

Semester- I

ADVANCED TEXTILE MATHEMATICS			
Course Code	MTX101	CIE Marks	50
Teaching Hours/Week (L:P: SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
<p>Course Learning objectives: This Course aims at updating knowledge of students in fields of</p> <ul style="list-style-type: none"> • Advanced statistical quality control • Calculations involved in Spinning, Weaving and Garment manufacturing. 			
Module-1			
Confidence limits- Estimation of confidence intervals, confidence limits for large and small samples, confidence limits for standard deviation and difference in mean and SD. Significance tests- interpretation of significance tests, single tail and double tail tests, chi- square distributions Analysis of variance- the design of experiments, randomized variation in experiments, randomization, completely randomized design (CRD) and randomized block design (one-way& two-way ANOVA).			
Module-2			
Linear regression and timeseries-relation between variables, variation about regression line regression equation, correlation coefficient, interpretation of “R”, equation for regression partial and multiple correlation. Components of timeseries, measurement of trend using method of least squares.			
Module-3			
Spinning calculations- forces acting on ring and traveller, calculations related to various drives viz, belt, rope, chain, gear etc. Details of average count and resultant count of yarn. Calculation related spin plan-preparation of spin plan for known count and known quantity of yarn produced with given spinning machinery details.			
Module-4			
Calculations related OE spinning, Air jet spinning, and friction spinning. Calculation of no. of fibres in the yarn, calculation related to evenness of sliver, riving, single & double yarns. Weaving and knitting calculation -estimation of production of different types of preparatory machines, sizing machines and looms. Calculation of fabric weight, cloth cover, stitch density of knitted fabric, air porosity, fabric thickness. Preparation of plan for weaving industry from known machine and material parameters.			
Module-5			
Calculations in garment manufacturing - standard time, importance of GSD & its benefits in garment industry. SAM calculations using synthetic data and time study techniques. Garments CM cost estimation using SAM calculation of product capacity of a factory, seam efficiency, seam strength, thread consumption factor etc.			
Assessment Details (both CIE and SEE)			
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.			

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:**Books**

1. Textile Testing–JE Booth., CBS Publishers, NewDelhi,1996
2. Handbook of textile testing and quality control-Hamby and Grover, India Eastern Pvt. Ltd., Delhi2011
3. Practical statistics for textile Industry–Part-1&2, GaveLeaf, Textile Institute1984
4. Textile Mathematics-Vol.1,2,3, J E Booth. Butterworth'sPub London,1986
5. Textile Mechanics-Vol.1&2, K Slater, Textile Institute Pub,1979
6. An introduction to quality control for the apparel industry, Pradeep V. Mehta
7. Mechanics of Textile Machinery-W A Hanton, Langmans, Green and Co., London 195

Web links and Video Lectures (e-Resources):

NPTEL COURSES ON SPINNING, EVALUATION OF TEXTILE MATERIALS AND FABRIC FORMATION
<https://archive.nptel.ac.in/courses/116/102/116102049/>

Skill Development Activities Suggested

- Preparation of spin plan, weaving shed plan and conducting case studies in various garment industries.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Conduct significance tests, variance analysis and find confidence limits	L3
CO2	Find correlation coefficient and do regression analysis	L3
CO3	Calculate various parameters in spinning and prepare spin plan	L3
CO4	Determine loom and fabric parameters	L3
CO5	Find various parameters in garment industry	L3

