the events organized in your institute.</p>	<p>Unit-5.0 Professional Writing</p> <p>5.1 Precis Writing 5.2 Business Letters / Applications 5.3 Drafting E-mails, Notices, Memos, Circulars 5.4 Report Writing: Project and Event/ Incident Report Writing</p>	CO5
<p style="text-align: center;">Part -B (हिंदी)</p> <p>TSO 1a सम्प्रेषण कौशल का अर्थ स्पष्ट कर सकेंगे.</p> <p>TSO 1b भाव एवं सम्प्रेषण में अंतर बता पाएँगे.</p> <p>TSO 1c सम्प्रेषण की प्रक्रिया का उल्लेख कर सकेंगे.</p> <p>TSO 1d श्रवण अविद्यक्ति, वाचन और लेखन की अवधारणा को स्पष्ट कर सकेंगे.</p> <p>TSO 1e सम्प्रेषण कौशल के निर्धारक तत्वों का विवेचन</p>	<p>Units-1.0: सम्प्रेषण सिद्धान्त एवं व्यवहार</p> <p>1.1 सम्प्रेषण : परिचय , अर्थ एवं परिभाषा 1.2 सम्प्रेषण की प्रक्रिया एवं तत्त्व 1.3 सम्प्रेषण के प्रकार : औपचारिक एवं अनौपचारिक, शाब्दिक एवं अशाब्दिक</p>	CO1, CO2, CO3

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
कर सकेंगे. TSO 1f प्रभावशाली सम्प्रेषण के सिद्धांतों का समावेश अपने वार्तालाप में कर सकेंगे.	1.4 प्रभावशाली सम्प्रेषण के सिद्धांत एवं सम्प्रेषण व्यवधान कुरुक्षेत्र में श्रीकृष्ण- अर्जुन संवाद महाभारत युद्ध प्रारम्भ होने से पहले कुरुक्षेत्र में श्री कृष्ण ने अर्जुन के प्रश्नों के उत्तर देते हुए जीवन के सूत्र समझाए थे। ये उपदेश श्रीमद्भागवत गीता में मिलते	
TSO 2a तकनीकी कौशल एवं व्यवहार कौशल में अन्तर बता पाएँगे . TSO 2b व्यवहार कौशल का महत्व स्पष्ट कर पाएँगे . TSO 2c आत्मा जागरूकता एवं आत्मा विश्लेषण का विवेचन सोदाहरण कर पाएँगे . TSO 2d भावनात्मक बुद्धिमत्ता एवं करुणा, अनुकूलनशीलता एवं लचीलापन का विकास कर पाएँगे. TSO 2e दैनिक जीवन में अनुकूलनशीलता एवं लचीलापन को आत्मसात कर पाएँगे .	Unit-2.0: व्यावसायिकउत्कृष्टता हेतु व्यवहार कौशल 2.1 परिचय : तकनीकी कौशल एवं व्यवहार कौशल 2.2 व्यवहार कौशल का महत्त्व 2.3 जीवन कौशल : आत्म जागरूकता एवं आत्म विश्लेषण 2.4 वनात्मक बुद्धिमत्ता एवं करुणा, अनुकूलनशीलता एवं लचीलापन, व्यवहार कौशल का उपयोग श्रीराम केवट संवाद श्रीराम जब लक्ष्मण और सीता के साथ वन गमन के लिए प्रस्थान करते हैं तब सरयू नदी के पार उतारने लिए केवट से अनुरोध करते हैं।	CO1
TSO 3a पठित गद्यांश एवं पद्यांश से प्राप्त नयी शब्दावली विकसित कर पाएँगे TSO 3b दिए गये कहानियों, कविताओं एवं निबंधों का सारांश अपने शब्दों में लिख पाएँगे. TSO 3c दिए गये कहानियों, कविताओं एवं निबंधों में प्रयुक्त मुहावरों एवं अलंकारों को बता पाएँगे . TSO 3d कविताओं का भावार्थ स्पष्ट कर पाएँगे .	Unit-3.0: पाठ-बोध : शब्दावली परिवर्धन एवं व्याकरण अभ्यास 3.1 नमक का दरोगा, ईदगाह – मुंशी प्रेमचंद 3.2 बात (निबंध)- प्रताप नारायण मिश्र 3.3 वह प्रदीप जो दिख रहा है झिलमिल दूर नहीं है – रामधारी सिंह दिनकर 3.4 नर हो न निराश करो मन को – मैथिलीशरण गुप्त 3.5 कबीर के दोहे -काल्ह करे सो आज कर , जाति न पूछो साधू की , ऐसी वाणी बोलिए	CO4
TSO 4a अपनी शाखा से सम्बन्धित तकनीकी शब्दावली का चयन कर पाएँगे . TSO 4b पर्यायवाची एवं विलोम शब्दों से सम्बंधित शब्दावली तैयार कर सकेंगे . TSO 4c दिये गये गद्यांशों में विराम चिह्नों का सही प्रयोग कर पाएँगे .	Unit-4.0: शब्दावली एवं व्याकरण 2 Hrs 4.1 सामान्य शब्दावली 4.2 प्रशासनिक शब्दावली 4.3 शब्द भेद, अनेक शब्दों के लिए एक शब्द 4.4 विराम चिन्ह 4.5 मुहावरें एवं कहावतें	CO4 CO5
TSO 5a दिए गये दिए गये गद्यांशों का संक्षेपण कर पाएँगे . TSO 5b विभिन्न प्रकार के पत्रों, आवेदनों ,सूचनाओं, विज्ञप्तियों को लिख पाएँगे . TSO 5c अपनी शाखा से सम्बंधित प्रतिवेदन लेखन कर पाएँगे . TSO 5d अपने संस्थान में हुए आयोजनों का प्रतिवेदन लिख पाएँगे.	Unit-5.0: लेखन कौशल 5.1 सार- लेखन 5.2 औपचारिक एवं व्यवसायिक पत्र लेखन 5.3 प्रारूप लेखन – सूचना, निविदा लेखन, प्रतिवेदन लेखन, बायोडाटा	CO5

