JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech. in TEXTILE ENGINEERING
COURSE STRUCTURE, I & II YEAR SYLLABUS (R22 Regulations)

Applicable from AY 2022-23 Batch

I YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.		Matrices and Calculus	3	1	0	4
2.		Applied Physics	3	1	0	4
3.		C Programming and Data Structures	3	0	0	3
4.		Engineering Workshop	0	1	3	2.5
5.		English for Skill Enhancement	2	0	0	2
6.		Elements of Mechanical Engineering	0	0	2	1
7.		Applied Physics Laboratory	0	0	3	1.5
8.		English Language and Communication Skills Laboratory	0	0	2	1
9.		C Programming and Data Structures Laboratory	0	0	2	1
10.		Environmental Science	3	0	0	0
11.		Induction Programme				
		Total	**14**	**3**	**12**	**20**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1.		Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.		Engineering Chemistry	3	1	0	4
3.		Computer Aided Engineering Graphics	1	0	4	3
4.		Engineering Mechanics	3	0	0	3
5.		Engineering Materials	2	0	0	2
6.		Python Programming Laboratory	0	1	2	2
7.		Engineering Chemistry Laboratory	0	0	2	1
8.		Fuels & Lubricants Laboratory	0	0	2	1
		Total	**12**	**3**	**10**	**20**

II YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Probability, Statistics & Complex Variables	3	1	0	4
2		General Textile Technology	3	0	0	3
3		Yarn Manufacture - I	3	0	0	3
4		Fabric Manufacture - I	3	1	0	4
5		Textile Testing - I	3	0	0	3
6		Yarn Manufacture - I Lab	0	0	2	1
7		Fabric Manufacture – I Lab	0	0	2	1
8		Textile Testing – I Lab	0	0	2	1
9		Constitution of India	3	0	0	0
		Total Credits	**18**	**2**	**6**	**20**

II YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Basic Electrical and Electronics Engineering	3	0	0	3
2		Yarn Manufacture - II	3	0	0	3
3		Technology of Knits & Nonwoven	3	0	0	3
4		Textile Testing - II	3	0	0	3
5		Man Made Fibre Technology	3	0	0	3
6		Basic Electrical and Electronics Engineering Lab	0	0	2	1
7		Yarn Manufacture – II Lab	0	0	2	1
8		Textile Testing – II Lab	0	0	2	1
9		Real Time Research Project	0	0	4	2
10		Gender Sensitization Lab	0	0	2	0
		Total Credits	**15**	**0**	**12**	**20**

III YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Fabric Structure & Design	3	1	0	4
2		Textile Wet Processing	3	0	0	3
3		Fabric Manufacture - II	3	1	0	4
4		Business Economics and Financial Analysis	3	0	0	3
5		Apparel Production Technology	3	0	0	3
6		Fabric Structure & Design Lab	0	0	2	1
7		Textile Wet Processing Lab	0	0	2	1
8		Fabric Manufacture – II Lab	0	0	2	1
9		Intellectual Property Rights	3	0	0	0
		Total Credits	**18**	**2**	**6**	**20**

III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1		Apparel Pattern Design	3	0	0	3
2		Printing & Finishing of Textiles	3	0	0	3
3		Apparel Quality Control and Merchandizing	3	0	0	3
4		Professional Elective - I	3	0	0	3
5		Open Elective - I	3	0	0	3
6		Apparel Technology Lab	0	0	2	1
7		Printing & Finishing Lab	0	0	2	1
8		Advanced Communication Skills lab	0	0	2	1
9		Industrial Oriented Mini Project/ Summer Internship	0	0	0	2
10		Environmental Science	3	0	0	0
		Total Credits	**18**	**0**	**6**	**20**

Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.

IV YEAR I SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Industrial Engineering for Textile & Apparel	3	1	0	4
2		Professional Elective – II	3	0	0	3
3		Professional Elective – III	3	0	0	3
4		Professional Elective - IV	3	0	0	3
5		Apparel Pattern Design Lab	0	0	2	1
6		Open Elective - II	3	0	0	3
8		Project Stage - I	0	0	6	3
		Total Credits	**15**	**1**	**8**	**20**

IV YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1		Professional Elective – V	3	0	0	3
2		Professional Elective - VI	3	0	0	3
3		Open Elective - III	3	0	0	3
4		Project Stage – II including seminar	0	0	22	9+2
		Total Credits	**9**	**0**	**22**	**20**

***MC – Satisfactory/Unsatisfactory**

Note: Industrial Oriented Mini Project/ Summer Internship is to be carried out during the summer vacation between 6th and 7th semesters. Students should submit report of Industrial Oriented Mini Project/ Summer Internship for evaluation.

Professional Elective - I

	Advanced Textile Manufacture
	Specialty Yarns
	Quantitative Techniques for Textile & Apparel

Professional Elective - II

	Specialty Fabrics
	Millennium Fibres
	High Performance Fibres

Professional Elective - III

	Advances in Textile wet Processing
	Apparel Product Development
	Process and Quality Control in Textiles

Professional Elective -IV

	Sports and Automotive Textiles
	Protective Garments
	Medical Textiles

Professional Elective -V

	Compliance Standards for Apparel Industry
	Technology of Denim Production
	Advances in Textile Production

Professional Elective -VI

	Sourcing and Supply Chain Management for Textile and Apparel
	Production and Properties of Sewing threads
	Coated Textiles

List of Open Electives

III Yr II Sem Open Elective (OE – I)	**IV Yr I Sem Open Elective (OE – II)**	**IV Yr II Sem Open Elective (OE – III)**
1. Statistical Analysis and Design of Experiments 2. Safety & Hazard Analysis 3. Exim Management for Apparel	1. Six Sigma and Lean for Process Industries 2. Handloom and Traditional Textiles 3. Plasma Technology for Textiles	1. Industrial Climatology and Relations 2. Retailing and Branding 3. Visual Merchandizing

MATRICES AND CALCULUS

B.Tech. I Year I Sem.

L	T	P	C
3	1	0	4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.
- Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigenvalues and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.
- Evaluate the multiple integrals and apply the concept to find areas, volumes

UNIT-I: Matrices **10 L**

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors **10 L**

Linear Transformation and Orthogonal Transformation: Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Calculus **10 L**

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series.

Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications) **10 L**

Definitions of Limit and continuity.

Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence & independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration) **8 L**

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Editon, 2016.

REFERENCE BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition,Pearson, Reprint, 2002.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
4. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.

APPLIED PHYSICS

B.Tech. I Year I Sem.

L	T	P	C
3	1	0	4

Pre-requisites: 10 + 2 Physics

Course Objectives: The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

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

1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nanomaterials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wein's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect - Davisson and Germer experiment –Heisenberg uncertainty principle - Born interpretation of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.

Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Sommerfeld) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT)–LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and pyroelectric materials – applications – liquid crystal displays (LCD) and crystal oscillators.

Magnetic Materials: Hysteresis - soft and hard magnetic materials - magnetostriction, magnetoresistance - applications - bubble memory devices, magnetic field sensors and multiferroics.

Energy Materials: Conductivity of liquid and solid electrolytes- superionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: NANOTECHNOLOGY

Nanoscale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods – top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD) - characterization techniques - XRD, SEM &TEM - applications of nanomaterials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes-Einstein coefficients and their relations-lasing action - pumping methods- ruby laser, He-Ne laser , CO_2 laser, Argon ion Laser, Nd:YAG laser-semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection-construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers-

losses in optical fiber - optical fiber for communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4thEdition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2ndEdition,2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group Energy Materials Taylor & Francis Group, 1st Edition, 2022.

C PROGRAMMING AND DATA STRUCTURES

B.Tech. I Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives: Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

Course Outcomes:

1. Understand the various steps in Program development.
2. Explore the basic concepts in C Programming Language.
3. Develop modular and readable C Programs
4. Understand the basic concepts such as Abstract Data Types, Linear and Non-Linear Data structures.
5. Apply data structures such as stacks, queues in problem solving
6. To understand and analyze various searching and sorting algorithms.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Software Development

Introduction to C Language – Background, Simple C programs, Identifiers, Basic data types, Variables, Constants, Input / Output

Structure of a C Program – Operators, Bit-wise operators, Expressions, Precedence and Associatively, Expression Evaluation, Type conversions, Statements.

UNIT - II

Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, go to, Recursion.

Designing Structured Programs- Functions, basics, user defined functions, inter function communication, standard functions.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays.

UNIT - III

Pointers – Introduction, Pointers for inter function communication, pointers to pointers, compatibility,

Pointer Applications – Passing an array to a function, Memory allocation functions, array of pointers

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion.

UNIT - IV

Derived types – The Typedef, enumerated types, Structures – Declaration, definition and initialization of structures, accessing structures, operations on structures, complex structures. Unions – Referencing unions, initializers, unions and structures.

Input and Output – Text vs Binary streams, standard library functions for files, converting file types, File programs – copy, merge files.

UNIT – V

Sorting- selection sort, bubble sort, insertion sort,

Searching-linear and binary search methods.

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, Pearson Education.

3. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education

REFERENCE BOOKS:

1. C & Data structures – P. Padmanabham, 3rd Edition, B.S. Publications.
2. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press
3 Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
4. C for Engineers and Scientists, H. Cheng, McGraw-Hill International Edition
5. Data Structures using C – A. M. Tanenbaum, Y. Langsam, and M.J. Augenstein, Pearson Education / PHI
6. C Programming & Data Structures, E. Balagurusamy, TMH.
7. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
8. C & Data structures – E V Prasad and N B Venkateswarlu, S. Chand & Co.

