ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
REGULATIONS 2017
B. TECH. TEXTILE TECHNOLOGY
CHOICE BASED CREDIT SYSTEM

1. Programme Educational Objectives (PEOs)

Bachelor of Textile Technology curriculum is designed to prepare the graduates having attitude and knowledge to

(a) Have powerful base to pursue a successful professional and technical career

(b) Have strong foundation in basic sciences, mathematics, engineering and experimentation skills to comprehend the manufacturing processes and provide practical and innovative solutions.

(c) Have knowledge on the theory and practices in the field of textile technology and allied areas to manage textile industry and provide techno-economic solutions to the problems.

(d) Engross in life-long learning to keep abreast with emerging technology

(e) Practice and inspire high ethical values and maintain high technical standards

2. Programme Outcome (POs)

1. Ability to apply knowledge of mathematics, science and engineering in textile production processes and product design.
2. Ability to apply knowledge on fiber, yarn, fabric manufacture, chemical processing and testing of textiles in the field of textile manufacture.
3. Ability to apply the knowledge on theory of yarn structure, fabric structure and design concepts on product development
4. Ability to identify and solve technological problems in textile industry
5. Ability to analyze and apply knowledge in the field of design and production of textile products using computational platforms and software tools.
6. Commitment to implement the professional and ethical values.
7. Use the techniques, skills, and modern tools necessary for practicing in the textile industry.
8. Ability to communicate effectively and work in interdisciplinary groups.
9. Ability to review, comprehend and report technological development.

3. PEOs / POs Mapping

PEOs	POs								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
a	√	√	√	√	√			√	
b	√				√	√	√		√
c		√	√	√	√		√		√
d				√	√		√	√	√
e						√		√	√

4. Semester Course wise POs Mapping

		Course Title	1	2	3	4	5	6	7	8	9
YEAR I	SEMESTER I	Communication English						√		√	√
		Engineering Mathematics I	√			√	√		√		√
		Engineering Physics	√			√					
		Engineering Chemistry	√	√		√					
		Problem Solving and Python Programming	√				√		√		√
		Engineering Graphics	√		√		√		√		√
		Problem Solving and Python Programming Laboratory					√		√		√
		Physics and Chemistry Laboratory	√	√		√					
	SEMESTER II	Technical English						√		√	√
		Engineering Mathematics II	√				√		√		√
		Physics of Materials	√	√	√						√
		Chemistry for Technologists		√	√	√					
		Basics of Electrical and Electronics Engineering	√		√				√		√
		Basics of Textile Technology		√	√	√					
		Engineering Practices Laboratory	√		√	√			√		
		Applied Chemistry Laboratory	√	√		√					
YEAR II	SEMESTER III	Probability and Statistics	√				√		√		√
		Engineering Mechanics for Textile Technologists	√			√			√		√
		Technology of Pre Weaving Process		√	√	√			√		
		Characteristics of Textile Fibres		√		√					
		Technology of Pre Spinning Process		√	√	√			√		
		Fibre Science Laboratory		√	√						
		Yarn Manufacture Laboratory I		√	√	√			√		
		Basic Electrical and Electronics Engineering Laboratory	√		√				√		
		Interpersonal Skills/Listening and Speaking						√		√	√
	SEMESTER	Numerical Methods	√				√				
		Solid Mechanics for Textile Technologists	√	√		√					
		Production of Manufactured Fibre		√	√	√					
		Technology of Yarn Spinning		√	√	√			√		
		Woven Fabric Manufacture		√	√	√			√		

	IV	Knitting Technology		√	√	√			√		
		Yarn Manufacture Laboratory II		√	√	√			√		
		Fabric Manufacture Laboratory		√	√	√			√		
		Advanced Reading and Writing						√		√	√
YEAR III	SEMESTER V	Environmental Science and Engineering	√	√				√			
		Process Control in Spinning		√	√	√			√		
		Chemical Processing of Textile Material I		√		√			√		
		Quality Evaluation of Fibres and Yarns		√	√	√					
		Woven Fabric Structures		√	√	√					
		Professional Communication									
		Fabric Analysis Laboratory		√	√	√					
	SEMESTER VI	Garment Manufacturing Technology			√	√			√		
		Chemical Processing of Textile Material II		√		√			√		
		Mechanics of Textile Machinery	√	√	√	√	√		√		
		Fabric and Garment Quality Evaluation		√	√	√					
		Textile Chemical Processing Laboratory		√		√			√		
		Knitting and Garment Construction Laboratory		√	√	√					
		Textile Quality Evaluation Laboratory		√	√	√					
YEAR IV	SEMESTER VII	Financial Management in Textile Industry						√	√	√	√
		Operations Research in Textile Industry				√	√		√		
		Technical Textiles		√	√	√			√		√
		Internship						√	√	√	√
	SEMESTER VIII	Bonded fabrics		√	√	√			√		
		Project work		√	√	√		√	√	√	√

ANNA UNIVERSITY, CHENNAI
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REGULATIONS 2017
B. TECH. TEXTILE TECHNOLOGY
CHOICE BASED CREDIT SYSTEM
I TO VIII SEMESTERS (FULL TIME) CURRICULA AND SYLLABI

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	HS8151	Communicative English	HS	4	4	0	0	4
2	MA8151	Engineering Mathematics- I	BS	4	4	0	0	4
3	PH8151	Engineering Physics	BS	3	3	0	0	3
4	CY8151	Engineering Chemistry	BS	3	3	0	0	3
5	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
6	GE8152	Engineering Graphics	ES	6	2	0	4	4
PRACTICALS								
7	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
8	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
			TOTAL	**31**	**19**	**0**	**12**	**25**

SEMESTER II

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	HS8251	Technical English	HS	4	4	0	0	4
2	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
3	PH8254	Physics of Materials	BS	3	3	0	0	3
4	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
5	BE8251	Basic Electrical and Electronics Engineering	ES	3	3	0	0	3
6	TT8251	Basics of Textile Technology	PC	3	3	0	0	3
PRACTICALS								
7	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
8	CY8261	Applied Chemistry Laboratory	BS	4	0	0	4	2
			TOTAL	**28**	**20**	**0**	**8**	**24**

SEMESTER III

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	MA8391	Probability and Statistics	BS	4	4	0	0	4
2	TT8391	Engineering Mechanics for Textile Technologists	ES	5	3	2	0	4
3	TT8353	Technology of Pre Weaving Process	PC	3	3	0	0	3
4	TT8351	Characteristics of Textile Fibres	PC	4	4	0	0	4
5	TT8352	Technology of Pre Spinning Process	PC	3	3	0	0	3
PRACTICALS								
6	TT8361	Fibre Science Laboratory	PC	2	0	0	2	1
7	TT8311	Yarn Manufacture Laboratory I	PC	4	0	0	4	2
8	EE8362	Basic Electrical and Electronics Engineering Laboratory	ES	4	0	0	4	2
9	HS8381	Interpersonal Skills/Listening and Speaking	EEC	2	0	0	2	1
			TOTAL	**31**	**17**	**2**	**12**	**24**

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	MA8491	Numerical Methods	BS	4	4	0	0	4
2	TT8452	Solid Mechanics for Textile Technologists	ES	3	3	0	0	3
3	TT8451	Production of Manufactured Fibre	PC	3	3	0	0	3
4	TT8453	Technology of Yarn Spinning	PC	3	3	0	0	3
5	TT8454	Woven Fabric Manufacture	PC	4	4	0	0	4
6	TT8491	Knitting Technology	PC	3	3	0	0	3
PRACTICALS								
7	TT8411	Yarn Manufacture Laboratory II	PC	4	0	0	4	2
8	TT8461	Fabric Manufacture Laboratory	PC	4	0	0	4	2
9	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
			TOTAL	**30**	**20**	**0**	**10**	**25**

Note: Internship for a duration of two weeks during the Semester summer vacation should be undergone by the students for which assessment will be done during VII semester.

SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3
2.	TT8501	Process Control in Spinning	PC	3	3	0	0	3
3.	TT8551	Chemical Processing of Textile Materials I	PC	3	3	0	0	3
4.	TT8552	Quality Evaluation of Fibres and Yarns	PC	3	3	0	0	3
5.	TT8591	Woven Fabric Structures	PC	3	3	0	0	3
6.		Professional Elective I	PE	3	3	0	0	3
7.		Open Elective I*	OE	3	3	0	0	3
PRACTICALS								
8.	TT8561	Fabric Analysis Laboratory	PC	4	0	0	4	2
9.	HS8581	Professional Communication	EEC	2	0	0	2	1
			TOTAL	**27**	**21**	**0**	**6**	**24**

* - Course from the curriculum of the other UG Programmes

SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	TT8653	Garment Manufacturing Technology	PC	4	4	0	0	4
2	TT8651	Chemical Processing of Textile Materials II	PC	3	3	0	0	3
3	TT8654	Mechanics of Textile Machinery	PC	3	3	0	0	3
4	TT8652	Fabric and Garment Quality Evaluation	PC	3	3	0	0	3
5		Professional Elective II	PE	3	3	0	0	3
6		Professional Elective III	PE	3	3	0	0	3
PRACTICALS								
7	TT8681	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
8	TT8611	Knitting and Garment Construction Laboratory	PC	4	0	0	4	2
9	FT8661	Textile Quality Evaluation Laboratory	PC	4	0	0	4	2
			TOTAL	**31**	**19**	**0**	**12**	**25**

Note: Internship for a duration of four weeks during the Semester summer vacation should be undergone by the students for which assessment will be done during VII semester.

SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	TT8751	Financial Management in Textile Industry	PC	3	3	0	0	3
2.	TT8791	Operations Research in Textile Industry	PC	3	3	0	0	3
3.	TT8792	Technical Textiles	PC	3	3	0	0	3
4.		Professional Elective IV	PE	3	3	0	0	3
5.		Professional Elective V	PE	3	3	0	0	3
6.		Open Elective II*	OE	3	3	0	0	3
PRACTICALS								
7.	TT8711	Internship**	EEC	0	0	0	0	2
			TOTAL	**18**	**18**	**0**	**0**	**20**

* - Course from the curriculum of the other UG Programmes

** - vide IV semester and VI semester

SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1	TT8851	Bonded Fabrics	PC	3	3	0	0	3
2		Professional Elective VI	PE	3	3	0	0	3
PRACTICALS								
3	TT8811	Project Work	EEC	20	0	0	20	10
			TOTAL	**26**	**6**	**0**	**20**	**16**

TOTAL CREDITS: 183

LIST OF PROFESSIONAL ELECTIVES

PROFESSIONAL ELECTIVE I, SEMESTER V

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8001	New Spinning Technologies	PE	3	3	0	0	3
2.	TT8082	Textile Structural Mechanics	PE	3	3	0	0	3
3.	TT8071	Apparel Production Machinery	PE	3	3	0	0	3
4.	TT8092	Denim Manufacturing	PE	3	3	0	0	3
5.	GE8071	Disaster Management	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE II, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8002	Polymer Chemistry	PE	3	3	0	0	3
2.	TT8003	Pattern Engineering	PE	3	3	0	0	3
3.	TT8081	Textile EXIM Management	PE	3	3	0	0	3
4.	FT8652	Industrial Engineering in Apparel Industry	PE	3	3	0	0	3
5.	GE8075	Intellectual Property Rights	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE III, SEMESTER VI

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8075	High Performance Fibres	PE	3	3	0	0	3
2.	TT8074	Functional Finishes	PE	3	3	0	0	3
3.	TT8080	Textile costing	PE	3	3	0	0	3
4.	FT8651	Apparel Marketing and Merchandising	PE	3	3	0	0	3
5.	GE8076	Professional Ethics in Engineering	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE IV, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8073	Eco - Friendly Dyes, Chemicals and Processing	PE	3	3	0	0	3
2.	TT8078	Production and Application of Sewing Threads	PE	3	3	0	0	3
3.	TT8072	Coated Textiles	PE	3	3	0	0	3
4.	FT8072	Retail Management and Visual Merchandising	PE	3	3	0	0	3
5.	GE8074	Human Rights	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE V, SEMESTER VII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8091	Clothing Comfort	PE	3	3	0	0	3
2.	TT8077	Medical Textiles	PE	3	3	0	0	3
3.	TT8076	Home Textiles	PE	3	3	0	0	3
4.	GE8077	Total Quality Management	PE	3	3	0	0	3
5.	GE8072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3

PROFESSIONAL ELECTIVE VI, SEMESTER VIII

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8004	Manufacture of Silk Fabrics	PE	3	3	0	0	3
2.	FT8071	Brand Management	PE	3	3	0	0	3
3.	TT8079	Protective Textiles	PE	3	3	0	0	3
4.	TT8093	Textile Reinforced Composites	PE	3	3	0	0	3
5.	MG8791	Supply Chain Management	PE	3	3	0	0	3
6.	GE8073	Fundamentals of Nanoscience	PE	3	3	0	0	3

SUBJECT AREAWISE DETAILS

HUMANITIES AND SOCIAL SCIENCES (HS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8151	Communicative English	HS	4	4	0	0	4
2.	HS8251	Technical English	HS	4	4	0	0	4
3.	GE8291	Environmental Science and Engineering	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	MA8151	Engineering Mathematics I	BS	4	4	0	0	4
2.	PH8151	Engineering Physics	BS	3	3	0	0	3
3.	CY8151	Engineering Chemistry	BS	3	3	0	0	3
4.	BS8161	Physics and Chemistry Laboratory	BS	4	0	0	4	2
5.	MA8251	Engineering Mathematics II	BS	4	4	0	0	4
6.	PH8254	Physics of Materials	BS	3	3	0	0	3
7.	CY8292	Chemistry for Technologists	BS	3	3	0	0	3
8.	CY8261	Applied Chemistry Laboratory	BS	4	0	0	4	2
9.	MA8391	Probability and Statistics	BS	4	4	0	0	4
10.	MA8491	Numerical Methods	BS	4	4	0	0	4

ENGINEERING SCIENCES (ES)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	GE8151	Problem Solving and Python Programming	ES	3	3	0	0	3
2.	GE8152	Engineering Graphics	ES	6	2	0	4	4
3.	GE8161	Problem Solving and Python Programming Laboratory	ES	4	0	0	4	2
4.	BE8251	Basic Electrical And Electronics Engineering	ES	3	3	0	0	3
5.	GE8261	Engineering Practices Laboratory	ES	4	0	0	4	2
6.	TT8391	Engineering Mechanics for Textile Technologists	ES	5	3	2	0	4
7.	EE8362	Basic Electrical and Electronics Engineering Laboratory	ES	4	0	0	4	2
8.	TT8452	Solid Mechanics for Textile Technologists	ES	3	3	0	0	3

PROFESSIONAL CORE (PC)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	TT8251	Basics of Textile Technology	PC	3	3	0	0	3
2.	TT8353	Technology of Pre Weaving Process	PC	3	3	0	0	3
3.	TT8351	Characteristics of Textile Fibres	PC	4	4	0	0	4
4.	TT8352	Technology of Pre Spinning Process	PC	3	3	0	0	3
5.	TT8361	Fibre Science Laboratory	PC	2	0	0	2	1
6.	TT8311	Yarn Manufacture Laboratory I	PC	4	0	0	4	2
7.	TT8451	Production of Manufactured Fibre	PC	3	3	0	0	3
8.	TT8453	Technology of Yarn Spinning	PC	3	3	0	0	3
9.	TT8454	Woven Fabric Manufacture	PC	4	4	0	0	4
10.	TT8491	Knitting Technology	PC	3	3	0	0	3
11.	TT8411	Yarn Manufacture Laboratory II	PC	4	0	0	4	2
12.	TT8461	Fabric Manufacture Laboratory	PC	4	0	0	4	2
13.	TT8501	Process Control in Spinning	PC	3	3	0	0	3
14.	TT8551	Chemical Processing of Textile Material I	PC	3	3	0	0	3
15.	TT8552	Quality Evaluation of Fibres and Yarns	PC	3	3	0	0	3
16.	TT8591	Woven Fabric Structures	PC	3	3	0	0	3
17.	TT8561	Fabric Analysis Laboratory	PC	4	0	0	4	2
18.	TT8653	Garment Manufacturing Technology	PC	4	4	0	0	4
19.	TT8651	Chemical Processing of Textile Materials II	PC	3	3	0	0	3
20.	TT8654	Mechanics of Textile Machinery	PC	3	3	0	0	3
21.	TT8652	Fabric and Garment Quality Evaluation	PC	3	3	0	0	3
22.	TT8681	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
23.	TT8611	Knitting and Garment Construction Laboratory	PC	4	0	0	4	2
24.	FT8661	Textile Quality Evaluation Laboratory	PC	4	0	0	4	2
25.	TT8751	Financial Management in Textile Industry	PC	3	3	0	0	3
26.	TT8791	Operations Research in Textile Industry	PC	3	3	0	0	3
27.	TT8792	Technical Textiles	PC	3	3	0	0	3
28.	TT8851	Bonded Fabrics	PC	3	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S. No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
1.	HS8381	Interpersonal Skills/Listening and Speaking	EEC	2	0	0	2	1
2.	HS8461	Advanced Reading and Writing	EEC	2	0	0	2	1
3.	HS8581	Professional Communication	EEC	2	0	0	2	1
4.	TT8711	Internship	EEC	0	0	0	0	3
5.	TT8811	Project Work	EEC	20	0	0	20	10

SUMMARY

S.No.	SUBJECT AREA	CREDITS AS PER SEMESTER								CREDITS TOTAL
		I	II	III	IV	V	VI	VII	VIII	
1.	HS	4	4							8
2.	BS	12	12	4	4					32
3.	ES	9	5	6	3	3				26
4.	PC		3	13	17	14	19	9	3	78
5.	PE					3	6	6	3	18
6.	OE					3		3		6
7.	EEC			1	1	1		2	10	15
	TOTAL	25	24	24	25	24	25	20	16	183

HS8151 COMMUNICATIVE ENGLISH L T P C
4 0 0 4

OBJECTIVES:

- To develop the basic reading and writing skills of first year engineering and technology students.
- To help learners develop their listening skills, which will, enable them listen to lectures and comprehend them by asking questions; seeking clarifications.
- To help learners develop their speaking skills and speak fluently in real contexts.
- To help learners develop vocabulary of a general kind by developing their reading skills

UNIT I SHARING INFORMATION RELATED TO ONESELF/FAMILY& FRIENDS 12

Reading- short comprehension passages, practice in skimming-scanning and predicting- **Writing**- completing sentences - developing hints. **Listening**- short texts- short formal and informal conversations. **Speaking-** introducing oneself - exchanging personal information- **Language development**- Wh- Questions- asking and answering-yes or no questions- parts of speech. **Vocabulary development**-- prefixes- suffixes- articles.- count/ uncount nouns.

UNIT II GENERAL READING AND FREE WRITING 12

Reading - comprehension-pre-reading-post reading- comprehension questions (multiple choice questions and /or short questions/ open-ended questions)-inductive reading- short narratives and descriptions from newspapers including dialogues and conversations (also used as short Listening texts)- register- **Writing** – paragraph writing- topic sentence- main ideas- free writing, short narrative descriptions using some suggested vocabulary and structures –**Listening**- telephonic conversations. **Speaking –** sharing information of a personal kind—greeting – taking leave- **Language development** – prepositions, conjunctions **Vocabulary development-** guessing meanings of words in context.

UNIT III GRAMMAR AND LANGUAGE DEVELOPMENT 12

Reading- short texts and longer passages (close reading) **Writing-** understanding text structure- use of reference words and discourse markers-coherence-jumbled sentences **Listening** – listening to longer texts and filling up the table- product description- narratives from different sources. **Speaking**- asking about routine actions and expressing opinions. **Language development**- degrees of comparison- pronouns- direct vs indirect questions- **Vocabulary development –** single word substitutes- adverbs.

UNIT IV READING AND LANGUAGE DEVELOPMENT 12

Reading- comprehension-reading longer texts- reading different types of texts- magazines **Writing**- letter writing, informal or personal letters-e-mails-conventions of personal email- **Listening**- listening to dialogues or conversations and completing exercises based on them. **Speaking-** speaking about oneself- speaking about one's friend- **Language development-** Tenses- simple present-simple past- present continuous and past continuous- **Vocabulary development**- synonyms-antonyms- phrasal verbs

UNIT V EXTENDED WRITING 12

Reading- longer texts- close reading –**Writing**- brainstorming -writing short essays **–** developing an outline- identifying main and subordinate ideas- dialogue writing-**Listening** – listening to talks- conversations- **Speaking –** participating in conversations- short group conversations-**Language development**-modal verbs- present/ past perfect tense - **Vocabulary development**-collocations- fixed and semi-fixed expressions

TOTAL : 60 PERIODS

OUTCOMES:

At the end of the course, learners will be able to:

- Read articles of a general kind in magazines and newspapers.
- Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.
- Comprehend conversations and short talks delivered in English
- Write short essays of a general kind and personal letters and emails in English.

TEXT BOOKS:

1. Board of Editors. **Using English** A Coursebook for Undergarduate Engineers and Technologists**.** Orient BlackSwan Limited, Hyderabad: 2015**.**
2. Richards, C. Jack. **Interchange Students' Book-2** New Delhi: CUP, 2015.

REFERENCES

1. Bailey, Stephen. **Academic Writing: A practical guide for students**. New York: Rutledge,2011.
2. Comfort, Jeremy, et al. **Speaking Effectively : Developing Speaking Skillsfor BusinessEnglish.** Cambridge University Press, Cambridge: Reprint 2011.
3. Dutt P. Kiranmai and RajeevanGeeta. **Basic Communication Skills,** Foundation Books: 2013.
4. Means,L. Thomas and Elaine Langlois. **English & Communication For Colleges.** CengageLearning ,USA: 2007.
5. Redston, Chris &Gillies Cunningham **Face2Face** (Pre-intermediate Student's Book& Workbook) Cambridge University Press, New Delhi: 2005.

MA8151 ENGINEERING MATHEMATICS – I L T P C
4 0 0 4

OBJECTIVES :

- The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus. The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions. This is a foundation course which mainly deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.

UNIT I DIFFERENTIAL CALCULUS 12

Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules - Maxima and Minima of functions of one variable.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT III INTEGRAL CALCULUS 12

Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

UNIT IV MULTIPLE INTEGRALS 12

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

UNIT V DIFFERENTIAL EQUATIONS 12

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients - Method of undetermined coefficients.

TOTAL : 60 PERIODS

OUTCOMES :

After completing this course, students should demonstrate competency in the following skills:

- Use both the limit definition and rules of differentiation to differentiate functions.
- Apply differentiation to solve maxima and minima problems.
- Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
- Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.
- Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.
- Apply various techniques in solving differential equations.

TEXT BOOKS :

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015. [For Units I & III - Sections 1.1, 2.2, 2.3, 2.5, 2.7(Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1(Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCES :

1. Anton, H, Bivens, I and Davis, S, "Calculus", Wiley, 10th Edition, 2016.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
3. Narayanan, S. and Manicavachagom Pillai, T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2007.
4. Srimantha Pal and Bhunia, S.C, "Engineering Mathematics" Oxford University Press, 2015.
5. Weir, M.D and Joel Hass, "Thomas Calculus", 12th Edition, Pearson India, 2016.

		L	T	P	C
PH8151	**ENGINEERING PHYSICS**	**3**	**0**	**0**	**3**

OBJECTIVES:

- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT I PROPERTIES OF MATTER 9

Elasticity – Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength – torsional stress and deformations – twisting couple - torsion pendulum: theory and experiment - bending of beams - bending moment – cantilever: theory and experiment – uniform and non-uniform bending: theory and experiment - I-shaped girders - stress due to bending in beams.

UNIT II WAVES AND FIBER OPTICS 9

Oscillatory motion – forced and damped oscillations: differential equation and its solution – plane progressive waves – wave equation. Lasers : population of energy levels, Einstein's A and B coefficients derivation – resonant cavity, optical amplification (qualitative) – Semiconductor lasers: homojunction and heterojunction – Fiber optics: principle, numerical aperture and acceptance angle - types of optical fibres (material, refractive index, mode) – losses associated with optical fibers - fibre optic sensors: pressure and displacement.

UNIT III THERMAL PHYSICS 9

Transfer of heat energy – thermal expansion of solids and liquids – expansion joints - bimetallic strips - thermal conduction, convection and radiation – heat conductions in solids – thermal conductivity - Forbe's and Lee's disc method: theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.

UNIT IV QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation) – Compton effect: theory and experimental verification – wave particle duality – electron diffraction – concept of wave function and its physical significance – Schrödinger's wave equation – time independent and time dependent equations – particle in a one-dimensional rigid box – tunnelling (qualitative) - scanning tunnelling microscope.

UNIT V CRYSTAL PHYSICS 9

Single crystalline, polycrystalline and amorphous materials – single crystals: unit cell, crystal systems, Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - crystal imperfections: point defects, line defects – Burger vectors, stacking faults – role of imperfections in plastic deformation - growth of single crystals: solution and melt growth techniques.

TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of this course,

- the students will gain knowledge on the basics of properties of matter and its applications,
- the students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,
- the students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,
- the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and
- the students will understand the basics of crystals, their structures and different crystal growth techniques.

TEXT BOOKS:

1. Bhattacharya, D.K. & Poonam, T. "Engineering Physics". Oxford University Press, 2015.
2. Gaur, R.K. & Gupta, S.L. "Engineering Physics". Dhanpat Rai Publishers, 2012.
3. Pandey, B.K. & Chaturvedi, S. "Engineering Physics". Cengage Learning India, 2012.

REFERENCES:

1. Halliday, D., Resnick, R. & Walker, J. "Principles of Physics". Wiley, 2015.
2. Serway, R.A. & Jewett, J.W. "Physics for Scientists and Engineers". Cengage Learning, 2010.
3. Tipler, P.A. & Mosca, G. "Physics for Scientists and Engineers with Modern Physics'. W.H.Freeman, 2007.