ADVANCED FIBER PHYSICS			
Course Code	MTX102	CIE Marks	50
Teaching Hours/Week (L: P: SDA)	4:0:0	SEE Marks	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	03
<p>Course Learning objectives: This Course aims at updating knowledge of students in fields of</p> <ul style="list-style-type: none"> • Advanced methods of characterization of fibres. • Various physical and mechanical properties of fibres and fibre reinforced composites. 			
Module-1			
Introduction to macro molecular physics: Modern concepts of fiber structure. Physical methods of structural characterization of fibers, viz., DGC, TEM, SEM, WAXS, SAXS, FTIRS, NMR, DSC and DTA			
Module-2			
Deformation of elastic solid: Generalized Hook's Law, Component of Stress and strain. Linear visco-elastic behaviour of fibers. Elastic recovery of fibres, theory of weak link effect. Maxwell's, Kelvins and burgers model for explaining time dependent mechanical properties, factors affecting creep and stress			
Module-3			
Boltzmann superposition principle. Study of dynamic mechanical properties and their application in understanding thermal relaxation in fibers. Measurement of dynamic mechanical properties. Temperature dependence of visco-elastic behavior. Time- Temperature Equivalence and Superposition. WLF equation. Study of fiber stiffness and torsion. Introduction to mechanical properties of fiber reinforced composites. Fracture mechanism of fiber reinforced composites, Axial and transverse modulus of CFRCS.			
Module-4			
Moisture in textiles- Effect of moisture on mechanical, electrical and other properties of fibres. Studies on heats of sorption, theories of moisture sorption, molecular theory of moisture Hysteresis and rate of absorption of moisture in textiles. Theory of moisture sorption and moisture swelling of fibres.			
Module-5			
Study of optical properties, thermal, frictional, electrical, Di-electric and static properties of fibers.			
Assessment Details (both CIE and SEE)			
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.			
Continuous Internal Evaluation:			
1. Two Unit Tests each of 25 Marks			
2. Two assignments each of 25 Marks or one Skill Development Activity of 50 marks to attain the COs and POs			
The sum of three tests, two assignments/skill Development Activities, will be scaled down to 50 marks			
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.			
Semester-End Examination:			
1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.			
2. The question paper will have ten full questions carrying equal marks.			

3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
 4. Each full question will have a sub-question covering all the topics under a module.
- The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:

Books

1. Polymer characterization'-HuntandJames -Chapman and Hall, London,
2. Mechanical properties of polymers-IM Ward
3. Mechanical properties of polymers- Nielson-Vol. I, II
4. Physical properties of fibers-W. R. MortonandJ. W.S Hearle.
5. Introduction to polymer visco-elasticity- Aklonis

Web links and Video Lectures (e-Resources):

Skill Development Activities Suggested: Study of fibre structure using various instruments available in nearby research centers, and analysis of various properties of fibres using different equipment and doing case study in nearby fibre manufacturing industries.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Conduct significance tests, variance analysis and find confidence limits	L3
CO2	Find correlation coefficient and do regression analysis	L3
CO3	Calculate various parameters in spinning and prepare spin plan	L3
CO4	Determine loom and fabric parameters	L3
CO5	Find various parameters in garment industry	L3

ADVANCED TEXTILE AND APPAREL TESTING			
Course Code	MTX103	CIE Marks	50
Teaching Hours/Week (L:P: SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
Course Learning objectives:			
<ul style="list-style-type: none"> • Explain the importance of HVI and AFIS in fibre and yarn testing • Demonstrate methods, standards, principles and working of KES ad FAST systems used for testing of fabrics. • Explain influence of chemical and mechanical finishes on fabric handle. • Demonstrate various in-process inspection of fabrics and garments • Demonstrate various fabrics and garment testing equipment's and apparel care labelling standards • Explain the use of modern quality control and quality management programmes in the textile industry 			
Module-1			
Advance Fibre and Yarn Testing Instruments: Study of High Volume Instrument (HVI). Advanced Fiber Information System (AFIS). Comparison of AFIS with HVI System, Yarn Hairiness and its measurement. Uster spectrograph and its analysis. Properties desired in export of yarns.			
Module-2			
Advance Fabric Testing Instruments: Objective evaluation of fabric handle by KAWABATA Evaluation system (KES), Fabric Assurance by Simple Testing (FAST) and fabric extractions force technique. The influence of chemical and mechanical finishes on fabric handle.			
Module-3			
Inspection: Introduction, raw material inspection, In-process Inspection - spreading, cutting, sewing, pressing and final inspection.			
Module-4			
Apparel Testing: Soil/Stain release testing, snagging, bonded and laminated apparel fabric, testing of fusible interlinings, buttons, zippers and sewing threads. Care labelling of apparel and textiles: American, International, British, Canadian and Japanese systems.			
Module-5			
Quality Control Program: Planning for the quality control program, inspection and analysis of data. Tools of quality control. ISO 9000 series standards. Total Quality Management concepts.			
Assessment Details (both CIE and SEE)			
The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.			
Continuous Internal Evaluation:			
<ol style="list-style-type: none"> 1. Two Unit Tests each of 25 Marks 2. Two assignments each of 25 Marks or one Skill Development Activity of 50 marks to attain the COs and POs 			
The sum of three tests, two assignments/skill Development Activities, will be scaled down to 50 marks CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.			

