

DEPARTMENT OF TECHNICAL EDUCATION (DIPLOMA SECTOR)

UTTAR PRADESH

CURRICULUM FOR DIPLOMA PROGRAMME

IN

TEXTILE ENGINEERING

(5rd to 6th Semester)

=====

Semester System

=====



YEAR 2026-2027

Prepared By:

INSTITUTE OF RESEARCH, DEVELOPMENT & TRAINING, U.P., KANPUR

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PREFACE

An important issue generally debated amongst the planners and educator's world over is how technical education can contribute to sustainable development of the societies struggling hard to come in the same bracket as that of the developed nations. The rapid industrialization and globalization have created an environment for free flow of information and technology through fast and efficient means. This has led to shrinking of the world, bringing people from different culture and environment together and giving rise to the concept of world turning into a global village. In India, a shift has taken place from the forgettable years of closed economy to knowledge based and open economy in the last few decades. In order to cope with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate professional knowledge, skills and attitude. Technical education system is one of the significant components of the human resource development and has grown phenomenally during all these years. Now it is time to consolidate and infuse quality aspect through developing human resources, in the delivery system. Polytechnics play an important role in meeting the requirements of trained technical manpower for industries and field organizations.

In order to meet the requirements of future technical manpower, we will have to revamp our existing technical education system and one of the most important requirements is to develop outcome-based curricula of diploma Programs. The curricula for diploma Programs have been revised by adopting time-tested and nationally acclaimed scientific method, laying emphasis on the identification of learning outcomes of diploma Program.

The real success of the diploma Program depends upon its effective implementation. However, best the curriculum document is designed, if it is not implemented properly, the output will not be as expected. In addition to acquisition of appropriate physical resources, the availability of motivated, competent and qualified faculty is essential for effective implementation of the curricula.

It is expected of the polytechnics to carry out job market research on a continuous basis to identify the new skill requirements, reduce or remove outdated and redundant courses, develop innovative methods of course offering and thereby infuse the much-needed dynamism in the system.

F K Khan
Director
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2. SALIENT FEATURES

- | | |
|---|---|
| 1. Name of the Programme | ➤ Diploma in Textile Engineering |
| 2. Duration of the Programme | ➤ Three years (Six Semesters) |
| 3. Entry Qualification | ➤ Matriculation or equivalent NEP-2020/
NSQF Level 5 as Prescribed by State
Board of Technical Education, UP. |
| 4. Pattern of the Programme | ➤ Semester System |
| 5. Ratio between theory and Practice | ➤ 40% (Theory) / 60% (Practical) |

1) Industrial Training/Internship:

Four and six weeks of industrial training is made mandatory after the II and IV semesters during summer vacation. Total marks allotted to industrial training will be respectively 50 & 100.

In the last (6th Semester) we have made the one semester Industrial training/Internship as optional along with usual classroom training.

2) Audit & Pathways:

As per AICTE and NEP-2020 directives, Essence of Indian Knowledge & Tradition, Indian Constitution, Entrepreneurship & Startup, subjects on Environmental Studies have been incorporated in the curriculum.

3) Student Centered Activities:

A provision of 4-8 hrs. per week has been made for organizing Student Centered Activities for overall personality development of students. Such activities will comprise co- curricular activities such as expert lectures, classroom seminars, games, hobby club like photography, painting, singing etc. declamation contests, field visits, NCC, NSS and other cultural activities, etc.

4) Project work:

Micro/Mini/Major project work has been included in the curriculum to enable the student to get familiarized with the practices and procedures being followed in the industries and provide an opportunity to work on some live projects in the industry.

3. EMPLOYMENT OPPORTUNITIES OF DIPLOMA HOLDERS IN TEXTILE ENGINEERING

Major clusters for textile production spread all over in India from north to south and east to west such as in Gujarat places like Ahmedabad, Bharuch etc, in Rajasthan places like Bhilwada etc.in Punjab places like Barnala, Ludhiana, in Madhya Pradesh places Budani, Chindwada etc.in west Bengal places like rishraetc There are very few colleges in India that are providing diploma engineering course in 'Textile Engineering'. Industry always required trained diploma engineers for smooth functioning and further development. The students completing this diploma course should get employment opportunities in following work profiles in different textile producing clusters on India -

1. In textile manufacturing industry primarily in private sector and textile Clusters.
2. In textile allied industries.
3. May become an entrepreneur with his/her own start up.
4. Merchandising and marketing and after sales service of textiles.
5. As quality engineers in textile industries.
6. As designer in textile industry or freelance designer.
7. As textile Engineer in textile manufacturing industries.
8. Various other opportunities in textile industry.

4. (A) PROGRAM OUTCOMES (POS)

PO1: Basics and Discipline specific Knowledge

Assimilate knowledge of basic mathematics, science, engineering fundamentals, and Textile Engineering.

PO2: Problem's Analysis and solution

Identify, analyze and solve problems using standard methods and established techniques.

PO3: Design and Development

Design solutions for technical problems.

Assist in designing components, systems, or processes to meet specific requirements.

PO4: Engineering Tools, Experimentation, and Testing

Use modern engineering tools and appropriate techniques to conduct experiments as per BIS standard.

PO5: Socio/ Economic /Environmental impact assessment/remedy.

Apply relevant technologies while considering societal needs, environmental impact keeping in view sustainable and ethical responsibilities.

PO6: Project Management and Communication

Apply engineering management principles, work effectively as an individual or in a team, and communicate clearly on activities.

PO7: Lifelong Learning

Recognize the importance of continuous learning and actively pursue self-improvement to keep pace with technological developments.

4. (B) LEARNING OUTCOMES OF THE PROGRAM

1. The learning outcome of a Diploma Programme in Textile Engineering typically includes a comprehensive understanding of various aspects of textile manufacturing, technology, and management. Here are some key learning outcomes you can expect from such a program:
2. Technical Knowledge: Graduates of the program will have a strong foundation in textile engineering principles, including knowledge of textile fibers, yarn production, fabric manufacturing processes, textile testing, and quality control.
3. Textile Design and Development: Students will learn about textile design techniques, including pattern making, fabric selection, dyeing, printing, and finishing. They will acquire skills to develop innovative textile products and understand the factors that influence design decisions.
4. Manufacturing Processes: The program will cover different textile manufacturing processes, such as weaving, knitting, nonwoven production, and garment manufacturing. Students will gain knowledge of the machinery and equipment used in these processes and learn how to

optimize production efficiency.

5. **Technical Skills:** Graduates will acquire hands-on skills in operating and maintaining textile machinery, conducting textile testing and analysis, and troubleshooting manufacturing issues. They will also learn about computer-aided design (CAD) software and other relevant technologies.
6. **Sustainability and Environmental Considerations:** The program will emphasize the importance of sustainable practices in the textile industry. Students will learn about eco-friendly manufacturing processes, waste management, recycling, and reducing the environmental impact of textile production.
7. **Quality Assurance and Control:** Students will understand the principles and techniques of quality control in textile manufacturing. They will learn how to conduct tests and inspections to ensure product quality and compliance with industry standards.
8. **Project Management:** The program may include courses on project management, where students will learn how to plan, execute, and monitor textile engineering projects effectively. This includes resource allocation, cost estimation, risk assessment, and timeline management.
9. **Professional Skills:** Students will develop skills in communication, teamwork, problem-solving, and critical thinking. They will learn how to collaborate with colleagues, present their ideas, and adapt to the dynamic nature of the textile industry.
10. **Industry Knowledge:** The program may provide insights into the textile industry, its market trends, global trade, and regulatory frameworks. Students will gain an understanding of the challenges and opportunities in the industry and develop strategies for success.
11. **Ethical Considerations:** Students will be introduced to ethical issues related to the textile industry, such as fair trade, labour rights, and responsible sourcing. They will learn about corporate social responsibility and the importance of ethical practices in the industry.

These learning outcomes will equip graduates of the Diploma Programme in Textile Engineering with the necessary knowledge, skills, and abilities to pursue careers in textile manufacturing, research and development, quality assurance, technical consultancy, and management positions within the textile industry.

6. STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME IN TEXTILE ENGINEERING (365)

TEXTILE ENGINEERING (365)

FIFTH SEMESTER

SR. NO.	SUBJECTS	COURSE TYPE & CATEGORY	STUDY SCHEME Periods / Week			Credits	MARKS IN EVALUATION SCHEME										Total Marks of Internal & External
							INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT							
			L	T	P		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot			
5.1	PRINCIPLE AND DESIGN OF SPINNING MACHINE	PROGRAM CORE (THEORY)	03	01	-	4	40		40	60	3	-	-	60	100		
5.2	PROGRAM ELECTIVE-2	PROGRAM CORE (THEORY)	03			3	40		40	60	3	-	-	60	100		
5.3	PRINCIPLE AND DESIGN OF WEAVING MACHINE	PROGRAM CORE (THEORY)	03	01		4	40		40	60	3	-	-	60	100		
5.4	PROGRAM ELECTIVE-3	PROGRAM CORE (PRACTICUM)	01	-	04	3		60	60	-	-	40	3	40	100		
5.5	(Q) INDIAN CONSTITUTION	AUDIT COURSE	02	-	-	-	50		50						N/A		
5.6	COMPUTER AIDED DESIGN	PROGRAM CORE (PRACTICAL)	-	-	08	4		60	60			40	3	40	100		
5.7	SUMMER INTERNSHIP** (4 - 6 Weeks)		-	-	-	2	-	60*	60*	-	-	40*	3	40*	100*		
	#STUDENT CENTERED ACTIVITIES	-	-	-	10	-		50	50	-	-	-	-		50		
Total			12	02	22	20	120	230	350	180		120		300	650		

(Q) It is compulsory to appear and to pass the examination, but marks will not be included for percentage and division of obtained marks.

** Students will present a seminar on their summer internship along with certificate, project and report.

Student Centered Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. Photography etc., Seminars, Declamation Contests, voluntary contribution in physical activities, Educational Field Visits, NCC, NSS, Cultural Activities and Self-Study.