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

J) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2400104

These practical's are common for both Part – A and Part -B.

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<i>LSO1.a</i> Identify the emotions of the speakers.	1	Emotions of the speakers.	CO1
<i>LSO2.a</i> Interpret instructions of audio transcripts.	2	Instructions of audio transcripts.	CO1
<i>LSO3.a</i> Solve the language puzzles based on the audio transcript.	3	Language puzzles.	CO1
<i>LSO4.a</i> Repeat words on language lab software after listening to them.	4	Repetition of words	CO1
<i>LSO5.a</i> Summarize the excerpt in their own words.	5	Summarize the excerpt.	CO1
<i>LSO6.a</i> Answer the questions based on the listening excerpt	6	Listening excerpt	CO2
<i>LSO7.a</i> Differentiate the sounds of minimal pairs, syllables, words, etc.	7	Sounds of minimal pairs, syllables words etc.	CO2
<i>LSO8.a</i> Pronounce the words/ sentences correctly based on the phonetic transcription.	8	Phonetic transcription.	CO2
<i>LSO9.a</i> Read out the words and sentences based on stress and intonation marks.	9	Stress and intonation.	CO2
<i>LSO10.a</i> Apply the paralinguistic codes in verbal dialogues to show different emotions.	10	Paralinguistic Codes	CO2
<i>LSO11.a</i> Integrate the non-verbal codes in their verbal dialogues.	11	Non-verbal Codes	CO2
<i>LSO12.a</i> Correct the verbal and non-verbal presentations of their peer while giving feedback.	12	Feedback on Presentations	CO2
<i>LSO13.a</i> Differentiate the sounds of minimal pairs, syllables, words, etc.	13	Syllables and Words	CO2
<i>LSO14.a</i> Locate the dictated words from the excerpt.	14	Dictated words	CO3
<i>LSO15.a</i> Arrange the correct and logical sequence of the jumbled sentences.	15	Jumbled Sentences.	CO3
<i>LSO16.a</i> Read the given texts aloud with proper pauses and proper pronunciation.	16	Pronunciation.	CO3
<i>LSO17.a</i> Compare the point of view with their peers.	17	Point of view of Self and Peers	CO4
<i>LSO18.a</i> Identify the main ideas of the excerpt	18	Main ideas of the excerpt	CO4
<i>LSO19.a</i> Prepare a list of technical jargon and register specific to their program /industry.	19	Technical Jargons	CO5
<i>LSO20.a</i> Write the specifications of the machines/ equipment available in the workshops/labs.	20	Specifications of the machines/ equipment	CO5
<i>LSO21.a</i> Write a report on the projects of their respective branches.	21	Report on the Projects	CO5

K) Suggested Term Work and Self-Learning: S2400104

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.