CY8151 ENGINEERING CHEMISTRY L T P C
3 0 0 3

OBJECTIVES:

- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- Preparation, properties and applications of engineering materials.
- Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.
- Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.

UNIT I WATER AND ITS TREATMENT 9

Hardness of water – types – expression of hardness – units – estimation of hardness of water by EDTA – numerical problems – boiler troubles (scale and sludge) – treatment of boiler feed water – Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) external treatment – Ion exchange process, zeolite process – desalination of brackish water - Reverse Osmosis.

UNIT II SURFACE CHEMISTRY AND CATALYSIS 9

Adsorption: Types of adsorption – adsorption of gases on solids – adsorption of solute from solutions – adsorption isotherms – Freundlich's adsorption isotherm – Langmuir's adsorption isotherm – contact theory – kinetics of surface reactions, unimolecular reactions, Langmuir - applications of adsorption on pollution abatement.

Catalysis: Catalyst – types of catalysis – criteria – autocatalysis – catalytic poisoning and catalytic promoters - acid base catalysis – applications (catalytic convertor) – enzyme catalysis– Michaelis – Menten equation.

UNIT III ALLOYS AND PHASE RULE 9

Alloys: Introduction- Definition- properties of alloys- significance of alloying, functions and effect of alloying elements- Nichrome and stainless steel (18/8) – heat treatment of steel. Phase rule: Introduction, definition of terms with examples, one component system -water system - reduced phase rule - thermal analysis and cooling curves - two component systems - lead-silver system - Pattinson process.

UNIT IV FUELS AND COMBUSTION 9

Fuels: Introduction - classification of fuels - coal - analysis of coal (proximate and ultimate) - carbonization - manufacture of metallurgical coke (Otto Hoffmann method) - petroleum - manufacture of synthetic petrol (Bergius process) - knocking - octane number - diesel oil - cetane number - natural gas - compressed natural gas (CNG) - liquefied petroleum gases (LPG) - power alcohol and biodiesel. Combustion of fuels: Introduction - calorific value - higher and lower calorific values- theoretical calculation of calorific value - ignition temperature - spontaneous ignition temperature - explosive range - flue gas analysis (ORSAT Method).

UNIT V ENERGY SOURCES AND STORAGE DEVICES 9

Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant - breeder reactor - solar energy conversion - solar cells - wind energy. Batteries, fuel cells and supercapacitors: Types of batteries – primary battery (dry cell) secondary battery (lead acid battery, lithium-ion-battery) fuel cells – H_2-O_2 fuel cell.

TOTAL: 45 PERIODS

OUTCOMES:

- The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.

TEXT BOOKS:

1. S. S. Dara and S. S. Umare, “A Textbook of Engineering Chemistry”, S. Chand & Company LTD, New Delhi, 2015
2. P. C. Jain and Monika Jain, “Engineering Chemistry” Dhanpat Rai Publishing Company (P) LTD, New Delhi, 2015
3. S. Vairam, P. Kalyani and Suba Ramesh, “Engineering Chemistry”, Wiley India PVT, LTD, New Delhi, 2013.

REFERENCES:

1. Friedrich Emich, “Engineering Chemistry”, Scientific International PVT, LTD, New Delhi, 2014.
2. Prasanta Rath, “Engineering Chemistry”, Cengage Learning India PVT, LTD, Delhi, 2015.
3. Shikha Agarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, 2015.

GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING L T P C
3 0 0 3

OBJECTIVES:

- To know the basics of algorithmic problem solving
- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I ALGORITHMIC PROBLEM SOLVING 9

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation

(pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA, EXPRESSIONS, STATEMENTS 9

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT III CONTROL FLOW, FUNCTIONS 9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS, TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, mergesort, histogram.

UNIT V FILES, MODULES, PACKAGES 9

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

OUTCOMES:

Upon completion of the course, students will be able to

- Develop algorithmic solutions to simple computational problems
- Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python Programs.

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think-python/)
2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

REFERENCES:

1. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
2. John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013
3. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.

4. Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3”, Second edition, Pragmatic Programmers, LLC, 2013.
5. Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.
6. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd.,, 2015.

GE8152 ENGINEERING GRAPHICS L T P C
2 0 4 4

OBJECTIVES:

- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (Not for Examination) 1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I PLANE CURVES AND FREEHAND SKETCHING 7+12

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

Visualization concepts and Free Hand sketching: Visualization principles –Representation of Three Dimensional objects – Layout of views- Freehand sketching of multiple views from pictorial views of objects

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE 6+12

Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes - Determination of true lengths and true inclinations by rotating line method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 5+12

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 5+12

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 6+12

Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions - Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method .

TOTAL: 90 PERIODS

OUTCOMES:

On successful completion of this course, the student will be able to

- familiarize with the fundamentals and standards of Engineering graphics
- perform freehand sketching of basic geometrical constructions and multiple views of objects.
- project orthographic projections of lines and plane surfaces.
- draw projections and solids and development of surfaces.
- visualize and to project isometric and perspective sections of simple solids.

TEXT BOOK:

1. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.
2. Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Limited, 2008.

REFERENCES:

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
2. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition, 2010.
3. Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
4. Luzzader, Warren.J. and Duff,John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
5. N S Parthasarathy And Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.
6. Shah M.B., and Rana B.C., "Engineering Drawing", Pearson, 2nd Edition, 2009.

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size. The examination will be conducted in appropriate sessions on the same day

GE8161	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L T P C 0 0 4 2

OBJECTIVES:

- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python.

LIST OF PROGRAMS

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary search
6. Selection sort, Insertion sort
7. Merge sort
8. First n prime numbers
9. Multiply matrices
10. Programs that take command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame
13. Simulate bouncing ball using Pygame

PLATFORM NEEDED

Python 3 interpreter for Windows/Linux

OUTCOMES:

Upon completion of the course, students will be able to

- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Develop Python programs step-wise by defining functions and calling them.
- Use Python lists, tuples, dictionaries for representing compound data.
- Read and write data from/to files in Python.

TOTAL :60 PERIODS

BS8161	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
	(Common to all branches of B.E. / B.Tech Programmes)	**0**	**0**	**4**	**2**

OBJECTIVES:

- To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics, properties of matter and liquids.

LIST OF EXPERIMENTS: PHYSICS LABORATORY (Any 5 Experiments)

1. Determination of rigidity modulus – Torsion pendulum
2. Determination of Young's modulus by non-uniform bending method
3. (a) Determination of wavelength, and particle size using Laser
   (b) Determination of acceptance angle in an optical fiber.
4. Determination of thermal conductivity of a bad conductor – Lee's Disc method.
5. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer
6. Determination of wavelength of mercury spectrum – spectrometer grating
7. Determination of band gap of a semiconductor
8. Determination of thickness of a thin wire – Air wedge method

TOTAL: 30 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- apply principles of elasticity, optics and thermal properties for engineering applications.

CHEMISTRY LABORATORY: (Any seven experiments to be conducted)

OBJECTIVES:

- To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
- To acquaint the students with the determination of molecular weight of a polymer by viscometery.

1. Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline / thiocyanate method).
10. Estimation of sodium and potassium present in water using flame photometer.
11. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics-ester hydrolysis.
13. Corrosion experiment-weight loss method.
14. Determination of CMC.
15. Phase change in a solid.
16. Conductometric titration of strong acid vs strong base.

OUTCOMES:

- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

TOTAL: 30 PERIODS

TEXTBOOKS:

1. Vogel's Textbook of Quantitative Chemical Analysis (8^{TH} edition, 2014)

HS8251	TECHNICAL ENGLISH	L T P C
		4 0 0 4

OBJECTIVES:

The Course prepares second semester engineering and Technology students to:

- Develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- Foster their ability to write convincing job applications and effective reports.
- Develop their speaking skills to make technical presentations , participate in group discussions.

- Strengthen their listening skill which will help them comprehend lectures and talks in their areas of specialisation.

UNIT I INTRODUCTION TECHNICAL ENGLISH 12

Listening- Listening to talks mostly of a scientific/technical nature and completing information-gap exercises- **Speaking** –Asking for and giving directions- **Reading** – reading short technical texts from journals- newsapapers- **Writing**- purpose statements – extended definitions – issue- writing instructions – checklists-recommendations-**Vocabulary Development**- technical vocabulary **Language Development** –subject verb agreement - compound words.

UNIT II READING AND STUDY SKILLS 12

Listening- Listening to longer technical talks and completing exercises based on them-**Speaking** – describing a process-**Reading** – reading longer technical texts- identifying the various transitions in a text- paragraphing- **Writing**- interpreting cgarts, graphs- **Vocabulary Development-** vocabulary used in formal letters/emails and reports **Language Development-** impersonal passive voice, numerical adjectives.

UNIT III TECHNICAL WRITING AND GRAMMAR 12

Listening- Listening to classroom lectures/ talkls on engineering/technology **-Speaking** – introduction to technical presentations- **Reading** – longer texts both general and technical, practice in speed reading; **Writing**-Describing a process, use of sequence words- **Vocabulary Development-** sequence words- Misspelled words. **Language Development-** embedded sentences

UNIT IV REPORT WRITING 12

Listening- Listening to documentaries and making notes. **Speaking** – mechanics of presentations- **Reading** – reading for detailed comprehension- **Writing**- email etiquette- job application – cover letter –Résumé preparation(via email and hard copy)- analytical essays and issue based essays--**Vocabulary Development**- finding suitable synonyms-paraphrasing-. **Language Development-** clauses- if conditionals.

UNIT V GROUP DISCUSSION AND JOB APPLICATIONS 12

Listening- TED/Ink talks; **Speaking** –participating in a group discussion **-Reading**– reading and understanding technical articles **Writing**– Writing reports- minutes of a meeting- accident and survey-**Vocabulary Development- verbal analogies Language Development-** reported speech .

TOTAL :60 PERIODS

OUTCOMES: At the end of the course learners will be able to:

- Read technical texts and write area- specific texts effortlessly.
- Listen and comprehend lectures and talks in their area of specialisation successfully.
- Speak appropriately and effectively in varied formal and informal contexts.
- Write reports and winning job applications.

TEXT BOOKS:

1. Board of editors. **Fluency in English A Course book for Engineering and Technology.** Orient Blackswan, Hyderabad: 2016.
2. Sudharshana.N.P and Saveetha. C. **English for Technical Communication**. Cambridge University Press: New Delhi, 2016.

REFERENCES

1. Booth-L. Diana**, Project Work,** Oxford University Press**,** Oxford: 2014.
2. Grussendorf, Marion, **English for Presentations,** Oxford University Press, Oxford: 2007
3. Kumar, Suresh. E. **Engineering English**. Orient Blackswan: Hyderabad,2015.
4. Means, L. Thomas and Elaine Langlois, **English & Communication For Colleges.** Cengage Learning, USA: 2007
5. Raman, Meenakshi and Sharma, Sangeetha- **Technical Communication Principles and Practice.**Oxford University Press: New Delhi,2014.

Students can be asked to read Tagore, Chetan Bhagat and for supplementary reading.

MA8251 ENGINEERING MATHEMATICS – II L T P C
4 0 0 4

OBJECTIVES :

- This course is designed to cover topics such as Matrix Algebra, Vector Calculus, Complex Analysis and Laplace Transform. Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering. Vector calculus can be widely used for modelling the various laws of physics. The various methods of complex analysis and Laplace transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

UNIT I MATRICES 12

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II VECTOR CALCULUS 12

Gradient and directional derivative – Divergence and curl - Vector identities – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTIONS 12

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions $w = z + c$, cz, $\frac{1}{z}$, z^2 - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 12

Line integral - Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour.

UNIT V LAPLACE TRANSFORMS 12

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems -Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.

TOTAL: 60 PERIODS

OUTCOMES :

After successfully completing the course, the student will have a good understanding of the following topics and their applications:

- Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.
- Gradient, divergence and curl of a vector point function and related identities.
- Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.
- Analytic functions, conformal mapping and complex integration.
- Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

TEXT BOOKS :

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, 10th Edition, New Delhi, 2016.

REFERENCES :

1. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
2. Jain R.K. and Iyengar S.R.K., " Advanced Engineering Mathematics ", Narosa Publications, New Delhi , 3rd Edition, 2007.
3. O'Neil, P.V. "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, New Delhi, 2007.
4. Sastry, S.S, "Engineering Mathematics", Vol. I & II, PHI Learning Pvt. Ltd, 4th Edition, New Delhi, 2014.
5. Wylie, R.C. and Barrett, L.C., "Advanced Engineering Mathematics "Tata McGraw Hill Education Pvt. Ltd, 6th Edition, New Delhi, 2012.

PH8254	PHYSICS OF MATERIALS (Common to courses offered in Faculty of Technology except Fashion Technology)	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To introduce the physics of various materials relevant to different branches of technology

UNIT I PREPARATION OF MATERIALS 9

Phases - phase rule – binary systems – tie line rule – lever rule – phase diagram – invariant reactions - nucleation – homogeneous and heterogeneous nucleation – free energy of formation of a critical nucleus – Thin films – preparation: PVD, CVD method – Nanomaterials Preparation: wet chemical, solvothermal, sol-gel method.

UNIT II CONDUCTING MATERIALS 9

Classical free electron theory - expression for electrical conductivity – thermal conductivity, - Wiedemann-Franz law – electrons in metals: particle in a three-dimensional box- degenerate states – Fermi-Dirac statistics – density of energy states – electron in periodic potential (concept only) – electron effective mass – concept of hole. Superconducting phenomena, properties of superconductors – Meissner effect and isotope effect. Type I and Type II superconductors, High

T_c superconductors – Magnetic levitation and SQUIDS.

UNIT III SEMICONDUCTING MATERIALS 9

Elemental Semiconductors - Compound semiconductors - Origin of band gap in solids (qualitative) - carrier concentration in an intrinsic semiconductor (derivation) – Fermi level – variation of Fermi level with temperature – electrical conductivity – band gap determination – carrier concentration in n-type and p-type semiconductors (derivation) – variation of Fermi level with temperature and impurity concentration – Hall effect – determination of Hall coefficient – LED - Solar cells.

UNIT IV DIELECTRIC AND MAGNETIC MATERIALS 9

Dielectric, Paraelectric and ferroelectric materials - Electronic, Ionic, Orientational and space charge polarization – Internal field and deduction of Clausius Mosotti equation – dielectric loss – different types of dielectric breakdown – classification of insulating materials and their applications - Ferroelectric materials - Introduction to magnetic materials - Domain theory of ferromagnetism, Hysteresis, Soft and Hard magnetic materials – Anti-ferromagnetic materials – Ferrites, magnetoresistance materials.

UNIT V NEW MATERIALS AND APPLICATIONS 9

Metallic glasses – Shape memory alloys: Copper, Nickel and Titanium based alloys – graphene and its properties - Ceramics: types and applications – Composites: classification, role of matrix and reinforcement – processing of fibre reinforced plastics and fibre reinforced metals – Biomaterials: hydroxyapatite – PMMA – Silicone - Sensors: Chemical Sensors - Bio-sensors – conducting, semiconducting and photoresponsive polymers.

TOTAL : 45 PERIODS

OUTCOMES:

At the end of the course, the students will able to

- gain knowledge on phase diagrams and various material processing methods,
- acquire knowledge on basics of conducting materials, superconductors and their applications
- get knowledge on the functioning of semiconducting materials and their applications in LED and solar cells,
- understand the functioning of various dielectric and magnetic materials ,
- have the necessary understanding on various advanced materials.

TEXT BOOKS:

1. Balasubramaniam, R. “Callister's Materials Science and Engineering”. Wiley India Pvt. Ltd. 2014.
2. Kasap, S.O. “Principles of Electronic Materials and Devices”. McGraw-Hill Education, 2007.
3. Wahab, M.A. “Solid State Physics: Structure and Properties of Materials”. Narosa Publishing House, 2009.

REFERENCES

1. Askeland, D. “Materials Science and Engineering”. Brooks/Cole, 2010
2. Raghavan, V. “Materials Science and Engineering : A First course”. PHI Learning, 2015.
3. Smith, W.F., Hashemi, J. & Prakash. R. “Materials Science and Engineering”. Tata Mcgraw Hill Education Pvt. Ltd., 2014.

CY8292 CHEMISTRY FOR TECHNOLOGISTS L T P C
3 0 0 3

UNIT I UNIT PROCESSES 9

Nitration, Sulphonation, Halogenation, Esterification, Amination, Saponification and Hydrogenation – Role of the above unit processes in such industries as petroleum, drugs, pharmaceuticals and organic synthesis.

UNIT II REACTION MECHANISMS 9

Free radical, substitutions, electrophilic, addition, aromatic electrophilic substitutions, nucleophilic additions, condensation reactions, nucleophilic substitutions in aliphatic and aromatic compounds, cyclo-additions, rearrangements-Beckmann and Fries rearrangement reactions.

UNIT III OILS, FATS, SOAPS & LUBRICANTS 9

Chemical constitution, Chemical analysis of oils and fats – acid, saponification and iodine values, Definitions, determinations and significance. Definition, mechanism of lubrication, preparation of petrolubes, desirable characteristics – viscosity, viscosity index, carbon residue, oxidation stability, flash and fire points, cloud and pour points, aniline point. Semisolid lubricant – greases, preparation of sodium, lithium, calcium and axle greases and uses, consistency test and drop point test. Solid lubricants – graphite and molybdenum disulphide.

UNIT IV CHEMICALS AND AUXILIARIES 9

Preparation, properties and uses of bleaching powder, sodium hypochlorite, hydrogen peroxide, chlorine dioxide. Estimation of available chlorine in hypochlorite bleach liquor. Determination of strength of hydrogen peroxide.

UNIT V COLORANTS 9

Theory of color and constitution: chromophore and auxochrome, classification of dyes based on application. Chemistry and synthesis of azo dye (Methyl red, Methyl orange and Congo red)

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Dhara S. S., “A Text Book of Engineering Chemistry”, 12th Ed., S. Chand & Co. Ltd., New Delhi, 2016.
2. Jain. P.C. and Monica Jain, “Engineering Chemistry”, Dhanpet Rai & Sons, New Delhi, 2012.
3. Shikha Agarwal, “Engineering Chemistry-Fundamentals and Applications”, Cambridge University Press, Delhi, 2015.

REFERENCES:

1. W.L. McCabe, J.C. Smith and P. Harriot, Unit Operations of Chemical Engineering, 7th Edition, McGraw Hill Education, 2005.
2. B.K. Sharma, “Industrial chemistry”, Krishna Prakashan Media (P) Ltd, Meerut, 2011.
3. Shore J., “Colourants and Auxiliaries: Volume II Auxiliaries”, Wood head Publishing Ltd., 2002.

4. Shenai V. A., “Chemistry of Dyes and Principles of Dyeing”, Sevak Publications, Mumbai, 1995.
5. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt. Ltd., New Delhi, 1994.

BE8251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To explain the basic theorems used in Electrical circuits and the different components and function of electrical machines.
- To explain the fundamentals of semiconductor and applications.
- To explain the principles of digital electronics
- To impart knowledge of communication.

UNIT I ELECTRICAL CIRCUITS & MEASURMENTS 9

Fundamental laws of electric circuits– Steady State Solution of DC Circuits – Introduction to AC Circuits –Sinusoidal steady state analysis– Power and Power factor – Single Phase and Three Phase Balanced Circuits. Classification of instruments – Operating Principles of indicating Instruments

UNIT II ELECTRICAL MACHINES 9

Construction, Principle of Operation, Basic Equations and Applications of DC Generators, DC Motors, Single Phase Transformer, single phase induction Motor.

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 9

Introduction - Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation.

Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics – Elementary Treatment of Small Signal Amplifier.

UNIT IV DIGITAL ELECTRONICS 9

Binary Number System – Boolean Algebra theorems– Digital circuits - Introduction to sequential Circuits– Flip-Flops – Registers and Counters – A/D and D/A Conversion –digital processing architecture.

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 9

Introduction – Elements of Communication Systems– Modulation and Demodulation: Principles of Amplitude and Frequency Modulations. Digital Communication - Communication Systems: Radio, Antenna, TV, Fax, ISDN, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

TOTAL: 45 PERIODS

OUTCOMES:

- ability to identify the electrical components and explain the characteristics of electrical machines.
- ability to identify electronics components and understand the characteristics

TEXT BOOKS:

1. D P Kothari and I.J Nagarath, ”Electrical Machines “Basic Electrical and Electronics Engineering”, McGraw Hill Education(India) Private Limited, Third Reprint ,2016

2. S.K.Bhattacharya “Basic Electrical and Electronics Engineering”, Pearson India, 2011
3. Sedha R.S., “Applied Electronics”, S. Chand & Co., 2006

REFERENCES:

1. Leonard S Bobrow, “ Foundations of Electrical Engineering”, Oxford University Press, 2013
2. A.E.Fitzgerald, David E Higginbotham and Arvin Grabel, “Basic Electrical Engineering”, McGraw Hill Education(India) Private Limited, 2009
3. Del Toro, “Electrical Engineering Fundamentals”, Pearson Education, New Delhi, 2007
4. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum’ Outline Series, McGraw Hill, 2002.
5. Mehta V K, “Principles of Electronics”, S.Chand & Company Ltd, 1994.
6. Nagsarkar T K and Sukhija M S, “Basics of Electrical Engineering”, Oxford press 2005.

TT8251 BASICS OF TEXTILE TEHNOLOGY L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn about the basics of fibre forming, yarn production, fabric formation, coloration of fabrics and garment manufacturing

UNIT I BASICS OF FIBRE SCIENCE AND SPINNING 13

Definition of fibre, classification of textile fibers; polymer and polymerization; fibre production principles – wet spinning, dry spinning, melt spinning, gel spinning, dope spinning; characteristics of cotton, viscose, wool, silk, polyester, nylon, polypropylene; sequence of machineries in short staple yarn spinning from ginning to cone winding and their objectives.

UNIT II BASICS OF FABRIC PRODUCTION 13

Woven fabric – warp, weft, weaving, path of warp; looms – classification, handloom and its parts, powerloom, automatic looms, shuttleless looms, special type of looms; preparatory machines for weaving process and their objectives; basic weaving mechanism - primary, secondary and auxiliary mechanisms; knitting – classification, principle, types of fabrics; nonwoven process – classification, principle, types of fabrics.

UNIT III BASICS OF CHEMICAL PROCESSING 9

Objectives of the processes - singeing, desizing, scouring, bleaching, mercerization; dyeing-classification of dyes, types of dyeing techniques; printing –types and styles of printing; finishing treatments – chemical and mechanical finishing.

UNIT IV BASICS OF GARMENT MANUFACTURING 5

Anthropometry, basic principles of pattern making and grading, marker planning, spreading, cutting, sorting, sewing, finishing and packing.

UNIT V BASIC FIBRE, YARN AND FABRIC PROPERTIES 5

Essential fibre properties- cotton and polyester; yarn numbering systems; essential yarn properties; fabric specifications and essential fabric properties

TOTAL : 45 PERIODS

OUTCOMES:

- The students will have the knowledge on the basics of fibre forming polymers, weaving the yarns into fabric, coloration of the fabrics and manufacturing of garments.

TEXT BOOKS:

1. Hornberer M., Eberle H., Kilgus R., Ring W. and Hermeling H., “Clothing Technology: From Fibre to Fabric”, Europa Lehrmittel Verlag, 2008, ISBN: 3808562250 / ISBN: 978-3808562253.
2. Wynne A., “Motivate Series-Textiles”, Maxmillan Publications, London, 1997.
3. Carr H. and Latham B., “The Technology of Clothing Manufacture” Backwell Science, U.K., 1994, ISBN: 0632037482 / ISBN:13: 9780632037483

REFERENCES:

1. Banerjee N. N., “Weaving Mechanism”, Textile Book House, ISBN: B001A1S41A, 1986.
2. Booth J. E., “Textile Mathematics Volume 3”, The Textile Institute, Manchester, 1977, ISBN: 090073924X.
3. Marks R. and Robinson T. C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0900739258.
4. Mishra G. S., “Introductory Polymer Chemistry”, John Wiley & Sons, Dhanpat Rai & Co. Pvt. Ltd., 2003, ISBN: 8122404715 / ISBN: 9788122404715.
5. Oxtoby E., “Spun Yarn Technology “, Butterworth, London, 1987, ISBN: 1483129381 / ISBN: 9781483129389.
6. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt. Ltd., New Delhi, 1994, ISBN: 0471809101 / ISBN: 9780471809104.

GE8261 ENGINEERING PRACTICES LABORATORY L T P C
0 0 4 2

OBJECTIVES:

- To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE 13

Buildings:

(a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:

(a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
(b) Study of pipe connections requirements for pumps and turbines.
(c) Preparation of plumbing line sketches for water supply and sewage works.
(d) Hands-on-exercise:
Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

(e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:

(a) Study of the joints in roofs, doors, windows and furniture.
(b) Hands-on-exercise:
Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE 18

Welding:

(a) Preparation of butt joints, lap joints and T- joints by Shielded metal arc welding.
(b) Gas welding practice

Basic Machining:

(a) Simple Turning and Taper turning
(b) Drilling Practice

Sheet Metal Work:

(a) Forming & Bending:
(b) Model making – Trays and funnels.
(c) Different type of joints.

Machine assembly practice:

(a) Study of centrifugal pump
(b) Study of air conditioner

Demonstration on:

(a) Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
(b) Foundry operations like mould preparation for gear and step cone pulley.
(c) Fitting – Exercises – Preparation of square fitting and V – fitting models.

GROUP B (ELECTRICAL & ELECTRONICS)

III ELECTRICAL ENGINEERING PRACTICE 13

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Measurement of resistance to earth of an electrical equipment.