TEXTILE ENGINEERING (365)

SIXTH SEMESTER

NORMAL PATHWAY

Sr. No.	SUBJECTS	COURSE TYPE & CATEGORY	STUDY SCHEME			CREDITS	MARKS IN EVALUATION SCHEME										TOTAL MARKS OF INTERNAL & EXTERNAL
			PERIODS/WEEK				INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT							
			L	T	P		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot			
6.1	QUALITY MANAGEMENT SYSTEMS	PROGRAM CORE	4	-	-	4	40	-	40	60	3	-	-	60	100		
6.2	ENTREPRENEURSHIP AND START-UP	HUMANITIES & SOCIAL SCIENCE	02	-	-	2	40	-	40	60	3	-	-	60	100		
6.3	IN HOUSE PROJECT	PROJECT	04	-	16	12	-	240	240	-	-	160	-	160	400		
6.4	ADVANCE SKILL DEVELOPMENT	(Q)OPEN ELECTIVE-3 (THEORY)	02	-	-	2	50	-	-	-	-	-	-	-	N/A		
		(Q)OPEN ELECTIVE-3 (Certification Course)					-	-	-	-	-	-	-	-	N/A		
#STUDENT CENTERED ACTIVITIES			-	-	08	-	-	50	50	-	-	-	-	-	50		
TOTAL			12		24	20	80	290	370	120		160		280	650		

NOTE: -

- (Q) It is compulsory to appear and to pass the examination, but marks will not be included for percentage and division of obtained marks.
- Advance skill development mention at 6.4 in the table provides the scope of selecting the course as per choice from the elective list provided in the syllabus conducted by various agencies of repute of duration not less than 20 Hrs (Offline/Online).
- # Student Centered Activities will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. Photography etc., Seminars, Declamation Contests, voluntary contribution in physical activities, Educational Field Visits, NCC, NSS, Cultural Activities and Self-Study.

OR

INDUSTRIAL PATHWAY

Sr. No.	SUBJECTS	CATEGORY & COURSE TYPE	STUDY SCHEME Periods/Week			Credits(C) (L+T)+P=C	MARKS IN EVALUATION SCHEME										Total Marks of Internal & External	ASSESSMENT
							INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT								
			L	T	P		Th	Pr	Tot	Th	Hrs.	Pr	Hrs	Tot				
6.1	ENTREPRENEURSHIP AND START-UPS (ONLINE MODE)	HUMANITIES & SOCIAL SCIENCE (THEORY)	-	-	-	2	-	-	-	100	03	-	-	100	100	THEORY		
6.2	INDUSTRIAL HANDS-ON PRACTICE	INDUSTRIAL TRAINING	-	-	-	12	150*			200**					350			
6.3	INDUSTRIAL PROJECT	INDUSTRIAL TRAINING	-	-	-	4	50*			50**					100			
6.4	SEMINAR	IN HOUSE	-	-	-	2	-	100	100	-	-	-	-	-	100			
Total			-	-	-	20									650			

NOTE:

- The Industrial training tenure should not be less than 14 weeks.
- Industry must be registered with MSME/Directorate of industries/Limited Organization/State/Central Government establishments.
- Monthly progress reports of Intern/ Trainee should be attested and forwarded by industrial supervisor (allotted to Intern/Trainee) during industrial Internship/Training.
- The Industrial unit/organisation must evaluate students using the format provided by polytechnic in the form of marks.
- The Industrial Hands on Practice, Industrial Project and seminar must be evaluated on the basis of the AICTE Internship Policy: Guidelines and procedures (Chapter -9 Procedures / format for organizing internship)
- "Entrepreneurship and Start-up" course is also mandatory in Industrial internship/training mode. It will be conducted online mode by his/her polytechnic institute. After completing the online course, students must appear for exam conducted by the Board of Technical Education, Lucknow.
- *Evaluation by faculty mentor**
The institute will depute one faculty member for mentoring at least 20-30 students undertaking apprenticeship training. Such mentors will monitor, guide and provide counselling to the students as and when required. Faculty mentor of the institute(s) may make a surprise visit to the internship/apprenticeship site to check the student's presence physically. (The Proforma of the evaluation is attached as the Annexure -1)
- ** Evaluation by industry** : The industry shall assess the candidates based on the following parameters attendance, discipline and punctuality, familiarity of tools and material, engineering skills, application of knowledge and problem-solving skills, comprehension and observation, professional ethics, safety and environmental consciousness, communication skills, supervisory skills and general conduct during the period (The Proforma of the evaluation is attached as the Annexure -2)
- # Evaluation through seminar presentation/Viva-Voce at the institute** : The student will give a seminar based on his training report, before an expert committee constituted by the concerned department as per norms of the institute. The evaluation will be based on the following criteria:

PROGRAMME ELECTIVE-2

SR.NO.	SUBJECT NAME
1.	INDUSTRIAL SAFETY
2.	INDUSTRIAL ENGINEERING

PROGRAMME ELECTIVE-3

SR.NO.	SUBJECT NAME
1.	GARMENT TECHNOLOGY
2.	KNITTING TECHNOLOGY

OPEN ELECTIVE-3

SR.NO.	(Q) THEORY COURSES NAME
1.	ARTIFICIAL INTELLIGENCE
2.	DISASTER MANAGEMENT
SR.NO.	CERTIFICATES COURSES
1	COURSES CONDUCTED BY CENTRE OF EXCELLENCE (ESTABLISHED BY THIRD PARTY AS: - TATA TECHNOLOGIES. etc) (ANNEXURE-1)
2	ANY COURSE OF MINIMUM 02 CREDIT FROM NPTEL
3	MOOCS THROUGH SWAYAM
4	AICTE-ELIS AND CENTRALLY FUNDED TECHNICAL INSTITUTES
5	C-DAC
6	CERTIFICATIONS CONDUCTED BY THE INSTITUTE OF NATIONAL IMPORTANCE (IIT, NIT,IIIT ETC.)
7	ISRO E-LEARNING
8	OTHER RELEVANT GOVERNMENT, INTERNATIONAL/NATIONAL PLATFORMS OF REPUTE
9	NEILIT/BITRA/NITRA/SITRA/ATIRA/SASMIRA CERTIFICATE PROGRAMME

LIST OF COURSES CONDUCTED BY TATA TECHNOLOGIES

1. Fundamentals of Innovation and Design Thinking
2. Product Design and Development
3. Product Verification and Analysis
4. Advanced Automobile
5. Electric Vehicle
6. Internet of Things
7. Advanced Manufacturing
8. Advanced Welding & Painting using Simulator
9. Industrial Automation and MES
10. Industrial Robotics
11. Inspection and Quality Control
12. Advanced Plumbing
13. AI and ML

7. DETAILED CONTENTS OF VARIOUS SUBJECTS

THEORY	5.1 PRINCIPLE AND DESIGN OF SPINING MACHINE	L	T	P
		3	1	-

COURSE OBJECTIVE:

This course aims to provide in-depth understanding of design principles and mechanical aspects of spinning machinery from blow room to ring frame. It enables students to analyze motion transmission systems, drafting mechanisms, and machine components, and to apply design concepts for improving performance, efficiency, and quality in modern spinning machinery.

COURSE OUTCOMES(CO):

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following

Students will be able to

CO1: Explain motion transmission systems and design concepts used in blow room machinery for effective mixing, opening, and cleaning.

CO2: Analyze the design and performance of carding machine components, clothing systems, web collection, and sliver coiling mechanisms.

CO3: Describe comber machine design elements, noil control concepts, and recent developments in combing machinery.

CO4: Analyze drafting systems, roller arrangements, differential motions, and component design in draw frames and speed frames.

CO5: Explain the design principles of ring frame components including cams, building motion, spindles, rings, and travellers.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	1	-	-	1	-	2	*	*
CO2	3	2	-	-	1	-	2	*	*
CO3	3	1	-	-	1	-	2	*	*
CO4	3	2	-	-	1	-	2	*	*
CO5	3	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.

DETAILED CONTENTS

Unit 1:

(11 Periods)

Transmission of motion through belts, ropes, chains, tapes etc. Tangential belt drive, Variable speed drive, Design of cone drums for Scutcher, principles of mixing, opening, cleaning in Blow Room line, difference in aerodynamics of lint and trash and its utilization in blow room Machinery design, redesigning of openers by using different principles for better performance.

Unit 2:

(11 Periods)

Transmission of motion to various parts of carding machine, detail study of varieties of licker-in, cylinder and flat clothing and its influence on carding performance, different systems of carding web collection, sliver coiling system, Inertia of carding engine, latest carding machine developments.

Unit 3:

(11 Periods)

Concept of lap formation for comber, designing concept of comber cylinder, top comb, detaching system, concept of noil control, latest machinery developments in comber frame.

Unit 4:

(11 Periods)

Different drafting systems in draw frame, roller weighing system, roller setting, and different stop motion, Differential motions used in speed frame, design of cone drums for speed frame, Design of flyer, spindle vibration measurement and control, building motion of speed frame.

Unit 5:

(12 Periods)

Design and analysis of ring frame comes, designing concept of building motion of ring frame, design of ring spindle and bolster, designing concept of various rings and travellers.

INSTRUCTIONAL STRATEGY

Teacher should take theory lecture, demonstration of concepts and prototype

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests

RECOMMENDED BOOKS

- 1.Principal of weaving machine by the textile institute.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	11	25
2	11	25
3	11	25
4	11	25
5	12	25
Total	56	100

THEORY	5.2 INDUSTRIAL SAFETY (PE-2)	L	T	P
		3	-	-

COURSE OBJECTIVE

The course aims to provide students with a thorough understanding of industrial safety principles and practices in the textile industry. It covers the importance of safe working conditions, legal and humanitarian considerations, and cost implications of accidents. Students will learn accident prevention theories, identification of unsafe acts and conditions, and methods to mitigate hazards in spinning, weaving, and chemical processing operations. The course also emphasizes the safe handling of materials, machine guarding, ergonomics, electrical safety, fire prevention, and health and welfare measures. Additionally, students will gain knowledge of relevant safety statutes, environmental regulations, and statutory provisions to ensure compliance and promote a safe, productive, and sustainable workplace.

COURSE OUTCOMES(CO):

The theory should be taught in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following

Students will be able to

CO1: Understand the importance of industrial safety, its economic, social, and humanitarian impact, and the role of management and workers in promoting a safe workplace..

CO2: Identify accidents, unsafe acts, unsafe conditions, and hazards, and apply principles and methods of accident prevention.

CO3: Analyze safety requirements in spinning, weaving, and other textile operations, including machine guarding, incidental safety devices, and ergonomics of workstations.

CO4 : Apply safety precautions in chemical processing, including bleaching, dyeing, printing, finishing, and management of chemical hazards and effluents.

CO5 : Implement safety engineering principles for material handling, electrical safety, fire prevention, illumination, and health and welfare measures in the textile industry.

CO6 : Understand relevant safety statutes, environmental regulations, and legislative provisions to ensure compliance and promote a safe and sustainable industrial environment.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	2	-	3	2	-	2	*	*
CO2	3	3	2	3	2	-	2	*	*
CO3	3	2	-	2	2	-	2	*	*
CO4	3	3	2	3	3	-	2	*	*
CO5	3	2	-	2	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.

COURSE CONTENTS

Unit 1: INTRODUCTION

(5 Periods)

Need for Industrial Safety – Legal, humanitarian, economic, and social considerations. Safe working conditions and productivity; unsafe conditions and hazards.

Cost of Accidents – Direct and indirect social costs; financial costs.

Role of Management and Workers' Participation in Industrial Safety – Safety management principles and practices.

Unit 2. PRINCIPLES OF ACCIDENT PREVENTION:

(6 Periods)

Definitions – Accident, injury, dangerous occurrences, unsafe acts, unsafe conditions, and hazards.