ENGINEERING WORKSHOP

B.Tech. I Year I Sem.

L	T	P	C
0	1	3	2.5

Pre-requisites: Practical skill

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
V. Welding Practice – (Arc Welding & Gas Welding)
VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K.L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

ENGLISH FOR SKILL ENHANCEMENT

B.Tech. I Year I Sem. **L T P C**
2 0 0 2

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using the theoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and written communication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports in various contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '***Toasted English*' by R.K.Narayan** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture" published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English
Grammar: Redundancies and Clichés in Oral and Written Communication.
Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice
Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage
Grammar: Common Errors in English (*Covering all the other aspects of grammar which were not covered in the previous units*)
Reading: Reading Comprehension-Exercises for Practice
Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: *Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum are covered in the syllabus of ELCS Lab Course.*

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended,*** besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

- **Note**: **2**.Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents .They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language, Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for Engineering Students. Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edition.

ELEMENTS OF MECHANICAL ENGINEERING

B.Tech. I Year I Sem.

L	T	P	C
0	0	2	1

Course Objectives: The objectives of this course are to

1. Make the student to experimentally measure the common geometric properties like length, diameter, flatness, curvature, volume and moment of inertia etc.
2. Give a practical knowledge to evaluate the friction between surfaces and also to evaluate the natural frequency of the system.
3. Correlate between theory and experimental results, directly observe the proof of principles and theories through practical knowledge
4. Introduce students to the basic concepts of manufacturing through the demonstration of various processes.
5. Understand the commonly used mechanical components like gear box, working of boilers and IC engine etc.

Course Outcomes: At the end of the course, students will be able to:

1. CO 1: Understand the operation, usage and applications of different measuring instruments and tools.
2. CO 2: Examine the different characteristics of instruments like accuracy, precision etc
3. CO 3: Prepare simple composite components and joining different materials using soldering process.
4. CO 4: Identify tools & learn practically the process of turning, milling, grinding on mild steel pieces.
5. CO 5: Understand the basic components of IC engine, Gear box and boiler

List of Experiments to be performed:

1. Measurement of length, height, diameter by vernier calipers.
2. To measure diameter of a given wire and sphere, thickness of a given sheet and volume of an irregular lamina using micrometer screw gauge.
3. Use of straight edge and sprit level in finding the flatness of surface plate.
4. Determination of time period and natural frequency of simple pendulum.
5. Determination of time period and natural frequency of compound pendulum.
6. To measure the coefficients of static and kinetic friction between a block and a plane using various combination of materials.
7. To determine the radius of curvature of a given spherical surface.
8. The experimental determination of the Moment of Inertia of regular and irregular solids.
9. Metal joining process–soldering of metal alloys to any PCB board
10. A simple composite geometry preparation by hand layup method.
11. Grouping of Dry cells for a specified voltage and current and its measurement using ammeters and voltmeters etc.
12. Demonstration of lathe, milling, drilling, grinding machine operations.
13. Study of transmission system –gear box
14. Assembly /disassembly of Engines
15. Study of Boilers

Note: Perform any 10 out of the 15 Exercises.

APPLIED PHYSICS LABORATORY

B.Tech. I Year I Sem.

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photoelectric effect experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
   b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
    b) Determination of Acceptance Angle and Numerical Apertureof an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

Note: *Any 8 experiments are to be performed.*

REFERENCE BOOK:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LABORATORY

B.Tech. I Year I Sem.

L	T	P	C
0	0	2	1

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- ✓ To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- ✓ To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✓ To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- ✓ To improve the fluency of students in spoken English and neutralize the impact of dialects.
- ✓ To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to:

- ✓ Understand the nuances of English language through audio- visual experience and group activities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills:

Objectives

1. To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication Skills Lab**.

Exercise – I
CALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.
Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*
ICS Lab:
Understand: Spoken vs. Written language- Formal and Informal English.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II
CALL Lab:
Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern in sentences – Intonation.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress pattern in sentences – Intonation - *Testing Exercises*
ICS Lab:
Understand: Features of Good Conversation – Strategies for Effective Communication.
Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III
CALL Lab:
Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).
Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation -*Testing Exercises*
ICS Lab:
Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing
Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV
CALL Lab:
Understand: Listening for General Details.
Practice: Listening Comprehension Tests - *Testing Exercises*
ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication- Presentation Skills.
Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V
CALL Lab:
Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests -*Testing Exercises*
ICS Lab:
Understand: Group Discussion
Practice: Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:
The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.
System Requirement (Hardware component):
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

i) Computers with Suitable Configuration
ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3*. CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* Cengage Learning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* Cambridge University Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford University Press
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* Cambridge University Press

C PROGRAMMING AND DATA STRUCTURES LABORATORY

B.Tech. I Year I Sem.

L	T	P	C
0	0	2	1

Course Objectives: Introduce the importance of programming, C language constructs, program development, data structures, searching and sorting.

Course Outcomes:

1. Develop modular and readable C Programs
2. Solve problems using strings, functions
3. Handle data in files
4. Implement stacks, queues using arrays, linked lists.
5. To understand and analyze various searching and sorting algorithms.

List of Experiments:

1. Write a C program to find the sum of individual digits of a positive integer.
2. Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to find the roots of a quadratic equation.
5. Write a C program to find the factorial of a given integer.
6. Write a C program to find the GCD (greatest common divisor) of two given integers.
7. Write a C program to solve Towers of Hanoi problem.
8. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
9. Write a C program to find both the largest and smallest number in a list of integers.
10. Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices
    ii) Multiplication of Two Matrices
11. Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to a given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
12. Write a C program to determine if the given string is a palindrome or not
13. Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
14. Write a C program to count the lines, words and characters in a given text.
15. Write a C program to generate Pascal's triangle.
16. Write a C program to construct a pyramid of numbers.
17. Write a C program that uses functions to perform the following operations:
    i) Reading a complex number
    ii) Writing a complex number
    iii) Addition of two complex numbers
    iv) Multiplication of two complex numbers
    (Note: represent complex number using a structure.)
18.
    i. Write a C program which copies one file to another.
    ii. Write a C program to reverse the first n characters in a file.
    (Note: The file name and n are specified on the command line.)
19.
    i. Write a C program to display the contents of a file.

ii. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

20. Write a C program that uses functions to perform the following operations on singly linked list.:
    i) Creation ii) Insertion iii) Deletion iv) Traversal

21. Write C programs that implement stack (its operations) using
    i) Arrays ii) Pointers

22. Write C programs that implement Queue (its operations) using
    i) Arrays ii) Pointers

23. Write a C program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sortiii)Insertion sort

24. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers:
    i) Linear search ii) Binary search

TEXT BOOKS:

1. C Programming & Data Structures, B.A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2. Let us C, Yeswanth Kanitkar
3. C Programming, Balaguruswamy.

ENVIRONMENTAL SCIENCE

B.Tech. I Year I Sem.

L	T	P	C
3	0	0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.
Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

ORDINARY DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

B.Tech. I Year II Sem.

L	T	P	C
3	1	0	4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn
- Methods of solving the differential equations of first and higher order.
- Concept, properties of Laplace transforms
- Solving ordinary differential equations using Laplace transforms techniques.
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course outcomes: After learning the contents of this paper the student must be able to
- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems.
- Use the Laplace transforms techniques for solving ODE's.
- Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order ODE **8 L**

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order **10 L**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type $e^{ax}, \sin ax, \cos ax,$ polynomials in x, $e^{ax}V(x)$ and $x\,V(x)$, method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation. Applications: Electric Circuits

UNIT-III: Laplace transforms **10 L**

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation **10 L**

Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Tangent plane and normal line, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration **10 L**

Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

ENGINEERING CHEMISTRY

B.Tech. I Year II Sem.

L	T	P	C
3	1	0	4

Course Objectives:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: Water and its treatment: [8]

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation - Determination of F^- ion by ion- selective electrode method.

Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT – II Battery Chemistry & Corrosion [8]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.

UNIT - III: Polymeric materials: [8]

Definition – Classification of polymers with examples – Types of polymerization –
addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP).

Rubbers: Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources: [8]

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and

its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

UNIT - V: **Engineering Materials: [8]**
Cement: Portland cement, its composition, setting and hardening.
Smart materials and their engineering applications
Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinyl amides
Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:
1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:
1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

COMPUTER AIDED ENGINEERING GRAPHICS

B.Tech. I Year II Sem.

L	T	P	C
1	0	4	3

Course Objectives:

- To develop the ability of visualization of different objects through technical drawings
- To acquire computer drafting skill for communication of concepts, ideas in the design of engineering products

Course Outcomes: At the end of the course, the student will be able to:

- Apply computer aided drafting tools to create 2D and 3D objects
- sketch conics and different types of solids
- Appreciate the need of Sectional views of solids and Development of surfaces of solids
- Read and interpret engineering drawings
- Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting

UNIT – I:

Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance, Scales – Plain & Diagonal, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Introduction to Computer aided drafting – views, commands and conics

UNIT- II:

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures. Auxiliary Planes. Computer aided orthographic projections – points, lines and planes

UNIT – III:

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views, Computer aided projections of solids – sectional views

UNIT – IV:

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Development of surfaces using computer aided drafting

UNIT – V:

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa –Conventions. Conversion of orthographic projection into isometric view using computer aided drafting.