1. Visit your institute's library/ web search and enlist the books, journals, and magazines related to your respective branches to prepare a bibliography consisting of names of the authors, titles of the books, publication, and place of publication.
2. SWOT Analysis: Analyze yourself concerning your strengths and weaknesses, opportunities, and threats for your communication.
3. Interview an eminent personality and write a report on it.
4. Deliver a seminar for 10-12 minutes using PPT on the topic given.
5. Prepare your timetable for a week and prioritize your activities.
6. Visit any historical places/offices/farms/industries/development sites etc. near your city and prepare a report on it.
7. Prepare a video of effective professional communication after listening to Bhagwat Geeta's conversation between Arjun and Krishna in the war field (IKS).

b. Micro Projects:

- i. Book review – students should read a book and then write their reviews about the book and present it in the class.
- ii. Interview any successful person in your locality in context with his life journey, inspiration social contribution, role model, and keys to success.
- iii. Prepare a register of technical jargon of the industry related to their specific branch.
- iv. Prepare a presentation on environmental issues of their locality with their solution.
- v. Listen to the dialogues of the conversation between Krishna and Arjun before the war for specific and effective Communication (IKS)

c. Other Activities:

1. Arrange a Blood Donation Camp in collaboration with a blood bank and prepare a communication plan for the same.
2. Organize a cleanliness campaign in your campus premises and nearby places and prepare hoardings, boards, collages, and posters for the same.
3. Organize a campaign on educational awareness in the nearby places and prepare an advertising campaign for the same.

d. Self- learning topics:

- Listen to different Conversations of Ramayana,(the Rama -Bharat conversation before going to Vanvaas) Mahabharata (Bheem and Arjun Conversation during War), and Bhagwat Geeta (discussions of Strategies before War) to develop effective communication Skills (IKS)
- Collect new words from daily newspapers.
- Observe negotiation skills in the nearby shops.

- Watch educational channels for improving English communication.

M) Suggested Course Evaluation Matrix: The course teacher has to decide and use the 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. This matrix has been prepared considering both Part – A and Part -B.

COs (Included in Part -A & B)	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	15%	20%	15%	20%	-	20%	20%
CO-2	10%	15%	10%	20%	25%	10%	20%
CO-3	20%	25%	15%	20%	25%	15%	20%
CO-4	25%	20%	30%	20%	25%	15%	20%
CO-5	30%	20%	30%	20%	25%	40%	20%
Total Marks	30	70	20	20	10	20	30
			50				

Legend:

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

** : Mentioned under point- (N)

#: Mentioned under point-(O)

Note:

- The percentages 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)
(Part - A)						
Unit-1.0 Communication Theory and Practice	5	CO1, CO2	10	3	3	4
Unit- 2.0 Types of Communication	5	CO3	8	2	2	4
Unit-3.0 Reading Comprehension	8	CO4, CO5	12	3	3	6
Unit-4.0 Vocabulary and Grammar	7	CO4, CO5	10	3	3	4
Unit-5.0 Professional Writing	7	CO5	10	3	4	3
(Part-B)						
Units-1.0: सम्प्रेषण सिद्धान्त एवं व्यवहार	2	CO1, CO2	3	1	1	1

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-2.0: व्यावसायिक उत्कृष्टता हेतु व्यवहार कौशल	2	CO3	3	1	1	1
Unit-3.0: पाठ-बोध :शब्दावली परिवर्धन, एवं व्याकरण अभ्यास	5	CO4, CO5	5	1	1	3
Unit-4.0: शब्दावली एवं व्याकरण	4	CO5	5	1	1	3
Unit-5.0: लेखन कौशल	3	CO5	4	2	1	1
Total	48	-	70	20	20	30