Theories of Accident Prevention – Principles and methods of accident prevention.

Unit 3. SAFETY PRECAUTIONS IN TEXTILE

(15 Periods)

Safeguarding of Machines – Statutory provisions related to the safeguarding of machinery and working near unguarded machines. Ergonomics of machine guarding. Types of guards and guarding methods used in the textile industry. Incidental safety devices. Guarding of machines and safety precautions in the following operations: opening, cleaning, carding, drawing, combing, fly frame, ring frames, rotors (spinning), winding, doubling, warping, sizing, and weaving.

Safety Precautions in Wet Processing – Safety precautions in bleaching, dyeing, printing, finishing, and accidental hazards. Chemical hazards in wet processing. Effluents in textile processing.

Unit 4. SAFETY ENGINEERING

(10 Periods)

Material Handling:

Ergonomics of Material Handling – Principles of correct methods for lifting objects of different sizes, shapes, and weights, along with the safe use of accessories for manual handling.

Safety Aspects in the Design, Construction, and Use of Material Handling Machinery in the Textile Industry – Lifts, forklifts, motor trolleys, overhead cranes, and chain pulleys.

Principles of Good Illumination at the Workplace – Recommended minimum standards for lighting and the role of lighting and colour in creating a safe and efficient work environment.

Danger From Electricity:

Safe Limits of Amperage and Voltages:

Safe limits of amperage and voltages. Means for cutting overloads and short-circuit protection. Earth fault protection. Protection of joints and conductors.

Fire Explosion:

Common causes for industrial fire, detection, and alarm. Knowledge of water system, carbon dioxide system, foam extinguishers system, and dry chemical extinguishing systems for extinguishing fire. Sprinklers.

Health and Welfare:

Occupational diseases. Personal protective equipment. Special precautions for specific work environments.

Unit 5. SAFETY STATUTES:

(6 Periods)

Indian Boiler Act and Regulations. The Water (Prevention and Control of Pollution) Act and Rules. The Air (Prevention and Control of Pollution) Act and Rules. The Noise Pollution (Regulation and Control) Act and Rules.

INSTRUCTIONAL STRATEGY

Teacher should take theory lecture, demonstration of concepts and prototype

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests

RECOMMENDED BOOKS

1. Health and Safety for Textile Industry by R Vettriselvan, T Jeya Sudha
2. A Textbook on Industrial Safety by Harsimran Singh Sodhi, Doordarshi Singh

Websites for Reference:

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

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	5	10
2	6	12
3	15	35
4	10	28
5	6	15
Total	42	100

THEORY	5.2 INDUSTRIAL ENGINEERING (PE-2)	L	T	P
		3	-	-

COURSE OBJECTIVE

The course aims to provide students with a comprehensive understanding of industrial engineering principles to enhance productivity, efficiency, and safety in manufacturing and service systems. It focuses on measuring and improving productivity, analyzing and optimizing work methods, applying motion and time study techniques, designing effective incentive schemes, and managing stores and inventory. The course also emphasizes occupational safety, accident prevention, and compliance with statutory safety regulations to ensure a safe and efficient workplace.

COURSE OUTCOMES (CO):

The theory should be taught in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following

Students will be able to

CO1: Understand the concepts of productivity, factors affecting it, and methods to measure and improve productivity in industrial operations.

CO2: Apply work study and method study techniques to analyze tasks, improve methods, and optimize workplace efficiency.

CO3: Use motion analysis, ergonomics, and work measurement tools such as time study, work sampling, and SIMO charts to calculate standard times and improve operational efficiency.

CO4: Understand different wage systems and incentive schemes and apply them to motivate labor and improve performance.

CO5: Apply principles of stores management, inventory control, and industrial safety, including accident prevention, mechanical and electrical hazard control, and compliance with statutory safety regulations

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	2	2	2	-	-	2	*	*
CO2	3	3	3	2	-	2	2	*	*
CO3	3	3	3	3	-	2	2	*	*
CO4	3	2	2	2	-	2	2	*	*
CO5	3	2	2	2	3	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.

COURSE CONTENTS

Unit -1 Productivity

(05 Periods)

Introduction to productivity, factors affecting productivity, practical measurement of productivity, difference between production and productivity, causes of low productivity and methods to improve productivity, contribution of standardization in improving productivity.

Unit- 2 Work study and Method Study

(11 Periods)

Definition and scope of work study; factors for selection of work study job, uses and limitations of work study, Inter-relation between method study and work measurement; Human aspects of work study; Role of work study in improving productivity.

Definition of method study, Objectives and procedure for Method study analysis; Information collection and recording techniques through various diagrams.

Unit -3 Motion Analysis & Work Measurement

(11 Periods)

Principles of Motion analysis; Therbligs and SIMO charts; Normal work area (Principle of motion economy), design and arrangement of work place. Ergonomics, design of tools and equipment's.

Objectives of work measurement techniques, stop watch time study; principle, equipment used and procedure; systems of performance rating; standard elements of time, calculation of basic times; various allowances; guide for rest allowance in Indian conditions, calculation of standard time, work sampling, standard data and its usage. Work sampling.

Unit -4 Wages and Incentive Schemes

(04 Periods)

Introduction to wages, Wage payment for direct and indirect labour, wage payment plans and incentives, various incentive plans, incentives for indirect labour.

Unit -5 Stores Management & Industrial Safety

(11 Periods)

Different Layout and structures of stores, Inventory control, calculation of EOQ, Bin cards and various forms required in stores for documentation. Purchase procedures. Accident- causes, types, results and control. Mechanical and electrical hazards- types, causes and preventive steps/procedure. Describe salient points of Factories Act 1948 for health and safety- wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels etc. Safety colour codes. Fire prevention and fire fighting, equipment and methods.

INSTRUCTIONAL STRATEGY

Teacher should take theory lecture, demonstration of concepts and prototype

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests

RECOMMENDED BOOKS

1. Work Study and Ergonomics by S Dalela and Sourabh
2. Industrial Engineering and Management by O.P. Khanna, Dhanpat Rai and Sons, Delhi.
3. Industrial Engineering and Management by M. Mahajan; Dhanpat Rai and Sons, New Delhi.
4. Introduction to Work Study, ILO Publication
5. Production and costing by GBS Narang; Khanna Publishers, New Delhi.
6. E-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR, Chandigarh.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	05	13
2	11	25
3	11	25
4	04	12
5	11	25
Total	42	100

THEORY	5.3 PRINCIPLE AND DESIGN OF WEAVING MACHINE	L	T	P
		3	1	-

COURSE OBJECTIVE:

This course aims to provide in-depth knowledge of design principles and mechanical concepts involved in weaving preparatory and weaving machinery. It enables students to understand and analyse the design of winding, warping, sizing, and loom mechanisms, including modern weft insertion systems and electronic controls used in advanced weaving technologies.

COURSE OUTCOMES(CO):

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following .

Students will be able to

CO1: Explain the design concepts of winding machines, including drums, traverse mechanisms, tensioners, and slub catchers.

CO2: Analyze design principles of warping machines, sectional warping, high-efficiency creels, transmission systems, and stop motions.

CO3: Describe the design concepts of sizing machines, drying systems, heating mechanisms, and recent advancements in sizing technology.

CO4: Analyze loom design principles, weaving mechanics, tappet design, warp tension control, and modern weft insertion systems.

CO5: Explain the design concepts of electronic dobby, jacquard, multiphase weaving, and stop motions in shuttle-less looms.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	1	-	-	1	-	2	*	*
CO2	3	2	-	-	1	-	2	*	*
CO3	3	1	-	-	1	-	2	*	*
CO4	3	2	-	-	1	-	2	*	*
CO5	3	1	-	-	1	-	2	*	*

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

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

DETAILED CONTENTS

Unit 1: (11 Periods)

Designing concepts of drum winding, designing of winding drum, traverse indifferent winding machines, Concepts of latest tensioners for winding, designing concept of slub catchers.

Unit 2: (11 Periods)

Designing concepts of warping drums, sectional warping, designing concepts of high efficiency creels, Transmission of motion in warping machines, concept of designing of stop motions in warping.

Unit 3: (11 Periods)

Designing concept of saw box for sizing machine, designing of drying cylinder, heating system for drying cylinder, Concept of cold sizing for worsted warp sizing, latest machinery developments in sizing machines

Unit 4: (11 Periods)

Principles governing the design of looms. Mechanics of basic weaving operations, Kinetics of slay, slay eccentricity, designing concepts of tappet for different twill weaves, warp tension measurement and its control, Different picking system, weft insertion system of Sulzer, rapier, air jet and waterjet systems.

Unit 5: (12 Periods)

Brief introduction of electronic Dobby and Jacquard, Designing concept of multiphase weaving, mechanism of different stop motions on shuttle less looms.

INSTRUCTIONAL STRATEGY

Teacher should take theory lecture, demonstration of concepts and prototype

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests

RECOMMENDED BOOKS

1. Principal of weaving machine by the textile institute.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	11	25
2	11	25
3	11	25
4	11	25
5	12	25
Total	56	100

PRACTICUM	5.4 GARMENT TECHNOLOGY (PE-3)	L	T	P
		1	-	4

COURSE OBJECTIVE:

This course aims to provide fundamental knowledge and practical skills in garment manufacturing processes, including fabric selection, pattern making, cutting, sewing, and finishing. It enables students to understand apparel production systems, prepare and grade patterns, plan fabric lays, operate sewing machines, analyze stitches and seams, and apply trims and finishing techniques used in the garment industry.

COURSE OUTCOMES (CO):

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following

Students will be able to

CO1: Explain garment manufacturing systems, fabric selection criteria, and pattern making concepts including drafting, grading, and size charts.

CO2: Apply spreading, lay planning, marker making, and garment cutting techniques for efficient material utilization.

CO3: Describe sewing machines, their parts, driving systems, attachments, and needle types used in garment production.

CO4: Analyze stitch formation, seam types, seam performance, thread consumption, and trimming methods.

CO5: Explain garment accessories and finishing processes such as labeling, pressing, folding, and packing.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	1	-	-	1	-	2	*	*
CO2	3	2	-	2	1	-	2	*	*
CO3	3	1	-	2	1	-	2	*	*
CO4	3	2	-	-	1	-	2	*	*
CO5	3	1	-	-	1	-	2	*	*

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

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

DETAILED CONTENTS

Unit-1

(03 Periods)

Garment Manufacturing: Introduction, Indian apparel industry. Different garment production systems. Selection of Fabrics: Garment from Woven, knitted and various other fabrics available in market, their characteristics and applications to suit to different purposes .Pattern making: Introduction to pattern making

and garment, Construction. Different terminologies. Drafting, Basic bodies blocks, Muslin pattern. Commercial pattern, Basic block construction, grading of pattern, size, size charts.