TEXT BOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S. Chand and company Ltd.

REFERENCE BOOKS:

1. Engineering Drawing, Basant Agrawal and C M Agrawal, Third Edition McGraw Hill
2. Engineering Graphics and Design, WILEY, Edition 2020
3. Engineering Drawing, M. B. Shah, B.C. Rane / Pearson.
4. Engineering Drawing, N. S. Parthasarathy and Vela Murali, Oxford
5. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

Note: - External examination is conducted in conventional mode and internal evaluation to be done by both conventional as well as using computer aided drafting.

ENGINEERING MECHANICS

B.Tech. I Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The objectives of this course are to

- Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium
- Perform analysis of bodies lying on rough surfaces.
- Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections
- Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
- Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations

Course Outcomes: At the end of the course, students will be able to

- CO 1: Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
- CO 2: Solve problem of bodies subjected to friction.
- CO 3: Find the location of centroid and calculate moment of inertia of a given section.
- CO 4: Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
- CO 5: Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

UNIT - I:
Introduction to Engineering Mechanics - Force Systems: Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy

UNIT - II:
Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack;
Centroid and Centre of Gravity -Centroid of Lines, Areas and Volumes from first principle, centroid of composite sections; Centre of Gravity and its implications. – Theorem of Pappus

UNIT - III:
Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem
Mass Moment of Inertia: Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.

UNIT - IV:
Review of particle dynamics- Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT - V:
Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D' Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation

TEXT BOOKS:

1. Shames and Rao (2006), Engineering Mechanics, Pearson Education
2. Reddy Vijay Kumar K. and J. Suresh Kumar (2010), Singer's Engineering Mechanics – Statics & Dynamics

REFERENCE BOOKS:

1. Beer F.P & Johnston E.R Jr., Vector Mechanics for Engineers – Statics and Dynamics, Mc Graw Hill, 12th Edition.
2. Dumir P.C, Sengupta, Srinivas, Engineering Mechanics- Universities Press, 2020.
3. Hibbeler R.C, Engineering Mechanics, Pearson, 14th Edition.
4. Arshad Noor, Zahid & Goel, Engineering Mechanics, Cambridge University Press, 2018.
5. Khurmi R.S, Khurmi N., Engineering Mechanics, S. Chand, 2020.
6. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press

ENGINEERING MATERIALS

B.Tech. I Year II Sem.

L	T	P	C
2	0	0	2

Course Objectives: The objectives of this course are to

1. Provide basic understanding of engineering materials, their structure, classification and usage.
2. Introduce the testing methods for various material properties and ASTM standards used in testing.
3. Understand the various materials used in mechanical engineering like metals, ceramics, polymers, composite materials and other new materials.

COURSE OUTCOMES: At the end of the course, students will be able to**:**

1. Classify the various materials that will be essential for the mechanical engineering applications.
2. Express the mechanical properties of metals and their testing procedures.
3. Understand the application of materials and their processing
4. Understand the requirement and need for the development of the new materials.

UNIT-I:

Classification of Engineering Materials, Ashby chart, Mechanical Properties of Metals and their testing equipment/procedures, ASTM standards for testing, Stress–Strain Behavior of various materials, Sources of Material Data

UNIT –II:

Metals and Metal Alloys, Classification of Metal Alloys, Classification, composition, properties and usage of Ferrous alloys, steel, HSS, grey cast iron, white cast iron; Classification, composition, properties and usage of Non-ferrous materials, Aluminum, Titanium, Zinc, Copper, Nickel, Cobalt and their alloys

UNIT –III:

Composites: Definitions, Reinforcements and matrices, Types of reinforcements, Types of matrices, Classification of composites, Properties of composites in comparison with standard materials
Manufacturing methods: Hand and spray lay - up, injection molding, resin injection, filament winding, pultrusion, centrifugal casting and prepregs.

UNIT – IV:

Ceramics, Classification of ceramic materials, Crystal Structure, Applications and Properties of Ceramics, Ceramic fabrication techniques, Carbon: Diamond and Graphite.
Polymer Structures, Chemistry of Polymer Molecules, Classification scheme of polymer molecules, Thermoplastic and Thermosetting Polymers, Characteristics, Applications, and Processing of Polymers, Elastomers.

UNIT – V:

Materials in nano technology: Semiconductor Nanomaterials (Zinc oxide nano materials, titanium dioxide nanoparticles, Metal nanoparticles, ceramic nano materials metal nano particles (Silver, gold, iron and copper), applications, bio materials and other recent materials

TEXT BOOKS:

1. George Murray, Charles V. White, Wolfgang Weise, “Introduction to Engineering Materials”, CRC Press, 2007.
2. William. D. Callister, David G. Rethwisch, “Materials Science and Engineering: An Introduction”, John Wiley & Sons, 2018.

REFERENCE BOOKS:

1. Myer Kutz, “Mechanical Engineers’ Handbook”, John Wiley & Sons, 2015.
2. M.A. Shah, K.A.Shah, Nano technology, the science of Small, WILEY, Second Edition, 2019.
3. E. Paul De Garmo, J.T. Black, R.A. Kohler. Materials and Processes in Manufacturing, John Wiley and Sons, Inc., NY, 11 th Edition, 2012.
4. R.J. Crawford, plastics engineering, Pergamon Presss, 2013.
5. Donald R Askland and Pradeep P Phule “Essentials of Materials Science and Engineering”, by Pradeep P. Fulay (Author), Donald R. Askeland, 2013.
6. K. K. Chawala, Cermic Matrix composite Materials, Kluwer Academic Publishers, 2002.

PYTHON PROGRAMMING LAB

B.Tech. I Year II Sem.

L	T	P	C
0	1	2	2

Course Objectives:

- To install and run the Python interpreter
- To learn control structures.
- To Understand Lists, Dictionaries in python
- To Handle Strings and Files in Python

Course Outcomes: After completion of the course, the student should be able to

- Develop the application specific codes using python.
- Understand Strings, Lists, Tuples and Dictionaries in Python
- Verify programs using modular approach, file I/O, Python standard library
- Implement Digital Systems using Python

Note: The lab experiments will be like the following experiment examples

Week -1:

1. i) Use a web browser to go to the Python website http://python.org. This page contains information about Python and links to Python-related pages, and it gives you the ability to search the Python documentation.
   ii) Start the Python interpreter and type help() to start the online help utility.
2. Start a Python interpreter and use it as a Calculator.
3.
   i) Write a program to calculate compound interest when principal, rate and number of periods are given.
   ii) Given coordinates (x1, y1), (x2, y2) find the distance between two points
4. Read name, address, email and phone number of a person through keyboard and print the details.

Week - 2:

1. Print the below triangle using for loop.
   5
   4 4
   3 3 3
   2 2 2 2
   1 1 1 1 1
2. Write a program to check whether the given input is digit or lowercase character or uppercase character or a special character (use 'if-else-if' ladder)
3. Python Program to Print the Fibonacci sequence using while loop
4. Python program to print all prime numbers in a given interval (use break)

Week - 3:

1. i) Write a program to convert a list and tuple into arrays.
   ii) Write a program to find common values between two arrays.
2. Write a function called gcd that takes parameters a and b and returns their greatest common divisor.
3. Write a function called palindrome that takes a string argument and returnsTrue if it is a palindrome and False otherwise. Remember that you can use the built-in function len to check the length of a string.

Week - 4:

1. Write a function called is_sorted that takes a list as a parameter and returns True if the list is sorted in ascending order and False otherwise.
2. Write a function called has_duplicates that takes a list and returns True if there is any element that appears more than once. It should not modify the original list.
   i). Write a function called remove_duplicates that takes a list and returns a new list with only the unique elements from the original. Hint: they don't have to be in the same order.
   ii). The wordlist I provided, words.txt, doesn't contain single letter words. So you might want to add "I", "a", and the empty string.
   iii). Write a python code to read dictionary values from the user. Construct a function to invert its content. i.e., keys should be values and values should be keys.

3. i) Add a comma between the characters. If the given word is 'Apple', it should become 'A,p,p,l,e'
   ii) Remove the given word in all the places in a string?
   iii) Write a function that takes a sentence as an input parameter and replaces the first letter of every word with the corresponding upper case letter and the rest of the letters in the word by corresponding letters in lower case without using a built-in function?
4. Writes a recursive function that generates all binary strings of n-bit length

Week - 5:

1. i) Write a python program that defines a matrix and prints
   ii) Write a python program to perform addition of two square matrices
   iii) Write a python program to perform multiplication of two square matrices
2. How do you make a module? Give an example of construction of a module using different geometrical shapes and operations on them as its functions.
3. Use the structure of exception handling all general purpose exceptions.

Week-6:

1. a. Write a function called draw_rectangle that takes a Canvas and a Rectangle as arguments and draws a representation of the Rectangle on the Canvas.
   b. Add an attribute named color to your Rectangle objects and modify draw_rectangle so that it uses the color attribute as the fill color.
   c. Write a function called draw_point that takes a Canvas and a Point as arguments and draws a representation of the Point on the Canvas.
   d. Define a new class called Circle with appropriate attributes and instantiate a few Circle objects. Write a function called draw_circle that draws circles on the canvas.
2. Write a Python program to demonstrate the usage of Method Resolution Order (MRO) in multiple levels of Inheritances.
3. Write a python code to read a phone number and email-id from the user and validate it for correctness.