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	Emotions of the Speakers.	CO1	30	60	10
2	Instructions of Audio Transcripts.	CO1	30	60	10
3	Language Puzzles.	CO1	30	60	10
4	Repetition of Words.	CO1	30	60	10
5	Summarize the Excerpts.	CO1	30	60	10
6	Listening Excerpts.	CO2	30	60	10
7	Sounds of minimal Pairs, Syllables and Words etc.	CO2	30	60	10
8	Phonetic Transcription.	CO2	30	60	10
9	Stress and Intonation.	CO2	30	60	10
10	Paralanguage Codes	CO2	30	60	10
11	Non-Verbal Codes	CO2	30	60	10
12	Verbal and Non-Verbal Presentations	CO2	30	60	10
13	Sounds of minimal pairs, syllables and words	CO2	30	60	10
14	Locate the Dictated Words	CO3	30	60	10

S. No.	Laboratory Practical Titles	Relevant COs Number (s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
15	Jumbled Sentences.	CO3	30	60	10
16	Pronunciation.	CO3	30	60	10
17	Compare the Point of view with their Peers.	CO4	30	60	10
18	Main Ideas of the Excerpt	CO4	30	60	10
19	Technical Jargons	CO5	30	60	10
20	Specifications of the machines/ equipment	CO5	30	60	10
21	Report on the Projects	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, 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:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/Practical Number
1.	High end computers	Intel® Core™ i5-9400 (6-Core, 9MB Cache, up to 4.1GHz with Intel® Turbo Boost Technology) RAM: 8GB DDR 4 HDD: 3.5" 1TB 7200RPM SATA Hard Drive OS: Windows 10 Pro 64bit OEM License Other ports: Gigabyte LAN card	1 to 21
2.	Language Lab software	Teacher console supporting audio-visual language lab	1 to 21
3.	Printer	LaserJet printer	1 to 21
4.	Head Phones with microphones	Logitech H111 wired on headphones	1 to 21
5.	Computer Furniture	Computer Desk, chair	1 to 21
6.	Smart Projector	Standard Specification	1 to 21

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

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Communication Skills in English (AICTE Prescribed Text Book)	Dr. Anjana Tiwari	Khanna and Khanna, New Delhi
2.	Business Communication	Dr. Nishith Rajaram Dubey, Anupam Singh	Publisher: Indra Publishing House, 2023 ISBN- 978-93-93577-69-6
3.	Communication Skills	Sanjay Kumar & Pushap Lata	Oxford University Press, India
4.	Employability Skills	Dr. Nishith Rajaram Dubey, Anupam Singh	Indra Publishing House, 2023 ISBN - 978-93-93577-68-9
5	Technical Communication for Engineers	Shalini Verma	S. Chand
6.	English Grammar	Raymond Murphy	S. Chand
7.	British English Grammar and Composition	Dr. Ashok Kumar Singh	Student's Friends
8.	A Textbook of English Phonetics	T. Balasubramanian	Macmillan Publishers
9.	Thesaurus of English Words and Phrases	Roget	Simon and Schuster
10	Better English Pronunciation	J. D. O'Connor	Cambridge: Cambridge University Press, 1980
11	An English Grammar: Comprehending Principles and Rules	Lindley Murray.	London: Wilson and Sons, 1908.
12	Effective Communication Skills	Kulbhushan Kumar	Khanna Publishing House, New Delhi (Revised Edition 2018)
13	Examine your English	Margaret M. Maison	Orient Longman: New Delhi, 1964
14	Collin's English Dictionary	Harper Collins	Harper Collins, Glasgow
15	संप्रेषण कौशल	डॉ प्रवीण कुमार अग्रवाल , डॉ अवनीश कुमार मिश्रा	साहित्य भवन पब्लिकेशन : आगरा
16	आधुनिक हिंदी व्याकरण और रचना	डॉ वासुदेवनंदन प्रसाद	भारती भवन पब्लिकेशन

(b) Online Educational Resources:

1. https://www.academia.edu/37871134/COMMUNICATION_SKILLS_1ST_YR_2_pdf
2. [https://socialsci.libretexts.org/Courses/Butte_College/Exploring_Intercultural_Communication_\(Grothe\)/05%3A_Nonverbal_Processes_in_Intercultural_Communication/5.02%3A_Types_of_Nonverbal_Communication](https://socialsci.libretexts.org/Courses/Butte_College/Exploring_Intercultural_Communication_(Grothe)/05%3A_Nonverbal_Processes_in_Intercultural_Communication/5.02%3A_Types_of_Nonverbal_Communication)
3. <http://muhamadjaelani35.blogspot.com/2014/11/inquiry-letter-order-letter->

- complaint.html?m=1
4. <https://www.slideshare.net/sundaredu/barriers-of-communication-53545680>
 5. <https://allpoetry.com/where-the-mind-is-without-fear>
 6. <https://www.poetryfoundation.org/poems/46561/ode-on-solitude>
 7. <https://www.poetryfoundation.org/poems/44644/a-psalm-of-life>
 8. <https://www.poetryfoundation.org/poems/42891/stopping-by-woods-on-a-snowy-evening>
 9. <https://www.hindisamay.com/content/>
 10. <http://kavitakosh.org/>
 11. <https://bundelkhand.in/maithilisharan-gupt/nar-ho-na-nirash-karo-man-ko>
 12. <https://etc.usf.edu/lit2go/92/up-from-slavery/1575/chapter-3-the-struggle-for-an-education/>
 13. <https://oursmartstudy.com/english-chapter-1-class-12-pdf-download/>
 14. [https://ve-iitg.vlabs.ac.in/Listening%20Skills\(Procedure\).html](https://ve-iitg.vlabs.ac.in/Listening%20Skills(Procedure).html)
 15. <https://nptel.ac.in/courses/109104031>

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

(c) Others:

1. <https://nptel.ac.in/courses/>

- A) **Course Code** : 2400006 (T2400006/P2400006/S2400006)
- B) **Course Title** : **Environmental Education and Sustainable Development**
(Common for all Programmes)
- C) **Pre- requisite Course(s)** :
- D) **Rationale** :

Every creature depends on nature for their survival. It is therefore, not only essential but also moral responsibility of all of us to keep our environment clean & in a good condition. The global environmental issues such as clean water and sanitation, affordable & clean energy, sustainable cities & communities, etc. are best addresses through sustainable development goals. Environmental education is one of the primary activities to spread the concept of sustainability on a broader scope. In India, environmental education is considered as mandatory for all segment of education including technical education. Every creature depends on nature for their survival. It is therefore, not only essential but also moral responsibility of all of us to keep our environment clean & in a good condition. The concept of sustainable development is closely associated with environmental education to promote developments. Considering importance of environmental education and sustainable development, it became necessary to provide basics of these areas to the engineering graduates. The knowledge gained through this course will help the diploma students to take engineering decisions aligned to ensure sustainability of environment for next generations through proper protection of environment.

- 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** Explain the importance of ecosystem for the protection of environment
- CO-2** Use relevant air & water pollution control methods to solve pollution related issues
- CO-3** Recognize relevant energy sources required for domestic & industrial application
- CO-4** Analyze the issues of climate change and its impact on sustainability
- CO-5** Apply engineering solutions/methods/legislations to reduce the activities that are harming the environment.

- 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	-	2		
CO-2	3	2	2	2	2	-	2		
CO-3	3	-	-	-	3	-	2		
CO-4	3	3	-	2	2	-	2		
CO-5	3	-	3	3	2	2	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:

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				
2400006	Environmental Education and Sustainable Development	01	-	01	01	03	02

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:

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)	
2400006	Environmental Education and Sustainable Development	15	-	10	-	10	15	50

Legend:

PTA: Progressive Theory Assessment in classroom (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: T2400006