IV ELECTRONICS ENGINEERING PRACTICE 16

1. Study of Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, rms period, frequency) using CR.
2. Study of logic gates AND, OR, EX-OR and NOT.
3. Generation of Clock Signal.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 60 PERIODS

OUTCOMES:

On successful completion of this course, the student will be able to

- fabricate carpentry components and pipe connections including plumbing works.
- use welding equipments to join the structures.
- Carry out the basic machining operations
- Make the models using sheet metal works
- Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and

fittings

- Carry out basic home electrical works and appliances
- Measure the electrical quantities
- Elaborate on the components, gates, soldering practices.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

CIVIL

1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.	15 Sets.
2. Carpentry vice (fitted to work bench)	15 Nos.
3. Standard woodworking tools	15 Sets.
4. Models of industrial trusses, door joints, furniture joints	5 each
5. Power Tools: (a) Rotary Hammer	2 Nos
(b) Demolition Hammer	2 Nos
(c) Circular Saw	2 Nos
(d) Planer	2 Nos
(e) Hand Drilling Machine	2 Nos
(f) Jigsaw	2 Nos

MECHANICAL

1. Arc welding transformer with cables and holders	5 Nos.
2. Welding booth with exhaust facility	5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc.	5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit.	2 Nos.
5. Centre lathe	2 Nos.
6. Hearth furnace, anvil and smithy tools	2 Sets.
7. Moulding table, foundry tools	2 Sets.
8. Power Tool: Angle Grinder	2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner	One each.

ELECTRICAL

1. Assorted electrical components for house wiring	15 Sets
2. Electrical measuring instruments	10 Sets
3. Study purpose items: Iron box, fan and regulator, emergency lamp	1 each
4. Megger (250V/500V)	1 No.
5. Power Tools: (a) Range Finder	2 Nos
(b) Digital Live-wire detector	2 Nos

ELECTRONICS

1. Soldering guns	10 Nos.
2. Assorted electronic components for making circuits	50 Nos.
3. Small PCBs	10 Nos.
4. Multimeters	10 Nos.
5. Study purpose items: Telephone, FM radio, low-voltage power supply	

CY8261 APPLIED CHEMISTRY LABORATORY L T P C

0 0 4 2

OBJECTIVE

- To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of nitrite in water, cement, oil, coal, Phenol

LIST OF EXPERIMENTS (Any ten experiments)

1. Determination of Redwood / Saybolt numbers, kinematic viscosity and viscosity index of lubricating oils
2. Determination of flash point, fire point, cloud and pour point of oils
3. Determination of acid value, iodine value of oils and saponification value.
4. Determination of COD of water samples
5. Determination of total, temporary & permanent hardness of water by EDTA method.
6. Estimation of HCl using Na_2CO_3 as primary standard and determination of alkalinity in water sample.
7. Determination of purity of washing soda and strength of a commercial acid
8. Estimation of available chlorine in hypochlorite solution
9. Estimation of strength of hydrogen peroxide
10. Estimation of Phenol.
11. Determination of Calorific value using Bomb calorimeter

TOTAL: 60 PERIODS

OUTCOME

- Familiarization with equipment like viscometers, flash and fire point apparatus etc
- Familiarization of methods for determining COD
- Familiarization of a few simple synthetic techniques for soap

TEXT BOOKS

1. Daniel R. Palleros, “Experimental organic chemistry” John Wiley & Sons, Inc., New York, 2001.
2. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., Vogel’s Textbook of practical organic chemistry, LBS Singapore, 2010.

MA8391 PROBABILITY AND STATISTICS L T P C

4 0 0 4

OBJECTIVE:

- This course aims at providing the required skill to apply the statistical tools in engineering problems.
- To introduce the basic concepts of probability and random variables.
- To introduce the basic concepts of two dimensional random variables.
- To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.
- To introduce the basic concepts of classifications of design of experiments which plays very important roles in the field of agriculture and statistical quality control.

UNIT I PROBABILITY AND RANDOM VARIABLES 12

Probability – The axioms of probability – Conditional probability – Baye’s theorem - Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.

UNIT II TWO - DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III TESTING OF HYPOTHESIS 12

Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample tests based on Normal distribution for single mean and difference of means -Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table (test for independent) - Goodness of fit.

UNIT IV DESIGN OF EXPERIMENTS 12

One way and Two way classifications - Completely randomized design – Randomized block design – Latin square design - 2^2 factorial design.

UNIT V STATISTICAL QUALITY CONTROL 12

Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL: 60 PERIODS

OUTCOMES:

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

- Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- Apply the concept of testing of hypothesis for small and large samples in real life problems.
- Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.
- Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

TEXT BOOKS:

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.

REFERENCES:

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2. Papoulis, A. and Unnikrishnapillai, S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, 4th Edition, New Delhi, 2010.
3. Ross, S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 3rd Edition, Elsevier, 2004.
4. Spiegel. M.R., Schiller. J. and Srinivasan, R.A., "Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition, 2004.
5. Walpole. R.E., Myers. R.H., Myers. S.L. and Ye. K., "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 8th Edition, 2007.

TT8391 ENGINEERING MECHANICS FOR TEXTILE TECHNOLOGISTS L T P C
3 2 0 4

OBJECTIVE:

- To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering

UNIT I BASICS AND STATICS OF PARTICLES 15

Introduction – Units and Dimensions – Laws of Mechanics – Lami's theorem, Parallelogram and triangular Law of forces –– Vectorial representation of forces – Vector operations of forces - additions, subtraction, dot product, cross product – Coplanar Forces – rectangular components – Equilibrium of a particle – Forces in space – Equilibrium of a particle in space – Equivalent systems of forces – Principle of transmissibility .

UNIT II EQUILIBRIUM OF RIGID BODIES 15

Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon's theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions

UNIT III PROPERTIES OF SURFACES AND SOLIDS 15

Centroids and centre of mass– Centroids of lines and areas - Rectangular, circular, triangular areas by integration – T section, I section, - Angle section, Hollow section by using standard formula –Theorems of Pappus -Area moments of inertia of plane areas – Rectangular, circular, triangular areas by integration – T section, I section, Angle section, Hollow section by using standard formula – Parallel axis theorem and perpendicular axis theorem –Principal moments of inertia of plane areas – Principal axes of inertia-Mass moment of inertia –mass moment of inertia for prismatic, cylindrical and spherical solids from first principle – Relation to area moments of inertia.

UNIT IV DYNAMICS OF BODIES 15

Displacements, Velocity and acceleration, their relationship – Relative motion – Curvilinear motion -Newton's laws of motion – Work Energy Equation– Impulse and Momentum – Impact of elastic bodies.

UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS 15

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction –wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

TOTAL: 75 PERIODS

OUTCOMES:

- Ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
- Ability to analyse the forces in any structures.
- Ability to solve rigid body subjected to dynamic forces.

TEXT BOOKS:

1. Beer, F.P and Johnson Jr. E.R. "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi (2004)
2. Vela Murali, "Engineering Mechanics", Oxford University Press (2010)

REFERENCES:

1. Hibbeller, R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", 11th Edition, Pearson Education (2010).
2. Irving H. Shames and Krishna Mohana Rao. G., "Engineering Mechanics – Statics and Dynamics", 4th Edition, Pearson Education (2006).
3. J. L. Meriam and L.G.Kraige, "Engineering Mechanics - Statics - Volume 1, Dynamics Volume 2,Third Edition, John Wiley & Sons, (1993).
4. Rajasekaran, S and Sankarasubramanian, G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., (2005).

TT8353 TECHNOLOGY OF PRE WEAVING PROCESS L T P C
3 0 0 3

OBJECTIVES:

The main objective of this course is to enable the students to understand

- Preparatory processes involved in the production of fabric
- Basics of weaving and knitting processes
- Basics of nonwoven production methods

UNIT I WINDING 13

Objects of winding; principles of cheese and cone winding machines;drum and precision winding; uniform build of yarn package; types of drums – half accelerated and fully accelerated drums; control of balloons; Classification of yarn faults and its removal; concepts in yarn clearing – mechanical, optical and electronic clearers; knotters and splicers, weft winding; study of modern automatic winders.

UNIT II PROCESS CONTROL IN WINDING 5

Faults in wound packages, their causes and remedies; winding synthetic and blended yarns; winding for colouration; quality of knots and splices;. winding performance; productivity; maintenance; quality control; material handling.

UNIT III WARPING AND SIZING 18

Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines. Sizing objectives of sizing; sizing materials and recipe used for different types of fibers; size preparation equipment; sizing machines; sizing filament yarns; concept of single end sizing, combined dyeing and sizing. Control concepts in modern sizing; energy conservation in sizing; Sizing defects and production calculations.

UNIT IV PROCESS CONTROL IN WARPING ANDSIZING 5

Process control in warping (production calculation, machine and labor productivity, control of end breaks, quality and hard waste in warping); Control systems used in sizing machine.

UNIT V DRAWING- IN 4

Need for drawing-in operation; manual and automatic drawing- in, leasing, knotting and pinning machines; selection and care of reeds, healds and drop pins, control of cross ends and extra ends and calculations.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Explain the preparatory processes involved in the production of fabrics
- Explain the principles of different fabric production methods

- Identify various fabric defects and their causes and remedies

TEXT BOOKS:

1. Sriramlu P.K., Ajgaonkar D.B. & Talukdar M.K., "Weaving Machines: Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998.
2. Lord P.R. and Mohammed M.H., "Weaving – Conversion of Yarn to Fabric", Merrow Publication, 1992.

REFERENCES:

1. John A. Iredale “Yarn Preparation: A Hand Book”, Textile Institute, Manchester, 1992, ISBN: 1853390429
2. Lord P. R. and Mohamed M.H., “Weaving: Conversion of Yarn to Fabric”, Merrow, 1992, ISBN: 090409538X
3. Ormerod A. and Sondhelm W. S., “Weaving: Technology and Operations”, Textile Institute, 1995, ISBN: 187081276X.

TT8351 CHARACTERISTICS OF TEXTILE FIBRES L T P C
4 0 0 4

OBJECTIVES:

To enable the students to understand the

- Structure and morphology of textile fibres
- Physical characteristics textile fibres

UNIT I STRUCTURE AND MORPHOLOGY 18

Classification of fibres; study of morphological structures of fibers; physical properties of fibres. order and disorder in fibre structure; molecular conformations – planar zig-zag, helical, lamellar, and sphrulite conformations; Transmission and Scanning electron microscopes-principle; construction and working; X-ray diffraction techniques – estimation of crystallinity; Infrared radiation and dichroism techniques; chemical element and group identification by transmittance and optical density methods, molecular orientation estimation

UNIT II MOISTURE ABSORPTION CHARACTERISTICS 12

Theories of moisture sorption; Moisture absorption behavior of natural and man-made fibres; influence of fibre structure, humidity and temperature on the moisture absorption; conditioning of fibres –mechanism of conditioning and factors influencing conditioning. Moisture diffusion in fibres. Heat of sorption – integral and differential, their relation; factors influencing heat of sorption - measurement of heat of sorption

UNIT III TENSILE CHARACTERISTICS 18

Tensile characteristics –study of strength, elongation, work of rupture, initial modulus, work factor and yield point – determination of yield point. Stress-strain relations of natural and manmade fibres - influence of fibre structure, humidity and temperature on tensile characteristics. Time effects Study of creep phenomena. Elastic recovery and its relation to stress and strain of fibres; mechanical conditioning of fibres and its influence on elastic recovery. Load cycling and extension cycling-their effect on elastic recovery. Introduction about torsional and flexural rigidity of fibers

UNIT IV OPTICAL AND FRICTIONAL CHARACTERISTICS 6

Reflexion and Lustre-objective and subjective methods of measurement - refractive index and its measurement - birefringence, factors influencing birefringence - Absorption and dichroism Friction

– static, limiting and kinetic friction, its measurement, comparison of fibres, directional friction in wool – friction.

UNIT V THERMAL CHARACTERISTICS 6

Thermal transitions of fibres - thermal conductivity, thermal expansion and contraction, Tg, melting; static electricity in textile fibres

TOTAL:60 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Correlate the physical properties of fibre to its microstructure and its influence on other characteristics
- Choose appropriate fibre for the required property

TEXT BOOKS:

1. Morton W. E., and Hearle J. W. S., "Physical Properties of Textile Fibres", The Textile Institute, Washington D.C., 2008, ISBN 978-1-84569-220-95
2. Meredith R., and Hearle J. W. S., "Physical Methods of Investigation of Textiles", Wiley Publication, New York, 1989, ISBN: B00JCV6ZWU | ISBN-13:
3. Mukhopadhyay S. K., "Advances in Fibre Science", The Textile Institute,1992, ISBN: 1870812379
4. Meredith R., "Mechanical Properties of Textile Fibres", North Holland, Amsterdam, 1986, ISBN: 1114790699, ISBN-13: 9781114790698

REFERENCES:

1. Hearle J. W. S., Lomas B., and Cooke W. D., "Atlas of Fibre Fracture and Damage to Textiles", The Textile Institute, 2nd Edition, 1998, ISBN: 1855733196.
2. Raheel M. (ed.)., "Modern Textile Characterization Methods", Marcel Dekker, 1995, ISBN:0824794737
3. Mukhopadhyay. S. K., "The Structure and Properties of Typical Melt Spun Fibres", Textile Progress, Vol. 18, No. 4, Textile Institute, 1989, ISBN: 1870812115
4. Hearle J.W.S., "Polymers and Their Properties: Fundamentals of Structures and Mechanics Vol 1", Ellis Horwood, England, 1982, ISBN: 047027302X | ISBN-13: 9780470273029 36
5. Greaves. P. H., and Saville B.P., "Microscopy of Textile Fibres", Bios Scientific, U.K., 1995, ISBN: 1872748244 | ISBN-13: 9781872748245
6. Seville. B. P., "Physical Testing of Textiles", Woodhead Publishing, 1999,ISBN: 1855733676 | ISBN-13: 9781855733671
7. Hearle J. W. S., and Peters. R. H., "Fibre structure", Elsevier Ltd, 1963, ISBN: 1483212211 | ISBN-13: 9781483212210

TT8352 TECHNOLOGY OF PRE SPINNING PROCESS L T P C

3 0 0 3

OBJECTIVES:

- To expose the students to the numbering system used to specify textile yarns
- To enable the students to understand the processes involved in the production of yarn from fibres

- To enable the students to understand the machinery used for the production of yarns using short staple spinning system

UNIT I INTRODUCTION TO SPINNING 9

Sequence of spinning machinery for producing carded, combed and blended yarns in short staple and long staple spinning system; yarn numbering systems- direct, indirect and conversions; influence of characteristics of raw material – fibre fineness, length, strength, elongation, stiffness, fibre friction, cleanliness on spinning performance; spinnability

UNIT II GINNING AND BLOWROOM MACHINERY 9

Description and working of different types of gins; selection of right type of gins; ginning performance on yarn quality; objects, principle and description of opening, cleaning and blending machines used in blowroom; chute feed; cleaning efficiency, production calculations.

UNIT III CARDING MACHINE 9

Objects and principle of carding; detailed study of flat card; autolevelling; card clothing and its maintenance; drives and production calculation

UNIT IV COMBER 9

Objectives of comber preparatory; detailed study of sliver lap, ribbon lap and super lap formers; objects and principles of combing; sequence of combing operation; combing efficiency and production calculation.

UNIT V DRAWING MACHINE AND ROVING MACHINE 9

Tasks of drawing machine; drafting systems used in modern drawing machines; autolevelling; draft and production calculation; objectives of roving machine; working of roving machine; bobbin builder mechanism – mechanical and electro-mechanical; draft, twist and production calculations.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Calculate the yarn numbering by different systems
- Understand the processes involved in the production of yarn using short staple spinning system
- Understand the details of machinery used for the production of yarn

TEXT BOOKS:

1. Klein W., Vol. 1-3, “The Technology of Short Staple Spinning”, “A Practical Guide to Opening & Carding” and “A Practical Guide to Combing, Drawing, and Roving frame”, The Textile Institute, Manchester, U.K., 1998.
2. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002.
3. Klein W., Vol.4 -5, “A Practical Guide to Ring Spinning, 1987” and “New Spinning Systems, 1993" The Textile Institute, Manchester, 1987.
4. Gowda R.V.M, “New Spinning Systems”, NCUTE, IIT Delhi, 2003.

REFERENCES:

1. Oxtoby E., “Spun Yarn Technology “, Butterworth, London, 1987
2. Klein W., “The Technology of Short-staple Spinning “, The Textile Institute, Manchester, 1998
3. Klein W., “A Practical Guide to Opening and Carding “, The Textile Institute, Manchester, 1999

4. Klein W., “A Practical Guide to Combing, Drawing and Roving Frame “, The Textile Institute, Manchester, 1999
5. Lord P.R., “Yarn Production: Science, Technology and Economics “, The Textile Institute, Manchester, 1999
6. Salhotra K.R. and Chattopadhyay R., “Book of papers on Blowroom and Card “, Indian Institute of Technology, Delhi, 1998 41
7. Iredale J., “Yarn Preparation: A Handbook “, Intermediate Technology, 1992
8. Doraiswamy I., Chellamani P. and Pavendhan A., “Cotton Ginning, Textile Progress”, The Textile Institute, Manchester, 1993.

TT8361 FIBRE SCIENCE LABORATORY L T P C
0 0 2 1

OBJECTIVES:

To enable the students to understand the

- Identification of fibres by different methods
- Method of characterization of fibres

LIST OF EXPERIMENTS

1. Identification of fibres by feel, microscopic view, burning behavior and solubility
   - Natural cellulose fibres
   - Natural protein fibres
   - Regenerated cellulose fibres
   - Polyamide fibres
   - Polyester fibres
   - Polyolefin fibres
2. Determination of density of various fibres by density gradient column
3. Determination of denier of synthetic fibres by gravimetric method
4. Determination of Moisture Regain and Moisture content of fibres
5. Determination of the percentage of spin finish of synthetic fibres
6. Determination of wax content of the cotton fibres
7. Determination of the blend proportion
   - Natural/ regenerated cellulose
   - Cellulose/ protein fibres
   - Cellulose/polyester fibres
   - Natural cellulose/ regenerated cellulose/polyester
8. Thermo gravimetric analysis of fibres using thermograms
9. FTIR analysis of polymers and fibres from spectrum

TOTAL: 30 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Identify the given fibres using cross section, dissolution in solvent and burn test practically.
- Determine important properties of fibres
- Determine blend proportion of different fibres in a blended material

LABORATORY EQUIPMENT

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Microscope – 1 No.

2. Weighing balance – 1 No.
3. Conditioning Chamber – 1 No.

TT8311 YARN MANUFACTURE LABORATORY I L T P C
0 0 4 2

OBJECTIVE:

- Students will be familiar with The operation and manipulation of process parameters in - Opening and Cleaning machines – Carding machine – Drawing machine- Combing machine – Roving machine

Experiments: (Minimum of Ten Experiments shall be offered)

1. Study of ginning machine
2. Study of blowroom machinery
3. Settings and production calculations in blowroom
4. Card - Draft and production calculations
5. Card - Settings
6. Construction details of Drawing machine
7. Draft calculation in Drawing machine
8. Study of comber preparatory machines
9. Construction details of comber machine
10. Draft calculation in comber machine
11. Construction details of roving machine
12. Draft calculation in roving machine
13. Twist calculation in roving machine
14. Study of builder motion mechanism in roving machine

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this practical course, the students would be able to

- Explain the construction of machines used for the production of yarns and
- Explain the different mechanisms of looms

LABORATORY EQUIPMENT

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Ginning Machine – 1 No.
2. Blow room Machinery – 1 No.
3. Carding machine – 1 No.
4. Drawing machine – 1 No.
5. Comber preparatory and combing machines – 1 No.
6. Roving machine – 1 No.

EE8362 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY L T P C
0 0 4 2

OBJECTIVES:

- To determine characteristics of electrical apparatus and electronic devices by conducting suitable experiments.

LIST OF EXPERIMENTS

1. Verification of Ohm's law and Kirchhoff's laws.
2. Measurement of three phase power
3. Load test on DC shunt motor.
4. Load test on single -phase Transformer
5. Load test on separately excited DC generator
6. Study of half wave and full wave rectifiers.
7. RC coupled transistor amplifier.
8. Study of logic gates and implementation of Boolean functions.
9. Implementation of binary adder/ subtractor.
10. Study of modulation and demodulation principles
11. Study of communication systems
12. Study of ADC and DAC circuits

Minimum of 10 Experiments to be carried out :-

TOTAL : 60 PERIODS

OUTCOMES:

- Understanding the relation between electrical voltage, current and resistance.
- Ability to measure the performance of electrical machine like DC and AC motors.
- Visualizing the usage of logic gates and Microprocessor in motor control systems.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S.No.	NAME OF THE EQUIPMENT	Qty.
1.	D. C. Motor Generator Set	2
2.	D.C. Shunt Motor	2
3.	Single Phase Induction Motor	2
4.	Ammeter A.C and D.C	20
5.	Voltmeters A.C and D.C	20
6.	Watt meters LPF and UPF	12
7.	Resistors & Breadboards	-
8.	Cathode Ray Oscilloscopes	4
9.	Dual Regulated power supplies	6
10.	A.C. Signal Generators	4
11.	Communication system demonstration kits	2
12.	Modulation and demodulation demo kits	2
13.	ADC and DAC circuit demo kits	2

HS8381 INTERPERSONAL SKILLS/LISTENING AND SPEAKING

L	T	P	C
0	0	2	1

OBJECTIVES:

The Course will enable learners to:

- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- improve general and academic listening skills
- Make effective presentations.

UNIT I

Listening as a key skill- its importance- speaking - give personal information - ask for personal information - express ability - enquire about ability - ask for clarification Improving pronunciation - pronunciation basics taking lecture notes - preparing to listen to a lecture - articulate a complete idea as opposed to producing fragmented utterances.

UNIT II

Listen to a process information- give information, as part of a simple explanation - conversation starters: small talk - stressing syllables and speaking clearly - intonation patterns - compare and contrast information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics.

UNIT III

Lexical chunking for accuracy and fluency- factors influence fluency, deliver a five-minute informal talk - greet - respond to greetings - describe health and symptoms - invite and offer - accept - decline - take leave - listen for and follow the gist- listen for detail

UNIT IV

Being an active listener: giving verbal and non-verbal feedback - participating in a group discussion - summarizing academic readings and lectures conversational speech listening to and participating in conversations - persuade.

UNIT V

Formal and informal talk - listen to follow and respond to explanations, directions and instructions in academic and business contexts - strategies for presentations and interactive communication - group/pair presentations - negotiate disagreement in group work.

TOTAL: 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

- Listen and respond appropriately.
- Participate in group discussions
- Make effective presentations
- Participate confidently and appropriately in conversations both formal and informal

TEXT BOOKS:

1. **B**rooks,Margret. **Skills for Success. Listening and Speaking**. **Level 4** Oxford University Press, Oxford: 2011.
2. Richards,C. Jack. & David Bholke. **Speak Now Level 3.** Oxford University Press, Oxford: 2010

REFERENCES:

1. Bhatnagar, Nitin and MamtaBhatnagar**. Communicative English for Engineers and Professionals.** Pearson: New Delhi, 2010.
2. Hughes, Glyn and Josephine Moate**. Practical English Classroom.** Oxford University Press: Oxford, 2014.
3. Vargo, Mari**. Speak Now Level 4.** Oxford University Press: Oxford, 2013.
4. Richards C. Jack. **Person to Person (Starter).** Oxford University Press: Oxford, 2006.
5. Ladousse, Gillian Porter**. Role Play.** Oxford University Press: Oxford, 2014

MA8491 NUMERICAL METHODS L T P C
4 0 0 4

OBJECTIVE:

- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals in real life situations.
- To acquaint the student with understanding of numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.
- To understand the knowledge of various techniques and methods of solving various types of partial differential equations.

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 12

Solution of algebraic and transcendental equations - Fixed point iteration method – Newton Raphson method - Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by Power method and Jacobi's method for symmetric matrices.

UNIT II INTERPOLATION AND APPROXIMATION 12

Interpolation with unequal intervals - Lagrange's interpolation – Newton's divided difference interpolation – Cubic Splines - Difference operators and relations - Interpolation with equal intervals - Newton's forward and backward difference formulae.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 12

Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 rule – Romberg's Method - Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's 1/3 rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 12

Single step methods - Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge - Kutta method for solving first order equations - Multi step methods - Milne's and Adams - Bash forth predictor corrector methods for solving first order equations.

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 12

Finite difference methods for solving second order two - point linear boundary value problems - Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat flow equation by explicit and implicit (Crank Nicholson) methods – One dimensional wave equation by explicit method.

TOTAL: 60 PERIODS

OUTCOMES:

Upon successful completion of the course, students should be able to:

- Understand the basic concepts and techniques of solving algebraic and transcendental equations.
- Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.
- Apply the numerical techniques of differentiation and integration for engineering problems.
- Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

- Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

TEXT BOOKS:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.

REFERENCES:

1. Brian Bradie, "A Friendly Introduction to Numerical Analysis", Pearson Education, Asia, New Delhi, 2007.
2. Gerald. C. F. and Wheatley. P. O., "Applied Numerical Analysis", Pearson Education, Asia, 6th Edition, New Delhi, 2006.
3. Mathews, J.H. "Numerical Methods for Mathematics, Science and Engineering", 2nd Edition, Prentice Hall, 1992.
4. Sankara Rao. K., "Numerical Methods for Scientists and Engineers", Prentice Hall of India Pvt. Ltd, 3rd Edition, New Delhi, 2007.
5. Sastry, S.S, "Introductory Methods of Numerical Analysis", PHI Learning Pvt. Ltd, 5th Edition, 2015.