Week- 7

1. Write a Python code to merge two given file contents into a third file.
2. Write a Python code to open a given file and construct a function to check for given words present in it and display on found.
3. Write a Python code to Read text from a text file, find the word with most number of occurrences
4. Write a function that reads a file *file1* and displays the number of words, number of vowels, blank spaces, lower case letters and uppercase letters.

Week - 8:

1. Import numpy, Plotpy and Scipy and explore their functionalities.
2. a) Install NumPy package with pip and explore it.
3. Write a program to implement Digital Logic Gates – AND, OR, NOT, EX-OR
4. Write a program to implement Half Adder, Full Adder, and Parallel Adder
5. Write a GUI program to create a window wizard having two text labels, two text fields and two buttons as Submit and Reset.

TEXT BOOKS:

1. Supercharged Python: Take your code to the next level, Overland
2. Learning Python, Mark Lutz, O'reilly

REFERENCE BOOKS:

1. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
2. Python Programming A Modular Approach with Graphics, Database, Mobile, and Web Applications, Sheetal Taneja, Naveen Kumar, Pearson
3. Programming with Python, A User's Book, Michael Dawson, Cengage Learning, India Edition
4. Think Python, Allen Downey, Green Tea Press
5. Core Python Programming, W. Chun, Pearson
6. Introduction to Python, Kenneth A. Lambert, Cengage

ENGINEERING CHEMISTRY LAB

B.Tech. I Year II Sem.

L	T	P	C
0	0	2	1

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

Course Outcomes: The experiments will make the student gain skills on:

- Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like bakelite and nylon-6.
- Estimations saponification value, surface tension and viscosity of lubricant oils.

List of Experiments:

I. Volumetric Analysis: Estimation of Hardness of water by EDTA Complexometry method.
II. Conductometry: Estimation of the concentration of an acid by Conductometry.
III. Potentiometry: Estimation of the amount of Fe^{+2} by Potentiomentry.
IV. pH Metry: Determination of an acid concentration using pH meter.
V. Preparations:

1. Preparation of Bakelite.
2. Preparation Nylon – 6.

VI. Lubricants:

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

VII. Corrosion: Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.
VIII. Virtual lab experiments

1. Construction of Fuel cell and its working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

FUELS AND LUBRICANTS LAB

B.Tech. I Year II Sem.

L	T	P	C
0	0	2	1

Prerequisite: Chemistry

Course Objectives: To Understand the fuel and lubricants properties.

Course Outcomes: At the end of the course, students will be able to

- Find the kinematic viscosity of lubricants and its variation with temperature
- Determine the flash point, fire point, cloud point and pour point of liquid fuels
- Determine the calorific value of solid, liquid and gaseous fuels
- Determination of the dropping point of lubricating grease
- Determination of distillation characteristics of petroleum products

List of Experiments:

1. Determination of Flash and Fire points of Liquid fuels/Lubricants using: Abels Apparatus
2. Determination of Flash and Fire points of Liquid fuels/Lubricants using: Pensky Martens Apparatus
3. Carbon residue test: Liquid fuels.
4. Determination of Viscosity of Liquid lubricants and Fuels using: Saybolt Viscometer
5. Determination of Viscosity of Liquid lubricants and Fuels using: Redwood Viscometer
6. Determination of Viscosity of Liquid lubricants and Fuels using: Engler Viscometer
7. Determination of Calorific value: of Gaseous fuels using: Junkers Gas Calorimeter.
8. Determination of Calorific value: Solid/Liquid/ fuels using: Bomb Calorimeter.
9. Drop point and Penetration Apparatus for Grease.
10. ASTM Distillation Test Apparatus.
11. Cloud and Pour Point Apparatus.

PROBABILITY, STATISTICS & COMPLEX VARIABLES

B.Tech. II Year I Sem.

L	T	P	C
3	1	0	4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

- The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- The statistical methods of studying data samples.
- Differentiation and integration of complex valued functions.
- Evaluation of integrals using Cauchy's integral formula and Cauchy's residue theorem.
- Expansion of complex functions using Taylor's and Laurent's series.

Course outcomes: After learning the contents of this paper the student must be able to

- Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
- Apply concept of estimation and testing of hypothesis to case studies.
- Analyze the complex function with reference to their analyticity, integration using Cauchy's integral and residue theorems.
- Taylor's and Laurent's series expansions of complex function.

UNIT-I: Basic Probability **8 L**

Probability spaces, conditional probability, independent events, and Baye's theorem.
Random variables: Discrete and continuous random variables, Expectation of Random Variables, Variance of random variables

UNIT-II: Probability distributions **10 L**

Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution, Continuous random variables and their properties, distribution functions and density functions,
Normal and exponential, evaluation of statistical parameters for these distributions

UNIT-III: Estimation & Tests of Hypotheses **10 L**

Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Estimating a Proportion for single sample, Difference between Two Means, difference between two proportions for two Samples.
Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT-IV: Complex Differentiation **10 L**

Limit, Continuity and Differentiation of Complex functions, Analyticity, Cauchy-Riemann equations (without proof), finding harmonic conjugate, elementary analytic functions (exponential, trigonometric, logarithm) and their properties, Conformal mappings, Mobius transformations.

UNIT-V: Complex Integration **10 L**

Line integral, Cauchy's theorem, Cauchy's Integral formula, Zeros of analytic functions, Singularities, Taylor's series, Laurent's series, Residues, Cauchy Residue theorem (All theorems without Proof).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.

2. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications.

REFERENCE BOOKS:

1. Fundamentals of Mathematical Statistics, Khanna Publications, S. C. Guptha and V. K. Kapoor.
2. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.
3. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
4. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Edition, Mc-Graw Hill, 2004.

GENERAL TEXTILE TECHNOLOGY

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives

1. To learn about the classification and properties of fibres
2. To understand the properties of Cotton and Jute
3. To understand the properties of Wool
4. To learn about Silk and Silk Technology
5. To understand the properties of Wool
6. To Identify different fibres and learn about unconventional fibres

UNIT - I.

Introduction to textiles – textile elements defined. - textile institute's classification of textile fibers – Introduction to count systems – conversion within and between different count systems - physical and chemical properties of textile fibers.

UNIT - II.

A brief note on classification of yarns: spun yarn, balanced yarn, filament yarn, simple yarn, novelty yarn – stretch yarn and textured yarn

Cotton: A brief note on different varieties of cotton – morphology and properties of cotton – conversion of cotton fibre to fabric. A Brief note on Organic, GM or Bt, Never Dried Cotton.

UNIT - III.

Bast fibres: JUTE-Retting methods, Properties of Jute, stages in conversion of fibre to fabric-A Brief note on Linen, Hemp, Sisal

Wool: Brief note on types of wool – Morphology and properties of wool – Brief study on friction properties of wool, heat of wetting, warmth of wool – conversion of wool fibre to woolen and worsted yarns

UNIT - IV.

A brief note on different varieties of silk – Life cycle of silk worm – Introduction to rearing of silk, cocoon sorting, stifling, cooking and drying, brushing, reeling, degumming and weighting – Morphology and properties of silk – A brief study on types of silk fabrics – Flow sheet of the manufacture of spun silk.

UNIT - V.

Identification of Textile Fibres: By Microscopic Examination, Physical and Chemical Means-Comparison of Cotton, Wool, Silk, Linen and Jute for common properties

Introduction to Unconventional Natural fibres: fibers from bacteria, deodorant fiber, fiber from Spider silk, Alginate, Paper/bamboo, Starch Banana fibre, Maize fibre, Coir fibre,

Course Outcomes: (Graduates have an ability)

1. To apply the knowledge of count of fibres or yarns.
2. To Identify Cotton and other fibres
3. To analyse the fibre properties for yarn formation process.
4. To understand about the conversion of fibre to fabric
5. To evaluate the quality of Silk and its types
6. To design the specific end use in relation to fibre structure and properties

TEXT BOOKS:

1. Textile Fibers – Dr. H.V. Sreenivasa Murthy, Woodhead Publishers, New Delhi, 2017
2. Fibre Science & Technology – S.P.Mishra, New Age India International Ltd. New Delhi (2015).
3. Textile Fibres – V.A Shenai, , Sevak Publication, Bombay., 2012

REFERENCE BOOKS:

1. Textile Fiber to fabric – Bernard P. Corbmann, Mc Graw-Hill International Education
2. Textile Fibres – Gorden Cook, CRC Publications, 2017
3. Textile Science – Gohl and Vilensky, Sara Publication House, New Delhi, 2014

YARN MANUFACTURE – I

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To learn about the contamination in cotton
2. To learn about the working of openers and cleaners
3. To learn about the working of Carding
4. To learn about the role of drafts in scutcher and Card
5. To learn about the quality aspects

UNIT - I.

Introduction: Selection of cotton – parameters governing the selection. Ginning: Objectives and working principles of Knife Roller, Saw GIN, Macarthy Gin., Contamination of Cotton, Preventive Measures. -Introduction to Mixing and blending: Mixing objectives and methods, working principle of Modern Equipments, Brief note on Bale management, Preparations of mixing for cotton and blends, Blending: Objectives and methods of Blending, working of Blendomat.

UNIT - II.

Introduction to opening and cleaning: Principles of opening and cleaning machines for Processing Cotton – working principle of Modern Bale opener – Elements and their functions – Working principle of step cleaner and Mono cylinder.

UNIT – III.