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
<p><i>TSO 1a.</i> Differentiate aquatic & terrestrial ecosystem</p> <p><i>TSO 1b.</i> Explain structure of ecosystem</p> <p><i>TSO 1c.</i> Compare food chain & web chain</p> <p><i>TSO 1d.</i> Describe carbon, nitrogen, Sulphur & phosphorus cycle</p> <p><i>TSO 1e.</i> Explain causes & effect of global warming</p>	<p>Unit-1.0 Ecosystem</p> <p>1.1 Aquatic & Terrestrial ecosystem</p> <p>1.2 Structure of ecosystem</p> <p>1.3 Food chain & Food web</p> <p>1.4 Carbon, Nitrogen, Sulphur & Phosphorous Cycle</p> <p>1.5 Global warming – Causes & Effects</p>	CO1
<p><i>TSO 2a.</i> Explain environmental pollution & its sources.</p> <p><i>TSO 2b.</i> Assess the causes of water & air pollution in a given area</p> <p><i>TSO 2c.</i> Explain the effects of water & air pollution on human, plant & animal</p> <p><i>TSO 2d.</i> Take appropriate measures to prevent the pollution problems at city /municipal areas</p> <p><i>TSO 2e.</i> Determine the pollution level in the environment at different seasons.</p>	<p>Unit-2.0 Air & Water Pollution</p> <p>2.1 Traditional pollution issues- Air, Water, Noise</p> <p>2.2 Water pollution</p> <p>2.2.1 Sources of water pollution</p> <p>2.2.2 Effects of water pollution</p> <p>2.2.3 Control of water pollution</p> <p>2.2.4 Physical & chemical standard of domestic water as per Indian Standard</p> <p>2.3 Air pollution</p> <p>2.3.1 Sources of air pollution</p> <p>2.3.2 Air pollutants</p> <p>2.3.3 Effects of air pollution on human, plant & animal</p> <p>2.3.4 Air monitoring system</p> <p>2.3.5 Air pollution control</p>	CO2
<p><i>TSO 3a.</i> Describe various types renewable sources of energy</p> <p><i>TSO 3b.</i> Explain solar energy & methods of harnessing</p> <p><i>TSO 3c.</i> Explain wind energy and its impact on environment</p> <p><i>TSO 3d.</i> Explain characteristics of biomass & its digestion process</p> <p><i>TSO 3e.</i> Describe new energy sources & their application</p>	<p>Unit-3.0 Sustainability & Renewable Sources of Energy</p> <p>3.1 Concept of sustainable development</p> <p>3.2 Renewable sources of energy for sustainable development</p> <p>3.3 Solar Energy</p> <p>3.3.1 Features of solar thermal & PV system</p> <p>3.3.2 Solar pond, Solar water heater, Solar dryer and Solar stills</p> <p>3.4 Wind Energy</p> <p>3.4.1 Current status & future prospects of wind energy</p> <p>3.4.2 Wind energy in India- Advantages and challenges of harnessing wind energy</p> <p>3.4.3 Environmental benefits & limitations</p> <p>3.5 Biomass</p> <p>3.5.1 Types of Biomass energy sources</p> <p>3.5.2 Energy content in Biomass of different types</p> <p>3.5.3 Biogas production</p>	CO3

Major Theory Session Outcomes (TSOs)	Units	Relevant COs Number(s)
	3.6 Concept and advantages of hydroponics or aquaponics system to demonstrate soil less cultivation and integration of fish and plant cultivation. 3.7 Water conservation and sustainable development 3.8 New Energy Sources: Hydrogen energy, Ocean energy & Tidal energy	
<i>TSO 4a.</i> Describe impact of climate change on human life <i>TSO 4b.</i> Identify the factors contributing to climate change <i>TSO 4c.</i> Explain sustainable development goals to transform the world <i>TSO 4d.</i> Develop implementation strategies for action plan on climate change	Unit-4.0 Climate Change and Sustainable Development 4.1 Impact of Climate change 4.2 Factor contributing to climate change 4.3 Sustainable development Goals (SDGs) 4.4 Action Plan on Climate Change- India	CO4
<i>TSO 5a.</i> Identify the elements of a successful management system <i>TSO 5b.</i> Explain green building concept & its benefits <i>TSO 5c.</i> Apply 5R concept in a given building construction project <i>TSO 5d.</i> Explain various environment protection laws <i>TSO 5e.</i> Explain carbon foot-print & carbon credit	Unit-5.0 Environmental legislation and Sustainable Building Practices 5.1 Environment management system and Planning 5.2 Green Building concept 5.3 Green and sustainable building materials - 5R concept 5.4 Environment protection acts, legislation and Laws 5.5 Zero carbon foot-print building for sustainable construction.	CO5

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

K) Suggested Laboratory (Practical) Session Outcomes (LSOs) and List of Practical: P2400006