Practical

1. Prepare the pattern for difference size and design.
2. Preparing of Paper patterns - Types, Contents of paper patterns, uses of paper patterns

Unit-2

(03 Periods)

Spreading and lay planning: Introduction to symmetrical and asymmetrical fabrics, criteria of spreading, mode of fabric spreading, methods of spreading, spreading m/cs. Principles of lay plan, types of lay plan. Marker making Garment Cutting: Introduction to cutting room processes, cutting methods and their merit demerits. Bundling system.

Practical

1. Study of various types of cutting methods used for cutting a garment.
2. Prepare Marker making of a garment.

Unit-3

(03 Periods)

Garment Sewing: Introduction to sewing m/c and its parts, sewing room processes and working details. Different types of sewing m/c and its suitability, Different sewing m/c driving system. Attachment of sewing m/c, Sewing needle and its sizes.

Practical

1. Draw neat and clean diagram of sewing machine and its parts.
2. Draw neat and clean diagrams of different types of needles.

Unit-4

(03 Periods)

Sewing stitches and seams types: Stitch formation, types of stitches, seam classification, seam geometry seam strength and slippage, seam puckering. Thread calculation and its consumption Trimming.

Practical

1. Draw neat and clean diagram of different types of stitches.
2. Draw neat and clean diagram of different types of seams.

Unit-5

(02 Periods)

Garment accessories: Definition, types, trimming methodologies and accessories application. Garment finishing: Fasteners, thread tucking, care and size labelling system, checking, pressing, folding and packing.

Practical

1. Draw neat and clean diagram of different types of trims.

INSTRUCTIONAL STRATEGY

Teacher should take theory lecture, demonstration of concepts and prototype

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests

RECOMMENDED BOOKS

1. Mary Kefgen, —Individuality in Clothing – Selection and Personal Appearance, Mac Millan Publications, New York (1981).
2. Mikell P, Grover and E Mory, —Computer Aided Design and Manufacturing, Prentice Hall of India Ltd. Delhi (1993).
3. Bhattacharya Anand, —Garment Technology, NCUTE, IIT, Delhi (2003)
4. Mikell P, Grover and E Mory, —Computer Aided Design and Manufacturing, Prentice Hall of India
5. Mehta P V and Bhardwaj S K, — Managing Quality in apparel industry, Om Book Service, New Delhi
6. Cooklin Gerry, —Garment Technology for Fashion Designers, OM Book Service, New Delhi (1997).

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Periods)	Marks allotted (%)
1	3	25
2	3	20
3	3	20
4	3	20
5.	2	15
Total	14	100

PRACTICUM	5.4 KNITTING TECHNOLOGY (PE-3)	L	T	P
		1	-	4

COURSE OBJECTIVE:

This course aims to provide fundamental knowledge and practical skills in weft and warp knitting technology. It enables students to understand knitting principles, machines, needles, fabric structures, and production processes, analyse knitted fabric properties and defects, and perform basic knitting operations and production calculations.

COURSE OUTCOME (CO):

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following .

Students will be able to

CO1: Explain the properties, classification, and basic principles of weft and warp knitting machines, including needle types and their applications.

CO2: Describe and design weft knit structures such as single jersey, rib, interlock, purl, and their derivatives with ornamentation techniques.

CO3: Explain the construction, knitting elements, and operating cycles of weft knitting machines and prepare knitted fabric samples.

CO4: Describe warp knitting machines such as tricot and raschel, their knitting cycles, yarn paths, and fabric characteristics.

CO5: Identify knitted fabric defects, suggest remedies, and perform production calculations for knitting machines.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	1	-	-	1	-	2	*	*
CO2	3	2	-	-	1	-	2	*	*
CO3	3	1	-	2	1	-	2	*	*
CO4	3	1	-	-	1	-	2	*	*
CO5	2	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.

DETAILED CONTENTS

Unit-1

(03 Periods)

Introduction: Properties of Knitted Fabrics ,Comparison of woven and knitted, Terms and Definitions, Classification of Warp and Weft knitting machines, Comparison of Warp and Weft knitting, Needle Types: Needle Types - Latch needle, Bearded Needle, Compound needle, Advantages and disadvantages of different needles.

Practical

1. Draw sketch demonstrates latch, beard and compound needle.
2. Practice feeding yarn on machine (threading or yarn feeding path).

Unit-2

(03 Periods)

Weft Knit Structures: Symbolic representation, Features and Properties of Plain Single Jersey, Rib-, Interlock and Purl knit structures Designing of Weft Knit Structures Ornamentation of Plain-knit Fabrics Derivatives of plain knit (Single Jersey) – Knit and float, knit and tuck, knit, float and tuck.

Practical

1. Draw and explain the principle of weft knitting.
2. Prepare the knitting fabric by hand driven knitting machine.

Unit-3

(03 Periods)

Weft Knitting Machines Plain Single Jersey knitting machine – Knitting Elements - Cams, Cylinder, Feed yarn carriers, Take-up mechanisms; Operation Cycle – Clearing, Feeding, Knitting Position Circular Rib knitting machine – Operation Cycle – Rest, Clearing, Feeding, Knitting Position Circular Interlock knitting machine– Operation Cycle Purl knitting machine – Operation Cycle .

Practical

1. Practice adjustment of dial and yarn guide.
2. Preparation of sample of knitting elastic top with elastic wheel.

Unit-4

(03 Periods)

Warp Knitting Machines knitting Classification –Tricot Machine, Raschel Machine – Main machines Parts, knitting elements, Knitting cycle Comparison of Tricot and Raschel Fabrics.

Practical

1. Draw and explain the principle of warp knitting.
2. To study the passage of yarn, throw Tricot Machine knitting machine.
3. To study the passage of yarn, throw Raschel Machine knitting machine.

UNIT-5**(02 Periods)**

Fabric Defects: Warp and Weft knit defects and their remedies, Production calculation.

PRACTICAL

1. To calculate the production of different knitting machine.
2. To identify the different faults in knitted fabrics.

RECOMMENDED BOOKS

1. Spencer D J, “Knitting Technology”, 2nd Ed., Pergamon Press (1989)
2. Ajgaonkar D B, —Knitting Technology, Universal Publishing Corporation (1998).
2. Reichman Charles, Lancashire J B and Darlington K D, —Knitted Fabric Primer, National Knitted outwear Association, New York (1967).

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Periods)	Marks allotted (%)
1	3	25
2	3	25
3	3	25
4	3	12
5.	2	13
Total	28	100

AUDIT COURSE	5.5 INDIAN CONSTITUTION	L	T	P
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COURSE OBJECTIVES:

To provide a comprehensive understanding of the Indian Constitution's history and philosophy, and to familiarize them with the administrative structure, powers, and functions of the Union, State, and Local governments, along with the Judiciary and Election Commission.

COURSE OUTCOMES:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

CO1: Explain the making of the Indian Constitution, interpret the Preamble, and discuss the significance of Fundamental Rights and Duties.

CO2: Describe the structure of the Union Executive, detailing the powers and roles of the President, Prime Minister, and Council of Ministers.

CO3: Distinguish between the functions of the Lok Sabha and Rajya Sabha and explain the jurisdiction and structure of the Supreme Court.

CO4: Discuss the administrative framework of State Governments, focusing on the roles of the Governor, Chief Minister, and State Secretariat.

CO5: Outline the hierarchy and functions of Local Administration, including District Administration, Municipal Corporations, and Zila Panchayats.

CO6: Examine the structure of the Election Commission of India and its critical role in conducting free and fair elections.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Engineering Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PSO2
CO1	-	-	-	-	3	1	3	*	*
CO2	-	-	-	-	2	2	2	*	*
CO3	-	-	-	-	3	1	2	*	*
CO4	-	-	-	-	2	2	2	*	*
CO5	-	-	-	-	3	2	2	*	*
CO6	-	-	-	-	3	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.

COURSE CONTENT

Unit – 1: The Constitution – Introduction

(06 Periods)

The History of the Making of the Indian Constitution
Preamble and the Basic Structure, and its interpretation

Fundamental Rights and Duties and their interpretation

Unit – 2: Union Government

(06 Periods)

Structure of the Indian Union Government
President – Election, Role and Power
Prime Minister and Council of Ministers

Unit – 3: Indian Legislature & Judiciary

(06 Periods)

Composition of Lok Sabha and Rajya Sabha
Powers & Functions of Lok Sabha and Rajya Sabha
Structure of Supreme Court including Appointment of Judges
Powers & Functions of Supreme Court

Unit – 4: State Government

(03 Periods)

Governor – Role and Power
Chief Minister and Council of Ministers
State Secretariat

Unit – 5: Local Administration

(04 Periods)

District Administration
Municipal Corporation
Zila Panchayat

Unit – 6: Election Commission

(03 Periods)

Structure of Election Commission of India
Role and Function of Election Commission

INSTRUCTIONAL STRATEGY

Teach the Indian Constitution through interactive methods like case studies, debates, and role-plays to engage students. Use visuals and simplified texts to explain key features like fundamental rights and duties. Encourage discussions on amendments and landmark judgments. Incorporate quizzes and group projects to foster critical thinking and civic awareness

MEANS OF ASSESSMENT

- Class test/quizzes
- Home assignments
- Attendance
- Sessional Test

RECOMMENDED BOOKS:

1. Ethics and Politics of the Indian Constitution Rajeev Bhargava Oxford University Press, New Delhi, 2008
2. The Constitution of India B.L. Fadia Sahitya Bhawan; New edition (2017)
3. Introduction to the Constitution of India DD Basu Lexis Nexis; Twenty-Third 2018 edition
4. Our Constitution Subhash Chand Kashyap NBT New Delhi.

SUGGESTED SOFTWARE/LEARNING WEBSITES:

- 1.1.<https://www.constitution.org/cons/india/const.html>
- 1.2.<http://www.legislative.gov.in/constitution-of-india>
- 1.3.<https://www.sci.gov.in/constitution>
- 1.4.<https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of-india/>
- 1.5.<https://ncert.nic.in/textbook.php>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (periods)	Marks Allotted (%)
1	6	20
2	6	20
3	6	20
4	3	12
5	4	16
6	3	12
Total	28	100

PRACTICAL	5.6 COMPUTER AIDED DESIGN	L	T	P
		-	-	8

COURSE OBJECTIVE :

To provide hands-on exposure to computer graphics and CAD tools, enabling students to understand display and input devices, create 2D and 3D CAD models, apply annotations and rendering, and generate professional engineering drawings in multiple formats.

COURSE OUTCOME :

After completing this course, students will be able to:

CO1: Identify and compare different display devices and input devices used in computer graphics and CAD systems.

CO2: Use scanners, digitisers, plotters, and printers to input and output CAD drawings and evaluate their performance.

CO3: Analyze and compare features of commonly used CAD software packages.

CO4: Configure project settings such as units, layers, line types, and templates in a CAD environment.

CO5: Create accurate 2D mechanical drawings using standard CAD tools and commands.