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:**Books**

1. Principles of Textiles Testing” - J.E. Booth.
2. Hand book of textile testing and quality control” -B. Glover, D.S. Hamby, Wiley Eastern Ltd.,
3. The measurement of Appearance” - Richard S. Hunter and Richard W. Harold, Wiley Inter science.
4. An introduction to quality control for the apparel industry” - Pradeep V Mehta.

Reference Books

1. International Apparel Quality Manuals – KESF and FAST Manuals
2. Progress in Textile Science and Technology – Vol.1 Ed.by V.K. Kothari, IAFL, India, 2000

Web links and Video Lectures (e-Resources):

- NPTEL course and lecture series: <https://nptel.ac.in/courses/>
- Apparel quality assurance and control: <https://textilelearner.net/?s=Apparel+quality+assurance>
- <https://textilelearner.net/quality-assurance-in-garment-industry/>

YouTube simulation videos, etc.

Skill Development Activities Suggested:**Course outcome (Course Skill Set)**

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Explain the importance and necessity of modern textile testing of fibres, yarns and fabrics	L2
CO2	Test and analyze of low stress mechanical properties of fabrics and its effects on comfort properties and its application in apparel production	L3
CO3	Demonstrate the principle and working of modern textile testing instruments	L2
CO4	Evaluate and demonstrate the determination of apparel quality and the parameters involved	L5
CO5	Discuss various quality control programs, tools for quality control and TQM concepts.	L3

ADVANCED TECHNICAL TEXTILES			
Course Code	MTX104	CIE Marks	50
Teaching Hours/Week (L:P: SDA)	2:0:2	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	03
Course Learning objectives:			
<ul style="list-style-type: none"> • To strengthen the understanding of technical textiles with the knowledge of latest textile materials used for technical textile applications. • To understand and analyse the performance of technical textile products with respect to various functional performance requirements. • To develop deep understanding for design and concepts to develop different technical textile products for various textile industrial applications. 			
Module-1			
Global Technical Textiles: Present scenario and future prospects with respect to India. Classification of technical textiles. Requirements of fibres, yarns and fabrics for technical textiles. High performance fibres. Study of properties of various fibres used for technical textiles.			
Module-2			
Textile Reinforced Composites			
Introduction to textile reinforced composites. Role of textile reinforcement, matrix and interface in composite materials. Classification, Structure and properties of the various textile reinforcements used for composite material preparation. Classification of resins; thermoset, thermoplastic and their properties. Testing of textile reinforced composites – density, fibre volume fraction, void content, tensile, bending and compression behaviour. Failure mechanism in textile composites.			
Module-3			
Technical Textile Sectors			
Introduction to different application sectors of technical textiles: Agro-Tech, Build-tech, Geo-textiles, Home-Textiles, Indu-tech, Automobile Textiles, Pack-Tech, Sports-Tech & Mobil-tech. Structure and properties of the fibres, yarns and fabrics used for different application sectors of technical textiles. Functional requirements of technical textile products in different application sectors and their testing.			
Module-4			
Protective Textiles, Defence Textiles, Medical Textiles and Biomaterials Functional requirements of technical textile products in ballistic protection, chemical protection, thermal protection and defence sectors and their testing. Medical textile product classification and functional properties required. Biomaterials: Introduction, classification, applications and testing of implantable, non-implantable, extra corporal devices			
Module-5			
Nanotextiles, Smart Textiles and Wearable Electronics			
Introduction to nanotechnology. Application of nanotechnology in textiles. Assessment of nanotextiles for physical and performance properties. Introduction & Classification of smart materials. Piezo-polymers, Magneto-strictive Materials, Electroactive Polymers, Shape Memory materials and Intelligent textiles based on smart materials. Integration of electronics in textiles and classification of Wearable electronic products. Working principle of different classes of sensors, wearable devices and systems.			