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
<i>LSO 1.1.</i> Use of Air pollutant analyzer to determine the air pollution level <i>LSO 1.2.</i> Collect air samples for pollution level detection	1.	Determination of air pollutants harming local environment	CO2
<i>LSO 2.1</i> Use of Water pollutant analyzer to determine the water pollution <i>LSO 2.2</i> Collect water samples for pollution level detection	2	Determine the water pollutants harming local environment	CO2
<i>LSO 3.1</i> Prepare report on EIA of a given context and area. <i>LSO 3.2</i> Collection of stakeholders view on effect on environment about a particular project/activity.	3.	Carry out the Environmental Impact Assessment (EIA) for a given project /activity of development	CO1 CO3
<i>LSO 4.1</i> Predict of possible factors causing effects of climate change <i>LSO 4.2</i> Effect of Ice melting on sea water	4.	Assessment of the impact of climate change on local environment	CO1 CO4

Practical/Lab Session Outcomes (LSOs)	S. No.	Laboratory Experiment/Practical Titles	Relevant COs Number(s)
LSO 5.1 Elaborate the uses of sustainable building materials, the considering 3R LSO 5.2 Trace of Carbon foot print due to construction of a small building	5.	Demonstration of sustainable building materials in lab/workshop	CO2 CO5
LSO 6.1 Set up sample recycling bins in the laboratory LSO 6.2 Appreciate the importance of recycling and environmental benefits LSO 6.3 Explain the importance of 3 R	6.	Demonstration of the recycling process for the different materials such as paper, plastic etc. for waste management	CO3
LSO 7.1 Explain the process of composting LSO 7.2 disseminate the use of composting process to near and dear for soil health and fertility for generating organic food	7	Setting up composting bins in the laboratory to demonstrate the process of composting organic waste	CO3
LSO 8.1 Calculate own water footprint for daily activities LSO 8.2 Explain the importance of reducing water consumption and conserve water resources.	8	Calculation of personal water footprint for daily water usage for activities like bathing, cooking and laundry.	CO3
LSO 9.1 Explore the alternative / renewable sources of energy in day to day life	9.	Develop bio mass energy in the laboratory	CO3 CO4
LSO 10.1 Explore the alternative / renewable sources of energy in day to day life	10.	Develop solar model in the laboratory	CO3
LSO 11.1 Explore the alternative / renewable sources of energy in day to day life	11.	Develop wind turbine model in the laboratory	CO4

L) Suggested Term Work and Self Learning: S2400006

Some sample suggested assignments, micro project and other activities are mentioned here for reference.

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

1. Conduct a waste audit in your polytechnic. Categorize waste into different types such as plastic, paper, organic. Quantify the amount of each waste.

b. Micro Projects:

- Conduct of EIA of a project/activity such as construction of roads in the local area. Prepare a report on:
 - (a) Environmental issues in your city
 - (b) SDGs and environment related acts/laws applicable in your state and in India.
 - (c) Current-status & future-prospects of Wind Energy
 - (d) New energy sources
- Prepare a model of rain water harvesting system to demonstrate how rainwater can be collected and stored for various purposes such as irrigation and toilet flushing.
- Students may be asked in group to set up a small solar panel to compare the energy output under different lighting condition and angles to understand the concept of solar energy and its potential applications.

c. Other Activities:

1. Seminar Topics:

- Climate change issue and problems
- Sustainable development- Global practices
- Factor affecting sustainability in India

2. Visits:

Visit Pollution control Board of your city. Prepare report of visit with special comments of initiatives taken for protecting environment and ensuring sustainable development of the city.

Organize a field trip to a nearby park for the students. Students can be observed different species of the plants, animals and insects. They may be asked to prepare report on importance of biodiversity conservation.