CO6: Develop basic 3D solid models and apply rendering, dimensioning, and annotations.

CO7: Export CAD drawings into standard file formats for documentation and sharing.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Engineering Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PSO2
CO1	2	-	-	2		-	2	*	*
CO2	2	1	-	3		2	2	*	*
CO3	2	2	-	2		-	3	*	*
CO4	2	1	1	3		2	2	*	*
CO5	2	2	2	3		2	2	*	*
CO6	2	2	2	3		1	2	*	*
CO7	1	-	-	2		1	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.

LIST OF PRACTICALS (To perform any eight practical)

Practical 1: Prepare a presentation/comparison chart showing different types of display devices:

- Stroke Writing Display
- Raster Display
- Beam Penetration Colour CRT
- Shadow Mask Colour CRT
- TFT Monitor

Practical 2: Demonstrate the working and usage of input devices:

Mouse, Light Pen, Joystick

Digitiser: Trace a 2D sketch using a digitiser

Track Ball and Thumb Wheel: Input control simulation

Scanner: Scan and import a drawing to a CAD environment

Practical 3: Use a plotter and printer to output CAD drawings. Compare the output quality and time taken for plotting vs. printing.

Practical 4: Prepare a report comparing various CAD software (e.g., AutoCAD, SolidWorks, CATIA, Fusion 360, Revit, etc.)

Practical 5: Document the ground rules and settings when starting a project in a CAD graphics package (units, layers, line types, templates, etc.)

Practical 6: Hands-on practice using any graphics package (e.g., AutoCAD or CorelDraw):

Practical 7: Create a mechanical part (e.g., a flange or bracket) using 2D tools in CAD software

Practical 8: Create a simple 3D model (e.g., a cube with holes) using solid modelling features

Practical 9: Apply rendering, dimensioning, and annotations to the drawing

Practical 10: Export the drawing in different file formats (DWG, DXF, PDF)

THEORY	6.1 QUALITY MANAGEMENT SYSTEMS	L	T	P
		4	-	

COURSE OBJECTIVE

The course aims to provide students with a comprehensive understanding of quality management principles and practices in manufacturing and service industries. Students will learn to implement quality planning, quality tools, and quality assurance techniques, including ISO standards and total productive maintenance (TPM). The course also covers customer and supplier management, Just-In-Time (JIT) manufacturing concepts, continuous improvement practices like Kaizen, and methods to ensure product and process quality. By the end of the course, students will be able to analyze, evaluate, and improve quality systems for enhanced organizational performance and customer satisfaction.

COURSE OUTCOMES(CO):

The theory should be taught in such a manner that students are able to acquire different learning outcomes in cognitive, psychomotor and affective domain to demonstrate following COURSE OUTCOMES.

Students will be able to

CO1 : Understand the fundamentals of quality management, quality planning, leadership, and motivation theories.

CO2 : Apply Just-In-Time (JIT) manufacturing concepts, inventory management, and decision-making principles to improve productivity.

CO3: Utilize quality management tools (Brainstorming, Histogram, Pareto, Ishikawa, Control Charts, etc.) and implement ISO standards and TPM principles

CO4: Analyze customer and supplier relationships, identify requirements, and measure satisfaction to enhance product and service quality.

CO5: Apply quality principles to products and processes, implement continuous improvement (Kaizen), and manage supply chain and supplier logistics effectively.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PS O2
CO1	3	2	-	2	2	2	2	*	*
CO2	3	3	2	3	2	2	2	*	*
CO3	3	3	3	2	2	2	2	*	*
CO4	3	3	2	3	2	2	2	*	*
CO5	3	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.

COURSE CONTENT

Unit-1

(10 Periods)

Quality Management: Introduction to Quality Management, Principles of Quality Management, Quality Planning, Leadership Theories, Theories of Motivations, Model of Comparative Management.

Unit-2**(10 Periods)**

Element of Just-In-Time Manufacturing, Advantages, Limitations, Plant Arrangement for Flexible Plan, Implementation Issues in JIT. Manufacturing, Inventory Management for JIT, Decision Making in JIT, Leadership Theories

Unit-3**(12 Periods)**

Quality Circle, Quality Management Tools like Brainstorming, Histogram, Check Sheet, Pareto Diagram, Ishikawa Diagram, Control Chart, Scatter Diagram, Affinity Diagram, Tree Diagram, Five S Theory. Quality Certification, ISO 9000, TPM - Definition and Distinctive Feature of TPM, Pillars of TPM, Introduction of Kaizen.

Unit-4**(12 Periods)**

Customers and Suppliers - Define Internal and External Customers, Identify Their Expectations, and Determine Their Satisfaction Levels; Define Internal and External Suppliers and Key Elements of Relations with Them, Customer Satisfaction and Loyalty, Basic Customer Service Principles.

Unit-5**(12 Periods)**

Quality Principles for Products and Processes – Identify Basic Quality Principles Related to Products (Such as Features, Fitness-for-Use, Freedom from Defects, etc.) and Processes (Such as Monitoring, Measuring, Continuous Improvement, etc.), Quality Standards, , Supply Chain Management, Supplier Selection, Supplier Certification, Partnerships, and Alliances, Supplier Logistics.

INSTRUCTIONAL STRATEGY

Teacher should take theory lecture, demonstration of concepts and prototype

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests

RECOMMENDED BOOKS

1. D. C. Montgomery, Introduction to Statistical Quality Control, John Wiley & Sons
2. Mitra A., Fundamentals of Quality Control and Improvement, PHI
3. J. Evans and W. Linsay, The Management and Control of Quality, Thomson
4. Besterfield, D. H. et al., Total Quality Management, Pearson Education
5. D. C. Montgomery, Design and Analysis of Experiments, John Wiley & Sons
6. D. C. Montgomery and G. C. Runger, Applied Statistics and Probability for Engineers, John Wiley & Sons

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Periods)	Marks allotted (%)
1	10	15
2	10	15
3	12	25
4	12	20
5.	12	25
Total	56	100

THEORY	6.2 ENTREPRENEURSHIP AND START-UP	L	T	P
		2	-	

COURSE OBJECTIVES:

The aim of this course is to help the student to attain the following industry identified competency through various teaching experiences:

- Acquiring Entrepreneurial spirit and resourcefulness.
- Familiarization with various uses of human resources for earning dignified means of living.
- Understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individuals and the nation.
- Acquiring entrepreneurial quality, competence, and motivation.
- Learning the process and skills of creation and management of entrepreneurial ventures.

COURSE OUTCOMES:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented COs associated with the above-mentioned competency:

CO1 : Explain the concept of entrepreneurship, classify business structures, and distinguish between the roles of an entrepreneur, intrapreneur, and manager.

CO2 : Identify feasible business ideas using activity maps and develop a preliminary Business Plan based on case study analysis.

CO3 : Analyze market strategies using STP and SWOT analysis, and formulate the Vision, Mission, and Objectives for a start-up.

CO4 : Discuss the fundamental functions of management, organizational structures, and the processes of recruitment, selection, and training.

CO5 : Select appropriate financing methods (Govt schemes, Venture Capital) and apply Intellectual Property Rights (IPR) concepts to protect business ideas.

CO6 : Describe the strategies for business succession, harvesting, and the legal types of dissolution.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Engineering Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PSO1	PSO 2
CO1	-	-	-	-	2	3	2	*	*
CO2	-	2	2	-	1	3	2	*	*
CO3	-	2	2	-	2	3	2	*	*
CO4	-	-	-	-	1	3	1	*	*
CO5	-	2	-	-	2	3	2	*	*
CO6	-	-	-	-	1	3	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.

COURSE CONTENTS

Unit – 1: Introduction to Entrepreneurship and Start – Ups (05 Periods)

Definitions, Classification of Entrepreneur
Traits of an Entrepreneur, Intrapreneurship, Motivation
Types of Business Structures- On the Basis of size and on the basis of ownership
Similarities/differences between entrepreneurs and managers

Unit – 2: Business Ideas and their implementation (04 Periods)

Discovering ideas and visualizing the business
Activity map
Business Plan (Case Study)

Unit – 3: Ideas to Start-up (08 Periods)

Marketing and Accounting- Definition and Importance.
Market Analysis – STP (Segmentation, Targeting, Positioning)
Competition evaluation and Strategy Development – Vision, Mission, Goal, Objectives.
Risk analysis- SWOT Analysis.

Unit – 4: Management (06 Periods)

Definition Concept and Functions of Management
Company's Organization Structure- Concept and Classification
Recruitment and Selection- Definition,
Training and Development- Importance.

Unit – 5: Financing and Protection of Ideas (03 Periods)

Financing methods available for Entrepreneurship/ Startups in India (Government Scheme, Banking, NBFCs, SHG and Micro Financing).
Intellectual Property Rights- Overview of - Copyrights, Trademark, Geographical Indicators, Patenting and Licenses
Communication of Ideas to potential investors – Investor Pitch.

Unit – 6: Succession, Dissolution and Harvesting strategy (06 Periods)

Ways of succession
Types of Dissolution

INSTRUCTIONAL STRATEGY

Some of the topics may be taught using question/answer, assignment, seminar or case study method. The teacher will discuss stories and case studies with students, which in turn will develop appropriate managerial and entrepreneurial and start- up qualities in the students. In addition, expert lecturers may also be arranged from outside experts and students may be taken to nearby industrial organizations on visit. Approach extracted reading and handouts may be provided.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests
- Mid-term and end-term written tests
- Model/Proto type making.

RECOMMENDED BOOKS

1. The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company – Steve Blank and Bob Dorf, K & S Ranch, ISBN: 978-0984999392
2. Entrepreneurship Development (A New Venture Creation) – Vasant Desai, Himalaya Publishing House
3. Entrepreneurship Development – Khanka S.S., S. Chand & Company Ltd., New Delhi
4. Entrepreneurship Development – Gupta and Srinivasan, S. Chand & Company Ltd., New Delhi
5. Demand: Creating What People Love Before They Know They Want It – Adrian J. Slywotzky with Karl Weber, Headline Book Publishing, ISBN: 978-0755388974
6. The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses – Eric Ries, Penguin UK, ISBN: 978-0670921607
7. The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business – Clayton M. Christensen, Harvard Business Review Press, ISBN: 978-1422196021

SUGGESTED SOFTWARE/LEARNING WEBSITES:

1. <https://www.fundable.com/learn/resources/guides/startup>
2. <https://corporatefinanceinstitute.com/resources/knowledge/finance/corporate-structure/>
3. <https://www.finder.com/small-business-finance-tips>
4. <https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/>
5. NPTEL Course on Entrepreneurship https://onlinecourses.nptel.ac.in/noc23_mg74/preview
6. National Geographic Channel you tube Video on “GI Tag Crafts of Bharat”

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (periods)	Marks Allotted (%)
1	05	17
2	04	14
3	08	20
4	06	17
5	03	21
6	02	11
Total	28	100

THEORY	6.4 ARTIFICIAL INTELLIGENCE (OE-3)	L	T	P
		02	-	-

COURSE OBJECTIVES

The objectives of this course are to:

- Introduce students to the fundamental concepts, goals, and applications of Artificial Intelligence.
- Enable understanding of intelligent agents and their interaction with different environments.
- Develop basic knowledge of search algorithms and problem-solving techniques used in AI.
- Familiarize students with fuzzy logic systems and their role in decision-making.
- Introduce neural network concepts and their applications in intelligent systems.