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks** **CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.**

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module

Suggested Learning Resources:**Books**

1. Hand book of Technical Textiles- Ed. A.R.Horrocks, S.C, Anand. Wood Head Pub., England, 2000.
2. Hand book of Industrial Textiles- Ed S.Adanur, Technomic Pub., Lancaster-Basel, 1995.
3. High Performance Fibres J.W.S. Hearle Woodhead UK 2005.
4. Smart Fibres- Fabris, & Clothig-Ed. Xiaoming Toa, Wood Head, England, 2001.
Design of Textiles For Industrial- Applications, ED P.W. Harrison, Pub Textile Institute 1977 Manchester.

Web links and Video Lectures (e-Resources):

https://onlinecourses.nptel.ac.in/noc21_te09/preview

Skill Development Activities Suggested:

Each student given assignment to present case study on different technical textile products in different application sectors

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

Sl. No.	Description	Blooms Level
CO1	Demonstrate technical textiles with the knowledge of latest textile materials used for textile industrial applications.	L2
CO2	Describe fibre reinforced composite and test fibre reinforced composites	L2
CO3	Conceptualize different technical textile products for various textile industrial applications.	L3
CO4	Explain protective and medical textiles	L2
CO5	Illustrate nano and smart textiles.	L2

YARN ENGINEERING			
Course Code	MTX105	CIE Marks	50
Teaching Hours/Week (L:P: SDA)	3:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03
<p>Course Learning objectives: This Course aims at updating knowledge of students in fields of</p> <ul style="list-style-type: none"> • Practical concepts involved in designing of Yarns • Application of yarn in various areas 			
Module-1			
Importance of Yarns: Designing yarns for specific end-uses. Selection of fibre /filament, structure of Fiber / filament, spun yarns, multifilament yarns, textured yarns and micro denier multifilament. Yarn diameter derivation of Pierce, Grasberg and Dickson formulae. Functional properties of end products.			
Module-2			
Yarn Structure and yarn Regularity: Geometrical properties of single and folded yarns. Derivations of related equations. Open & hexagonal packing and their merits and demerits. Twist contraction and			
Module-3			
Twist migration and segment length in spun and filament yarns -Theoretical analysis of yarn Irregularity blend irregularity. Transfer of Force: Transmission of force from fiber to fiber in spun yarns - mechanism of yarn breakage			
Module-4			
Relationship: Effect of fibre properties and their geometrical configuration on tensile properties of yarns. Concept of elongation			
Module-5			
Blends: Effect of properties of constituent fibers and their composition on the behavior of blended Yarns.			
<p>Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. Minimum passing marks in SEE is 40% of the maximum marks of SEE. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.</p>			

Continuous Internal Evaluation:

1. Two Unit Tests each of **25 Marks**
2. Two assignments each of **25 Marks** or **one Skill Development Activity of 50 marks** to attain the COs and POs

The sum of three tests, two assignments/skill Development Activities, will be **scaled down to 50 marks**
CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

1. The SEE question paper will be set for 100 marks and the marks scored will be proportionately reduced to 50.
2. The question paper will have ten full questions carrying equal marks.
3. Each full question is for 20 marks. There will be two full questions (with a maximum of four sub-questions) from each module.
4. Each full question will have a sub-question covering all the topics under a module.
5. The students will have to answer five full questions, selecting one full question from each module
- 6.

Suggested Learning Resources:**Books**

1. Textile yarns-B. C. Goswamy, J. G. Martindale, WileyInter science
2. Structural mechanics of fibres, yarns and fabrics,J. W. S. Hearle, PGrosberg, S.Backer, WileyInterscience.
3. Spun yarn technology–Oxtoby, Butter Worth.
Technology of short staple spinning–Vol I, II, III, W. Klein, Textile Institute.