3. Self-Learning Topics:

- Sustainable Development Goals
- Climate change.
- Pollution issues
- Laws and legislation of environmental protection

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	20%	-	15%	-	-	20%	20%
CO-2	10%	-	10%	25%	-	10%	20%
CO-3	15%	-	15%	25%	50%	15%	20%
CO-4	15%	-	30%	50%	50%	15%	20%
CO-5	40%	-	30%	-	-	40%	20%
Total Marks	15	-	10	-	-	10	15
			10				

Legend:

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

** : Mentioned under point- (N)

: Mentioned under point-(O)

Note:

- The percentages 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):

S. No.	Laboratory Practical Titles	Relevant COs Number(s)	PLA/ELA		
			Performance		Viva-Voce (%)
			PRA* (%)	PDA** (%)	
1.	Determine the Air and water pollutants harming local environment	CO1	30	60	10
2.	Determine the water pollutants harming local environment	CO1	40	50	10
3.	Carry out the Assessment of Environmental Impact (EIA) for a given project /activity of development	CO1 CO3	30	60	10
4.	Assess the impact of climate change on local environment	CO1 CO4	30	60	10
5.	Demonstrate sustainable building materials in lab/workshop	CO2 CO5	30	60	10
6.	Demonstrate the recycling process for the different materials such as paper, plastic etc. for waste management	CO3	50	40	10
7.	Setting up composting bins in the laboratory to demonstrate the process of composting organic waste	CO3	50	40	10
8.	Calculation of personal water footprint for daily water usage for activities like bathing, cooking and laundry.	CO3	50	40	10
9.	Develop bio mass energy in the laboratory	CO3 CO4	30	60	10
10.	Develop solar model in the laboratory	CO3	30	60	10
11.	Develop Wind turbine model in the laboratory	CO4	40	50	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, 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:

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/Practical Number
1.	Air analyzer	Air Quality Meter Product Type: Measuring Instrument Analysis Time: 2 sec to 8-hour 59 min. 59 sec Automation Grade: Automatic	1
2.	Water Analyzer	Multi-Parameter Water Testing Meter Digital LCD Multi-Function Water Quality Monitor PH/EC/TDS/Salt/S. G/CF/ORP	2
3.	Sustainable Building Materials	As per availability in the market	2,5

S. No.	Name of Equipment, Tools and Software	Broad Specifications	Relevant Experiment/Practical Number
4.	Solar energy Panel – KT	Solar Panel Kit 5 LEDs, 2 ON/Off Switch, Wire, 2 Crocodile Clip	7
5.	Bio mass/energy installation -kit	The Bio-energy Science Kit is a great way to find out how a direct ethanol fuel cell works.	6
6.	Wind power energy -Kit	4M wind turbine kit, to demonstrate power of wind and convert it into electricity by building your own turbine.	8
7.	Ice melting demo kit	Simple bowls of different sizes	--

R) Suggested Learning Resources:

(a) Books:

S. No.	Titles	Author(s)	Publisher and Edition with ISBN
1.	Ecology and Control of the Natural Environment	Izrael, Y.A.	Kluwer Academic Publisher eBook ISBN: 978-94-011-3390-6
2.	Renewable Energy Sources and Emerging Technologies	Kothari, D.P. Singal, K.C., Ranjan, Rakesh	PHI Learning, New Delhi, 2009 ISBN-13 - 978-8120344709
3.	Green Technologies and Environmental Sustainability	Singh, Ritu, Kumar, Sanjeev	Springer International Publishing, 2017 eBook ISBN 978-3-319-50654-8
4.	Coping with Natural Hazards: Indian Context	K. S. Valadia	Orient Longman ISBN-10: 8125027351 ISBN-13: 978-8125027355
5.	Introduction to Engineering and Environment	Edward S. Rubin	Mc Graw Hill Publications ISBN-10: 0071181857 ISBN-13: 978-0071181853
6.	Environmental Science	Subrat Roy	Khanna Book Publishing Co. (P) Ltd. ISBN-978: 93-91505-65-3

(b) Online Educational Resources:

1. http://www1.eere.energy.gov/wind/wind_animation.html
2. http://www.nrel.gov/learning/re_solar.html
3. http://www.nrel.gov/learning/re_biomass.html
4. <http://www.mnre.gov.in/schemes/grid-connected/biomass-powercogen/>
5. <http://www.epa.gov/climatestudents/>
6. <http://www.climatecentral.org>
7. <http://www.envis.nic.in/>
8. <https://www.overshootday.org/>
9. <http://www.footprintcalculator.org/>
10. <https://www.carbonfootprint.com/calculator.aspx>

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. www.nptel.iitm.ac.in
2. www.khanacademy