COURSE OUTCOMES (CO):

After successful completion of this course, the students will be able to:

CO1: Explain the concept, goals, history, and applications of Artificial Intelligence.

CO2: Describe intelligent agents, their types, and properties of environments.

CO3: Apply basic search algorithms and heuristic techniques for problem solving.

CO4: Explain principles and components of fuzzy logic systems.

CO5: Describe the structure and working of neural networks including perceptron and back-propagation.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

Course Outcome s (COs)	PO1 Basics & Discipline Knowledge	PO2 Problem Analysis	PO3 Design & Development	PO4 Tools, Experimentation & Testing	PO5 Socio-Economic/ Environmental	PO6 Project Mgmt & Communication	PO7 Lifelong Learning	PSO 1	PSO 2
CO1	3	1	–	–	–	–	1	*	*
CO2	2	2	–	–	–	–	1	*	*
CO3	2	3	–	–	–	–	1	*	*
CO4	2	2	–	–	–	–	1	*	*
CO5	2	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.

COURSE CONTENT:

Unit 1 – Introduction to Artificial Intelligence

(06 Periods)

- Artificial Intelligence (AI) definition
- Goals of AI
- History of AI
- Applications of AI

Unit 2 – Agents and Environments (06 Periods)

- Agent Terminology, Types of Agents – Simple Reflex Agents, Model Based Reflex Agents, Goal Based Agents
- Nature of Environments, Properties of Environments

Unit 3 – Search Algorithms Terminology (06 Periods)

- Brute Force Search Strategies – Breadth First Search, Depth First Search.
- Heuristic Search Strategies, Local Search Algorithms.

Unit 4 – Fuzzy Logic Systems (05 Periods)

Introduction to Fuzzy Logic and Fuzzy systems,

- Membership functions,
- Fuzzification/Defuzzification

Unit 5 – Neural Networks (05 Periods)

Basic structure of Neural Networks

- Perceptron
- Back-propagation

RECOMMENDED BOOKS

Artificial Intelligence By Example: Develop machine intelligence from scratch using real artificial Intelligence use cases Denis Rothman Packt Publishing ISBN – 978-1788990547

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (periods)	Marks Allotted (%)
1	06	15
2	06	25
3	06	20
4	05	20
5	05	20
Total	28	100

THEORY	6.4 DISASTER MANAGEMENT (OE-3)	L	T	P
		2	-	

COURSE OBJECTIVES:

Following are the objectives of this course:

- To learn about various types of natural and man-made disasters.
- To know pre- and post-disaster management for some of the disasters.
- To know about various information and organisations in disaster management in India.
- To get exposed to technological tools and their role in disaster management.

COURSE OUTCOMES:

After completing this course, student will be:

CO1: Acquainted with fundamental concepts of disaster, hazard, vulnerability, risk, and capacity, and explain their inter-relationships.

CO2 : Classify various types of disasters (Geological, Hydro-meteorological, Biological, Man-made) and analyze their causes, trends, and consequences.

CO3 : Apply the Disaster Management Cycle (Pre, During, Post) and global frameworks (Hyogo, IDNDR) to plan for risk assessment and mitigation.

CO4 : Familiarised with institutional and legal mechanism of Disaster Management in India, including the DM Act 2005 and the role of various agencies.

CO5: Able to select scientific tools (GIS, RS, GPS) and engineering practices (structural/non-structural mitigation) for disaster preparedness and safe construction.

SUGGESTED COURSE ARTICULATION MATRIX (CAM):

CO No.	PO1 Basic and Discipline Specific Knowledge	PO2 Problem Analysis	PO3 Design/ Development of Solutions	PO4 Engineering Tools	PO5 Engineering Practices for Society, Sustainability and Environment	PO6 Project Management	PO7 Life Long Learning	PS O 1	PSO 2
CO1	2	-	-	-	3	-	1	*	*
CO2	3	2	-	-	3	-	2	*	*
CO3	1	2	1	-	3	2	2	*	*
CO4	2	-	-	-	3	1	2	*	*
CO5	3	2	1	2	3	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.

COURSE CONTENTS

Unit – 1: Understanding Disaster

(02 Periods)

Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, and disaster management.

Unit – 2: Types, Trends, Causes, Consequences and Control of Disasters

(05 Periods)

Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire); Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.

Unit - 3: Disaster Management Cycle and Framework

(08 Periods)

Disaster Management Cycle – Paradigm Shift in Disaster Management. Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness. During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Strategy, Hyogo Framework of Action.

Unit – 4: Disaster Management in India

(05 Periods)

Disaster Profile of India – Mega Disasters of India and Lessons Learnt. Disaster Management Act 2005 – Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter Governmental Agencies 457 Open Elective Courses

Unit – 5: Applications of Science and Technology for Disaster Management

(08 Periods)

Geo-informatics in Disaster Management (RS, GIS, GPS and RS). Disaster Communication System (Early Warning and Its Dissemination). Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non-Structural Mitigation of Disasters S&T Institutions for Disaster Management in India

RECOMMENDED BOOKS:

1. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management.
2. Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi.
3. Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi.
4. Alexander, David, Natural Disasters, Kluwer Academic London.
5. Ghosh, G. K., Disaster Management, A P H Publishing Corporation.
6. Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (periods)	Marks Allotted (%)
1.	02	10
2.	05	19
3.	08	28
4.	05	19
5.	08	24
Total	28	100

7. GUIDELINES FOR ASSESSMENT OF STUDENT-CENTRED ACTIVITIES (SCA)

It was discussed and decided that the maximum marks for SCA should be 50 as it involves a lot of subjectivity in the evaluation. The marks may be distributed as follows

- i. 15 Marks for general behaviour and discipline
(by HODs in consultation with all the teachers of the department)
- ii. 10 Marks for attendance as per following:
(by HODs in consultation with all the teachers of the department)
 - a) 75 - 80% 6 Marks
 - b) 80 - 85% 8 Marks
 - c) Above 85% 10 Marks
- iii. *** Even Semester:**
25 Marks maximum for Sports/NCC/Cultural/Co-curricular/NSS activities as per following: (by In-charge Sports/NCC/Cultural/Co-curricular/NSS)
 - a) State/National Level participation
 - b) Participation in two of above activities
 - c) Inter-Polytechnic level participation
****Odd Semester:**
25 Marks maximum
 - a) Language Lab Practices / foreign language practices
 - b) Group Discussion and Personality Development
 - c) Industrial Visits/Industrial Talks
 - d) Power Point Presentations and Resume Making
 - e) Development of Aptitude and Reasoning Skills
 - f) Participation in the technical Exhibitions, Symposiums, Seminars, Workshops at the Institute /District/State/National Level.

8. RESOURCE REQUIREMENT

A. PHYSICAL RESOURCES

a) Space requirement

Norms and standards laid down by All India Council for Technical Education (AICTE) are to be followed to work out space requirement in respect of classrooms, tutorial rooms, drawing halls, laboratories, space required for faculty, student amenities and residential area for staff and students.

b) Equipment Requirement:

Following Laboratories are required for diploma programme in Textile Technology (5th and 4th Semester)

TEXTILE TESTING LAB

S.No	Name of Equipment	No.	@Rs.	Amt.in Rs.
1.	Baer Sorter (For Fibre Length) Acrylic Transparent Sheet - 6"X8"X2 pices, 3"X8"X2 pcs Fibre Mounting Templest 6"X8"X2 pices, 3"X8"X2 pcs with tweezers, velvet pad, scales, plan chass with all complete accessories or Latest Configuration	2	35000	35000
2.	Micro scope Digital Mocro scope - Microscope & Ends Counting Equipments-Magnifying Power 5X,10X,20X,40X,100X lenses Trinocular biological microscope with fibre cross section kit, high resolution CCD camera and imaging software with measurement facilities, Scope of use section of fibre or yarn, analysis of any fibre, yarn and fibre Range : 5X,10X,20X,450X,100X / as per requirements, Focus : Adjustable, Lights - White, Blue, Yellow, Upper & Lower, Supply -220 V AC supply Single Phase with all complete accessories Or Latest Configuration	2	65000	65000
3.	Moisture Meter	1	16000	16000
4.	Wrap reel	2	40000	80000
5.	Wrap Block	2	9500	19000
6.	Beesley Balance	4	7000	28000
7.	Quadrant Balance	2	6000	12000
8.	Lea Strength Tester	1	75000	75000
9.	Single Thread Tester (Digital)	1	100000	100000
11.	One Inch Twist Tester	2	9800	19600

12.	Take Up Twist Tester Yarn test length : 25 mm to 500 mm adjustable (Metric unit) Or 1" to 20" Maximum adjustable (imperial unit), The test length is automatically taken into account for calculation and final reading is displayed directly in TPM/TPL Range :Upto 60TPL Resolution :1 TPM or 0.01 TPI Motor Speed: Upto 1500 RPM Clamps : Spring loaded clamps at motor end for easy clamping of Yarn Averaging : Reading of at least 10 samples can be stored and average TPM/TPI value is calculated and digital display with pre set device. Supply : 220 V AC, single phase Suitable for S/Z type of twisted yarn with reset device. Tension weight upto 100 gm adjustable. Yarn spool mounting arrangement at one end of the twist tester with all complete accessories or Latest Configuration	2	28500	57000
13.	Fabric Strength Tester (Tensile Strength)	1	80000	80000
14.	Tearing Strength Tester	1	35000	35000
15.	Bursting Strength Tester	1	35000	35000
16.	Abrasion Resistance Tester(Martindale Type)	1	75000	75000
17.	Laundro meter (For washing fastness testing)	1	80000	80000
18.	Crocko Meter	1	10000	10000
19.	Digital Fibro graphMeasuring Principle-Optical Measuring Range-12.0 to 45.0 mm Measuring Accuracy - +/- 0.1 mm Result Output-2.5% SL,50% SL & UR % Front End Language-English Applicable Standard-ASTM D5332,ISO2648 & IS233 Power Supply-Single Phase 220V AC	1	320000	320000