Web links and Video Lectures (e-Resources):

- NPTEL courses on Theory of yarn structure, yarn manufacture -2
<http://nitttrc.edu.in/nptel/courses/video/116102051/L01.html>

Skill Development Activities Suggested: Exposure of students to spinning industry to study the yarn formation in depth and analysis of different types of yarn for their structure and properties.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

Sl. No.	Description	Blooms Level
CO1	Illustrate the method of Designing of Yarns	L1
CO2	Determine the Packing Coefficient I and air space in Yarn	L3
CO3	Explain the Migration of Fibres in to the core of Yarn	L2
CO4	Describe the Geometrical and Tensile Properties of Yarn	L2
CO5	Explain the Blend Composition in Blends of different fibres	L2

Advanced Textile Testing Lab			
Course Code	MTXL106	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:4:0	SEE Marks	50
Credits	02	Exam Hours	03
Course objectives:			
<ul style="list-style-type: none"> • Explain the importance of HVI and AFIS in fibre and yarn testing • Demonstrate methods, standards, principles and working of KES and FAST systems used for testing of fabrics. • Explain influence of chemical and mechanical finishes on fabric handle. • Demonstrate various in-process inspection of fabrics and garments • Demonstrate various fabrics and garment testing equipment's and apparel care labelling standards • Explain the use of modern quality control and quality management programmes in the textile industry 			
Sl.No.	Experiments		
1	Collection and analysis of HVI test result sheets.		
2	Collection and analysis of AFIS test result sheets.		
3	Collection and analysis of KESF test result sheets.		
4	Collection and analysis of FAST test result sheets.		
5	Collection and analysis of Uster test result sheets.		
6	Collection and analysis of Uster spectrograph result sheets.		
7	Collection of Uster standards for fibres and yarns		
8	Collection and analysis of fusible interlinings		
Demonstration Experiments			
9	Collection and analysis on 7 basic quality tools for process improvement		
Course outcomes (Course Skill Set):			
At the end of the course the student will be able to:			
<ul style="list-style-type: none"> • Explain the importance and necessity of modern textile testing of fibres, yarns and fabrics • Test and analyze of low stress mechanical properties of fabrics and its effects on comfort properties and its application in apparel production • Demonstrate the principle and working of modern textile testing instruments • Evaluate and demonstrate the determination of apparel quality and the parameters involved • Discuss various quality control programs, tools for quality control and TQM concepts. 			

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks. A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. The student has to secure not less than 40% of maximum marks in the semester-end examination (SEE). In total of CIE and SEE student has to secure 50% maximum marks of the course.

Continuous Internal Evaluation (CIE):

CIE marks for the practical course is **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment to be evaluated for conduction with observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments designed by the faculty who is handling the laboratory session and is made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to 30 marks (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct 02 tests for 100 marks, the first test shall be conducted after the 8th week of the semester and the second test shall be conducted after the 14th week of the semester.
- In each test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The average of 02 tests is scaled down to **20 marks** (40% of the maximum marks).

The Sum of **scaled-down** marks scored in the report write-up/journal and average marks of two tests is the total CIE marks scored by the student.

Semester End Evaluation (SEE):

SEE marks for the practical course is 50 Marks.

SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the University.

All laboratory experiments are to be included for practical examination.

(Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.

Students can pick one question (experiment) from the questions lot prepared by the internal /external examiners jointly.

Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.

General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on

course type, rubrics shall be decided by the examiners)

Change of experiment is allowed only once and 10% Marks allotted to the procedure part to be made zero.

The duration of SEE is 03 hours

Suggested Learning Resources:

- NPTEL course and lecture series: <https://nptel.ac.in/courses/>
- Apparel quality assurance and control:
<https://textilelearner.net/?s=Apparel+quality+assurance>
- U Tube simulation videos, etc.
- Students can collect fibre, yarn, fabric and garment test data's from testing, R & D centers, textile and apparel industry and studying the same.
- Seminars, quizzes, group discussions and report writing on modern textile testing concepts.
- Practical exposure to testing of structure and related properties of fibres, yarns and fabrics



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