TT8452 SOLID MECHANICS FOR TEXTILE TECHNOLOGISTS L T P C
3 0 0 3

OBJECTIVE:

- To teach the students on design of support column, beams, pipelines, storage tanks and reaction columns and tanks after undergoing this course. This is precursor for the study on process equipment design and drawing.

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Rigid bodies and deformable solids – forces on solids and supports – equilibrium and stability – strength and stiffness – tension, compression and shear stresses – Hooke's law and simple problems – compound bars – thermal stresses – elastic constants and poission's ratio.

UNIT II TRANSVERSE LOADING ON BEAMS 9

Beams – support conditions – types of Beams – transverse loading on beams – shear force and 41 bending moment in beams – analysis of cantilevers, simply – supported beams and over hanging beams – relationships between loading, S.F. and B.M. In beams and their applications – S.F.& B.M. diagrams.

UNIT III DEFLECTIONS OF BEAMS 9

Double integration method – Macaulay's method – Area – moment theorems for computation of slopes and deflections in beams.

UNIT IV STRESSES IN BEAMS 9

Theory of simple bending – assumptions and derivation of bending equation (M/I = F/Y =E/R) – analysis of stresses in beams – loads carrying capacity of beams – proportioning beam sections – leaf springs – flitched beams – shear stress distribution in beams – determination of shear stress in flanged beams.

UNIT V TORSION 9

Torsion of circular shafts – derivation of torsion equation (T/J = fs/R = Cθ/L) – stress and deformation in circular and hollow shafts – stepped shafts – shafts fixed at both ends – stresses in helical springs – deflection of springs – spring constant.

TOTAL: 45 PERIODS

OUTCOME:

- Upon completion of the program the student will be able to design the support columns, beams in a textile industrial point of view. And also they can overcome defects in the existing construction.

TEXT BOOKS:

1. Junarkar, S.B., Mechanics of Structure Vol. 1, 21st Edition, Character Publishing House, Anand, Indian, (1995)
2. William A.Nash, Theory and Problems of Strength of Materials, Schaum's Outline Series. McGraw Hill International Editions, Third Edition, 1994.
3. Bansal, R.K, Strength of Materials, Laxmi Publications(P) Ltd., Fourth Edition 2010

REFERENCE:

1. Elangovan, A., Thinma Visai Iyal (Mechanics of Solids in Tamil), Anna University, Madras, 1995.

TT8451 PRODUCTION OF MANUFACTURED FIBRE L T P C
3 0 0 3

OBJECTIVES:

- To enable the students to learn about the polymer rheology and the laws, and various spinning techniques of polymers
- To expose the students to advances in the spinning process

UNIT I POLYMER RHEOLOGY 9

Transport Phenomena in Fibre Manufacturing- Heat and mass; Polymer rheology-Newtonian and non-newtonian fluids, factors affecting shear viscosity; conditions of fibre forming polymers; Melt instabilities.

UNIT II MELT SPINNING 9

Melt Spinning- Polymer Selection and Preparation, equipment, properties and applications of polyester, polyamide and polypropylene fibers.

UNIT III SOLUTION SPINNING 9

Solution spinning- Polymer Selection and Preparation, equipment, properties and applications of acrylic, polyurethane and regenerated cellulose fibres.

UNIT IV POST SPINNING OPERATIONS 9

Neck drawing, drawing systems, influence of drawing on structure and properties of fibres; Types of heat setting, influencing parameters on heat setting, influence of heat setting on fibre behavior; Spin finish composition and application; texturising.

UNIT V DEVELOPMENTS IN FIBER SPINNING 9

Liquid crystal spinning; Gel spinning; Profile fibres, hollow & porous fibres; Speciality fibres polyglycolic acid, polylactic acid, chitosan fibres preparation properties and applications.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to understand

- Polymer rheology and the laws
- Various spinning techniques of polymers parameter involved in spinning synthetic yarn
- Need of various post spinning operations
- Advances in the spinning process

TEXT BOOKS:

1. Kothari V. K., "Textile Fibres: Development and Innovations", Vol. 2, Progress in Textiles, IAFL Publications, New Delhi, 2000
2. Vaidya A. A., "Production of Synthetic Fibres", Prentice Hall of India Pvt. Ltd., New Delhi, 1988
3. Nakasjima (English edition, edited by Kajiwara K. and McIntyre J. E.), "Advanced Fibre Spinning Technology", Wood head Publication Ltd., England, 1994.

REFERENCES:

1. Gupta V. B. and Kothari V. K. (Editors), "Manufactured Fibre Technology", Kluwer Academic Publishers, 1997.
2. Cook J. G., "Handbook of Textile Fibres: Vol. 2: Man Made Fibres", The Textile Inst., 5th Ed. 1984.
3. Srinivasa Murthy H. V., "Introduction to Textile Fibres", Textile Association, India, 1987.

TT8453 TECHNOLOGY OF YARN SPINNING L T P C

3 0 0 3

OBJECTIVES:

- To expose the students to the numbering system used to specify textile yarns
- To enable the students to understand the processes involved in the production of yarn from fibres
- To enable the students to understand the machinery used for the production of yarns using short staple spinning system

UNIT I RING SPINNING 13

Principle of yarn formation in ring spinning machines; working of ring spinning machine; cop building; design features of important elements used in ring spinning machine; draft, twist and production calculations in ring spinning machine; end breakage rate – causes and remedies

UNIT II CONDENSED YARN SPINNING 5

Condensed yarn spinning – principle, different methods, properties; comparison with ring spun yarn

UNIT III YARN PLYING 9

Merits of plying of yarns; methods followed for plying – TFO, ring twisting; selection of twist level for plying; calculation of resultant count of plied yarns; types of fancy yarns, method of production

UNIT IV ROTOR SPINNING 9

Principle of open end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; properties of rotor yarn

UNIT V OTHER SPINNING SYSTEMS 9

Friction, air jet and air vortex spinning methods – principle of yarn production, raw material used, structure, properties and applications; principle of yarn production by self-twist, core, wrap, integrated compound spinning systems.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Calculate the yarn numbering by different systems
- Understand the processes involved in the production of yarn using short staple spinning system
- Understand the details of machinery used for the production of yarn

TEXT BOOKS:

1. Klein W., Vol. 1-3, "The Technology of Short Staple Spinning", "A Practical Guide to Opening & Carding" and "A Practical Guide to Combing, Drawing, and Roving frame", The Textile Institute, Manchester, U.K., 1998.
2. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002.
3. Klein W., Vol.4 - 5, "A Practical Guide to Ring Spinning", 1987, and "New Spinning Systems", 1993, The Textile Institute, Manchester, 1987.
4. Gowda R.V.M, "New Spinning Systems", NCUTE, IIT Delhi, 2003.

REFERENCES:

1. Oxtoby E., "Spun Yarn Technology ", Butterworth Publications, London, 1987
2. Lord P.R., "Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, 1999
3. Shaw J., "Short-staple Ring Spinning, Textile Progress", The Textile Institute, Manchester, 1982
4. Iredale J., "Yarn Preparation: A Handbook ", Intermediate Technology, 1992.

TT8454 WOVEN FABRIC MANUFACTURE L T P C
4 0 0 4

OBJECTIVE:

- To enable the students to understand the preparation for weaving and various functions of weaving machine

UNIT I INTRODUCTION TO WEAVING 6

Yarns quality requirements for high speed automatic shuttle looms and shuttle less loom; warp and weft preparation for high speed looms; Principle of weaving, passage of material, motions in loom – primary, secondary and auxiliary motions, plain power loom driving, timing of motions.

UNIT II SHEDDING MOTIONS 12

Shed geometry and shedding requirement. Types of shed. Shedding mechanisms - positive and negative. Principles of tappet, dobby and jacquard shedding mechanisms, reversing mechanisms-limitations of various shedding mechanisms; Conventional and modern dobby and jacquard mechanism.

UNIT III WEFT INSERTION AND BEAT UP 18

Shuttle picking and checking mechanisms, shuttle flight and timing; Weft feeder – types, Principles of weft insertions in shuttle less looms; mechanism of weft insertion by projectile, rapier loom and

jet – air and water. Multi-Phase weaving systems; Kinematics of sley, sley eccentricity; beat up mechanism in modern looms;

UNIT IV SECONDARY AND AUXILARY MOTIONS 12

Take up and let - off motions used in plain power looms; cloth formation, weaving condition - factors and control; warp protector and warp and weft stop motion; plain power loom accessories. Automatic weft replenishment in shuttle looms – pirn changing and shuttle changing looms; mechanisms involved in automatic pirn changing – feelers, cutters, design of shuttle, three try motions; multi shuttle looms- box changing principle, Automatic pirn changing in multi shuttle loom. Weft arrival control and automation in shuttle less looms; selvedges in shuttle less looms; quick style change;

UNIT V PROCESS CONTROL & SPECIAL WEAVING PROCESSES 12

Techno economics of shuttle less loom weft insertion systems; loom monitoring and control Loom stoppages and efficiency; fabric defects and value loss; fabric shrinkage in the loom - causes and control; fabric engineering. Filament weaving – Silk & Texturised yarns. Principles and mechanisms in weaving Pile fabrics, tapes and triaxial fabrics

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this course, the student shall

- Understand the concepts of preparation of yarn for weaving
- Understand different motions of loom in fabric formation

TEXT BOOKS:

1. Talukdar, M.K., “An Introduction to Winding and Warping”, Textile Trade Press, Mumbai.
2. Talukdar M.K., Sriramulu P.K. and Ajgaonkar D.B., “Weaving: Machines, Mechanisms, Management”, Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0
3. Marks R. and Robinson T.C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0 900739 258

REFERENCES:

1. Ajgaonkar, D.B., “Sizing, Materials, Methods and Machines”, Textile Trade Press, Mumbai, 1982.
2. “Weaving: The knowledge in Technology”, Papers Presented at the Textile Institute Weaving Conference 1998, Textile Institute, ISBN: 18770372182
3. Booth J.E., “Textile Mathematics Volume 3”, The Textile Institute, Manchester, 1977, ISBN: 090073924X
4. Lord P.R. and Mohamed M.H., “Weaving: Conversion of Yarn to Fabric”, Merrow, 1992, ISBN: 090409538X
5. Ormerod A. and Sondhelm W.S., “Weaving: Technology and operations”, Textile Institute, 1995, ISBN: 187081276X
6. Sabit Adanur, “Handbook of Weaving”, Technomic Publishing Co. Inc., 2001
7. Vangheluwe L., “Air- Jet Weft Insertion”, Textile progress, Vol. 29, No. 4, Textile Institute Publication, 1999, ISBN; 1870372255.
8. Banerjee, P.K., “Industrial Practices in Yarn winding”, NCUTE Publication, 1999.

TT8491 KNITTING TECHNOLOGY L T P C

3 0 0 3

OBJECTIVES:

To make the students to understand

- Fundamentals of knitting
- Types of knitting processes in detail
- Functioning of components of knitting machine

UNIT I INTRODUCTION TO KNITTING 9

Reasons for the growth of the knitting industry. Comparison of fabric properties - wovens, knits and bonded fabrics; classification of knitting processes – weft knit & warp knit; yarn quality requirements for knitting. Preparation of staple yarns for weft and warp knitting.

UNIT II FUNDAMENTALS OF KNITTING 9

General definitions and principles of knitting; Types of knitting needles – Bearded, Latch & Compound Needle. Elements of knitted loop structure.

UNIT III WEFT KNIT STRUCTURES 9

Basic weft knitted structures and their production - plain, rib, interlock and purl; Fundamentals of formation of knit, tuck and float stitches; factors affecting the formation of loop; effect of loop length and shape on fabric properties; Analysis of various types of weft knitted structure. Weft knitted fabric geometry.

UNIT IV WEFT KNITTING MACHINES 9

Construction, Characteristics and working of circular knitting machines used for the production of basic structures; production of derivatives of weft knitted structures; needle control in circular knitting machines; quality control in knitted fabric production; production calculation. Basic principles and elements of flat knitting machines; different types of flat knitting machines - manual, mechanical and computer controlled; production of various weft knitted structures using flat knitting machines.

UNIT V WARP KNITTING 9

Basic principles; elements of warp knitted loop – open loop, closed loop; warp knitting elementschain link, chain links for simple patterns, guide bar movement mechanism,. Tricot and Rachel warp knitting machines. Principles of double needle bar patterning, Terry pile fabric production. Let off system; run in value based on the lapping diagram; take up system; theoretical concepts of warp knitted loop configuration.; Uses of warp knitted fabrics in technical applications.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to understand the

- Principle of knitting by different types of knitting machines
- Structure and properties of fabric produced by different knitting machines

TEXT BOOKS:

1. Spencer D.J., “Knitting Technology”, III Ed., Textile Institute, Manchester, 2001, ISBN: 1 85573 333 1
2. Ajgaonkar D.B., “Knitting Technology”, Universal Publishing Corporation, Mumbai, 1998, ISBN: 81-85027-34-X
3. Gajjap B.J., “Handbook of warp Knitting Technology”, Textile Institute, Manchester, 2004, ISBN: 1 85573 7701

REFERENCES:

1. Chandrasekhar Iyer, Bernd Mammel and Wolfgang Schach., “Circular Knitting”, Meisenbach GmbH, Bamberg, 1995, ISBN: 3-87525-066-4
2. Samuel Raz., “Flat Knitting: The new generation”, Meisenbach GmbH, Bamberg, 1997, ISBN: 3- 87525-054-0

3. Samuel Raz., “Warp Knitting production”, Melliand Textilberichte, GmbH, Rohrbacher, 1987, ISBN: 3-87529-022-4
4. Thomas D.G.B., “An Introduction to Warp Knitting”, Merrow Publishing Company, UK., 1971, ISBN-13: 9780900541070
5. Sam Raz, “Warp Knitting Production”, Melliand Textilberichte GmbH, Heidelberg, Germany, 1987, ISBN:3-87529-022-4
6. Die Maschenbindungen der Kettenwirkerai, “An Introduction to the Stitch Formations in Warp Knitting”, Published Employee’s Association, Karl Mayere.V., Germany, 1966
7. Paling D.F., “Warp Knitting Technology”, Columbine Press, U.K, 1966
8. Charles Reichman, “Wool and Synthetic Knitwear Handbook”, National Knitted Outerwear Association, U.S.A, 1967
9. Charles Reichman, “Knitted Stretch Technology”, National Knitted Outerwear Association, U.S.A, 1965.

TT8411 YARN MANUFACTURE LABORATORY II L T P C
0 0 4 2

OBJECTIVES:

To expose the students to the

- Machinery used for production of yarn from fibres and
- Weaving preparatory machines and looms

LIST OF EXPERIMENTS

1. Construction details of ring spinning machine and material passage
2. Draft, Twist and production calculations in ring spinning machine
3. Study of builder mechanism of ring spinning machine
4. Selection of ring travellers
5. Construction details of rotor spinning machine and material passage
6. Draft, Twist and production calculations in rotor spinning machine
7. Production of carded sliver
8. Production of draw frame sliver
9. Production of roving
10. Production of yarn using ring spinning machine
11. Production of yarn using rotor spinning machine
12. Analysis of MIS reports from spinning mills

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this practical course, the student will be able to

- Calculate draft, twist and production rate of ring and rotor spinning machines
- Understand the formation of yarn by ring and rotor spinning systems
- Produce yarn using ring and rotor spinning system
- Analyse MIS reports from spinning mills

LABORATORY EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Carding machine – 1 No.
2. Drawing machine – 1 No.
3. Roving machine – 1 No.
4. Ring frame – 1 No.
5. Rotor spinning machine – 1 No.

(Commercial or Miniature models of above machines)

TT8461 FABRIC MANUFACTURE LABORATORY L T P C
0 0 4 2

OBJECTIVE:

- To train the students on different mechanisms of plain loom and circular knitting machines

LIST OF EXPERIMENTS

1. Analysis of Yarn faults
2. Control of production, package density, yarn faults in cone / cheese winding machine
3. Determination of depth of shed and heald shaft movements in tappet shedding mechanism
4. Preparation of pattern card for dobby shedding mechanism and way in which adjust the depth of shed
5. Study of jacquard shedding mechanism
6. Study of picking mechanisms in looms
7. Study of let-off mechanisms
8. Determination of pick space through 5 and 7 wheel take-up mechanisms
9. Study of weft replenishment mechanism in shuttle looms
10. Method of achieving the required colour patterns in 4 X 1 drop box motion
11. Study of warp protector mechanism

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this practical course, the students shall be able to

- Understand the material passage in the machine, draw gearing diagram, identify the components of spinning and weaving machines
- Calculate draft, twist and production rate of spinning machines
- Understand the mechanism of weaving machine

LAB EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

- Cone / Cheese winding machine – 1 No.
- Pirn winding machine – 1 No.
- Sizing chemicals (Consumables) Quantity as per the requirements
- Loom with tappet shedding – 1 No.
- Loom with dobby shedding – 1 No.
- Loom with jacquard – 1 No.
- Loom with dropbox – 1 No.
- Shuttleless loom – 1 No.

HS8461 ADVANCED READING AND WRITING L T P C
0 0 2 1

OBJECTIVES:

- Strengthen the reading skills of students of engineering.
- Enhance their writing skills with specific reference to technical writing.
- Develop students' critical thinking skills.

- Provide more opportunities to develop their project and proposal writing skills.

UNIT I

Reading - Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title **Writing**-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence –Write a descriptive paragraph

UNIT II

Reading-Read for details-Use of graphic organizers to review and aid comprehension **Writing**-State reasons and examples to support ideas in writing- Write a paragraph with reasons and examples- Write an opinion paragraph

UNIT III

Reading- Understanding pronoun reference and use of connectors in a passage- speed reading techniques-**Writing-** Elements of a good essay-Types of essays- descriptive-narrative- issue-based-argumentative-analytical.

UNIT IV

Reading- Genre and Organization of Ideas- **Writing-** Email writing- visumes – Job application-project writing-writing convincing proposals.

UNIT V

Reading- Critical reading and thinking- understanding how the text positions the reader- identify **Writing**- Statement of Purpose- letter of recommendation- Vision statement

TOTAL: 30 PERIODS

OUTCOMES: At the end of the course Learners will be able to:

- Write different types of essays.
- Write winning job applications.
- Read and evaluate texts critically.
- Display critical thinking in various professional contexts.

TEXT BOOKS:

1. Gramer F. Margot and Colin S. Ward **Reading and Writing (Level 3)** Oxford University Press: Oxford, 2011
2. Debra Daise, CharlNorloff, and Paul Carne **Reading and Writing (Level 4)** Oxford University Press: Oxford, 2011

REFERENCES:

1. Davis, Jason and Rhonda LIss.**Effective Academic Writing (Level 3)** Oxford University Press: Oxford, 2006
2. E. Suresh Kumar and et al. **Enriching Speaking and Writing Skills.** Second Edition. Orient Black swan: Hyderabad, 2012
3. Withrow, Jeans and et al**. Inspired to Write. Readings and Tasks to develop writing skills.** Cambridge University Press: Cambridge, 2004
4. Goatly, Andrew**. Critical Reading and Writing.** Routledge: United States of America,

2000

5. Petelin, Roslyn and Marsh Durham**. The Professional Writing Guide: Knowing Well and Knowing Why.** Business & Professional Publishing: Australia, 2004

GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To study the nature and facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world;
- envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth‟s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity. Field study of common plants, insects, birds; Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides. Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs,

renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

- Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.
- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

TEXT BOOKS:

1. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004.

REFERENCES:

1. Dharmendra S. Sengar, "Environmental law", Prentice hall of India PVT LTD, New Delhi, 2007.
2. Erach Bharucha, "Textbook of Environmental Studies", Universities Press(I) PVT, LTD, Hydrabad, 2015.
3. Rajagopalan, R, "Environmental Studies - From Crisis to Cure", Oxford University Press, 2005.
4. G. Tyler Miller and Scott E. Spoolman, "Environmental Science", Cengage Learning India PVT, LTD, Delhi, 2014.

TT8501 **PROCESS CONTROL IN SPINNING** **L T P C**
3 0 0 3

OBJECTIVE:

- To enable the students to understand and apply process and quality control measures during spinning of yarn

UNIT I LEVELLING **9**

Different levelling methods adopted in the spinning machines to achieve better uniformity of the products; influence of the uniformity of the intermediate products on the yarn quality; effect of machines and processing parameters on product uniformity; importance of fibre mix homogeneity on yarn quality; types and levels of mixing in the preparatory processes; assessment of fibre-blend variations.

UNIT II NEP AND HOOK REMOVAL **9**

Causes of nep and hook formation in the fibre-opening processes; improving the removal of neps in the carding and combing machines; maximizing the fibre hook straightening during the preparatory operations; measurement of neps and hooks.

UNIT III WASTE CONTROL **9**

Control of waste in blowroom, card and combers; influence of machine and processing parameters on waste removal; controlling the lint content in waste; cleaning efficiency and cleaning intensity.

UNIT IV PRODUCTION CONTROL **9**

Factors affecting the production limits of the spinning machinery; achieving maximum production in the given machinery; new concepts in achieving higher production in the spinning machinery; role of machinery maintenance and humidity control on production efficiency; computation of the productivity indices; balancing of machinery requirement.

UNIT V YARN QUALITY ANALYSIS & MAN-MADE FIBRE PROCESSING **9**

Analysis and control of within length and between length variations and spectrogram; yarn faults classifications; causes and remedies for yarn defects. Optimum processing conditions required for man-made-fibres like polyester, viscose in the spinning machinery.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to understand the

- Quality control measures in terms of levelling of material, neps and waste during the process Factors influencing production of the spinning machines
- Analysis of quality of yarn
- Special measures to be taken while processing manmade fibres

TEXT BOOKS:

1. Garde A.R. and Subramaniam T.A., “Process Control in Spinning”, ATIRA Publicaitons, Ahmedabad, 1989
2. Klein W., “Man-made Fibres and their Processing” ,The Textile Institute, Manchester, 1994

REFERENCES:

1. Lord P.R., “Yarn Production; Science, Technology and Economics”, The Textile Institute, Manchester, 1999
2. Furter R., “Evenness Testing in Yarn Production Part 1 and Part II “, The Textile Institute, Manchester, 1982

3. Van der Sluijs M and Hunter L., “Neps in Cotton Lint, Textile Progess “,The Textile Institute, Manchester, 1999
4. Slater K.Yarn Evenness, “Textile Progress”, The Textile Institute, Manchester, 1986.
5. Townend P.P., “Nep Formation in Carding “, Wira, U.K., 1982.

TT8551 CHEMICAL PROCESSING OF TEXTILE MATERIALS I L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn about chemical structure of fibres, pre-treatments involved in the wet processing of textiles and finishing treatment of textile fabrics

UNIT I **9**

Chemical structure of fibres; action of chemicals on fibres; natural and added impurities intextiles; singeing and desizing of natural and synthetic fibres and its blends; heat setting.

UNITII **9**

Scouring, bleaching and mercerization of cotton, bio-scouring of cotton; carbonization, scouring and bleaching of wool; degumming of silk

UNIT III **9**

Loose stock machine; hank and package processing machines; yarn singeing machine; woven and knitted fabric singeing machines; stretching devices; shearing and raising machines; kiers; mangles; jigger; winch; jet and soft flow machines; yarn mercerizer, chain and chainless mercerizers; continuous scouring and bleaching machines; washing ranges, hydro extractors; detwisters; dryers; stenters

UNIT IV **9**

Calendering, crease proofing, shrink proofing and softening; wool finishing.

UNIT V **9**

Water and oil repellent finishes; fire retardant finish; antibacterial finish; Application of Nanotechnology in finishing; assessment of finishes; safety measures to be taken at the textile chemical processing industry.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall have the knowledge of

- Chemical structure of the fibres
- Necessity and requirements of pretreatments in wet processing of textiles
- Various finishing treatments done on fabric

TEXT BOOKS:

1. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt.Ltd., New Delhi, 1994.
2. Menachem Lewin and Eli M. Pearce, “Handbook of Fibre Chemistry: Second Edition, Revised and Expanded, Marcel Dekker, Inc., 1998.

3. Menachem Lewin and Stephen B. Sello., “Handbook of Fibre Science and Technology: Volume I: Chemical Processing of Fibres and Fabrics-Fundamentals and Preparation Part A”, Marcel Dekker, Inc., 1983.
4. Karmakar S. R., “Chemical Technology in the Pre-treatment Process of Textiles”, Elsevier sciences B.V., 1999.

REFERENCS:

1. Choudhury A. K. R., “Textile Preparation and Dyeing”, SDC India Region,2011.
2. Bhagwat R. S., “Handbook of Textile Processing”, Colour Publication, Mumbai. 1999.
3. Cavaco-Paulo A. and Gubitz G. M., “Textile Processing with enzymes”, Woodhead Publication Ltd., 2003.
4. Schindler W.D and Hauser P., “Chemical Finishing of Textiles”., Wood head Publications, ISBN: 1855739054
5. Heywood D,“Textile Finishing”, Wood head Publishing Ltd., 2003, ISBN 090195681.
6. Yin-Ling Lam , Chi-Wai Kan & Chun-Wah Marcus Yuen, " Developments in functional finishing of cotton fibres – wrinkle-resistant, flame retardant and antimicrobial treatments", Textile Progress, Vol. 44, Nos. 3-4, September-December 2012, 175–249

TT8552 QUALITY EVALUATION OF FIBRES AND YARNS L T P C
3 0 0 3

OBJECTIVE:

- To make the students understand the principle and method of working of equipments used for testing of fibres and yarns

UNIT I INTRODUCTION 9

Definition of quality- importance of quality assessment- selection of samples for quality assessment – random and biased samples – squaring technique and zoning technique for fibre selection; yarn sampling - use of random numbers - sampling for various types of yarn tests.