20.	Uster Evenness Tester	1	2000000	2000000
21.	Trash Analyser	1	150000	150000
22.	Conditioning Oven 220 V With capability of maintaining temperature up to 100oC and facility for smoth variation of temperature inside 27 liter.	1	98500	98500
23.	Stelometer (For bundle Strength)	2	150000	300000
24.	Crease Recovery Tester Size of the Test Specimen - 40mm X 15mm, Crease Load : 1Kg.(Stainless Steel), Angle measurement : On an Engraved circular scale graduated in 1 deg., Scale measurement : 0-180 with all complete accessories or Latest Configuration	2	15000	30000
25.	Water Repellency Tester	1	80000	80000
26.	Pilling Tester	1	30000	30000
28.	Air Permeability Tester	1	60000	60000
29.	Sheffield Micronaire with compressor (For Fibre Fineness)	1	150000	150000
31.	Miscellaneous Items-Thermometers, Whirling Hydrometer, Dry & Wet bulb thermometer, Physical Balance, 1.5 ton Air conditioner for atmosphere control etc.			
32.	Classimate (Yarn faults finding equipment)	1		1200000
34.	Sublimation fastness tester	1	100000	100000
35.	Round Sample of GSM with Electronic balance	1	20000	20000
36.	Stiffness Tester	1	15000	15000
37.	Drape meter	1	25000	25000
38.	Fabric Thickness Tester	1	8000	8000
39.	A.S.T.M. Cards For Threads/Inch	1		

SPINNING LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
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1.	Blow Room Line With Six Beating Points (Lab Model) Latest Lab Model of blow room line of 10 inch width or more complete with hopper feeder, Scutcher, beaters with adjustment grid bars, latic, Krischner neater, Feed regulatory system, calendar rollers, lap rollers, lap tray with electric control panel, beating point = 4.5 to 6 with complete accessories or Latest Configuration	1	5000000	5000000
2.	Model of mini carding plant 250 mm working width 250 mm cylinder, doffer, feed roller, opening roller, striping roller, crush roller stainless undercasing, takeup drum suitable for feeding, miniature draw frame with gear and pulleys to drive feed roller, cylinder and doffer and other accessories, Mechanical type possibility of processing 50 gms. per batch 10 "width, metallic wire clothing with complete accessories, Microprocessor based individual drive or Latest Configuration	1No.	800000	800000
3.	Draw Frame : Having 3 over 3 drafting arrangement to process the sliver from miniature carding machine with individual AC variable speed motors with change gears to vary the speeds of front roller, middle and back roller for different Total Draft and break Draft inclusive of motor, rpm indicators control system and other accessories Mechanical type single delivery, 3 over 3 drafting arrangement, range 5-15 Draft Microprocessor based or Latest Configuration	1No.	800000	8,00,000
4.	High Speed Simplex (Lab Model) Latest Lab Model Range :6-12 Spindle Suitable for 110 mm dia package Draft Range=6-18, 3 roller apron drafting arrangement SKF PK 1500, individual AC variable speed motors with control system with automatic stop motion, Inching mechanism, 100 empty PP bobbins with complete accessories and pinion according to draft change with all complete accessories or Latest Configuration	1	480000	480000
5.	Ring Frame Ring Spinning Frame : No. of Spindle 6-12, mechanical speed 25000 rpm, ring dia - 38 mm, 70mm gauge, 180 mm lift, SKF PK 2025/2035, 3 over 3 drafting arrangement with short cradles, for gearing arrangement to change the total draft, Break draft and TPI with change gears and other accessories. Mechanical draft 10-50 Microprocessor based or Latest Configuration	1	850000	850000
6.	Sliver Lap Machine	1	250000	250000
7.	Ribbon Lap Machine	1	250000	250000

8.	Comber 6/8 Heads	1	800000	800000
9.	Parallel Winding Machine(24 Drums) (Lab Model) Cheese winding :Range 4-8 or more drum, Speed Range-600-800 y.p.m., Optical cleaner on individual spindle, Steel drum/ Bakelite drum as per parallel winding, 220V, Single phase motor, 100pp cheeses with all complete assessories or latest configuration	1	400000	400000
10.	Yarn Doubling Machine (Lab Model)	1	275000	275000
11.	Hank Reeling Machine	1	25000	25000
12.	Two For One Twister(T.F.O.) TFO type, No. of spindle= range 4-8, 230 mm guage, 150 mm pot dia, suitable for cheese of 170 mm traverse, twist range=3.0 to 45.0, count range 2/8's to 2/80's Ne, Tangential belt drive for S & Z twist both, with automatic shop motorn and other complete accessories, 100 PP empty package with all complete accessories or Latest Configuration	1	600000	600000
13.	Stripping Roller (For Card)	1	5000	5000
14.	Grinding Roller (Transverse wheel Grinder)	1	5000	5000
15.	Metallic Wire Mounting Equipment (With Butt Welder)	1	20000	20000
17.	Assembly Winder	1	250000	250000
18.	Open end spinning M/c of Twelve rotors (Lab Model) Having Range 4-8 head rotor guage-230 mm having 48 mm rotor with OK39/40 opening rollers, automatic stop motion R4/10 navels, built in automatic indicators and quick response sensors to monitor yarn continuity and sliver, trash separator and discharge tunel for better cleaning, Feeding can size of 14" X 42" and take up package cone and cheese both with individual motors with pully to change draft and twist with motors. Electrical PLC system, Computer, UPS, Control system, Dreft range suitable for 2' to 24's and other all complete accessories, draft range-50-200 user friendly menu driven software or Latest Configuration	1	750000	750000

NOTE:

1. Indian make working laboratory models for the costly equipment mentioned above be purchased if available.

WEAVING LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
1.	Warp Winding Machines			
	A. Ordinary Machine with 10 Heads	1	75000	75000
	B. Automatic Winding Machine with 10 Heads	1	800000	800000
2.	Pirn Winding Machine with 4 Heads	1	75000	75000
3.	Warping Machines			
	A. Beam Warping Machine (High Speed)	1	300000	300000
	B. Sectional Warping Machine	1	175000	175000
4.	Working Model of Sizing Plant	1	500000	500000
5.	Drawing and Denting Frames (cap. 200e nds) Stainless Screen Frame, Capacity 3200 ends with all Complete Accessories or Latest Configuration.	2	10000	20000
6.	Beam Knotting Machine	1	80000	80000
7.	Plane Looms			
	A. Plain Loom For Plain Tappet	1	70000	70000
	B. Plain Loom For Other Weave Tappets	1	100000	100000
8.	Dobby Looms			
	A. Single (Acting) Dobby Loom	1	200000	200000
	B. Double Acting (Double Lift) Dobby Loom	1	200000	200000
9.	Jacquard Looms			
	A. Loom with Single Lift Single Cylinder Jacquard	1	250000	250000
	B. Loom With Single Lift Double Cylinder Jacquard	1	250000	250000
	C. Loom With Double Lift Double Cylinder Jacquard	1	250000	250000
10.	Automatic Weaving Machines			
	A. Automatic Pirn Changing Loom	1	300000	300000
	B. Automatic Shuttle Changing Loom	1	300000	300000
11.	Shuttleless Weaving Machines			
	A. Gripper Type Shuttleless Loom	1	3500000	3500000
	B. Air Jet Weaving Machine	1	1200000	1200000
	C. Water Jet Weaving Machine	1	1200000	1200000
12.	Other Weaving Machines			
	A. Hand Looms	2	40000	80000
	B. Loom With Circular Multiple Box Motion.	1	150000	150000
	C. Loom With Drop Box Multiple Box	1	150000	150000
	D. Loom With Terry Motion	1	200000	200000
	E. Loom With Pick At Will Motion	1	150000	150000
13.	Card Cutting Machine	1	40000	40000
14.	Knitting Machines			
	A. Flat Knitting Machine	1	75000	75000
	B. Circular Knitting Machine	1	125000	125000
15.	Sewing Machine	6	10000	60000
16.	Model of Rapier Looms 20" with winding and warping unit complete set	1	3000000	3000000

COMPUTER AIDED DESIGN LAB

S.No.	Name of Equipment	No.	@ Rs.	Amt.in Rs.
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1.	Computer Desktop	25	50000	1250000
2.	AutoCAD Software	1	600000	600000
3.	Inverter	2	50000	100000
4	AC	2	50000	100000
5	Computer table with chair	25	10000	250000
6	Printer	2	10000	20000

9. EVALUATION SCHEME GUIDELINES: As Per AICTE ATTACHED (ANNEXURE- 2)

a. Theory Courses:

- Internal Assessment: 40%
- End Semester Examination: 60%
- Passing Criteria: A student must secure a minimum of 40% marks separately in both internal assessment and end semester examination to pass the course.

b. Practical Courses:

- Internal Assessment: 60%
- End Semester Examination: 40%
- Passing Criteria: A student must secure a minimum of 40% marks separately in both internal assessment and end semester examination to pass the course.

c. Summer Internship / Projects / Seminars, etc.:

- Evaluation is based on the following components:
 - Quality of work completed
 - Report preparation and documentation
 - Viva-voce performance
 - Presentation skills

Note: Internal assessment is conducted based on the student's overall performance, which includes:

- Two best out of three mid-semester tests
- Quizzes and assignments
- Class participation and attendance
- Viva-voce and lab records (for practical subjects)

EVALUATION METHODOLOGY**1. EVALUATION METHOD for THEORY**

	Internal Assessment (40 marks)				External Assessment (60 marks)
	IA 1	IA 2	IA 3	IA 4	
Mode	Written Test	Written Test	Attendance and Assignments	Pre – Semester Examination	End Semester Examination
Portion	2 units	2 units	Regularly	All units	All units
Duration1hr	1hr	1hr	-	3hrs	3hrs
Exam Marks	20	20	20	60	60
Converted to	10	10	15	15	60
Tentative Schedule	5 th Week	10 th Week	Regularly	12 th -13 th Week	

IA1 and IA2: A written assessment test worth 20 marks should be conducted for two units. The marks earned (20 marks) will be converted to 10 marks. The best of the two assessments will be evaluated for an internal 10-mark assessment.

IA3: Assignments given after the completion of each unit, along with attendance throughout the semester, will be assessed for a total of 15 marks.

IA4: The pre-semester examination should follow the end-semester examination question pattern. The marks should be adjusted to 15 for internal assessment.

2. EVALUATION METHOD for PRACTICAL

	Internal Assessment (60 marks)				External Assessment (40 marks)
	IA 1	IA 2	IA 3	IA 4	
Mode	Practical Test	Practical Test	Attendance and Practical Documentation	Practical Test and Quiz – Viva Voce	Practical Examination
Portion	50% Practical	50% practical	All practical	All practical	All practical
Duration	3hrs	3 hrs	Regularly	3 hrs	3hrs
Exam Marks	20	20	20	20	40
Tentative Schedule	5th Week	10th Week	Regularly	12th -13 th Week	

IA1 and IA2: Complete all exercises and experiments as outlined and retain them for the practical test. The test should be conducted in accordance with the evaluation scheme. The best of the two practical tests will be internally evaluated for a total of 20 marks.

IA3: Maintain a practical file for each exercise while ensuring attendance throughout the semester. Submit the required documents for the practical file, quiz, and practical test along with a valid certificate (Progress Card). This will be assessed for 20 marks.