Working principle of ERM & AIRJET cleaners. -Rieter's and Trutzschller's scutcher: Elements and their functions – Production calculations – Introduction to chute feeding. -A brief note on Selection of Blow Room lines - Accessories in blow room – Latest developments in Blow room. –Quality Control Aspects in Blow Room

UNIT - IV.

Introduction to carding: Objectives, regions, Principles of carding, Conventional card and role of each element, Stripping and grinding, Card clothing, Card setting.

UNIT – V.

A brief note on Card Coiler mechanisms – High production cards – Tandem card – Auto leveling in card – Latest Developments in carding – Production calculations. - Quality Control Aspects in Carding.

COURSE OUTCOME: (Graduate to have)

1. An ability to plan for bale to bale management
2. An ability to select the machinery based on the fibre and its properties
3. An ability to select the process parameters for processing the different
4. An ability to evaluate the Cleaning efficiency
5. An ability to estimate the waste extraction at each machine
6. An ability to assess the end product quality at Blow room and Card.

TEXT BOOKS:

1. Spun Yarn Technology Vol. I & II – Venkata Subramani Mahajan Book Publishers, Ahmedabad, 2007
2. Short staple spinning process – Opening and Carding – W.Klein, The Textile Institute, Manchester 2007

REFERENCE BOOKS:

1. Essential facts of practical cotton spinning – T.K.Pattabhiraman, Mahajan Book Publishers, Ahmedabad, Revised edition, 2008.
2. Textile Processing – Opening and cleaning by Szaloki, Institute of Textile Technology, Chezeslovakia 2007.
3. BTRA Monograph series on Blow room and Carding, BRRA Publications, Bombay 2008.

FABRIC MANUFACTURE – I

B.Tech. II Year I Sem.

L	T	P	C
3	1	0	4

Course Objectives:

1. To learn the basic principles of Warp and Weft Winding
2. To understand the role of Tensioners and Yarn clearers in Winding
3. To learn about the process of Winding, Warping and Sizing
4. To learn about the selection of Size recipe for sizing of different fibres
5. To learn about the loom and its primary motions

Course Outcomes: (Graduate to have)

1. An ability to decide the suitable yarn preparation system based on the supply and end packages
2. An ability to select the tensioning and yarn clearing levels for processing a specific fibre /yarn
3. An ability to detect the package defects
4. An ability to plan for a size recipe for a specific set
5. An ability to test the wound package, warp beam, pirn and sized yarn for required parameters
6. An ability to adjust and set the timings and setting of primary motions in a loom for weaving a sort.

UNIT - I.

Yarn Preparatory – Introduction, systems of yarn preparation – classification of winding machines – principles of warp winding- study of high speed and super speed cone winding machines – special features such as splicing, auto doffing, electronic slub catcher, ribbon breaker etc., - special features of Schalphrost Auto corner, production calculations – winding faults and remedies.-Quality Control Aspects

UNIT - II.

Pirn winding: Introduction, systems of Weft Preparation, objectives, spindle and spindless pirn winders, constructional features of super speed pirn winder, bunch building motion, pirn elements, production calculation. Quality Control Aspects – Warping: objectives, classification, planning for patterned warps, calculations, anti-bound let off in beam warping, Working principle of conventional and modern beam warpers, Production calculation in beam and Sectional warping

UNIT – III.

Introduction to sizing: Objectives, Types of forms of sizing, different zones,

Creel zone: elements, different types of creels, Positive and negative creels, brake system, Lapper formation and recording

Wet Zone : Elements and construction of Sow box, controls in sow box , modern sow box, stretch control .

Dry Zone : Methods of Drying Concept of drying, Drying efficiency calculation , Stretch Control, Construction of Cylinders Wet splitting

UNIT – IV:

Head Stock: Cut mark motion, moisture control , after waxing in sizing – dry splitting – Migratory behavior of warp ends in sizing – ATIRA Method of recoding – Brief note on Beam winding & Beam press – Types of combs – Motion for combs – Sizing faults and remedies – Calculations in sizing – Post sizing operations.

UNIT – V.

Weaving: Introduction, Loom Specification, types and classification, loom motions ,comparison of tappet, Dobby and jacquard shedding ,Principles of Shedding : positive and negative tappet shedding, kinds of sheds, heald reversing motions, early and late shedding.- Principles of picking: cone under

Vs over picking, intensity of picking, setting and timing of picking mechanisms, early and late picking, shuttle checking, Picking elements – Beat up: Eccentricity of sley, Significance- loom production problems.

TEXT BOOKS:

1. Sizing Methods, Materials and Machines – D.B.Ajgaonkar, Mahajan Publishers, Ahmedabad, 2006
2. Introduction to Winding & Warping – M.K. Talukdar, Mahajan publishers, Ahmedabad, 2004

REFERENCE BOOKS:

1. Modern Yarn Preparation & Weaving Machinery- ormerod, Butterworths, London,2006
2. Conversion of Yarn to Fabric – P.R.Lord & M.H.Mohammed, Marrow Publishers, London, 2008.
3. Weaving, Technology, Management – Azagaonker, Sriramulu,Mahajan ,Ahemedabad, 2007

TEXTILE TESTING - I

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	3

Course Objectives:

1. To provide the knowledge of sampling of testing of fibres , Yarns and fabrics
2. To understand the concept of Moisture relations in Textiles and its importance
3. To learn the students to use different instruments for measuring fibre properties
4. To learn the working of Trash measuring instruments
5. To learn about the concept of Eveness.

Course Outcomes: (Graduate to have)

1. An ability to plan the sampling of fibrs, yarns and fabrics in different situations
2. An ability to estimate the properties of fibrs and yarns based on the corrected value with necessary Moisture regain
3. An ability to select the different instruments to test different types of fibres , Yarns
4. An ability to understand the relations between the conditions of testing and substrates in relation to method of Testing and instruments
5. An ability to apply the knowledge of trash in cotton fibre while processing in spinning
6. An ability to interpret the results of spectrograph.

UNIT - I.

Introduction to textile testing and quality control – objectives of testing – Sampling: The random sample, the biased sample, Length and extent biased samples, Squaring technique, Cut squaring, Zoning techniques for raw cotton, Sampling methods for wool- Yarn and Fabric sampling methods – Sampling errors, Sample size.

UNIT - II.

Moisture Relations: Significance in Textiles, Role of Moisture in different operations of Textile Processing, Relations between Regain and moisture content, Corrections for regains(Numerical simple examples) Measurement of atmospheric conditions by Wet and dry bulb hygrometer, Hair hygrometer, Factors affecting the regain, Effect of moisture on fibre properties, Moisture testing ovens, Drying oven, CSIRO Direct regain tester, WIRA electrical hygrometer, Shirley moisture meter, Forte electronic moisture content analyzer.

UNIT - III.

Fibre length: Significance of Measurement, Cotton fibre length measurement by Fibre sorter methods, Analysis of Sorter diagrams, The Uster Stapler, Shirley Photoelectric model stapler, Fibrograph: Digital Fibrograph (span lengths and their significance),Wool fibre length measurement. Fibre fineness: Significance, Measurement by Gravimetric method, Optical methods , Vibroscope , Air flow methods: Principle ,WIRA Fineness meter for cotton and wool, Sheffield Micronaire. Maturity of cotton : Significance, Maturity ratio, Maturity count and Measurement of maturity of cotton fibres. Relation between Fineness and Meturity.

UNIT - IV.

Fibre strength: Measurement by Pressley tester, Stelometer, Scott Clemson tester, Cambridge extensometer. General remarks on fibre strength testing - Non lint content and nep control – Shirley analyzer – Sugar content (Honey dew) analysis – Cavitomic cotton – Staple synthetic fibre tests – Amount of finish and moisture in staple length – Fibre strength and elongation.

UNIT - V.

Yarn dimensions: Measurement of yarn count : Warp reel , Knowles balance,– quadrant balance&– Beesley's yarn balance, Corrections to Yarn Count with respect to Moisture Regain of Cotton

Significance of CSP, CCSP and Corrections to them with respect to Moisture Regain of Cotton .Yarn twist and its importance: Study of various twist Measuring instruments.

TEXT BOOKS:

1. Physical Testing Vol.– I & II Angappan, SSMITT Publications Komarapalyam, 2008
2. Textile Testing – Arindam Basu, SITRA,2006.

REFERENCE BOOKS:

1. Principles of Textile Testing – J.E.Booth, Butterworths, London – 2007.
2. Physical properties of Textile Fibres – W.E. Morton and J.W.S. Hearle, The Textile Institute, Manchester, 2008.

YARN MANUFACTURE – I LAB

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Course Objectives:

1. To learn about the calculation of speeds of various elements in Blended Scutcher
2. To learn about the calculation of drafts in Blended Scutcher
3. To learn about the calculation of speeds of various elements in Carding
4. To learn about the calculation of various types of drafts in Carding
5. To calculate the required DCP and PCP in Carding

Course Outcomes: (Graduate to have)

1. An ability to select the specific number of openers and cleaners for Cotton processing
2. An ability to assess the cleaning efficiency of the Blow room machines
3. An ability to plan for processing different types of fibres
4. An ability to calculate the DCP and PCP for a specific hank of sliver
5. An ability to plan for number of machines of Card and Blow room lines
6. An ability to carry out the research studies at Blow room and Card

List of Experiments (Minimum of 8 Experiments have to be Performed)

1. Study of Layout of Spinning laboratory
2. Passage of material through blended scutcher.
3. Calculation of speeds of Beater, & Cone Drums.
4. Calculation of Surface speeds of Feed roller and Feed lattice.
5. Calculation of Speeds of Callander Roller, Cages and Shell Rollers
6. Calculation of Drafts, Beats per inch and Waste estimation with Material Balance in Blended Scutcher
7. Study of Piano feed regulating motion and construction of cone drums.
8. Production calculations in blended scutcher with different feed inputs
9. Passage of material through Carding.
10. Calculation of speeds of Licker-in Zone elements
11. Calculation of speeds of in Carding Zone and Condensing Zone
12. Calculation of Actual draft, Mechanical Draft, Tension Draft in carding.
13. Production calculations in Carding.