UNIT II FIBRE LENGTH AND STRENGTH ANALYSIS 9

Fibre testing, the fibre quality index and spinnablity; Fibre length and length uniformity measuring techniques. Strength Tensile Testing modes – CRT, CRE, CRL and ARL; Fibre strength, importance, relation to yarn strength; Measurement techniques.

UNIT III FIBRE FINENESS, MATURITY AND TRASH ANALYSIS 9

Fibre fineness – definition-comparison of various fibres – its importance in yarn manufacture; measurement techniques. Cotton fibre maturity, estimation by microscopic method - maturity ratio and index, estimation by other methods – optical, air flow differential dyeing; its importance in spinning. Fibre trash – influence on quality; measurement – principle and estimation microdust estimation for rotor spinning. High volume instrument for total fiber quality measurement.

UNIT IV YARN COUNT, TWIST AND STRENGTH 9

Yarn numbering systems-Indirect and direct systems-count conversions; Count measuring systems. Twist in single and ply yarns –twist direction – twist factor – twist and yarn strength; twist measurement and breaking twist angle measurement. Single yarn strength; Lea count strength product (CSP) and Corrected Count Strength Product (CCSP).

UNIT V YARN MASS EVENNESS AND SURFACE QUALITY 9

Yarn mass evenness parameters – measurement – electronic mass evenness determination – Yarn fault classification – Yarn Appearance; Yarn abrasion resistance – importance and

measuring technique. Yarn hairiness – importance and assessment techniques. Yarn friction – static and dynamic friction – methods of measurement

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Understand the principle of operation of equipments used for testing fibres and yarns
- Apply knowledge gained through this course, while operating the equipments
- Analyze and interpret the results obtained from quality evaluating systems of fibre and yarns

TEXT BOOKS:

1. Booth J.E., "Principle of Textile Testing", Butterworth Publications, London, 1989
2. Saville B.P., "Physical Testing of Textiles", Textile Institute, Manchester, 1998
3. Kothari V. K., "Testing and Quality Management", Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999

REFERENCES:

1. Arindam Basu, "Textile Testing", The South India Textile Research Association, Coimbatore, 2001
2. Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993.

TT8591 WOVEN FABRIC STRUCTURES L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn about structure of fabric and design the structure for different applications.

UNIT I **9**

Elementary weaves – plain and its derivatives, twill and its derivatives, satin, sateen and their derivatives – loom requirements

UNIT II **9**

Ordinary and Brighten Honey Comb; Huck-a-Back and its modifications; Mock Leno; crepe weaves; colour theory – light and pigment theory; modification of colour; application of colours; colour and weave effects – loom requirements

UNIT III **13**

Bedford cords - plain and twill faced, wadded; welts and piques, wadded piques; backed fabrics - warp and weft, reversible and non-reversible fabrics; extra warp and extra weft figuring - single and double colour – loom requirements

UNIT IV **9**

Pile fabrics; warp pile - wire pile, terry pile, loose backed; weft pile – plain back and twill back velveteen, lashed pile, corduroy, weft plush – loom requirements

UNIT V **5**

Double cloth, types of stitches; Damasks; Gauze and Leno principles – loom requirements, 3D woven structures.

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of this course the student will be able to

- Understand different structures of woven fabric
- Design the structure for different end uses
- Construct the draft and peg-plan which are required to convert the design into fabric

TEXT BOOKS:

1. Grosicki Z. J., "Watson's Textile Design and Colour", Vol.1, Woodhead Publications, Cambridge England, 2004
2. Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989

REFERENCES:

1. Wilson J., "Handbook of Textile Design", Textile Institute, Manchester, 2001.
2. Horne C.E., "Geometric Symmetry in Patterns and Tilings", Textile Institute, Manchester, 2000.
3. Seyam A. M., "Structural Design of Woven Fabrics, Theory and Practice", Textile Institute, Manchester, 2002.
4. Georner D, "Woven Structure and Design, part 1: Single Cloth Construction", WIRA, U.K., 1986
5. Georner D, "Woven Structure and Design, Part 2: Compound Structures", WIRA, U.K.,1989

TT8561 FABRIC ANALYSIS LABORATORY L T P C
0 0 4 2

OBJECTIVE:

- To train the students in analyzing the cloth to identify construction parameters and prepare design, draft and peg plan.

Analysis of construction details of the following fabric structure

1. Plain and its derivatives
2. Twill and its derivatives
3. Satin (Regular and irregular)
4. Sateen(Regular and irregular)
5. Honeycomb (ordinary and Brighton)
6. Huck-a-back
7. Extra warp and extra weft figuring
8. Pile fabrics (warp and weft)
9. Backed fabrics
10. Gauze and Leno
11. Double cloth
12. Crepe
13. Tapestry
14. Mock-leno
15. Bedford cord.
16. Single jersey
17. Double jersey structures
18. Analysis of blend composition in the yarn of the fabric
19. Analysis of finish on the fabric

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of the lab the student will be able

- Identify the constructional parameters of fabric
- Construct design, draft and peg plan for weaving the fabric
- Analyse the blend composition of yarn used in the fabric and the type of finish applied in the fabric

LAB EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. GSM Cutter – 3 Nos.
2. Beesley Balance – 2 Nos.
3. Crimp Tester – 2 Nos.
4. Electronic balance – 1 No.

HS8581 PROFESSIONAL COMMUNICATION L T P C
0 0 2 1

OBJECTIVES:

The couse aims to:

- Enhance the Employability and Career Skills of students
- Orient the students towards grooming as a professional
- Make them Employable Graduates
- Develop their confidence and help them attend interviews successfully

UNIT I

Introduction to Soft Skills-- Hard skills & soft skills - employability and career Skills—Grooming as a professional with values—Time Management—General awareness of Current Affairs

UNIT II

Self-Introduction-organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice— presenting the visuals effectively – 5 minute presentations

UNIT III

Introduction to Group Discussion— Participating in group discussions – understanding group dynamics - brainstorming the topic -– questioning and clarifying –GD strategies- activities to improve GD skills

UNIT IV

Interview etiquette – dress code – body language – attending job interviews– telephone/skype interview -one to one interview &panel interview – FAQs related to job interviews

UNIT V

Recognizing differences between groups and teams- managing time-managing stress- networking professionally- respecting social protocols-understanding career management-developing a long-term career plan-making career changes

TOTLA: 30 PERIODS

OUTCOMES:

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

- Make effective presentations
- Participate confidently in Group Discussions.
- Attend job interviews and be successful in them.
- Develop adequate Soft Skills required for the workplace

Recommended Software

1. Open Source Software
2. Win English

REFERENCES:

1. Butterfield, Jeff **Soft Skills for Everyone.** Cengage Learning: New Delhi, 2015
2. **Interact** English Lab Manual for Undergraduate Students,. OrientBalckSwan: Hyderabad, 2016.
3. E. Suresh Kumar et al. **Communication for Professional Success.** Orient Blackswan: Hyderabad, 2015
4. Raman, Meenakshi and Sangeeta Sharma. **Professional Communication**. Oxford University Press: Oxford, 2014
5. S. Hariharanetal. **Soft Skills**. MJP Publishers: Chennai, 2010.

TT8653 GARMENT MANUFACTURING TECHNOLOGY L T P C
4 0 0 4

OBJECTIVES:

- To enable the students to understand the basics of garment manufacturing, pattern making & sewing and garment wet processing
- To expose the students to various problems & remedies during garment manufacturing & processing

UNIT I **18**

Anthropometry, mass-production, mass-customization; pattern making, grading, marker planning, spreading & cutting

UNIT II **18**

Different types of seams and stitches; single needle lock stitch machine - mechanism and accessories; needle – functions, special needles, needle size, numbering, needlepoint; sewing thread construction, material, thread size, packages.

UNIT III **6**

Labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

UNIT IV **12**

Raw material, in process and final inspection; needle cutting; sewability of fabrics; strength properties of apparel; dimensional changes in apparel due to laundering, dry-cleaning, steaming and pressing; care labeling of apparel

UNIT V **6**

Garment dyeing, printing and finishing; pressing categories and equipment, packing

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of the course, the students will

- Know about pattern making, market planning, cutting and sewing of apparels
- Know about dyeing and finishing of garments

TEXT BOOKS:

1. Carr H., and Latham B., “The Technology of Clothing Manufacture”, Blackwell Science Ltd., Oxford, 1994.
2. Gerry Cooklin, “Introduction to Clothing Manufacture” Blackwell Science Ltd., 1995.

3. Harrison.P.W Garment Dyeing, The Textile Institute Publication, Textile Progress, Vol .19 No.2,1988.

REFERENCES:

1. Winifred Aldrich., "Metric Pattern Cutting", Blackwell Science Ltd., Oxford, 1994
2. Peggal H., "The Complete Dress Maker", Marshall Caverdish, London, 1985
3. Jai Prakash and Gaur R.K., "Sewing Thread", NITRA, 1994
4. Ruth Glock, Grace I. Kunz, "Apparel Manufacturing", Dorling Kindersley Publishing Inc., New Jersey, 1995.
5. Pradip V.Mehta, "An Introduction to Quality Control for the Apparel Industry", J.S.N. Internationals, 1992.

TT8651 CHEMICAL PROCESSING OF TEXTILE MATERIALS II L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to understand the theory of dyeing and printing of woven fabrics, knitted fabrics and garments

UNIT I COLOUR SCIENCE 9

Theories of colour measurement, Beer–Lambert's law and Kubelka-Munk theory and their application in colour assessment and colour matching; whiteness and yellowness indices.

UNIT II THEORY OF DYEING 9

Dyeing equilibrium; dye-fibre interaction; adsorption isotherm; dye affinity; heat of dyeing; half dyeing time.

UNIT III DYEING 13

Basic characteristics of dyes and pigments; classification of dyes and principle of application of dyes; Chemistry and technology of application of direct, reactive, disperse, acid and basic dyes; processing of denims; determination of fastness properties.

UNIT IV PRINTING 9

Methods and styles of printing; printing machines; constituents of printing paste; printing with direct, reactive, acid and disperse dyes; printing with pigments

UNIT V KNITS AND GARMENTS 5

Dimensional stabilization of tubular and open width knits; garment dyeing and printing; garment

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course the student will have knowledge on

- Colour, perception of colour
- Different class of dyes and ways of coloration
- Knit and garment processing
- Need of various finishes to the fabric.

TEXT BOOKS:

1. Shah H.S., and Gandhi R.S., "Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles", Mahajan Book Publication, 1990, ISBN: 8185401004 / ISBN: 9788185401003

2. Choudhury A.K.R., “Modern concepts of colour and Appearance”, Oxford and IBH publishing Ltd., 2000, ISBN: 1578080789 | ISBN-13: 9781578080786
3. Gulrajani M.L.(Ed.)., “Colour Measurement - Principles, advances and industrial applications", Wood head Publishing Ltd, 2010, ISBN: 1845695593 | ISBN-13: 9781845695590
4. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt.Ltd. New Delhi, 1994 , ISBN: 0471809101 | ISBN-13: 9780471809104
5. Shenai V.A., “Chemistry of Dyes and Principles of Dyeing”, Sevak Publications, Mumbai, 1995.

REFERENCES:

1. Chakraborty J.N., "Fundamentals and practice in Colouration of Textiles", Wood head Publishing India Pvt Ltd, India, 2010, ISBN: 184569788X | ISBN-13: 9781845697884.
2. Mittal R.M., and Trivedi S.S., “Chemical Processing of Polyester/Cellulosic Blends”, 2nd ed., Tata McGraw Hill, 2000.
3. Burkinshaw S. M., “Chemical Principles of Synthetic Fibre Dyeing", Springer-Science + Business Media, B.V., 2012, ISBN: 9401042632 | ISBN-13: 9789401042635.
4. Shenai V. A., “Technology of Printing”, Sevak Publications, Mumbai, 1996.
5. Miles W. C., “Textile Printing”, Wood head Publication, 2003, ISBN 0 901956 76 1.
6. Jones B. W., “Garment Dyeing: Ready to Wear Fashion from the Dyehouse”, Textile Progress, Vol. 19, No. 2, 1988, ISBN 1870812131.
7. Roshan Paul (Ed.)., “Denim – Manufacture Finishing and Applications”, Wood head Publishing, 2015, ISBN: 0857098438 | ISBN-13: 9780857098436

TT8654 MECHANICS OF TEXTILE MACHINERY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Basic elements used in the textile machinery
- Design of cams, cone drums and other important elements used in the textile machinery

UNIT I **5**

Equations of forces, motion and energy; energy stored in rotating masses.

UNIT II **9**

Clutches and brakes – types, application in textile machines; gears, gear trains; power transmission – different modes, advantages and limitations, applications

UNIT III **9**

Differential and variable speed drives – principles, application in textile machines; design of cone drums – piano feed regulation, roving machine builder mechanism;

UNIT IV **9**

Friction – calculations; bearings, design of drive transmitting shafts, balancing of rotating masses

UNIT V **13**

Design of winder drums; kinematics of shedding; design of tappets; beat up force, sley eccentricity; power for picking

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course students will

- Have knowledge of types of gears, gear trains and their applications
- Be able to design cams, tappets and cone drums used in the spinning machinery
- Be able to understand the design aspects of machine elements for specific requirements

TEXT BOOKS:

1. Booth J. E., "Textile Mathematics", Vol. 2&3, The Textile Institute, Manchester, 1975.
2. Slater K., "Textile Mechanics", Vol. 1&2, The Textile Institute, Manchester, 1977.

REFERENCES:

1. Rengasamy R. S., "Mechanics of Spinning Machines", NCUTE, Ministry of Textiles, Govt. of India, 2000.
2. https://nptel.ac.in/courses/116102012

TT8652 FABRIC AND GARMENT QUALITY EVALUATION L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn about the construction of fabrics and evaluation of fabric properties and their importance

UNIT I CONSTRUCTION CHARACTERISTICS 9

Basic fabric particulars – Measurement of ends and picks per inch, count of warp and weft, determination of the type of weave, measurement of length, width, thickness and Area density (GSM); warp and weft crimp measurements for spun and filament yarn fabrics, the cover factor calculations; Fabric sampling techniques.

UNIT II STRENGTH CHARACTERISTICS 9

Tensile strength measurement – ravelled strip test and grab test – mechanical and electronic measuring systems. Tear strength – importance – measuring systems. Bursting strength and its measurement. Ballistic impact strength. Universal tensile tester - principle and operation

UNIT III COMFORT AND SURFACE CHARACTERISTICS 9

Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drape coefficient; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability testers, water repellency, contact angle and fabric shrinkage testing; Fabric abrasion resistance – measuring technique; Fabric pilling resistance – methods of determination.

UNIT IV SPECIAL CHARACTERISTICS 5

Fabric bending hysteresis testing; Shear hysteresis measurements; Fabric compression and decompression behaviour; Fabric surface roughness and friction measurements; Fabric tensile hysteresis measurements; Fabric flame resistance testing methods; Moisture and thermal characteristics.

UNIT V FABRIC INSPECTION AND GARMENT QUALITY 13

Fabric inspection – Manual, semi-automatic and Automatic Inspection systems, classification of fabric defects, independent product quality certification, acceptable quality level, MIL standards and final inspection. Quality assessment of garments - cutting, sewing, pressing, finishing and packageing defects.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, students would be able to

- Evaluate the constructional parameters of fabrics
- Understand the principle of measurement of fabric characteristics
- Analyze the various reports generated during quality evaluation of fabric
- Understand the evaluation of garment quality

TEXT BOOKS:

1. Booth J.E., “Principle of Textile Testing”, Butterworth Publications, London, 1989
2. Saville B.P., “Physical Testing of Textiles”, Textile Institute, Manchester, 1998
3. Kothari V. K., “Testing and Quality Management”, Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999

REFERENCES:

1. RuthE clock and Grace Kunz., "Apparel Manufacture – Sewn Product Analysis", Upper Sadle River Publications, New York, 2000
2. Pradip V. Mehta., "Managing Quality in the Apparel Industry", NIFT Publication, India, 1998
3. Sara J. Kadolph., 'Quality Assurance for Textiles and Apparels', Fair Child Publications, New York, 1998
4. Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993.

TT8681 TEXTILE CHEMICAL PROCESSING LABORATORY L T P C
0 0 4 2

OBJECTIVE:

- To train the students in pre treatment and wet processing of textile materials

LIST OF EXPERIMENTS

1. Desizing and scouring of cotton fabric.
2. Peroxide Bleaching of Cotton Yarn/Fabric.
3. Degumming of silk.
4. Identification of dyes
5. Dyeing of Cotton using Reactive dyes.
6. Dyeing of Cotton using Vat dye.
7. Dyeing of polyester using disperse dyes.
8. Dyeing of polyester and cotton blend
9. Determination of wash, light, perspiration and rubbing fastness of dyed fabrics.
10. Printing of cotton fabric using direct style.
11. Determination of Whiteness and Yellowness index
12. Determination of K/S of dyed fabrics using Spectrophotometer
13. Water proof and Flame retardant finishing of cotton.
14. Resin and softener finishes.
15. Antimicrobial Finish Evaluation

TOTAL: 60 PERIODS

OUTCOME:

- Upon completing this practical course, the student would be able to desize, bleach, dye, print and finish the fabric with different types of chemicals and colourants

LAB EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Stainless vats (500 ml)	-30 Nos.
2. Water bath	-2 Nos.
3. Stirrer	-1 No.
4. Steam ager	-1 No.
5. Pilot padding mangle	-1 No.
6. HTHP Beaker dyeing machine	-1 No.
7. Pilot curing chamber	-1 No.
8. Fastness tester for Washing, Light, Perspiration & Rubbing	-1 No.
9. Printing table	-1 No.
10. Spectrophotometer	-1 No.

TT8611 KNITTING AND GARMENT CONSTRUCTION LABORATORY L T P C
0 0 4 2

OBJECTIVE:

- To train the students on construction of different types of garments

LIST OF EXPERIMENTS

1. Formation of Stitch classes.
2. Sewing practice of seam types – superimposed seam, lapped seam, bound seam and flat seam.
3. Sewing of plackets
4. Sewing of pockets
5. Sewing of different types of sleeves
6. Sewing of different types of collars
7. Assembling of various garment components using appropriate seams
8. Practice in Button hole and button stitch machines
9. Practice in Feed-off the arm machine
10. Practice in Flat lock machine
11. Study of plain, rib and interlock circular knitting machines
12. Study of flat knitting machines

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this practical course, the students can

- Carry out different types of stitching, button holing and button stitching and would have hands on experience on different machines used for garment manufacture
- Understand drafting and draping

LAB EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Circular knitting machine (Plain, rib and interlock)	– 1 each.
2. Single Needle Lock stitch machine	– 15 Nos.
3. Button hole machine	– 1 No.
4. Button attaching machine	– 1 No.
5. Feed off arm machine	– 1 No.
6. Flat lock Machine	– 1 No.

FT8661 TEXTILE QUALITY EVALUATION LABORATORY L T P C
0 0 4 2

OBJECTIVE:

- To make the students practically learn various fibre, yarn and fabric evaluation procedures to determine characteristics of fibres, yarn and fabric

LIST OF EXPERIMENTS

Determination of

1. Fibre fineness, length and maturity
2. Fibre trash content, Bundle fibre strength
3. Sliver/roving/ yarn linear density
4. Single yarn strength and Yarn Lea strength
5. Yarn single and ply yarn twist
6. Unevenness of yarn and assessment of yarn appearance
7. Fabric tensile strength
8. Fabric tear and bursting strength
9. Fabric flexural rigidity, bending modulus and crease recovery
10. Drapeability of fabrics
11. Fabric abrasion and pilling resistance
12. Fabric air permeability and thickness
13. Seam strength and seam slippage

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion the students will be able to

- Measure important characteristics of fabric and garment
- Interpret the results obtained during evaluation of fabrics

LAB EQUIPMENTS

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

Baer Sorter	- 1 No.
Fibre Bundle strength tester	- 1 No.
Fibre Fineness tester	- 1 No.
Trash Analyser	- 1 No.
Projection Microscope	- 1 No.
Wrap Reel	- 1 No.
Wrap Block	- 1 No.
Yarn Twist Tester	- 1 No.
Single Yarn Strength Tester	- 1 No.
Bundle yarn strength tester	- 1 No.
Ballistic Tester	- 1 No.
Yarn Unevenness tester	- 1 No.
Weighing balance	- 1 No.
Yarn appearance Board Winder	- 1 No.
Yarn appearance Board (Standards)	- 1 No.
Fabric tensile strength tester	-1 No.
Fabric tearing strength tester	-1 No.
Fabric Thickness Tester	-1 No.
Fabric Stiffness Tester	-1 No.
Fabric Crease Recovery Tester	-1 No.

Fabric Bursting Strength Tester -1 No.
Fabric Abrasion Resistance Tester -1 No.
Fabric Pilling resistance tester -1 No.
Fabric air permeability tester -1 No.
Fabric Drape meter -1 No.

TT8751 FINANCIAL MANAGEMENT IN TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to understand

- Basics of financial management that are required for the textile industry
- Determination of cost of yarn, fabric and garment

UNIT I **18**

Costing - concepts; classification of costs; preparation of cost sheet; costing of yarn, fabric and garment; cost profit volume analysis, breakeven analysis

UNIT II **9**

Depreciation – method of computing depreciation; techniques of investment analysis – payback period method, accounting rate of return, Discounted Cash Flow methods - IRR, NPV, PI

UNIT III **9**

Capital structure; Sources and cost of capital; working capital management

UNIT IV **9**

Tools for financial analysis and control- profit and loss account, balance sheet; ratio analysis - illustrations from textile unit

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Explain the basics of financial management applied to textile industry
- Understand the economical feasibility of capital investment, sources of capital and cost of capital applied

TEXT BOOKS:

1. M.Y. Khan and P.K.Jain, "Financial management, Text, Problems and cases" Tata McGraw Hill, 5th edition, 2008.
2. M. Pandey, "Financial Management", Vikas Publishing House Pvt. Ltd., 8th edition, 2007.
3. Khanna, O.P, "Industrial Engineering and Management", Dhanpat rai publications, New Delhi, 2005.

REFERENCES:

1. Bhave P.V. and Srinivasan V., "Costing Accounting to Textile Mills", ATIRA, Ahmadabad, 1976
2. Thukaram Rao M.E., "Cost and Management Accounting", New Age International, Bangalore, 2004
3. Thukaram Rao M.E., "Cost Accounting and Financial Management", New Age International, Bangalore, 2004
4. Prasanna Chandra, "Financial Management, Theory and Practice", Tata McGraw-Hill Publishing Company Ltd, 5th Edition, New Delhi, 2001

5. James C. Vanhorne, "Financial Management and Policy", Pearson Education Asia (Low Priced Edition) 12th Edition, 2002
6. Narang, G. B. S. and Kumar V., "Production and Costing", Khanna Publishers, New Delhi, 1988
7. Aswat Damodaran, "Corporate Finance Theory and Practice", John Wiley & Sons, 2000
8. Hrishikes Bhattacharya, "Working Capital Management, Strategies and Techniques", Prentice – Hall of India Pvt. Ltd., New Delhi, 2001
9. Khan and Jain, "Basic Financial Management and Practice", Tata McGraw Hill, New Delhi, 5th Edition, 2001

TT8791 OPERATIONS RESEARCH IN TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Various operations research (OR) methods that can be applied in the textile industry
- Designing of OR problem related to textile industry
- Method of solving OR problems

UNIT I **9**

Scope of operation research, applications, limitations; linear programming problems – construction, solutions by graphical method, simplex method, Big M method; sensitivity analysis; application of LP technique for mixing optimization in spinning mill

UNIT II **9**

Transportation problem – construction, initial basic feasible solution – North West Corner rule, lowest cost entry method, Vogel's Approximation Method; optimality test - … method, stepping stone method; replacement analysis

UNIT III **9**

Assignment problem – construction, solution by Hungarian method, application in textile industry; sequencing problems; integer programming – construction, solving by cutting plane method

UNIT IV **9**

Decisions theory - decisions under assumed certainty, decision under risk, decision under uncertainty, illustrations from textile industry; inventory control - EOQ models-deterministic models –probabilistic models, simulation theory, models, queuing system.

UNIT V **9**

Project planning and control models: CPM, PERT – network representation, determining critical path, project duration; crashing of project duration; resource leveling

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Design operations research problems that can be applied to textile industry.
- Solve the OR problems

TEXT BOOKS:

1. Hamdy A Taha, "An Introduction to Operations Research, Prentice Hall, 8th Edition.
2. Panneerselvam R., "Operations Research", Prentice Hall of India, 2002
3. Sharma J. K., "Operations Research: Theory and Applications", Macmillan, 1997

REFERENCES:

1. Hillier and Lieberman, "Introduction to Operations Research", McGraw-Hill International Edition, Seventh Edition, 2001
2. W.J. Fabrycky, P.M. Ghare & P.E. Torgersen, "Applied Operation Research and Management Science" Prentice Hall, New Jersey, 1984
3. Tulsian P.C., "Quantitative Techniques Theory and Problems", Dorling Kindersley (India) Pvt. Ltd., 2006
4. Ronald L. Rardin, "Optimization in Operations Research", Pearson Education, 1998
5. Srivastava U.K., Shenoy G.V., Sharma S. C., "Quantitative Techniques for Managerial Decision", Second Edition, New Age International (P) Ltd., 2007
6. Gupta P. K., Hira D.S., "Problems in Operations Research", S. Chand & Company, 2002
7. Mustafi C.K., "Operations Research: Methods and Practice", 3rd Edition, New Age International (P) Ltd., 2007

TT8792 TECHNICAL TEXTILES L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn about production, properties & application of various technical textile products viz., tyre cords, fabrics, belts, filter fabrics and medical textiles.