IA4: The pre-semester practical examination, quiz, and viva-voce should follow the end-semester practical examination pattern, with marks adjusted to 20 for internal assessment.

SUGGESTED DISTRIBUTION OF MARKS FOR INTERNAL EVALUATION

Part	Description	Marks Allotted
A.	Objective	5
B.	Circuit Diagram	5
C.	Procedure and Connections	10
D.	Observation Table and Calculation	10
E.	Result and its Discussion, Conclusion	10
F.	Practical Test	20
	Total	60

SUGGESTED DISTRIBUTION OF MARKS FOR EXTERNAL EVALUATION

Part	Description	Marks Allotted
A.	Objective	5
B.	Circuit Diagram	5
C.	Procedure and Connections	5
D.	Observation Table and Calculation	5
E.	Result and its Discussion, Conclusion	10
F.	Viva-Voce	10
	Total	40

3. EVALUATION METHOD for PRACTICUM (End Exam-Practical)

	Internal Assessment (60 marks)				External Assessment (40 marks)
	IA 1	IA 2	IA 3	IA 4	

Mode	Practical Test	Practical Test	Attendance and Practical Documentation	Micro Project	Practical Examination
Portion	50% practical	50% practical	All practical	All practical	All practical
Duration	3hrs	3 hrs	Regularly	Regularly	3hrs
Exam Marks	20	20	20	20	40
Tentative Schedule	5th Week	10th Week	Regularly	12th -13 th Week	

- **IA1 and IA2:** Complete all exercises and experiments as instructed and retain them for the practical test. The test should be conducted according to the evaluation scheme. The best of the two practical tests will be internally assessed for a total of 20 marks.
- **IA3:** Maintain a practical file for each exercise, ensuring attendance throughout the semester. Submit the required documents for the practical file, quiz, practical test, and end-semester examination, along with a valid certificate (Progress Card). This will be evaluated by 20 marks.
- **IA4:** Submit a micro-project report along with a fabrication model or analysis report. The performance of each student in the group will be assessed by both the laboratory supervisor and an internal examiner. This evaluation will contribute 20 marks.

SUGGESTED DISTRIBUTION OF MARKS FOR INTERNAL EVALUATION

Part	Description	Marks Allotted
A.	Objective	5
B.	Circuit Diagram	5
C.	Procedure and Connections	10
D.	Observation Table and Calculation	10
E.	Result and its Discussion, Conclusion	10
F.	Mini Project	20
	Total	60

SUGGESTED DISTRIBUTION OF MARKS FOR EXTERNAL EVALUATION

Part	Description	Marks Allotted
A.	Objective	5
B.	Circuit Diagram	5
C.	Procedure and Connections	5
D.	Observation Table and Calculation	5
E.	Result and its Discussion, Conclusion	10
F.	Viva-Voce	10
	Total	40

4. EVALUATION METHOD for PRACTICUM (End Exam-Theory)

	Internal Assessment (40 marks)						External Assessment (60marks)
	IA 1		IA 2		IA 3	IA 4	
Mode	Written Test	Practical Test	Written Test	Practical Test	Attendance and Practical Documentation	Pre Semester Examination and Micro Project	End Semester Examination
Portion	2 units	Practical related to the units	2 units	Practical related to the units	All unit	All Practical	All unit
Duration	1hr	3hrs	1hr	3 hrs	3hrs	Regularly	3hrs
Exam Marks	10	20	10	20	60	60	60
	30		30				
Converted to	10		10		15	15	60
Tentative Schedule	5 th Week		10 th Week		Regularly	12 th -13 th Week	

IA1 and IA2: A written assessment test worth 10 marks should be conducted for two **UNITs**. Complete all exercises and experiments as outlined and retain them for the practical test worth 20 marks. The practical test should be conducted in accordance with the evaluation scheme. The total marks earned (30 marks) will be converted to 10 marks. The best of the two assessments will be internally evaluated for a total of 10 marks.

IA3: Attendance and the pre-semester examination should follow the end-semester examination question paper pattern. The marks should be adjusted to 15 for internal assessment.

IA4: Maintain a practical file for each exercise. Submit the required documents for the practical file, quiz/viva-voice, practical test, and end-semester examination, along with a valid certificate (Progress Card). This will be assessed for 40 marks. Additionally, submit a micro-project report along with a fabrication model or analysis report. The performance of each student in the group will be evaluated by both the laboratory supervisor and an internal examiner. The total of 60 marks will be converted to 15 marks.

SUGGESTED DISTRIBUTION OF MARKS FOR INTERNAL EVALUATION FOR IA4

Part	Description	Marks Allotted
A.	Objective	5
B.	Circuit Diagram	5
C.	Procedure and Connections	5
D.	Observation Table and Calculation	5
E.	Result and its Discussion, Conclusion	10
F.	Attendance & Mini Project	10
	Total	40

12. LIST OF EXPERTS

Sr.No.	Name and Designation	Organization
1.	Anubha Gupta, Lecturer Textile Technology	GP Kanpur
2.	Sh. Santosh Kumar, Lecturer Textile Technology	GP Mau
3.	Sh. Palash Kumar Patra, Lecturer Textile Design	GP Kuru Pindra, Varanasi
4.	Sh.Vijay Pratap Singh, Ret. Senior Executive	Elgin Mill Ltd.
5.	Sh. R.K Shrivastav, Ret. Factory Manager	National Textile Corporation, Bhopal

(ANNEXURE-I)

PROCEDURES / FORMATS FOR ORGANIZING INTERNSHIPS.

STUDENT INTERNSHIP PROGRAM APPLICATION

Complete and submit to the TPO/ Internship Program Coordinator.

1. Student Name:		Enroll. No.:	
2. Campus Address:		Phone:	
3. Home Address:		Phone:	
4. Student email address:			
5. Branch:		6. Internship Semester: ____	
7. Internship Preferences			
	Company/Industry	Core Area	Location
Preference-1			
Preference-2			
Preference-3			
Faculty mentor Signature: _____ Date _____ .			
Student Signature: _____ Date _____.			
Signature confirms that the student agrees to the terms, conditions, and requirements of the Internship Program			

Signature with seal

HOD/Principal

(ANNEXURE-I)

REQUEST LETTER FROM INSTITUTE TO INTERNSHIP/INDUSTRIAL TRAINING PROVIDER

Ref. No.: _____

Date: _____

To,
The HR Manager/Training Coordinator
.....
.....

Subject: Request for Internship/Industrial Training for Diploma Students

Sir/Madam,

We are pleased to introduce....., a premier institution affiliated with Board of Technical Education, Uttar Pradesh, offering diploma programs in various diploma disciplines.

As a part of the curriculum, our students are required to undergo Internship/Industrial Training to gain practical exposure and enhance their technical competencies. Therefore, we kindly request your esteemed organization to provide Internship/Training opportunities to our students during the period from to

S. No.	Name	Enroll. No.	Semester/Year	Discipline

Yours sincerely,

(Head of Department/Principal)

(ANNEXURE-II)

PROFORMA FOR EVALUATION OF INTERNSHIP BY INDUSTRY

Student Name:Evaluation Date:

Industry Supervisor Name:

Company/Organization:

Title of the Project:

.....

Please evaluate your intern by indicating the frequency with which you observed the following behaviors:

Parameters	Max. Marks	Marks Given
Attendance and Punctuality	20	
Discipline and Professional Behavior	20	
Technical Knowledge and Understanding of Processes	30	
Practical Skills and Quality of Work	20	
Ability to Apply Theoretical Knowledge	20	
Problem Solving and Analytical Ability	10	
Communication and Interpersonal Skills	20	
Teamwork and Collaboration	10	
Internship Report/Documentation	20	
Presentation and Viva-Voce	30	
Total Marks	200	

Additional comments, if any:

Signature with seal of Industry supervisor

HR Manager

INTERNSHIP REPORT

STUDENT'S DIARY/ DAILY LOG

The main purpose of writing daily diary is to cultivate the habit of documenting and to encourage the students to search for details. It develops the students' thought process and reasoning abilities. The students should record in the daily training diary the day to day account of the observations, impressions, information gathered and suggestions given, if any. It should contain the sketches & drawings related to the observations made by the students.

The daily training diary should be signed after every day by the supervisor/ in charge of the section where the student has been working. The diary should also be shown to the Faculty Mentor visiting the industry from time to time and got ratified on the day of his visit.

Student's Diary and Internship Report should be submitted by the students along with attendance record and an evaluation sheet duly signed and stamped by the industry to the Institute immediately after the completion of the training. It will be evaluated on the basis of the following criteria:

- Regularity in maintenance of the diary.
- Adequacy & quality of information recorded.
- Drawings, sketches and data recorded.
- Thought process and recording techniques used.
- Organization of the information.

INTERNSHIP REPORT

After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period. The student may contact Industrial Supervisor/ Faculty Mentor/TPO for assigning special topics and problems and should prepare the final report on the assigned topics. Daily diary will also help to a great extent in writing the industrial report since much of the information has already been incorporated by the student into the daily diary. The training report should be signed by the Internship Supervisor, TPO and Faculty Mentor. The Internship report will be evaluated on the basis of following criteria:

- i. Originality.
- ii. Adequacy and purposeful write-up.
- iii. Organization, format, drawings, sketches, style, language etc.
- iv. Variety and relevance of learning experience.
- v. Practical applications, relationships with basic theory and concepts taught in the course.

MONITORING & EVALUATION OF INTERNSHIP

The industrial training of the students will be evaluated in three stages:

1. Evaluation by Industry.
2. Evaluation by faculty supervisor of Industry.
3. Evaluation through seminar presentation/viva-voce at the Institute.

1. EVALUATION BY INDUSTRY

The industry will evaluate the students based on the Punctuality, eagerness to learn, Maintenance of Daily Diary and skill test in addition to any remarks.

2. MONITORING/ SURPRISE VISIT BY TPO/ STAFF/ FACULTY MENTOR

TPO/Staff/ Faculty Mentor of the institutes will make a surprise visit to the internship site, to check the student's presence physically, if the student is found absent without prior intimation to the T & P Cell, entire training will be cancelled. Students should inform the TPO, faculty mentor as well as the industry supervisor at least one day prior to availing leave by email. Students are eligible to avail 1-day leave in 4 weeks and 2 days leave in 6 weeks of the internship period apart from holidays and weekly offs.

3. EVALUATION THROUGH SEMINAR PRESENTATION/VIVA-VOCE AT THE INSTITUTE

The student will give a seminar based on his training report, before an expert committee constituted by the concerned department as per norms of the institute. The evaluation will be based on the following criteria:

- Quality of content presented.
- Proper planning for presentation.
- Effectiveness of presentation.
- Depth of knowledge and skills.
- Attendance record, daily diary, departmental reports shall also be analyzed along with the Internship Report.

Seminar presentation will enable sharing knowledge & experience amongst students & teachers and build communication skills and confidence in students.