FABRIC MANUFACTURE - I LAB

B.Tech. II Year I Sem.

L	T	P	C
0	0	2	1

Course Objectives:

1. To learn about the working of precision winder and drum winder
2. To learn about the calculation of pattern in sectional warping
3. To learn about the winding speeds in precision winder for different steps
4. To learn about the working of Pirn winder and calculation of traverse speeds
5. To learn about the dismantling, assembling, setting and timing of cone over pick and beat up motions

Course Outcomes: (Graduate to have)

1. An ability to decide the requirements for winding in precision winding machines
2. An ability to assess the package of drum wound and precision wound packages
3. An ability to plan for different patterns in sectional warping
4. An ability to select the tensioning levels in winding, warping and pirn winding
5. An ability to set the winding, warping and pirn winding machines for processing different types of fibres or sorts
6. An ability to set and time primary mechanisms of the loom for different sorts.

List of Experiments (Minimum of 8 Experiments in the list are to be performed)

1. Passage of material through precision winding machine speed, production and efficiency calculations
2. Determination of coil angle, coils/inch, wind in warp winding
3. Study of slow speed pirn winding and production calculations
4. Study of high speed, automatic pirn winding and production calculations
5. Study of sectional warping – Passage of material, speed and production calculations
6. Passage of material through Non-automatic and Automatic looms production and loom efficiency calculations
7. Dismantling and Assembling of shedding mechanism (Demonstration)
8. Dismantling and Assembling of cone-over pick mechanism
9. Dismantling and Assembling of cone-under pick mechanism
10. Dismantling and Assembling of side lever under pick mechanism
11. Dismantling and Assembling of beat-up mechanism Study of eccentricity of sley. Determination ‘e’.

TEXTILE TESTING – I LAB

B.Tech. II Year I Sem.

L	T	P	C
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Course Objectives:

1. To provide the knowledge about the Testing instruments used for testing of fibers
2. To educate and understand the need, principle, selection of the fiber, yarn samples.
3. To learn about the testing method followed in testing the fibre properties
4. To learn about the interpretation of results
5. To learn about the selection of specific instrument for measuring a specific property of fibre / yarn

Course Outcome: (Graduate to have)

1. An ability to test different types of fibres, Yarns using different types of instruments
2. An ability to understand the relations between the conditions of testing and substrates in relation to method of Testing and instruments
3. An ability to understand different fibre properties and relate them.
4. An ability to use fibres according to their end uses applications
5. An ability to interpret the results of testing
6. An ability to suggest the process parameters to spinning based on the testing results

List of Experiments (Minimum of 8 Experiments have to be Performed)

1. Identification of textile fibers under microscope (Demonstration).
2. Determination of fiber maturity by NaOH swelling method and differential dyeing techniques.
3. Determination of ginning percentage.
4. Determination of fiber length by Hallo and Butterfly Method.
5. Determination of fiber length by Bear Sorter and Interpretations by other methods.
6. Determination of fiber fineness by ATIRA fineness tester.
7. Determination of yarn count by different methods.
8. Determination of moisture content of cotton material.
9. Determination of single yarn twist
10. Determination of plied yarn twist.
11. Determination of Single Yarn Strength
12. Determination of CSP and CCSP of Yarns

CONSTITUTION OF INDIA

B.Tech. II Year I Sem.

L	T	P	C
3	0	0	0

Course Objectives: Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Course Outcomes: Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution
- Discuss the passage of the Hindu Code Bill of 1956.

Unit - 1 History of Making of the Indian Constitution- History of Drafting Committee.
Unit - 2 Philosophy of the Indian Constitution- Preamble Salient Features
Unit - 3 Contours of Constitutional Rights & Duties - Fundamental Rights

- Right to Equality
- Right to Freedom
- Right against Exploitation
- Right to Freedom of Religion
- Cultural and Educational Rights
- Right to Constitutional Remedies
- Directive Principles of State Policy
- Fundamental Duties.

Unit - 4 Organs of Governance: Parliament, Composition, Qualifications and Disqualifications, Powers and Functions, Executive, President, Governor, Council of Ministers, Judiciary, Appointment and Transfer of Judges, Qualifications, Powers and Functions

Unit - 5 Local Administration: District's Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Panchayat raj: Introduction, PRI: Zila Panchayat. Elected officials and their roles, CEO ZilaPanchayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

Unit - 6 Election Commission: Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.

Suggested Reading:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.
6. To introduce the concepts of diodes & transistors, and
7. To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations
5. To identify and characterize diodes and various types of transistors.

UNIT - I:

D.C. Circuits: Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation.

A.C. Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits , Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT - II:

Electrical Installations: Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT - III:

Electrical Machines: Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors, Construction and working principle of Three-phase Induction motor, Torques equations and Speed control of Three-phase induction motor. Construction and working principle of synchronous generators.

UNIT - IV:

P-N Junction and Zener Diode: Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Zener diode characteristics and applications.

Rectifiers and Filters: P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT - V:

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations.

Field Effect Transistor (FET): Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R. L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
7. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
8. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
9. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

YARN MANUFACTURE – II

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

1. To learn about the principles of Drawing
2. To learn about the process of Combing
3. To learn about the process of Simplex'
4. To learn about the role of break draft in machines
5. To learn about the ring spinning

Course Outcomes: (Graduate to have)

1. An ability to understand the material flow through various machines thro Draw frame and quality control aspects of product produced
2. An ability to understand the details of Speed frame
3. An ability to select the process parameters in Combers
4. An ability to select the DCP in Simplex based on sliver hank
5. An ability to test the quality of sliver at each stage and draw the conclusions
6. An ability to plan the number of machines for spin plan based on production

UNIT - I.

Drawing: Introduction, Objectives, basic concepts of drawing (ideal draft and real draft), Study of conventional Draw frame, Principle of Roller drafting, Different drafting systems, methods of roller weighing, Roller eccentricity, Coiler mechanism, Draw frame setting, Importance of Break draft, Study of Modern Draw frame, Auto leveling in Draw frame – Production calculations. - Quality control Aspects

UNIT - II.

Combing: Introduction, Objectives, Hook presentation, Hooks theory, combing preparatory machines: study of sliver lap, ribbon lap and super lap formers – Comber: passage of material, functions and setting of each part, Combing principle, cycle of combing, working of modern combers – production calculations. - Quality control Aspects

UNIT - III

Speed Frame: Principles, detailed study of mechanisms of speed frame, study of different speed frames role of various drafts, processing of cotton, synthetic and regenerated fibers, Recent Developments, production calculations – maintenance schedules. - Quality control Aspects

Ring Spinning: Introduction, Passage of material, functions of parts, Specification of R/F, Principles of ring spinning. Types of Creel

UNIT – IV:

Types of various drafting systems on Ring Frame – Drafting elements and their types- Selection of drafting system & elements – weighing of drafting rollers- Principle of Twisting – Types of Twists – Twist levels and their selection for 100% cotton, P/C, P/V & 100% Synthetics – Twist Factor and its importance – Twisting arrangement – Observed and calculated twist – Twist contraction -Principles of winding, Types of builds – builder motions – Arrangements made before and after Doffing – Labor allotment .

UNIT – V:

Wrapping test – Developments in ring frame – Ring data – Production Calculations-Quality control aspects in Ring Spinning-Post spinning operations – Systems of doubling – Doubling twist – Two from one twister – Up twister and Down twister – Brief note on reeling, bundling and baling – machinery and process for waste spinning.

TEXT BOOKS:

1. Cotton Combing – A.R.Khare, Mahajan Book Publishers, Ahmedabad, 2003
2. Spun Yarn Technology Vol. III- Vekatsubrmani, SSM Co-operative Stores, Komarapalyam,2003
3. Essential facts of practical cotton spinning – T. K. Pattabhiraman Mahajan Brothers Ahmedabad, 2005 Drawing, Combing, and Roving, Ring Spinning - NCUTE Pilot Programme, IIT, New Delhi,2004

REFERENCE BOOKS:

1. Short Staple Spinning – W.Klein, Textile Institute, 1993.
2. Tablets on Combing, Speed Frame, Ring Frame- TAI Publication, Series Editor – T.V. Ananthan, 2003
3. Recent Developments in Yarn production – K.R. Salhotra, Textile Association, Bombay 1983.