UNIT I HIGH PERFORMANCE FIBRE 9

Manufacture of glass filaments and staple fibre - manufacture of staple fibre yarn properties and applications of filament and staple fibre yarns. Asbestos Thread: Manufacturing process - properties and applications of asbestos yarn. Ultra High Modulus fibres - Carbon fibres - Aramid and related fibres.

UNIT II TYRE CORDS AND FABRICS 9

Requirements of tyre cord - suitability of various fibres-Polyester and Nylon tyre cords - manufacture of tyre cords - physical and mechanical property requirements of tyre cord fabrics-fabric design - Specifications - Rubberised textiles.

UNIT III BELTS 9

Conveyor belts - physical and mechanical properties-construction, manufacture of conveyor belts & power transmission belts. HOSE: Construction, applications and properties (physical and mechanical).

UNIT IV FILTER FABRICS 9

General consideration of filtration of solids from liquids, solid from gases, solids from solids, liquids from liquids, liquids from gases and gases from gases. PROTECTIVE CLOTHING: Fire protection-thermal protection - electro-magnetic protection - water proof fabrics - protection against microorganisms, chemicals and pesticides - protection against aerosols.

UNIT V MEDICAL TEXTILES 9

Surgical Textiles - Suture threads, Cardio Vascular Textiles - Knitted cardiac biological valves. Dialysis Textiles- Hollow fibres as dialysis membrane. Hospital Textiles - Operation and post operation clothing—disposable draperies; sanitary applications. GEO-TEXTILES: Geo Textile functions - raw materials - woven, non-woven and knitted geo textiles Applications of geo-textiles for drainage, separation, soil reinforcement, filtration and erosion control. Textile materials in foot-wear, automotive, agriculture and maritime applications.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Understand different high performance fibres and their properties
- Explain various method of production of technical textiles, their properties and applications

TEXT BOOKS:

1. Horrocks A. R., Anand S.C., “Handbook of Technical Textiles”, Woodhead Publishing, Cambridge, 2000
2. Adanur S., “Handbook of Industrial Textiles”, Technomic Publication, Lancaster, 2001

REFERENCES:

1. Kanna M.C., Hearle, O Hear., Design and manufacture of Textile Composites, Textile progress , Textile Institute, Manchester, April 2004.
2. Scott,Textile for production, Textile progress , Textile Institute, Manchester, Oct. 2005.
3. Shishoo,Textile in spot, Textile progress, Textile Institute, Manchester, Aug. 2005
4. Fung W., Collins & Aikman Textiles in Automotive Engineering ,Woodhead Publishing Ltd., UK, 2000.
5. Kennady, Anand Miraftab, Rajandran, Medical Textile & Biomaterials for Health care, Woodhead publishing Ltd., UK, 2005.

TT8851 BONDED FABRICS L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about the

- Fundamentals of bonded fabrics
- Different method of web formation and bonding

UNIT I FUNDAMENTALS OF BONDED FABRICS 5

Definitions and classification of bonded fabrics; fibres, fibre preparations and their characteristics for the production of bonded fabrics, uses; methods of bonded fabric production

UNIT II WEB FORMATION WITH STAPLE FIBRES 9

Production of staple-fibre web by dry and wet methods; influence of web laying methods on fabric properties; quality control of web

UNIT III MECHANICAL, CHEMICAL AND THERMAL BONDING 13

Bonded fabric production by mechanical bonding - needling, stitching, water jet consolidation; Thermal Bonding technologies; Chemical bonding – Binder polymers and bonding technologies

UNIT IV POLYMER – LAID WEB AND FABRIC FORMATION 9

Manufacture of Spun bonded fabrics, fibre orientation in spun bonded fabrics and characterization of filament arrangement; Manufacture of Melt blown fabrics – fibre formation and its attenuation; Effect of processing parameters on fabric characteristics

UNIT V FINISHING AND APPLICATION OF BONDED FABRICS 9

Dry and Wet finishing; Characterization, structure - property relationship in bonded fabrics; End uses of bonded fabrics

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course the student will be able to

- Explain different types of nonwovens and their method of production

- Explain different type of finishes applied on the fabric and their end uses
- Choose appropriate bonded technique for getting desired properties in fabric.

TEXT BOOKS:

1. Lunenschloss J., Albrecht W. and David Sharp., "Nonwoven Bonded Fabrics", Ellis Horwood Ltd., New York, 1985.
2. Russell S., "Hand Book of Nonwovens", Textile Institute, Manchester, 2004.
3. Chapman R., "Applications of Nonwovens in Technical Textiles", Textile Institute, Manchester, 2010.

REFERENCES:

1. Mrstina V. and Feigl F., "Needle Punching Textile Technology", Elsevier, New York, 1990.
2. Dharmadhikary R. K., Gilmore T. F., Davis H. A. and Batra S. K., "Thermal Bonding of Nonwoven Fabrics", Textile Progress, Vol.26, No.2, Textile Institute Manchester,1995.
3. Jirsak O. and Wadsworth L. C., "Nonwoven Textiles", Textile Institute, Manchester, 1999.

TT8811	PROJECT WORK	L	T	P	C
		0	0	20	10

OBJECTIVE:

- To objective of the project work is to make use of the knowledge gained by the student at various stages of the degree programme.

The students are assigned project work related to product / process development, solution to the technical problems in industry and current research at national and international level. The student is required to submit a report at the end of semester based on the findings. The evaluation is made as per the Regulations of University.

TT8001 NEW SPINNING TECHNOLOGIES L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn the theory of yarn formation by rotor spinning, friction spinning, air vortex spinning, air-jet spinning and other spinning systems and the effect of process parameters used in the spinning system on yarn quality

UNIT I ROTOR SPINNING 18

Principle of open end spinning; working principle of rotor spinning machine and theory of yarn formation; requirements of the materials; preparation of the sliver for rotor spinning; design of rotor, opening roller, navel and their implications on production and yarn quality; process parameters in rotor spinning; back doubling, production calculation, techno economic study.

UNIT II FRICTION SPINNING 9

Working principle of DREF2, DREF3, DREF 2000 machines, theory of yarn formation in friction spinning, raw materials requirement, characteristics of yarn, application of yarn; the economics; technological limitations.

UNIT III AIR JET AND AIR VORTEX SPINNING 9

Principle of yarn production in air-jet and air vortex spinning machines; structure and quality of the air-jet, air vortex spun yarns; raw material requirement, process parameters used in production, yarn characteristics, application of yarn.

UNIT IV OTHER SPINNING TECHNOLOGIES 9

Production of yarn in PLYfil spinning, self-twist spinning, electrostatic spinning, Bobtex spinning; production of double-rove yarns, core spun yarns and wrap yarns; raw material requirement, yarn characteristics and their application.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall know the

- Principle of yarn formation by rotor, friction, air-jet, air vortex and other spinning systems
- Process parameters used in these machines

TEXT BOOK:

1. Oxtoby E., "Spun Yarn Technology", Butterworths, London, 1987.
2. Klein W., “New Spinning Methods ", The Textile Institute, Manchester, 1993.
3. Dyson E., "Rotor Spinning, Technical and Economics Aspects ", Textile Trade Press, New Mills, Stock Port, 1975.

REFERENCES:

1. Salhotra K.R. and Ishtiaque S.M., "Rotor Spinning; its advantages", Limitations and Prospects in India, ATIRA, Ahmedabad, 1995.
2. Lord P.R, "Yarn Production; Science, Technology and Economics", The Textile Institute, Manchester, 1999.
3. Trommer G., "Rotor Spinning", Meliand Textilebenchte GmbH, Rohrbacher, 1995.
4. Lawerence C.A and Chen K.Z., "Rotor Spinning", Textile Progress, The Textile Institute, Manchester, 1984.

TT8082 TEXTILE STRUCTURAL MECHANICS L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to learn about the structure of ideal and real yarn, migration of fibres in the yarn, breakage mechanism of yarn, mechanics of blended yarns and relationship between structure and property of yarns produced by different spinning systems.

UNIT I YARN GEOMETRY 13

Idealized helical yarn structure; yarn count and twist factors, twist contraction; packing of fibers in yarns; measurement of packing density and radial packing density of yarn; measurement of yarn diameter; ideal migration, tracer fiber technique, characterization of migration behavior, migration in blended yarns, mechanisms of migration, effect of various parameters on migration behavior.

UNIT II MECHANICS OF CONTINUOUS FILAMENT YARNS 9

Analysis of tensile behavior; prediction of breakage; analysis of yarn mechanics by energy method; observed extension and breakage of continuous filament yarns; mechanics of torque in filament yarns

UNIT III MECHANICS OF STAPLE FIBRE YARNS 5

Theoretical analysis; fiber obliquity and slippage; influence of fiber length, fineness and friction; strength of blended yarns - Hamburger's model

UNIT IV WOVEN FABRIC GEOMETRY AND DEFORMATION 13

Elements of woven fabric geometry; Pierce and Olofsson models - form factor; jamming of threads, cover factor; crimp interchange, degree of set; modification to Pierce model - race track, saw tooth and bilinear models, extension behavior of woven fabric; prediction of modulus, tensile properties in bias direction; other fabric deformation - shear, buckling, bending and compression; fabric handle

UNIT V NONWOVEN AND KNITTED STRUCTURES 5

Geometry of plain knitted structure, mechanics of non-woven fabrics

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course the student will be able to understand the

- Models proposed for geometry of woven fabrics
- Characteristics of fabric on deformation
- Structural characteristics of knitted and nonwovens and the student can design the fabric to get the desired property

TEXT BOOKS:

1. Hearle J. W. S., “Structural Mechanics of Fibers, Yarns and Fabrics”, Wiley Interscience, New York, 1969.
2. Jinlian Hu., “Structure and Mechanics of Woven Fabrics”, Woodhead Publishing Ltd., 2004.
3. Goswami B. C., "Textile Yarns: Technology, Structure and Applications", WileyInterscience – New York, 1977, ISBN: 0471319007

REFERENCES:

1. Hearl J. W. S., "Structural Mechanics of Fibers, Yarns and Fabrics", Wiley Inter science, New York, 1969, ISBN: 0471366692.
2. Hearle J. W. S., John J., Thwaites. and JafargholiAmirbayat., "Mechanics of Flexible Fibre Assemblies", Sijthoff and Noordhoff, 1980, ISBN: 902860720X.

3. Jinlian Hu., "Structure and Mechanics of Woven Fabrics", Woodhead Publishing Ltd., 2004, ISBN: 1855739046.
4. Hassan M. Berery., "Effect of Mechanical and Physical properties on Fabrics Hand", Woodhead publishing Ltd., 2005, ISBN: 13: 978 – 1- 85573 -9185.

TT8071 APPAREL PRODUCTION MACHINERY L T P C
3 0 0 3

OBJECTIVE:

- To acquaint students of the basic production machinery and equipments used in apparel construction

UNIT I FABRIC INSPECTION AND SPREADING MACHINES 9

Fabric inspection devices – manual and automatic – modes of fabric feeding, fabric tension controller and modern developments; Spreading machines – manual, semi automatic and fully automatic machines, fabric control devices in spreading machines

UNIT II CUTTING MACHINES 9

Mechanism of straight knife cutting machines, rotary cutting machines, band knife cutting machines, die cutting, laser cutting, plasma cutting, water jet cutting and ultra sonic cutting; Notches, drills and thread markers; Computer interfaced cutting machines.

UNIT III SEWING MACHINES 9

Sewing machines – primary and secondary components; Working principle, stitch formation and timing diagram - lock stitch and chain stitch; single needle and double needle lock stitch mechanism: needle bar, hook – rotary and feed mechanism; Needles – geometry, types and selection

UNIT IV SPECIAL SEWING MACHINES 9

Over lock, Flatlock, Feed off arm, button fixing and button holing; Embroidery machines – mechanism and stitch formation; Sewing machines feed mechanisms; sewing machine attachments

UNIT V FINISHING MACHINES 9

Molding machineries; Shrinking machineries – London shrinking, hot-water shrinking, steam sharking and compaction shrinkage; Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers and advanced pressing machineries; Pleating – principles and mechanics machineries

TOTAL: 45 PERIODS

OUTCOME:

- Upon completion of the course the student will be able to understand the fundamental principles and working of garment production machinery and the interrelationship of assembly methods

TEXT BOOKS:

1. Harold Carr& Barbara latham, “The Technology of Clothing Manufacture”, Black well Sciences, 1996.
2. Jacob Solinger., “ Apparel Manufacturing Handbook “, VanNostrand Reinhold company 1980.

REFERENCES:

1. Ruth E. Glock and Grace I. Kunz, "Apparel Manufacturing Sewn Product Analysis", Pearson Prentice Hall, 2005.
2. Singer, "Sewing Lingerie", Cy DeCosse Incorporated, 1991.
3. Laing R.M. and Webster J," Stitches and Seams", The Textile Institute, Manchester, 1999

TT8092 DENIM MANUFACTURING L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Requirement of fibre, yarn
- Production of fabric, dyeing and finishing
- Stitching for denim garments

UNIT I **5**

An overview on denim and jeans; fiber qualities for denim yarn production; yarns for denim production and their characteristics

UNIT II **9**

Indigo dye and its reduction; dyeing technology of denim yarns; non-indigo dyes for denims; weaving and finishing of denim fabrics.

UNIT III **13**

Denim garment manufacture -types of garments and production sequence, seams and stitches, sewing threads and needles, sewing machines, fastenings, trims, pressing and Inspection.

UNIT IV **9**

Dry and wet finishes to produce effects and colours on denim garments; novel denims

UNIT V **9**

Dyeing of denim garments; digital printing of denim garments; comfort aspects of denim

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the students shall know about

- Fibres and yarns used for production of denim garments
- Weaving and chemical processing of denim fabrics
- Stitching and finishing of denim garments

TEXT BOOK:

1. Parmar M. S., Satsangi S. S., and Jai Prakash, “Denim – A fabric for ALL (Dyeing, Weaving, Finishing)”, NITRA, Ghaziabad, India, 1996.
2. Roshan Paul (Ed.), “Denim – Manufacture, Finishing and Applications”, Woodhead Publishing, 2015, ISBN: 0857098438 | ISBN-13: 9780857098436

REFERENCES:

1. Denim: Manufacture, Finishing & Applications, Ed. by Roshan Paul, The Textile Institute, Manchester, 2016
2. Denim: A Fabric for all Dyeing, Weaving & Finishing by M.S. Parmar, S.S. Satsangi, Dr. Jai Prakash, NITRA, 1996

GE8071 **DISASTER MANAGEMENT** **L T P C**
3 0 0 3

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj

Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.

TEXT BOOKS:

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES:

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

TT8002 POLYMER CHEMISTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Fibre forming polymer characteristics and their related models and models describing fibre structure.
- Conducting of experiments to characterize the polymers and fibres

UNIT I **9**

Synthetic fibre forming polymers, definition, terms and fundamental concepts of polymerization; molecular architecture in polymers-configuration and conformation, random chain model and rms end-to-end distance of polymeric chain

UNIT II **9**

Glass transition temperature (Tg), Factors affecting Tg, WLF equation; Rubber Elasticity; Melting and Crystallization, polymer solutions- solubility parameter and its significance to fibre spinning.

UNIT III **9**

Newton's law of viscosity, velocity distribution in flow systems Newtonian and non-newtonian fluids; mass transfer operations: Fick's law of diffusion, solid-liquid extraction and drying operations with application to polymer chips.

UNIT IV **9**

Deformation of elastic solid, viscoelasticity and its measurement, non-linear viscoelasticity, yield behavior of solids and breaking phenomena

UNIT V **9**

Mechanical properties of natural and synthetic fibres, moisture sorption behaviour of natural and synthetic fibres. Models describing fibre structure, Fringed fibrillar and fringed micellar model, One phase model.

TOTAL: 45 PERIODS

OUTCOME:

- Upon completion of this course, the student shall be able to correlate the physical properties of polymer to its microstructure able to characterize polymers and fibres

TEXT BOOK:

1. Gowrikar V. R. , Viswanathan N.V. and Jayadev Sreedhar, “Polymer Science”, New Age Publication, New Delhi 2003.
2. Gupta V. B. and Kothari V. K. , “Manufacture Fibre Technology”, Chapman and Hall Publication, UK 1997.
3. Billmayer F. M., “ Text Book of Polymer science”, Wiley Inter Science, New York, 2002.

REFERENCES:

1. Billmeyer, “Textbooks of Polymer Science”,3rd ed., Wiley, 1984.
2. Sperling, “Introduction to Physical Polymer Science”, Wiley, 1986.
3. Gupta.V.B. and Kothari V.K., “Man Made Fibre Production”, Chapman and Hall, 1985
4. Kothari V.K., “Textile Fibres: Developments and innovations”, IAFL Publication, 2000
5. Hongu T. and Philips G., “New Fibres”, Wood Head Publishing Ltd,1997

TT8003 PATTERN ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To introduce students the human anthropometrics from the scientific and technological view point
- To equip students with comprehensive pattern making skills

UNIT I ANTHROPOMETRICS AND PATTERN TERMINOLOGIES 9

Anthropometry measurements, human anatomy, landmark terms, Important body measurements across all age groups. Functions of pattern making tools, preparation of dress form , pattern grain line, balance line terms, notches, seam allowance, jog seam, dart points, pleats, flares, gather and true bias, trueing, blending.

UNIT II PATTERNS FOR TOPS 9

Basic block for men and women – front bodice draft, back bodice draft, sleeve, adding seam allowance and pattern information.

UNIT III PATTERNS FOR BOTTOMS 9

Pant foundation – front and back, waist band; pant derivatives; skirt foundation – front and back, patterns for A- line skirt, circular skirt and gathered skirt.

UNIT IV PATTERNS FOR COLLARS AND SLEEVES 9

Collar classification and terms, peter pan collar, sailor collar, mandarin collar, built-up neck lines, cowls, sleeve cap, sleeve cuffs, puff, petal, lantern and leg-of-mutton sleeves

UNIT V FLAT PATTERN TECHNIQUES AND GRADING 9

Dart manipulation- single dart series-slash-spread technique, pivotal transfer technique; two dart series-slash spread and pivotal transfer technique; graduated and radiating darts; grading process, grade rules and types of grading system.

TOTAL: 45 PERIODS

OUTCOMES:

On completion of this course, the students shall have knowledge on

- Clothing sizing system and body measurements

- Drafting and pattern preparation
- Dart manipulation and grading process

TEXT BOOKS:

1. Helen Joseph Armstrong., "Patternmaking for Fashion Design", Pearson Education Pvt Ltd., 2005,ISBN: 067398026X | ISBN-13: 9780673980267
2. Fan J., Yu W., and Hunter L., "Clothing Appearance and Fit: Science and Technolog", Wood head Publishing Limited, 2004, ISBN: 1855737450 | ISBN-13: 9781855737457.
3. Ruth E. Glock., and Grace I. Kunz., "Apparel Manufacturing, Sewn Product Analysis", fourth edition, Pearson Education,2004, ISBN: 0131119826 ISBN-13: 9780131119826.
4. Laing R.M., and Webster J., "Stitches & Seams", The Textile Institute, India,1999, ISBN: 1870812735 | ISBN-13: 9781870812733
5. Singer., "Sewing Lingerie", Cy De Cosse Incorporated, 1991,ISBN: 0865732604 | ISBN-13: 9780865732605

REFERENCES:

1. Ashdown S., "Sizing in Clothing", Wood head Publishing Limited, 2007, ISBN: 1845690346 | ISBN-13: 9781845690342
2. Jacob Solinger., "Apparel Production Handbook", Reinhold Publications,1998, ISBN: 1879570009 / ISBN: 978-1879570009
3. Winifred Aldrich., "Metric Pattern Cutting for Children's Wear and Baby Wear", Blackwell Publishing, 2009, ISBN: 140518292X | ISBN-13: 9781405182928
4. Carr H., and Latham B., "The Technology of Clothing Manufacturing", Blackwell Science, U.K.,1994, ISBN: 0632037482 | ISBN-13: 9780632037483

TT8081 TEXTILE EXIM MANAGEMENT L T P C
3 0 0 3

OBJECTIVE:

- To give the students an exposure on international market for textile products, regulations with respect to export and import of textiles

UNIT I **5**

International markets for yarns, woven fabrics; international market for cotton, silk, jute, wool and other fibres; export and import of textiles by India – current status, promotional activities

UNIT II **5**

International markets for carpets and home textiles – product types, market potential and statistics, India - current status and promotional activities, role of export promotional councils

UNIT III **9**

International markets for woven piece goods, knitted garments, leather garments; statistics of international apparel market and trade; export incentives, role of AEPC, CII, FIEO, Textile Committee

UNIT IV **13**

Marketing – strategies, global brand building; logistics & SCM; role of export finances & EXIM banking, ECGC, Indian council of arbitration, FERA; impact of foreign trade on Indian economy

UNIT V **13**

Exim policy - customs act, acts relating to export/import of textile and apparel; Indian customs formalities - export documentation for excisable goods, import documentation, clearance of import

goods; concepts - 100% export oriented units, export processing zones, special economic zones; duty drawback procedure; import/export incentives; licenses; case study

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall have the knowledge on

- International market for textile products
- Global marketing strategies and
- EXIM policy and procedures

TEXT BOOKS:

1. Charles W.I. Hill and Arun Kumar Jain, “International Business”, 6th edition, Tata Mc Graw Hill, 2009
2. John D. Daniels and Lee H. Radebaugh, “International Business”, Pearson Education Asia, New Delhi, 2000
3. K. Aswathappa, “International Business”, Tata Mc Graw Hill, 2008

REFERENCES:

1. Michael R. Czinkota, IlkkaA. Ronkainen and Michael H. Moffet, “International Business”, Thomson, Bangalore, 2005
2. Aravind V. Phatak, Rabi S. Bhagat and Roger J. Kashlak, “International Management”, Tata Mc Graw Hill, 2006
3. Oded Shenkar and Yaong Luo, “International Business”, John Wiley Inc., Noida, 2004
4. Datey V.S., “Taxmann’s Indirect Taxes”, Taxmann Publications, 2008
5. Kapoor D.C., “Export Management”, Vikas Publishing House Pvt. Ltd., 2009
6. Govindan N.S., “Indirect Taxes Made Easy”, C.Sitaram & Co. Pvt.,

FT8652 INDUSTRIAL ENGINEERING IN APPAREL INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Basics of industrial engineering
- Different tools of industrial engineering and its application in apparel industry

UNIT I **5**

Industrial Engineering - evolution, functions, role of industrial engineer

UNIT II **13**

Methods study – introduction, techniques of recording; method analysis techniques; principles of motion economy; method study in garment manufacture; ergonomics- importance, workplace design, fatigue

UNIT III **13**

Work measurement – introduction; time study – equipment and procedure; standard data; predetermined time standards; work sampling techniques; incentive wage system; work measurement applied to garment industry

UNIT IV **5**

Site selection for textile industry; plant layout - types of layouts suitable for textile industry, methods to construct layout; line balancing

UNIT V **9**

Statistical Process Control – data collection; concept of AQL, control charts in quality control; process capability

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course the student will be able to apply the following methodologies in apparel industry.

- Method study, work measurement
- Layout study and line balancing
- Statistical process control

TEXT BOOKS:

1. Khanna O. P. and Sarup A., "Industrial Engineering and Management", Dhanpat Rai Publications, New Delhi, 2005
2. George Kanwaty, "Introduction to Work Study", ILO, Geneva, 1989
3. Norberd Lloyd Enrick, "Industrial Engineering Manual for Textile Industry", Wiley Eastern (P)Ltd., New Delhi, 1988
4. Enrick N. L., "Time study manual for Textile industry", Wiley Eastern (P) Ltd., 1989

REFERENCES:

1. Chuter A. J., "Introduction to Clothing Production Management", Black well Science, U. S. A., 1995
2. Richard I. Levin. and David S. Rubin., "Statistics for Management", 7th Edition, Prentice Hall of India Pvt. Ltd., New Delhi, 1997
3. David M. Levine, Timothy C. Krehbiel and Mark L. Berenson., "Business Statistics: A First Course", Pearson Education Asia, New Delhi, 2nd Edition, 2000
4. Panneerselvam R., "Production and Operation Management", Prentice Hall of India, 2002
5. Edward S. Buffa and Rakesh Sarin., "Modern Production and Operations Management", John Wiley & Sons, U. S. A., 1987
6. Lee J. Krajewski and Larry P. Ritzman., "Operations Management: Strategy and Analysis", Addison Wesley, 2000
7. Chase, Aquilano and Jacobs., "Production and Operations Management", Tata McGraw-Hill, New Delhi, 8th Edition, 1999

GE8075 **INTELLECTUAL PROPERTY RIGHTS** **L T P C**

3 0 0 3

OBJECTIVE:

- To give an idea about IPR, registration and its enforcement.

UNIT I INTRODUCTION **9**

Introduction to IPRs, Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications, IPR in India and Abroad – Genesis and Development – the way from WTO to WIPO –TRIPS, Nature of Intellectual Property, Industrial Property, technological Research, Inventions and Innovations – Important examples of IPR.

UNIT II REGISTRATION OF IPRs **10**

Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad

UNIT III AGREEMENTS AND LEGISLATIONS 10

International Treaties and Conventions on IPRs, TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act, Trademark Act, Geographical Indication Act.

UNIT IV DIGITAL PRODUCTS AND LAW 9

Digital Innovations and Developments as Knowledge Assets – IP Laws, Cyber Law and Digital Content Protection – Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – Case Studies.

UNIT V ENFORCEMENT OF IPRs 7

Infringement of IPRs, Enforcement Measures, Emerging issues – Case Studies.

TOTAL:45 PERIODS

OUTCOME:

- Ability to manage Intellectual Property portfolio to enhance the value of the firm.