TECHNOLOGY OF KNITS AND NONWOVEN

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives

1. To learn about the basic aspects of Knitting
2. To understand about the structures of warp and weft knitting
3. To learn the dynamics of knitting
4. To study the manufacturing of nonwoven
5. To learn the applications of nonwoven

Course Outcomes (Graduate to have):

1. An ability to apply the knowledge of engineering concept of Knit production.
2. An ability to examine the role of process parameters of' knitting.
1. An ability to design a typical nonwoven production process to suit the needs of Industrial or apparel application
2. An ability to understand the fiber selection and bonding methods
6. An ability to understand nonwoven finishing methods.
3. An ability to apply the basic knowledge of Nonwoven production for processing a specific fibre

UNIT – I

Introduction to knitting: Comparison with Weaving for Technology, Production and Properties. A brief note on: Knit industry in India and Reasons for Popularity of Knitting. Basic terms in Knitting Technology, Relation between gauze and count of yarn. Elements of Knitting Machine, Specification and types. Various zones in Knitting machine and their significance, Passage of material through knitting machine. Function of each element, Methods of representation of Knit structure – Method of loop formation by Latch, Beard and Compound needle. Different types of Creeling arrangements (Wall & Over head),

UNIT- II

Classification of Weft Knitting structures (Plain or single jersey, Rib, Interlock and Purl) loop and needle diagrams to illustrate basic structures. Types and selection of Tension devices and Positive Feeders and their role in Knitting, Stop motions in Knitting machines. Patterning in weft knitting: Scope and need -Arrangements in cam for Knit, Miss and Stitch – combination of any two to produce structures: Representation of 2 or more colour jacquard design (including needle layout, knitting sequence, and needle diagram)

Introduction to Knitting dynamics: A brief note on forces acting on the needle, linear and nonlinear cams, needle breakages, spirality angle, Geometry of Weft Knits,

UNIT-III

Warp Knitting: Introduction- Warp and weft knitting compared, Elements of Warp knitting machine and structure, Representation of common Warp knit structures, Loop formation by Beard, Latch and Compound Needles in Tricot and Raschel knitting machines. Basic Lapping movements in Warp knitting, methods to represent Lapping diagrams, Runner's ratio, estimation of runner's ratio, Fall plate patterning, full width insertion,

Nonwoven Technology: Introduction, fibres arrangement, Classification of nonwoven-selection of raw material potential of Nanofibres for NWF, physical and chemical properties

Production of Dry Web: Fiber selection, fiber preparation, web formation- web removal system, carding, garneting, online basis weight measurement, Arrangement of cards, cross and vertical lapper

UNIT - IV

Air Laid Web: Principle of web formation, feeding systems, Rando – Webber, DOA, Fehrer system, Chicopee system, Laroche system, Spinnabau , developments in Air laying Air Laid web , developments

in Air laying – integrated forming and bonding, star former, combined air lay and hydroentangled, roller draft air laying, Air flow and fiber dynamics in air laying, parameters controlling the quality , physical properties of webs

Wet Laid Web : Introduction to Wet laying ,raw material selection, fiber preparation, web forming concept, bonding systems- hydrogen bonding, latex bonding, thermal bonding, hydro entanglement , parameters of Wet laying , application

Polymer Laid Web : Introduction , resins for polymer laying, Spunbond fabric production, various system , bonding methods, and parameters controlling the quality , applications, Meltblown technology, properties and applications

UNIT- V

Mechanical Bonding - Needle Punching: Introduction, batt formation, drafting, passage of material, needle design, types and selection, parameters of needling, methods of needle punch technology, applications

Hydroentanglement Technology: Introduction, principles, fibre selection, process layout, process technology – Pre wetting- support surface- injectors arrangements- jet stripes and nozzles- dewatering-drying- , Multilayer hydroentangled nonwovens ,applications.

Thermal and Chemical Bonding: Introduction, Principles, raw materials, calender bonding, process parameters, through –air and impingement bonding, thermal radiation / IR and Ultrasonic bonding, structure of thermal bonded fabric, applications. - Various methods of chemical bonding**-** Finishing of nonwoven- 3D Nonwoven

TEXT BOOKS:

1. Handbook of Nonwovens- S.J. Russell, CRC Publications, 2010
2. Wellintons Handbook of Industrial Textiles – S. Adanur, CRC Publications, 2011

REFERENCE BOOKS:

1. The Nonwovens- Giovanni Tanchis, ITALIA Publications, Italy, 2009.
2. Nonwoven Fabrics- Wilhelm Albrecht, Hilmar Fuchs & Wlater Kittelemann, Wiley- Vch Publications, Germany, 2012

TEXTILE TESTING - II

B.Tech. II Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

1. To provide the knowledge of testing of fabrics using different types of instruments
1. To understand the relations between the fabrics properties and structures for specific end uses
2. To educate the importance of fabric quality related to different processes during manufacturing and fabric processing.
3. To develop the new methods of testing fabrics in order to get accurate values and spontaneous results
4. To understand the properties of fabrics and construct various diagrammatic representations

COURSE OUTCOME (Graduate have)

1. An ability to test different types of fabrics properties, using different types of instruments
2. An ability to understand different fabric properties and relate them w.r.t comfort of apparels.
3. An ability to acquire good fundamentals in fabric testing and use fabrics according to their end applications
4. An ability to assess the physical properties of fabrics with different weaves
5. An ability to assess the thermal properties
6. An ability to assess the low stress mechanical properties

UNIT - I

Fabric Testing: Scope, Classification of Fabric properties., selection of properties criterion followed, Standard conditions for test methods and list of different test methods universally followed.

Measurement of Fabric Geometrical Properties

Fabric dimensions: Need for measurements of Fabric dimensions in general from the research point of view. Significance of measurement of length, width, Warp and Weft count, fabric weight and threads /inch in fabrics- Methods of measurement of length, Width, Count, Weight, Thread set., Use of Densimeters and the range of instruments available in Textile Industry. Fabric GSM measurement.

Fabric Thickness: Need and Significance, measurement, Fabric compressibility at different loads, Calculation of EMC, Load Vs Recovery. Factors governing compressibility of fabrics.

Crimp: Need, Significance from properties and production of point of view, measurement, Measurement of Crimp from Stress and Strain Curve (as suggested by Hearle) Factors affecting crimp, Crimp Vs Take up.

UNIT - II

Measurement of High Stress mechanical properties of fabrics

Tensile Properties: Role of Tensile property of a fabric, Crimp interchange, Criterion for measuring Tensile strength, Selection of suitable Tensile method of fabric testing, Conventional and Modern Instruments, Factors affecting the Tensile strength results and their interpretation

Tear Strength: Need and Significance, Criterion for Tear Strength, Different modes for measuring Tear Strength, Relation between fabric Washing and Tear strength, Impact of Textile Wet Processing on Tear strength, Factors affecting the Tear strength results and their interpretation

Bursting Strength: Need and Significance, Criterion for Bursting strength, Conventional and modern instruments available, Factors affecting the Bursting strength results and their interpretation

Ballistic strength: Need and Significance, Criterion for Ballistic strength, Factors affecting the Ballistic strength results and their interpretation

UNIT - III

Measurement of Fabric Aesthetic Properties

Flexural Rigidity: Need and Significance, Conventional and Modern methods of measuring Fabric

bending and Overall Flexural rigidity, recent development in measuring fabric bending, Factors affecting Bending behavior and Measurement results and their interpretation.

Fabric Drape: Need and Significance, Methods of measurement, Static Vs Dynamic Drape, Measurement of Static and Dynamic Drape, Review of Research carried out on Fabric Drape, Analysis of Drape contour, Relation between bending and Drape, Factors affecting Draping behavior and Measurement results and their interpretation.

Fabric Shear : Concept of Shear and Shear force , Analysis of Fabric Shear behavior, Need and significance of Shear measurement, Methods of Shear measurement, Factors affecting Shaer behavior and Measurement, results and their interpretation.

Crease Recovery: Measurement , Factors affecting , Typical Textile Wet processing to improve the Crease Recovery of Fabrics, Results and Interpretation

Measurement of Serviceability: Abrasion resistance, Pilling of fabrics. Factors affecting these properties

UNIT - IV

Measurement of Fabric Comfort and Transmission properties

Air permeability: Need and Significance, factors affecting, measurement of Air Resistance, Rate of Air flow Vs Fabric Cover, Conventional and Modern Instruments available for testing. Impact of Textile Wet Processing on Air permeability, Factors affecting the Air permeability results and their interpretation

Moisture Management Properties: Need, scope, Instrument available and working of MMT. Factors affecting, Importance from Textile wet processing point of view

Wicking Behavior of Fabrics: Study of water penetration, Wicking height Vs Geometrical & other factors, Drop penetration test, Shower Proofness test, Shrinkage tests. Unconventional methods of estimating the moisture and wicking behavior of fabrics, Review of research

Thermal Properties: Need and Significance, measurement of Thermal Conductivity and

T I V , Conventional and Modern testing methods (Thermolobo and KES-F, Factors affecting thermal properties

Fabric Shrinkage measurement: Need, commercial processes, Economic interpretation, Laboratory methods, factors governing and Interpretation of results

UNIT - V

Impact of Wet Processing on all fabric properties- Impact of each wet processing process on all fabric properties and use of each process parameters to set the property as per requirement.

Fastness Properties: Need and Measurement of Wash, Light (Sun and Ultra Violet), Perspiration and Rubbing fastness, Governing factors. Evaluation as per the Grey scales, Interpretation of results.

Flammability: Introduction, terms related, Need and Significance, LOI, measurement methods (Vertical Vs Horizontal). Flammability finishes applied and their impact on fabric performance,

Fabric Low Stress Mechanical Properties: Introduction, Objective Vs Subjective measurements, KES-F & FAST testers, Analysis of mechanical properties and their interrelations. Fabric Response to pull out force, factors governing, Analysis of KESF-Data (16 mechanical properties) -Latest tools for Interpretation of Test results (brief Note**)**, Use of Bi-Plot, Snake chart, Control chart and Polar chart,

TEXT BOOKS:

1. Principle of Textile Testing – J.E.Booth, Butterworths London 2003
2. Textile Testing – Arindam Basu, SITRA, 2010.
3. Physical Testing Vol. I & II - Keshavan and Angappan, SSMITT Publications, Komarapalyam, 1993.