TEXT BOOKS:

1. V. Scople Vinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012
2. S. V. Satakar, “Intellectual Property Rights and Copy Rights, Ess Ess Publications, New Delhi, 2002

REFERENCES:

1. Deborah E. Bouchoux, “Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets”, Cengage Learning, Third Edition, 2012.
2. Prabuddha Ganguli,”Intellectual Property Rights: Unleashing the Knowledge Economy”, McGraw Hill Education, 2011.
3. Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.

TT8075 HIGH PERFORMANCE FIBRES L T P C

3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Various high performance fibres which are used for application as technical textiles
- Production of high performance fibres

UNIT I LINEAR POLYMER FIBRES 9

Introduction – linear polymer fibres; Aramid fibres - Polymer preparation, Spinning, Structure and properties and applications; Gel-spun high performance polyethylene fibres – Manufacture, Fibre characteristics, Properties, Yarn and fabric processing and applications; Other high modulus - high tenacity (HM-HT) fibres from linear polymers, melt-spun wholly aromatic polyester, PBO and related polymers, rigid-rod polymer, Russian aromatic fibres; Solid-state extrusion high-molecular weight polyethylene fibres

UNIT II CARBON FIBRE 9

Introduction – carbon fibres; different tyoes; PAN-based carbon fibres – manufacturing methods, properties and applications; Pitch-based carbon fibres - manufacturing methods, properties and applications; Rayon based carbon fibres - manufacturing methods, properties and applications; Vapour-grown carbon fibres; Carbon nanotubes - manufacturing methods, properties and applications.

UNIT III GLASS AND CERAMIC FIBRES 9

Introduction, types of glasses, properties and applications; Glass fibre production – batch process, continuous process; Fibre finish, Glass fibre properties, applications; glass fibre composites – manufacturing methods and applications. Introduction to ceramic fibrevs– types, manufacturing methods; Silicon carbide-based fibres – manufacturing methods, properties and applications. Other non-oxide fibres - Alumina based fibres; other polycrystalline oxide fibres; Single-crystal oxide fibres – properties and applications

UNIT IV CHEMICAL AND THERMAL RESISTANCE FIBRES 9

Chemical resistant fibres – Introduction; Chlorinated fibres – PVDC; Fluorinated fibres - PTFE, PVF, PVDF and FEP; Poly(etheretherketones): PEEK, Poly(phenylene sulphide), PPS, Poly(ether imide), PEI – manufacturing methods, properties and applications; Thermal resistant fibres – Introduction, Thermosets, Aromatic polyamides and polyarimids - manufacturing methods, properties and applications; Semi-carbon fibres - oxidised acrylics, Polybenzimidazole(PBI), Polybenzoxazoles (PBO) - manufacturing methods, properties and applications.

UNIT V SPECIALITY FIBRES 9

Speciality fibres - Hollow and profile fibres - polymers used, method of manufacturing, properties and applications, advantages; blended and bi-component fibres – types; manufacturing process, properties and applications; super absorbent fibres – mechanism, method of manufacturing, applications; film fibres – raw materials, manufacturing techniques, properties and applications.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course the students will have knowledge on

- Various high performance fibers and its polymers preparation
- Preparation and properties of carbon, glass, ceramic fibers and their application
- Hollow fibers and functional fibers

TEXT BOOKS:

1. Kothari V.K., “Textile Fibres: Development and Innovations”, Progress in Textiles, Vol. 2, IAFL Publications, 2000
2. Hearle J.W.S., “High Performance Fibres”, Wood head Publishing Ltd., Cambridge, England, 2001

REFERENCES:

1. Peebles L.H., “Carbon Fibres”, CRC Press, London, 1995
2. Hongu T. and Phillips G.O., “New Fibres”, Wood head Publishing Ltd., England, 1997.

TT8074 FUNCTIONAL FINISHES L T P C

3 0 0 3

OBJECTIVE:

- To enable the students to learn various finishes applied on the textile fabrics for different applications.

UNIT I REPELLENCY FINISH 9

Repellents applied to textile substrates; repellency tests; application of repellents by impregnation, coating and surface modification techniques.

UNIT II SOIL RELEASE AND ANTISTATIC FINISHING 9

Soil release agents; applications of soil- release finishes and testing; antistatic finishes-measurement, mechanism and antistatic agents applied on substrates.

UNIT III FLAME PROOFING 9

Flame retardant mechanisms; flame retarding chemicals for textile materials and testing of flame retardant finishes.

UNIT IV UV PROTECTION 9

UV radiation; factors affecting UV protection; UV protection finishes; measurement of UV protection.

UNIT V ANTIMICROBIAL FINISH 9

Basic of microbiology; classification; application of antimicrobial finishes;evaluation of antimicrobial finishes.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to state the

- Need for functional finishes and
- Methods of application of finishes and its evaluation.

TEXT BOOKS:

1. Park J., “Instumental Colour formulation: A Practical guide”, Woodhead Publishing, 1993, ISBN 0 901956 54 6.
2. Choudhury A. K. R., “Modern concepts of colour and appearance”, Oxford and IBH Publishing Ltd, 2000.
3. Sule A. D., “Computer colour analysis”, New Age International Publishers, 2002.
4. Mc Laren K., “The color science of Dyes & Pigments”, Adam Hilger Ltd., 1983, ISBN 0-85274-426-9.

REFERENCES:

1. Nierstrasz V. and Cavaco-Paulo A., “Advances in textile biotechnology”, Woodhead Publishing Ltd, Cambridge, UK, 2010.
2. Schindler W. D. and P J Hauser P. J., “Chemical finishing of textiles” Woodhead Publishing Ltd, Cambridge, UK, 2004.
3. Cavaco-Paulo A. and Gubitz G., “Textile processing with enzymes”, Woodhead Publishing Ltd, Cambridge, UK, 2003.
4. Heywood D., “Textile finishing ”, Woodhead Publishing Ltd, Cambridge, UK, 2003.
5. Rouette H. K., “Encyclopedia of textile finishing: English Version, Vol. 3”, Woodhead Publishing Ltd, Cambridge, UK, 2001.

TT8080 TEXTILE COSTING L T P C

3 0 0 3

OBJECTIVE:

- To impart the knowledge of costing techniques used in manufacturing of apparel products.

UNIT I 9

Cost accounting, elements of cost, classification of cost elements – examples from spinning and weaving mill; standard costing, analysis of variance; breakeven analysis, cost volume profit analysis

UNIT II 18

Costing of yarn – material, labour, power and overhead expenses; allocation of costs to yarns in spinning mill running with different counts; costing of fabrics

UNIT III **9**

Working capital management in spinning, weaving and chemical processing unit – determination, sources, cost; Budget, types of budgets, budgeting and control in textile unit

UNIT IV **9**

Detailed project report – elements, preparation for textile unit

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Calculate the cost garment
- Understand the concept of preparation of cost sheet, budget and breakeven analysis

TEXT BOOKS:

1. Johnson Maurice, E. Moore, "Apparel Product Development", Om Book Service, 2001.
2. Katherin McKelvy, "Fashion Source Book", Om Book Service, 2001.

REFERENCES:

1. Pandey I. M., "Financial Management",10th Edition, Vikas Publishing House Pvt. Ltd., New Delhi, 2010, ISBN: 8125937145 / ISBN: 978-8125937142
2. Prasanna Chandra., "Financial Management, Theory and Practice",8th Edition, Tat a McGraw-Hill Publishing Company Ltd, New Delhi,2011, ISBN: 0071078401 / ISBN: 978-0071078405
3. Aswat Damodaran., "Corporate Finance Theory and Practice", John Wiley & Sons, 2001, ISBN: 0471283320 | ISBN-13: 9780471283324
4. James C., Van Home., "Financial Management and Policy", 12th Edition Prentice Hall of India Pvt. Ltd., New Delhi, 2001, ISBN: 0130326577 | ISBN-13: 9780130326577
5. Thukaram Rao M.E., "Cost and Management Accounting" New Age International, Bangalore, 2004, ISBN:; 812241513X / ISBN: 978-8122415131
6. Khan., and Jain, "Basic financial Management & Practice", 7th Edition, Tata McGraw Hill, New Delhi, 2014, ISBN: 933921305X / ISBN: 978-9339213053

FT8651 APPAREL MARKETING AND MERCHANDISING L T P C

3 0 0 3

OBJECTIVE:

- To acquaint the students of the concepts of business, merchandising, sourcing and export documentation

UNIT I INTRODUCTION TO APPAREL BUSINESS **9**

International apparel business pattern, basic business concepts in Indian apparel export house, business operations in China and other south Asian countries. Business patterns for Indian apparel retail and home textiles. Understanding from concept board to finished product and its sequence.

UNIT II MARKETING FOR APPAREL AND TEXTILE PRODUCTS **9**

Defining marketing, marketing mix the objectives of marketing department, market research, different types of markets, marketing strategies with respect to a product/brand, Indian apparel houses international marketing strategies and domestic marketing strategies, marketing models, B to B marketing, B to C marketing, direct marketing, digital marketing.

UNIT III MERCHANDISING 9

Concepts of merchandising, concepts and apparel product lines, dimensions of product change, determination and development of product line and product range. Creative and technical design in garments and accessories, new product development and seasons of sale, costing, coordination and communication with the production house and export house

UNIT IV SOURCING 9

Understanding the basics of sourcing, sourcing strategy and best sourcing practice in apparel and textile businesses, supply chain and demand chain understanding, sourcing negotiations, global co-ordination in sourcing, materials management and quality in sourcing, quick response and supplier partnership in sourcing, JIT technology.

UNIT V EXPORT DOCUMENTATION AND POLICIES 9

Government policies a guide lines for apparel export and domestic trade, tax structures and government incentives in apparel trade. Export documents and its purposes, banking activities, Letter of credit, logistics and shipping, foreign exchange regulation, export risk management and insurance. Export finance, Special economic zones.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to apply

- Concept of marketing and merchandizing in the apparel industry in India
- Procedure involved in the export of apparel

TEXT BOOKS:

1. Elian stone, Jean A samples, “Fashion Merchandising”, McGraw Hill Book Company, New York, 1985.
2. Philip Kotler, Kevin Lane Keller, Abraham Koshy, and Mithileshwar Jha , “Marketing Management A South Asian Perspective”, Pearson Education, New Delhi, 2006
3. Ruth E. Glock, Grace I. Kunz ” Apparel Manufacturing Sewn Product Analysis” Fourth Edition, Pearson Prentice Hall, NJ, 2005.

REFERENCES:

1. Shivaramu S., "Export Marketing – A Practical Guide to Exporters”, Wheeler Publishing, Ohio, 1996.
2. Warren. J. Keegan and Mark.C.Green , “Global Marketing”, Pearson Prentice Hall, New Delhi, 2005.
3. Grace I. Kunz , Ruth E. Glock, “Apparel Manufacturing: Sewn Product Analysis”, 4th Edition. Prentice Hall, 2004

GE8076 PROFESSIONAL ETHICS IN ENGINEERING L T P C

3 0 0 3

OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.

UNIT I HUMAN VALUES 10

Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and

meditation for professional excellence and stress management.

UNIT II ENGINEERING ETHICS 9

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS 9

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk - Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT V GLOBAL ISSUES 8

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership –Code of Conduct – Corporate Social Responsibility.

TOTAL: 45 PERIODS

OUTCOME:

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

TEXT BOOKS:

1. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", Tata McGraw Hill, New Delhi, 2003.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles B. Fleddermann, "Engineering Ethics", Pearson Prentice Hall, New Jersey, 2004.
2. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.
5. Laura P. Hartman and Joe Desjardins, "Business Ethics: Decision Making for Personal Integrity and Social Responsibility" Mc Graw Hill education, India Pvt. Ltd.,New Delhi, 2013.
6. World Community Service Centre, ' Value Education', Vethathiri publications, Erode, 2011.

Web sources:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org

4. www.ethics.org

TT8073 ECO - FRIENDLY DYES, CHEMICALS AND PROCESSING L T P C
3 0 0 3

OBJECTIVES:

- To impart knowledge about the environmental and ecological aspects of various chemicals, dyes and auxiliaries used in processing.
- To make the students aware of the alternative chemicals and dyes that can replace the harmful chemicals.
- To update the students on the various rules, regulation that governs the textile processing industry.

UNIT I INTRODUCTION 9

Need – Concepts – Environmental Issues – Eco Standards. Environmental friendly fibres – Harmful substances in natural fibres – Eco-standards. Banned amines and toxic substances – Sources of contaminations – Approaches for Eco-processing: Reduce – Recycle – Reuse.

UNIT II ECO-FRIENDLY PREPARATION, DYEING, PRINTING AND FINISHING 9

Eco-friendly fabric preparation methods – Solvent assisted preparation – ozone bleaching – peracetic acid. Hazardous nature of synthetic dyes – types of hazards – alternative dyes. Ecofriendly chemicals and auxiliaries in dyeing and finishing: Reducing agents – oxidizing chemical – thickeners – sequestering agents – biosurfactants. Eco-friendly finishing chemicals: Cross-linking treatment – formaldehyde free chemicals – softeners – biopolishing – flame retardant finish – preservatives.

UNIT III ECO-AUDIT 9

Eco-audit – Procedure – Environmental Impact Assessment – Sampling methods – Audit methods. Reduction of pollution by prevention – Eco-testing. Environment Management System – Developments – IS0 14000 - Concepts – Clauses – Certifying bodies - Certification. Occupational safety and Hazards: OHSAS 18000 – Concepts – Clauses – Certification Methods. Introduction to Social Accountability 8000.

UNIT IV ECO-NORMS AND ECO-LABELING 9

Need – Assessment of toxicity - Norms for toxic chemicals: Carriers – Emulsions - Formaldehyde – Pesticides – Amines – Halogenated compounds - Heavy metals – Inorganic chemicals. Norms for baby clothing and adult clothing. Eco-labelling – Trademarks - Toxic substances in textile processing – Precautions – Assessment – Standards - Certifying Bodies.

UNIT V TESTING OF ECO-PARAMETERS 9

Instrumental Analysis – Chromatogrpahic Methods – Spectroscopy – Inductively Coupled Plasma. Detectors: Flame & photo ionization – electron capture – Thermal conductivity – Flame photometer. Interpretation of test results.

TOTAL: 45 PERIODS

OUTCOME:

- The study of this course would help the students to understand and comprehend the human and environmental hazards involved in day to day production activities in a textile wet processing mill. This also helps and supports the students in making socially responsible and economically viable solutions

TEXT BOOKS:

1. Chavan R.B., Radhakrishnan J., Environmental Issues - Technology Options for Textile Industry, IIT Delhi Publication, 1998
2. Reife A and Freeman H.S., Environmental Chemistry of dyes and pigments, Wiley, 2001, ISBN: 0471589276

REFERENCES:

1. Asokan R., Eco-Friendly Textile Wet Processing, NCUTE Publications, New Delhi, 2001
2. Eco friendly Textiles: Challenges to the Textile Industry, Textiles Committee, Mumbai, 1996.

TT8078 PRODUCTION AND APPLICATION OF SEWING THREADS L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to understand the requirements and production of sewing threads for different applications

UNIT I **13**

Sewing threads – property requirements for different applications; ticket numbering; characterization of sewing threads; sewability of the thread, seam efficiency index

UNIT II **14**

Types of sewing thread – spun threads, core spun threads, filament threads; production, properties and applications; fancy yarns – types and production; metallic yarns

UNIT III **13**

Characteristics and application of high performance sewing threads - aramid threads, ceramic threads, polypropylene threads, polyethylene threads, polytetrafluroethylene threads, fibreglass threads, other sewing threads – tencel, acrylic, linen, elastic, soluble; embroidery threads

UNIT IV **5**

Sewing defects related to sewing threads – Assessment and control

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to understand the

- Production of sewing thread
- Characterization of sewing thread and
- Selection of sewing thread for different end uses.

TEXT BOOKS:

1. Jacob Solinger., “Apparel Production Handbook”, Reinhold Publications, 1998, ISBN: 1879570009 / ISBN: 978-1879570009
2. Rao J.V., and Rajendra Kr.Gaur., “Sewing Threads: Technology, Stitches, Seams, Problems, Needles”, NITRA, 2006.
3. Gong R.H., and Wright R.M., “Fancy yarns –Their manufacture and application”, Woodhead Publishing Ltd, England, 2002, ISBN: 0849315506 | ISBN-13: 9780849315503.

REFERENCES:

1. Ukponmwan J.O., Mukhopadhyay A., and Chatterjee K.N., “Sewing threads”, Textile Progress, 2000, ISBN: 1870372387 | ISBN-13: 9781870372381.

2. Carl A Lawrence., “Fundamentals of Spun Yarn Technology”, CRC Press, Florida, USA, 2003, ISBN: 1566768217 | ISBN-13: 9781566768214
3. Carr H., “The Technology of Clothing Manufacture”, Blackwell Publisher, UK, 2004, ISBN: 0632021934 | ISBN-13: 9780632021932
4. Ruth E. Glock., “Apparel Manufacturing Sewn Product Analysis”, Prentice Hall, New Jersey, 2005,ISBN: 0131119826 | ISBN-13: 9780131119826

TT8072 COATED TEXTILES L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to understand need for coating of textiles, different methods of coating of textile fabrics

UNIT I **9**

Rubber—Natural and Synthetic- Polyvinyl Chloride- Polyurethanes-AcrylicPolymers-Adhesive Treatment-Radiation-Cured CoatingsMaterials and Trends- Textile Fibers- Spinning- Woven Fabrics- Knitted Fabrics, Nonwoven Fabrics

UNIT II **9**

Rheological Behavior of Fluids- Rheology of Plastisols-Hydrodynamic Analysis of Coating, Clothing Comfort- Impermeable Coating-Breathable Fabrics

UNIT III **9**

Coating Features -Methods of Coating- Knife Coating- Roll Coating-Dip Coating-Transfer Coating-Rotary Screen Printing- Calendering-Hot-melt Coating, General CharacteristicsTensile Strength-Elongation- Adhesion- Tear Resistance-Weathering Behavior-Microbiological Degradation-Yellowing

UNIT IV **9**

Synthetic Leather, Architectural Textiles, Fluid Containers,Tarpaulins,Automotive Air Bag Fabrics, Carpet Backing-Textile Foam Laminates for Automotive Interiors, Flocking,Fabrics for Chemical Protection-Thermochromic Fabrics,Temperature Adaptable Fabrics ,Camouflage Nets Metal and Conducting Polymer-Coated Fabrics.

UNIT V **9**

Test methods for coated fabric evaluation; environmental norms for the chemicals usedin coating industry.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the students would be able to understand

- Need of coating of textiles for different applications
- Methods of coating of textiles
- Testing of coated fabrics

TEXT BOOKS:

1. Fung. W., “Coated and Laminated Textiles”., Wood head Publishing Limited., Cambridge., 2002., ISBN: 1 85573 576 8
2. Ghosh. S. K., “Functional Coatings”., Wiley-VCH Verlag, GmbH & Co. KGaA, Weinheim, 2006, ISBN:3-527-31296-X 69

3. Guneu Akovali., Diveswar Banerjee., Sen A. K., and Dipak K. Setua., “Advances in polymer coated textiles”, SmithersRapra, 2012
4. Ashish Kumar Sen., “Coated Textiles: Principles and Application”, TechnomicPublication,U.S.A.,2007, ISBN: 1420053450 | ISBN-13: 9781420053456

REFERENCES:

1. Sen A.K., “Coated Textiles: Principles and Application”, Technomic Publication, U.S.A., 2001
2. W. C. Smith, “Journal of Coated Fabrics”, Vol. 15, Jan., 1986, pp. 180–197
3. Mary Jo Waters, “Laboratory Methods for Evaluating Protective Clothing System Against Chemical Agents”, Report no. CRDC-SP 84010, CRDC, Aberdeen Proving Ground, MD, U.S.A, 1984

FT8072 RETAIL MANAGEMENT AND VISUAL MERCHANDISING L T P C
3 0 0 3

OBJECTIVES:

- To introduce the students, the fashion business segments, retail management concepts
- To acquaint the students with fashion communication tools

UNIT I **9**

Retailing, current global and Indian retail scenario in garment and fashion, key drivers of Indian apparel retail business, growth of organised apparel retail in India; understanding the Indian retail economics, foreign direct investment in Indian apparel retail.

UNIT II **9**

Operational excellence, customer service strategies, pricing strategies, inventory levels and merchandise availability as a strategy, case studies on Indian and International retail stores, retail business formats, retail management information system

UNIT III **9**

Objectives of store planning, location, design, retail image mix, layout plan for retail stores. Buying, mark-up and mark-down in merchandise management, private labels; apparel franchising- types, Key success factors

UNIT IV **9**

Visual merchandising as a communication tool, presentations in visual merchandising, visual merchandising and enhanced customer buying decision, interiors with respect to brand, sensory elements, signs and graphics, focal point for season and type of sale; case studies on visual merchandising

UNIT V **9**

An introduction to fashion e-commerce, apparel and fashion e-business, s-commerce vs. ebusiness, economic forces – advantages – myths – e-business models, design, develop and management of e-business, web and social networking, mobile commerce - business applications, classifications, and models, payments, security and legal requirements

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student shall know

- The concept of retail management

- The concept of visual merchandizing
- e-commerce, s-commerce

TEXT BOOKS:

1. Gibson G. Vedamani., "Retail Management Functional Principles & Practices", Third Edition, Jaico Publishing House, 2003, ISBN -10:81-7992-151-4
2. Martin.M. Pegler., "Visual Merchandising and Display", (fifth edition), Fair Child Publications, 2011, ISBN 10: 1563674459
3. Harvey M.Deitel., Paul J.Deitel., and Kate Steinbuhler., "e-business and e-commerce for managers", Pearson, 2011, ISBN: 0130323640 | ISBN-13: 9780130323644

REFERENCES:

1. Efraim Turban., Jae K. Lee., David King., Ting Peng Liang., and Deborrah Turban., "Electronic Commerce –A managerial perspective", Pearson Education Asia, 2012, ISBN: 0139752854 / ISBN: 978-0139752858
2. John Fernie, Suzanne Fernie and Christopher Moore, "Principles of Retailing", Reed Elsevier India Private Limited, New Delhi, 2007.

GE8074 HUMAN RIGHTS L T P C
3 0 0 3

OBJECTIVE:

- To sensitize the Engineering students to various aspects of Human Rights.

UNIT I **9**

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.

UNIT II **9**

Evolution of the concept of Human Rights Magana carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

UNIT III **9**

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV **9**

Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V **9**

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements.

TOTAL: 45 PERIODS

OUTCOME:

- Engineering students will acquire the basic knowledge of human rights.

REFERENCES:

1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.

2. Chandra U., “Human Rights”, Allahabad Law Agency, Allahabad, 2014.
3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi.

TT8091 CLOTHING COMFORT L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about the

- Important characteristics of the fabric responsible for its comfort properties and
- Different phenomena which take place in the fabric related to the comfort properties of the fabric

UNIT I **9**

Comfort – types and definition; human clothing system, comfort perception and preferences

UNIT II **9**

Psychological comfort; neuro-physiological comfort-basis of sensory perceptions; measurement techniques - mechanical stimuli and thermal stimuli

UNIT III **9**

Thermo physiological comfort – thermoregulatory mechanisms of the human body, role of clothing on thermal regulations

UNIT IV **9**

Heat and moisture transfer – moisture exchange, wearer’s temperature regulations, effect of physical properties of fibres, behaviour of different types of fabrics

UNIT V **9**

Fabric tactile and mechanical properties - fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness; predictability of clothing comfort performance

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Understand different phenomena such as perception of comfort, fabric mechanical properties and, heat and moisture interaction and
- Correlate the property of the fabric with comfort to the wearer

TEXT BOOKS:

1. Apurba Das., and Alagirusamy R., “Science in clothing comfort”, Wood head Publishing India Pvt. Ltd., India, 2010, ISBN: 1845697898 | ISBN-13: 9781845697891
2. Guowen Song., “Improving comfort in clothing”, Wood head Publishing Ltd., UK, 2011, ISBN: 1845695399 | ISBN-13: 9781845695392
3. Ukponmwan J.O., “The Thermal-insulation Properties of Fabrics”, Textile Progress 24:4, 1-54, Taylor and Francis, UK, 1993, ISBN: 1870812654 | ISBN-13: 9781870812658.

REFERENCES:

1. Hassan M. Behery., “Effect of Mechanical and Physical Properties on Fabric Hand”, Wood head Publishing Ltd.,2005, ISBN: 1855739186 | ISBN-13: 9781855739185
2. Li Y., “The Science of Clothing Comfort”, Textile Progress 31:1-2, Taylor and Francis, UK, 2001, ISBN: 1870372247 | ISBN-13: 9781870372244

3. Laing R.M., and Sleivert G.G., “Clothing, Textile and Human Performance” Textile Progress 32:2, The Textile Institute, 2002, ISBN: 1870372514 | ISBN-13: 9781870372510.

TT8077 MEDICAL TEXTILES L T P C
3 0 0 3

OBJECTIVES:

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

- Outline on medical textile industry
- Explain properties, types, applications of implantable, non-implantable and drug delivery textiles
- Discuss on property requirements, applications and testing of biopolymers and Tissue engineering
- Summarize different types and its properties of wound care and reusable medical textiles
- Compare the characteristics of different smart medical textiles and its applications.

UNIT I INTRODUCTION 9

Medical textiles – classification, current market scenario in international and national level – government initiatives; antimicrobial fibres and finishes; nano fibrous materials and films; super absorbent polymers; operating room garments; personal health care and hygiene products and their testing methods; applications of non-wovens in medicine; textiles in infection prevention control.