REFERENCE BOOKS:

1. I S I Hand book of Textile testing –Indian standard Institution, N. Delhi 1981.
2. Hand book of testing methods – CIRCOT
3. Fabric assessment by mechanical sensing methods – Textile Progress, Edited by Bishop, Vol – 28, 1996
4. Hand book of Textile Testing – Grower and Hamby, Universal Book Corporation, Mumbai, 2010

MAN MADE FIBRE TECHNOLOGY

B.Tech. II Year II Sem.

L	T	P	C
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Course Objectives:

1. To provide the knowledge of the principle involved in fiber forming polymers, and also the process involved in various spinning processes.
2. To understand the manufacturing aspects, properties and the application of different synthetic fibers.
3. To provide the knowledge on the spin finishes, selection criterion and also the technology involved in regenerated fiber manufacturing process
1. To understand the manufacturing techniques, properties and applications of micro fiber and nano fibers
4. To provide the knowledge on the manufacturing processes of polyester and nylon fiber and their surface treatments techniques
5. To understand the cleaning methods of spinnerette

Course Outcomes:

1. An ability to distinguish the natural and synthetic fibers in terms of the structure and the properties.
2. An ability to understand the process and the machinery requirements of the different types of spinning process.
3. An ability to understand the need, types and the application of the spin finishes.
4. An ability to study the manufacturing and the properties of various types of synthetic fibers used in vogue
5. An ability to understand the process, technological requirement for polyester and Nylon fiber production
6. To describe the polymerization process and the requirements there of

UNIT - I.

Introduction to manmade fibers – Distinction between Natural and Man-Made Fibers for Production, Properties & End Uses. important operations in the production of synthetic fibres – fibres varying substrate and geometry – Principles of fibre forming polymers, parameters influencing the quality – glass transition temperature

Introduction to solution spinning – salient features of solution spinning – principles of wet and dry spinning-Rheology of Wet& Dry Spinning – comparison – a brief note on dry jet wet spinning

UNIT - II.

Melt spinning – detailed note on elements on melt spin equipment – various zones in extruders – design of extruder – types of extruders – characteristic feature of extruder – types of spin pack assemblies – construction of spinnerets – spinneret cleaning methods – Rheology of melt spinning – variables of melt spinning High speed spinning concept (integrated spin drop process, H4 S and FDY Process) - Stretching and drawing – drawing condition phenomena of necking – drawing behavior of thermoplastic polymer – influence of drawing on structure and property .

UNIT – III

Spin finishes – Objectives, – types of spin finish- application methods – problems of application – Ideal spin finish — constitution of spin finish –problems in removal of spin finsh-Manufacture of Rayons - viscoserayons, manufacturing process– physical and chemical properties.- A brief note on Recent developments in modal fiber manufacturing (Lyocellfibre).

UNIT - IV

Manufacture of acrylics, mode acrylics, polypropylene fibers – properties and applications of acrylic and mode acrylic, PP Fibres.

Micro fibres– methods of production – bi component technology – meltblown process properties and applications of micro fibres – problems in processing of micro fibres in weaving

Nano fiber- methods of production –properties- applications

UNIT - V

Polyester manufacture – trans esterification, polycondensation – technical details - chemical reactions – side reactions – properties and applications

Manufacture of Polyamide: Nylon – classification of polyamides – manufacture nylon 6, nylon 66, (manufacture monomers various routes for PET and nylon).

Surface modification of Synthetic fibres: Need , polyester cause and effect – recent developments in polyesters like CDP, EDP, CFDP, APP etc

TEXT BOOKS:

1. Technology of Manufactured Fibres– Prof. V. B. Gupta, Chapmen and Hall, New York, 2004
2. Textile fibers – Dr. H. V. Srinivasmurthy, Wood Head Publishers, New Delhi, 2016.
3. Production of synthetic fibers A.A. Vaidya, Prentice Hall of India, New Delhi, 2005

REFERENCE BOOKS:

1. Manmade fibers – R.W. Moncrieff, Batterworth & Co., Manchester, 1980.
2. High performance Fibers – Textile Progress, Textile Institute, 1995.
3. Man Made Fibres- NCUTE Pilot Programme, IIT, New Delhi,2006

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

B.Tech. II Year II Sem.

L	T	P	C
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Pre-requisites: Basic Electrical and Electronics Engineering

Course Objectives:

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.
6. To introduce the concepts of diodes & transistors, and
7. To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes:

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations
5. To identify and characterize diodes and various types of transistors.

List of Experiments/ Demonstrations:

PART A: ELECTRICAL

1. Verification of KVL and KCL
2. (i) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
   (ii) Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star) in a Three Phase Transformer
3. Measurement of Active and Reactive Power in a balanced Three-phase circuit
4. Performance Characteristics of a Separately Excited DC Shunt Motor
5. Performance Characteristics of a Three-phase Induction Motor
6. No-Load Characteristics of a Three-phase Alternator

PART B: ELECTRONICS

1. Study and operation of
   (i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.
2. PN Junction diode characteristics
3. Zener diode characteristics and Zener as voltage Regulator
4. Input & Output characteristics of Transistor in CB / CE configuration
5. Full Wave Rectifier with & without filters
6. Input and Output characteristics of FET in CS configuration

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCE BOOKS:

1. Electronic Devices and Circuits – R. L. Boylestead and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e, 1998.

3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.
7. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
8. E. Hughes, “Electrical and Electronics Technology”, Pearson, 2010.
9. V. D. Toro, “Electrical Engineering Fundamentals”, Prentice Hall India, 1989

YARN MANUFACTURE – II LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Course Objectives:

1. To learn about the elements of Draw frame
2. To learn about the simplex
3. To calculate the speeds of various elements in above machines
4. provide the knowledge about different machinery used for the conversion of yarn
5. To Educate and understand the importance of parameters in relation to the quality and

Course Outcomes (Graduate to have)

1. An ability to understand the Production calculations in Draw Frame and Comber
2. An ability to carry out quality control aspects of product produced
3. An ability to set the machinery for different types of fibres used for the specific quality products
4. An ability to understand the different parameters which affect the process, production and quality of yarn
5. An ability to test the product of draw frame and simplex
6. An ability to select the process parameters of above process

List of Experiments:

1. Material passage through Draw frame and functions of important parts in Draw frame
2. Calculations of speeds of various parts like drafting rollers, coiler calendar roller, feed roller, drafts and production etc.
3. Calculations of Break Draft constant, Draft constants change pinion for different range of drafts.
4. Material passage through speed frame and functions of important parts
5. Calculations of speeds of various rotating parts in fly frame
6. Calculations of Total Draft, zonal Draft, Break draft, twist constant, production constant
7. Study of Builder mechanisms and calculation of Bobbin Rail movement, No.of layers on the bobbing, coils/inch.
8. Passage of material through Ring frame with the help of line diagram.
9. Calculation of speeds of drafting rollers of ring frame with the help of diagram and draft calculation in Ring Frame.
10. Calculation of spindle speed with the help of gearing diagram and calculation of twist per inch, traveler speed.
11. Calculation of draft constant, twist constant with the help of gearing diagram and problems pertaining to draft constant and twist constant in Ring Frame
12. Spin plan and production calculation.

TEXTILE TESTING LAB - II

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	1

Course Objectives:

1. To Educate the student for standard testing conditions for different fabric properties.
2. To develop an understanding of scope, principle behind testing of fabric samples w.r.t end uses applications.
3. To train the students for understanding the result and interpret the conclusion.
4. To provide student with technical knowledge of fabric testing
5. To understand the total physical properties of fabrics

Course Outcomes (Graduate to have):

1. An ability to understand the fabric properties & relate them with standards.
2. An ability to improve the fabric testing procedures.
3. An ability of giving conclusions for different applications
4. An ability to design a specific fabric based on the end use.
5. An ability to standardize the process parameters in relation to end product quality
6. An ability to evaluate the test results of the fabric properties following testing.

List of Experiments (Minimum of 8 is to be performed)

1. Determination of Geometrical Properties
2. Determination of Drape Co-efficient for Textile Fabrics
3. Determination of Air Permeability of Woven Fabrics
4. Determination of Crease Recovery Angle of Fabrics
5. Determination of Bending Length of Fabrics
6. Determination of Bursting Strength of Fabrics
7. Determination of Abrasion Resistance of Fabrics
8. Determination of Tearing Strength of Fabrics
9. Determination of Tensile Strength of Fabrics
10. Determination of Water Repellency of Fabrics
11. Testing of Fabrics for Pilling Test

Additional Experiments:

1. Determination of Tear Strength by Ballistic Tester of Fabrics

GENDER SENSITIZATION LAB

B.Tech. II Year II Sem.

L	T	P	C
0	0	2	0

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labor and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Unit-I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men
- Preparing for Womanhood. Growing up Male. First lessons in Caste.

Unit – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles-

Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

Unit – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. -Gender Development Issues-Gender, Governance and Sustainable Development-Gender and Human Rights-Gender and Mainstreaming

Unit – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No!-Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

Unit – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".***

- **ESSENTIAL READING**: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender"* written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%