UNIT II BIOPOLYMERS, TESTING AND TISSUE ENGINEERING 9

Biopolymers: classification and their properties, requirements, and applications, testing methods; In vitro tests – direct contact, agar diffusion & elution methods – in vivo assessment of tissue compatibility. Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.

UNIT III IMPLANTABLES, NON-IMPLANTABLES AND DRUG DELIVERY 9

Bandages-types, properties and applications; compression garments-types, properties and applications; sutures: types and properties; implantable textiles: hernia mesh – vascular prostheses – stents; Extra corporeal materials: Cartilage nerves – liver ligaments, kidney, tendons, cornea; Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications.

UNIT IV WOUND CARE AND REUSABLE MEDICAL TEXTILES 9

Wound: types and healing mechanism- textile materials for wound dressing – bio active dressing – anti microbial textiles dressing – composite dressing –- testing of wound care materials; Wound compression textiles; Reusable medical textiles: types, advantages, physical properties and performance –— reusable processing methods.

UNIT V SMART MEDICAL TEXTILES AND LEGAL ISSUES 9

Smart textiles – types, characteristics – smart textiles in wound care; applications of phase change and shape memory materials – monitoring pregnancy, children and cardio patients – mobile health monitoring ; electronics in medical textiles; Smart textiles in rehabilitation and applications; textile sensors for healthcare ;legal and ethical values involved in the medical textile materials.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall know the

- Types of materials available for biomedical applications
- Functional requirements of textile structures for specific end use and
- Selection and characterization of textile materials used for biomedical applications

TEXT BOOKS:

1. Allison Mathews and Martin Hardingham , “Medical and Hygiene Textile Production - A Hand Book”, Intermediate Technology Publications, 1994
2. Anand S.C., Kennedy J.F. Miraftab M. and Rajendran S., “Medical Textiles and Biomaterials for Health Care”, Wood head Publishing Ltd., 2006
3. Joon B. Park. and Joseph D. Bronzino., “Biomaterials – Principles and Applications”, CRC Press Boca Raton London, NewYork, Washington, D.C. 2002

REFERENCES:

1. Anand S., “ Medical Textiles”, Textile Institute, 1996, ISBN: 185573317X
2. Horrocks A.R. and Anand S.C., “Technical Textiles”, Textile Institute, 1999, ISBN: 185573317X
3. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster Pennylvania, 1995, ISBN 1-56676-340-1
4. Michael Szycher and Steven James Lee, “Modern Wound Dressing: A Systematic Approach to Wound Healing”, Journal of Biomaterials Applications, 1992.

TT8076 HOME TEXTILES L T P C
3 0 0 3

OBJECTIVES:

- To enable the students to learn about the
- Recent developments in furnishing, floor covering and other home textile products Various kinds of materials used in home textile.

UNIT I FURNISHINGS 9

Developments in Textile Furnishing; Type of Furnishings Materials – Woven and non-woven; Factors affecting selection of Home Furnishings.

UNIT II FLOOR COVERINGS 9

Recent Developments in manufacturing of floor coverings -Hard Floor Coverings, Resilient Floor Coverings, Soft Floor Coverings, Rugs, Cushion and Pads; Care of floor coverings.

UNIT III CURTAINS AND DRAPERIES 9

Advances in Home decoration - Draperies – Choice of Fabrics, Curtains – Types of Developments in Finishing of Draperies; Developments in tucks and Pleats; uses of Drapery Rods, Hooks, Tape Rings and Pins.

UNIT IV HOME FURNISHING 9

Advances in period style in, Different styles, and use of Colours, design & texture in home furnishing. Developments in living room furnishing including upholstery, Wall Hangings, Cushion, Cushion Covers, Bolster and Bolster Cover.

UNIT V BED LINENS 9

Advances in the production of - Different Types of Bed Linen, Sheets, Blankets, Blanket Covers, Comforts, Comfort Covers, Bed Spreads, Mattress and Mattress Covers, Pads, Pillows.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Know about different types of home textiles
- Understand the production method of different types of home textile products

TEXT BOOKS:

1. Alexander.N.G., “Designing Interior Environment”, Mas Court Brace Covanorich, Newyork, 1972
2. Donserkery.K.G., “Interior Decoration in India”, D. B. Taraporeval Sons and Co. Pvt. Ltd., 1973

REFERENCES:

1. Wingate I.B. & Mohler J.F., “Textile Farbics & Their Selection”, Prentice Hall Inc., New York, 1984.
2. Irsak.C, " Nonwoven Textiles" Textile Institute", Manchester, 1999
3. Krcma.R., Manual of Non-wovens, Textile Trade Press, Manchester 1993.

GE8077 TOTAL QUALITY MANAGEMENT L T P C

3 0 0 3

OBJECTIVE:

- To facilitate the understanding of Quality Management principles and process.

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definitions of quality - Dimensions of product and service quality - Basic concepts of TQM - TQM Framework - Contributions of Deming, Juran and Crosby - Barriers to TQM - Customer focus - Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNIT II TQM PRINCIPLES 9

Leadership - Quality Statements, Strategic quality planning, Quality Councils - Employee involvement - Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement - PDCA cycle, 5S, Kaizen - Supplier partnership - Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS AND TECHNIQUES I 9

The seven traditional tools of quality - New management tools - Six sigma: Concepts, Methodology, applications to manufacturing, service sector including IT - Bench marking - Reason to bench mark, Bench marking process - FMEA - Stages, Types.

UNIT IV TQM TOOLS AND TECHNIQUES II 9

Quality Circles - Cost of Quality - Quality Function Deployment (QFD) - Taguchi quality loss function - TPM - Concepts, improvement needs - Performance measures.

UNIT V QUALITY MANAGEMENT SYSTEM 9

Introduction—Benefits of ISO Registration—ISO 9000 Series of Standards—Sector-Specific Standards—AS 9100, TS16949 and TL 9000-- ISO 9001 Requirements—Implementation—Documentation—Internal Audits—Registration--**ENVIRONMENTAL MANAGEMENT SYSTEM:** Introduction—ISO 14000 Series Standards—Concepts of ISO 14001—Requirements of ISO 14001—Benefits of EMS.

TOTAL: 45 PERIODS

OUTCOME:

- The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.

TEXT BOOK:

1. Dale H.Besterfiled, Carol B.Michna,Glen H. Besterfield,Mary B.Sacre,Hemant Urdhwareshe and Rashmi Urdhwareshe, “Total Quality Management”, Pearson Education Asia, Revised Third Edition, Indian Reprint, Sixth Impression, 2013.

REFERENCES:

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 8th Edition, First Indian Edition, Cengage Learning, 2012.
2. Janakiraman. B and Gopal .R.K., "Total Quality Management - Text and Cases", Prentice Hall (India) Pvt. Ltd., 2006.
3. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2006.
4. ISO9001-2015 standards

GE8072	FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT	L	T	P	C
		3	0	0	3

OBJECTIVES:

- To understand the global trends and development methodologies of various types of products and services
- To conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- To understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- To understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- To develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

Global Trends Analysis and Product decision - Social Trends - Technical Trends- Economical Trends - Environmental Trends - Political/Policy Trends **- Introduction to Product Development Methodologies and Management -** Overview of Products and Services - Types of Product Development - Overview of Product Development methodologies **-** Product Life Cycle – Product Development Planning and Management.

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

Requirement Engineering - Types of Requirements - Requirement Engineering - traceability Matrix and Analysis - Requirement Management - **System Design & Modeling -** Introduction to System Modeling - System Optimization - System Specification - Sub-System Design - Interface Design.

UNIT III DESIGN AND TESTING 9

Conceptualization - Industrial Design and User Interface Design - Introduction to Concept generation Techniques – **Challenges in Integration of Engineering Disciplines** - Concept Screening & Evaluation - **Detailed Design -** Component Design and Verification –

Mechanical, Electronics and Software Subsystems - High Level Design/Low Level Design of S/W Program **-** Types of Prototypes, S/W Testing- Hardware Schematic, Component design, Layout and Hardware Testing – **Prototyping -** Introduction to Rapid Prototyping and Rapid Manufacturing - **System Integration, Testing, Certification and Documentation**

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 9

Introduction to Product verification processes and stages - Introduction to Product Validation processes and stages - Product Testing Standards and Certification - Product Documentation - **Sustenance -**Maintenance and Repair – Enhancements - **Product EoL -** Obsolescence Management – Configuration Management - EoL Disposal

UNIT V BUSINESS DYNAMICS – ENGINEERING SERVICES INDUSTRY 9

The Industry - Engineering Services Industry - Product Development in Industry versus Academia –**The IPD Essentials -** Introduction to Vertical Specific Product Development processes -Manufacturing/Purchase and Assembly of Systems - Integration of Mechanical, Embedded and Software Systems – Product Development Trade-offs - Intellectual Property Rights and Confidentiality – Security and Configuration Management.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to:

- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Gain knowledge of the Innovation & Product Development process in the Business Context
- Work independently as well as in teams
- Manage a project from start to finish

TEXTBOOKS:

1. Book specially prepared by NASSCOM as per the MoU.
2. Karl T Ulrich and Stephen D Eppinger, "Product Design and Development", Tata McGraw Hill, Fifth Edition, 2011.
3. John W Newstorm and Keith Davis, "Organizational Behavior", Tata McGraw Hill, Eleventh Edition, 2005.

REFERENCES:

1. Hiriyappa B, “Corporate Strategy – Managing the Business”, Author House, 2013.
2. Peter F Drucker, “People and Performance”, Butterworth – Heinemann [Elsevier], Oxford, 2004.
3. Vinod Kumar Garg and Venkita Krishnan N K, “Enterprise Resource Planning – Concepts”, Second Edition, Prentice Hall, 2003.
4. Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and Design", McGraw Hill Education, Seventh Edition, 2013

TT8004 MANUFACTURE OF SILK FABRICS L T P C

3 0 0 3

OBJECTIVES:

- To provide the knowledge on theory of manufacturing and dyeing of silk fibrous material
- To provide the knowledge on classification, principle, shop floor practice & problems in the application of various dyes on silk textiles

UNIT I REARING 5

Domestic silk worm rearing – multivoltine, bivoltine and univoltine species; wild silk worms rearing – Tasar, Muga and Eri culture

UNIT II SILK REELING 13

Cocoon quality; stifling and conditioning of cocoons, boiling and brushing of cocoons; reeling; re-reeling; raw silk testing and classification; wild silk reeling; production of spun silk yarn

UNIT III SILK WEAVING 9

Technological parameters of weaving and productivity; weaving of silk fabrics using semi automatic, automatic, shuttleless and pile looms

UNIT IV PREPARATION OF SILK 9

Properties of sericin; degumming of silk - extraction with water, treatment with alkalis and digestion with enzymes; bleaching of silk – origin and nature of colours, bleaching with reducing and oxidising agents

UNIT V DYEING, PRINTING AND FINISHING 9

Dyeing with acid, basic and reactive dyes; different styles of printing with acid and reactive dyes, printing with pigments, khadi and metallic powders, sublimation transfer printing; finishing of silk – weighting, softening, flame proofing, crease proofing, mildew proofing

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will be able to

- Dye the silk textiles with different dyes
- Perform research and development in the field of dyeing of silk textiles

TEXT BOOKS:

1. Shekar P. and Ardingham., “Sericulture and silk production – A hand book”, Intermediate Technology, U.K., 1995, ISBN:1853393177.
2. Dandin S.B., Jayaswal J. and Giridhar K. (ed.), “Handbook of Sericulture Technologies”, Central Silk Board, Bangalore, 2003.
3. Huang Guo Rui (ed.), “Silk reeling”, Oxford & IBH Publishing company Pvt. Ltd., New Delhi, 1998.

REFERENCES:

1. “Manuals on Sericulture”, Food and agriculture organisation of the United Nations, Rome, 1976.
2. “Silk dyeing and finishing handbook”, compiled by Shanghai Municipality Silk Industry Corporation, China, 2000, ISBN:1578080886.
3. “Silk weaving”, compiled by Zhejiang silk engineering institute, China, Suzhou silk engineering institute, China, Oxford & IBH Publishing company pvt. Ltd, New Delhi, 2002.
4. Gulrajani M.L., (ed.) “Silk – dyeing printing and finishing”, Indian Institute of Technology, New Delhi, 1989.
5. Nanavathy M., “Silk production, processing and marketing”, Wiley Eastern, 1991.
6. Scott P., “The book of silk”, Thames and Hudson, 1993.
7. Sinha S., “The development of Indian silk: A wealth of opportunities”, Intermediate technology, U.K, 1990.
8. Rheinberg L., “The romance of silk”, Textile progress, The Textile institute, Manchester, 1991.
9. Sonwalker T.A., “Handbook of silk technology”, Wiley Eastern, Chennai, 1992.

FT8071 **BRAND MANAGEMENT** **L T P C**
3 0 0 3

OBJECTIVE:

- To introduce students to the concept of brand, brand building, branding strategies and legal issues in brand management

UNIT I **9**

Product – definition, types; product line, product mix; new product development; estimating market and sales potential, sales forecasting

UNIT II **13**

Brand – definition, evolution, importance; product vs brand; terminologies used in branding; branding – meaning, creation, challenges; brand design – understanding consumer, competition, components, brand identity - brand naming, logos, characters, slogans, tools to maintain identity, illustrations from apparel industry

UNIT III **9**

Brand Building: brand insistence model; advertising – definition, objectives, modes, economic and ethics; non traditional marketing approach

UNIT IV **9**

Branding strategies; brand extension, brand revitalization, brand repositioning, brand recall, brand elimination, brand imitation

UNIT V **5**

Brand equity measurement systems; legal issues in brand management; global branding

TOTAL: 45 PERIODS

OUTCOME:

- The students would have knowledge on consumer behaviour, brand identity and brand equity management

TEXT BOOKS:

1. Brad Van Auken, “Branding”, Jaico Publishing House, Mumbai, India, 2010.
2. Mahim Sagar, Deepali Singh, Agrawal DP, Achintya Gupta, “Brand Management”, Ane Books India Pvt. Ltd., India, 2009.

REFERENCES:

1. Harsh V Verma, “ Brand Management”, Excel Books, New Delhi, India, 2004
2. Gordon T Kendall, “Fashion Brand Merchandising”, Fairchild Publications, New York, 2009

TT8079 **PROTECTIVE TEXTILES** **L T P C**
3 0 0 3

OBJECTIVES:

- To gain knowledge about fibre structure and its geometry
- To study the influence of comfort properties of protective clothing

UNIT I FIBRES, YARNS AND FABRICS FOR PROTECTIVE GARMENTS **9**

Selection of fibres-suitability and properties of high performance fibres for various protective clothing, chemical composition and physical structure, characteristics and working of various fibres according to different end uses like thermal protection, ballistic protection, anti-microbial protection, Protection against cold etc. Yarn and fabric (knitted, woven and Non-woven)

parameters, their methods of production, effect of structure on their performance; use of composite materials in yarn and fabric formation used for protective end uses.

UNIT II CHEMICAL FINISHES FOR PROTECTIVE GARMENTS 9

Use of coated fabrics – different types of finishes like fire retardant finishes, for different textile materials, water repellent finishes, anti-microbial finishes; chemical finishes against radiation and chemicals – method of application of those finishes; machines and techniques used for such applications; protective finishes for health care garments.

UNIT III PROTECTIVE GARMENTS IN OTHER APPLICATIONS 9

Protective fabrics used in the medical field and in hygiene; military combat clothing; protective fabrics against biological and chemical warfare; textiles for high visibility.

UNIT IV GARMENT CONSTRUCTION 9

Garment construction – method of construction of garments according to various protective end uses like protection against cold, heat, chemical, ballistic protection etc.; use of different fabric type – knitted, woven, and Non-woven; coated / laminated in protective applications different places; use of inter lining and composites.

UNIT V EVALUATION OF PROTECTIVE GARMENTS 9

Evaluation of protective fabrics – desirable properties of protective textiles, method of testing for thermal protective performance, water, cold, abrasion and wear resistance; evaluation of resistance in to mildew, ageing, sunlight, chemical, electrostatic and electrical resistivity, impact properties; ASTM standards for protective garments.

TOTAL: 45 PERIODS

OUTCOME:

- The students would develop an understanding of the materials, chemical finishes, garment construction and evaluation methods of protective garments

TEXT BOOKS:

1. Adanur S., “Wellington sears handbook of Industrial textiles”, Technomic publishing co inc, 1995.
2. Pushpa Bajaj and Sengupta A.K., “Protective clothing”, The Textile Institute, 1992.
3. Horrocks A.R. and Anand S.C., “Handbook of Technical Textiles”, Woodhead Publishing Limited, Cambridge, UK.
4. Anand S.C., Kennedy J.F., Miraftab M. and Rajendran S., “Medical textiles and biomaterials for health care”, Woodhead Publishing Limited, Cambridge, UK.

REFERENCES:

1. Chellamani K.P. and Chattopadhyay D., “Yarns and Technical Textiles”, SITRA, 1999.
2. Scott R.A.,“Textiles for protection”, Woodhead Publishing Limited, Cambridge, UK.
3. Saville.B.P., “Physical testing of textiles”, Woodhead Publishing Limited, Cambridge, UK.
4. Fan Q., “Chemical Testing of Textiles”, Woodhead Publishing Limited, Cambridge, UK.
5. Long A.C., “Design and manufacture of Textile Composities”, Woodhead Publishing Limited, Cambridge, UK.
6. Fung W., “Coated and laminated textiles”, Woodhead Publishing Limited, Cambridge, UK.

TT8093 TEXTILE REINFORCED COMPOSITES L T P C
3 0 0 3

OBJECTIVES:

- To acquire knowledge on constituents of composite materials
- To get exposure to various composite manufacturing technologies and testing of composites

UNIT I COMPOSITES REINFORCEMENT AND MATRICES 9

Composites: introduction – definition – classification based on reinforcement and matrix - constituents. Matrix: thermoplastic and thermosetting matrices – properties – limitations – comparison - applications. Reinforcement Types – MMC, CMC, PMC – properties – limitationsapplications. Textile Reinforcement Forms – fibre, roving, fabric, mat, braid, etc. - properties – applications. High performance fibres: aramid- glass – boron – carbon. Prepregs and Preforms: properties – manufacturing. Testing of Reinforcement and Matrices.

UNIT II COMPOSITES MANUFACTURING TECHNOLOGIES 9

Lay-up & Automatic lay-up: working principle – advantages – limitations – applications. Resin Transfer Moulding: principle of operation – resin system & injection – mold materials - resin flow strategies - advantages – limitations – applications. Filament winding: principle of working – geometry of winding – types of winding – mandrels - advantages – limitations – applications. Pultrusion: process equipments - principle of operation – pull forming - advantages – limitations – applications. Consolidation techniques: Vacuum bagging – Pressure bagging.

UNIT III DESIGN OF STRUCTURE WITH COMPOSITES 9

Interface: definition – conditions for good interfacial reactions - interface mechanisms - surface treatments. Design of Composites: material selection - configuration selection – design requirements – design load definitions – optimization concepts - laminate design.

UNIT IV MECHANICS AND TESTING OF COMPOSITES 9

Geometric and Physical definitions. Lamina and Laminate: definition - angle of orientation mass density and ply thickness, fibre volume fraction (FVF) - critical fibre length - rule of mixture. Fibre Composites: strength and failure – fracture toughness – fatigue – impact – delamination – moisture expansion – conductivity – damage and failure modes. Testing of Composites: Destructive testing: tensile - compression – bending - shear – impact – ignition loss & matrix digestion – accelerated weathering test.

UNIT V APPLICATIONS OF COMPOSITES 9

Land Transport Applications: Automotive applications – rail road applications – mass transit applications – military applications. Marine Applications: boats – large power yachts – sail boats – pressure hulls – sonar domes – fairings – control surfaces – decking – pipes. Industrial Applications: antennas – bridges – cable cars – electrical and electronics. Composite Biomaterials: orthopaedic implants – femoral components for total hip arthroplasty – bone cement, articulation components. Construction applications: rebars – prestressing – rehabilitation – platforms – pedestrian bridges – cooling towers. Other applications: aircrafts, sports goods and aerospace.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to

- Select different types of textile reinforcements and matrices for the manufacture of composites for getting different characteristics and
- Evaluate the characteristics of composites

TEXT BOOKS:

1. S.T. Peters, Chapman & Hall, “Hand Book of Composites”, Second Edition, ISBN 0 412 54020 7, 1998.
2. Robert M.Jones, Taylor & Francis, “Mechanics of Composite Materials”, Second Edition, 1999.

REFERENCES:

1. Güneri Akovali, “Hand book of Composite Fabrication” Rapra technology Ltd., UK, ISBN: 1-85957-263-4, 2001.
2. Isaac M.Daniel, Ori Ishai, “Engineering mechanics of Composite Materials”, Oxford University Press, UK, 1994.
3. A. Brent Strong, “Fundamentals of Composites Manufacturing” Society of Manufacturing Engineers, 2008.
4. Mel M. Schwartz, “Composite materials handbook” McGraw-Hill, 1992.
5. Stuart M. Lee, “International encyclopedia of composites” VCH, 1999.

MG8791 SUPPLY CHAIN MANAGEMENT L T P C
3 0 0 3

OBJECTIVE:

- To provide an insight on the fundamentals of supply chain networks, tools and techniques.

UNIT I INTRODUCTION 9

Role of Logistics and Supply chain Management: Scope and Importance- Evolution of Supply Chain -Decision Phases in Supply Chain - Competitive and Supply chain Strategies **–** Drivers of Supply Chain Performance and Obstacles.

UNIT II SUPPLY CHAIN NETWORK DESIGN 9

Role of Distribution in Supply Chain **–** Factors influencing Distribution network design **–** Design options for Distribution Network Distribution Network in Practice-Role of network Design in Supply Chain **–** Framework for network Decisions.

UNIT III LOGISTICS IN SUPPLY CHAIN 9

Role of transportation in supply chain **–** factors affecting transportations decision **–** Design option for transportation network **–** Tailored transportation **–** Routing and scheduling in transportation.

UNIT IV SOURCING AND COORDINATION IN SUPPLY CHAIN 9

Role of sourcing supply chain supplier selection assessment and contracts- Design collaboration - sourcing planning and analysis - supply chain co-ordination - Bull whip effect **–** Effect of lack of co-ordination in supply chain and obstacles **–** Building strategic partnerships and trust within a supply chain.

UNIT V SUPPLY CHAIN AND INFORMATION TECHNOLOGY 9

The role IT in supply chain- The supply chain IT frame work Customer Relationship Management **–** Internal supply chain management **–** supplier relationship management **–** future of IT in supply chain **–**E-Business in supply chain.

TOTAL: 45 PERIODS

OUTCOME:

- The student would understand the framework and scope of supply chain networks and functions.

TEXT BOOK:

1. Sunil Chopra, Peter Meindl and Kalra, **"**Supply Chain Management, Strategy, Planning, and operation**"**, Pearson Education, 2010.

REFERENCES:

1. David J.Bloomberg , Stephen Lemay and Joe B.Hanna, **"**Logistics**"**, PHI 2002.
2. James B.Ayers, **"**Handbook of Supply chain management**"**, St.Lucle press, 2000.
3. Jeremy F.Shapiro, **"**Modeling the supply chain**"**, Thomson Duxbury, 2002.
4. Srinivasan G.S, **"**Quantitative models in Operations and Supply Chain Management**"**, PHI, 2010.

GE8073 FUNDAMENTALS OF NANOSCIENCE L T P C
3 0 0 3

OBJECTIVE:

- To learn about basis of nanomaterial science, preparation method, types and application

UNIT I INTRODUCTION 8

Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II GENERAL METHODS OF PREPARATION 9

Bottom-up Synthesis-Top-down Approach: Co-Precipitation, Ultrasonication, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.

UNIT III NANOMATERIALS 12

Nanoforms of Carbon - Buckminster fullerene- graphene and carbon nanotube, Single wall carbon Nanotubes (SWCNT) and Multi wall carbon nanotubes (MWCNT)- methods of synthesis(arc-growth, laser ablation, CVD routes, Plasma CVD), structure-property Relationships applications-Nanometal oxides-ZnO, TiO2,MgO, ZrO2, NiO, nanoalumina, CaO, AgTiO2, Ferrites, Nanoclays-functionalization and applications-Quantum wires, Quantum dots-preparation, properties and applications.

UNIT IV CHARACTERIZATION TECHNIQUES 9

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques-AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation.

UNIT V APPLICATIONS 7

NanoInfoTech: Information storage- nanocomputer, molecular switch, super chip, nanocrystal, Nanobiotechlogy: nanoprobes in medical diagnostics and biotechnology, Nano medicines, Targetted drug delivery, Bioimaging - Micro Electro Mechanical Systems (MEMS), Nano Electro Mechanical Systems (NEMS)- Nanosensors, nano crystalline silver for bacterial inhibition, Nanoparticles for sunbarrier products - In Photostat, printing, solar cell, battery.

TOTAL: 45 PERIODS

OUTCOMES:

- Will familiarize about the science of nanomaterials

- Will demonstrate the preparation of nanomaterials
- Will develop knowledge in characteristic nanomaterial

TEXT BOOKS:

1. A.S. Edelstein and R.C. Cammearata, eds., “Nanomaterials: Synthesis, Properties and Applications”, Institute of Physics Publishing, Bristol and Philadelphia, 1996.
2. N John Dinardo, “Nanoscale Charecterisation of surfaces & Interfaces”, 2nd edition, Weinheim Cambridge, Wiley-VCH, 2000.

REFERENCES:

1. G Timp, “Nanotechnology”, AIP press/Springer, 1999.
2. Akhlesh Lakhtakia,“The Hand Book of Nano Technology, Nanometer Structure, Theory, Modeling and Simulations”. Prentice-Hall of India (P) Ltd, New Delhi, 2007.