K.S. Rangasamy College of Technology
(Autonomous)

CURRICULUM AND SYLLABI

Of

B.Tech. Textile Technology
(For the batch admitted in 2023 – 2024)

R 2022

Courses Accredited by NBA, Accredited by NAAC A++ Grade,
Approved by AICTE, Affiliated to Anna University, Chennai.

KSR Kalvi Nagar, Tiruchengode – 637 215.
Namakkal District, Tamil Nadu, India.

Passed in BoS Meeting held on 21/11/2023
Approved in Academic Council Meeting held on 23/12/2023

BoS Chairman
Dr. G. KARTHIKEYAN, B.E., M.Tech., Ph.D
Professor and Head
Department of Textile Technology
K S Rangasamy College of Technology
Tiruchengode-637 215

VISION OF THE DEPARTMENT

To be the center of excellence in textile education, training, research and service.

MISSION OF THE DEPARTMENT

- To enlighten the students about the latest technology in textile industries through innovative educational practices and multi-disciplinary approach.
- To engage with the industry as solution providers through consultancy.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: **Production Process and Solutions to Problems**: Graduates are competent in textile production processes and be able to identify problems and suggest suitable solutions.

PEO2: **Modern Tools & Technology and Ethics**: Graduates use latest tools and technology for the production of textile materials and serve society in an ethical manner.

PEO3: **Skills, Entrepreneurship and Life Long Learning**: Graduates will exhibit skills in their career and develop entrepreneurial culture through life-long learning.

PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

PO1: **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: **Design /development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

PO6: **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: **Communication:** Communicate effectively on complex engineering activities with the

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engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

PSO1: **Application of Basic Concepts**: Apply fundamental concepts in the areas of spinning, weaving, testing, garment making and processing.

PSO2: **Solution for Industrial Problems**: Solve industrial problems in textile industries considering environmental issues to improve quality and productivity.

PSO3: **Moral Values**: Demonstrate social and ethical responsibilities relevant to textile industries.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) WITH PROGRAMME OUTCOMES (POs)

Programme Educational Objectives	Programme Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO 1	3	3	3	3	3	2	2	1	3	2	3	2
PEO 2	2	2	3	2	3	2	2	3	2	2	2	2
PEO 3	3	2	2	2	2	2	1	1	3	2	3	3

Contributions: 1- Low, 2- Medium, 3- High

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MAPPING – UG -TEXTILE TECHNOLOGY

Year	Semester		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I	I	Professional English - I	-	-	-	-	-	-	-	2	3	3	2	3	2	2	3
		Matrices and Calculus	3	3	3	3	3	-	-	-	-	-	-	2	3	2	1
		Physics for Textile Technology	3	3	2	2	-	-	2	3	-	2	-	2	-	2	-
		Chemistry for Textile	3	2	2	1	-	-	2					2	1	1	1
		Engineering Drawing	3	3	3		1			1					3	3	3
		Environmental Studies and climate Change	3	2	1	1	1	2	2	1				2	1	1	-
		Applied Physics and Chemistry Laboratory	3	3	1	3	1	1	1				2	1	2	1	
		Fabrication and Reverse Engineering Laboratory	3	2	3	1	3	2	2	2	3	2	1	3	3	2	2
	II	Professional English - II	-	-	-	-	-	-	-	2	3	3	2	3	2	2	3
		Integrals, Partial Differential Equations and Laplace Transform	3	3	2	2	2	-	-	-	-	-	-	2	3	2	0
		Basic Electrical, Electronics and Instrumentation	3	2	3	3	2	1	1	-	-	-	2	3	2	3	1
		Engineering Mechanics	3	3	3		1	-	-	1	-	-	-	-	2	3	-
		C Programming	3	3	3		3				2	2		2	3	3	
		Fibre Science	3	3	3	3	2	2	2	1	2	1	1	2	3	3	2
		NCC/NSS/NSO/YRC/RRC/Fine Arts*	1	1											1	1	3
		Heritage of Tamils / தமிழர் மரபு							3	3		2		3	2	1	3
		Basic Electrical, Electronics and Instrumentation Laboratory	3	2	2	2	3	-	-	-	2	-	2	2	2	3	1
		C Programming Laboratory	-	-	-	-	-	-	-	2	3	3	2	3	3	3	1
		Career Skill Development I	-	-	-	-	-	-	-	2	3	3	2	3	2	2	2
	III	Optimisation Techniques and Numerical Methods	3	3	3	3	2	-	-	-	-	-	-	2	3	3	1
		Elements of Mechanical Engineering	3	3	3	3	3	2	2	2	1	1	-	3	2		2
		Structure and Properties of Fibers	3	2	1	2	2	-	1	-	-	2	-	1	3	3	1

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II		Yarn Manufacturing Technology I	3	1	1	2	2					1	2	2	3	3	1
		Fabric Manufacturing Technology I	2	1	3	2	1	3	3		3	1		1	3	2	1
		Tamils and Technology / தமிழரும் தொழில்நுட்பமும்							3	3		2		3	3	2	1
		Fibre Science Laboratory	2	1	1	1	1	2	1	2	2	2	2	2	3	3	1
		Yarn Manufacturing Technology Laboratory I	2	1	1	1	1	2	1	2	2	2	2	2	3	3	1
		Career Skill Development II								2	3	3	2	3	2	2	2
	IV	Applied Statistics	3	3	3	3	2							2	3	3	1
		Yarn Manufacturing Technology II	3	3	2								3		3	3	1
		Fabric Manufacturing Technology II	2	2	1			1				1			3	3	1
		Textile Chemical Processing I	3	3	2	3					2	2			3	3	1
		Universal Human Values*						3	3	3	3		2	3	1	1	3
		NCC/NSS/NSO/YRC/RRC/ Fine Arts*	1	1											1	1	3
		Yarn Manufacturing Technology Laboratory II	3	3	2								3		3	3	1
		Fabric Manufacturing Technology Laboratory	3	2	3	3		3			2	1	3		3	3	1
		Career Skill Development III	3	3	3	3		3				2	3	3	2	2	2
		Internship													3	2	1
III	V	Knitting Technology	3	1	-	-	-	-	-	-	-	2			3	2	-
		Textile Chemical Processing II	3	1	1	-	-	-	-	-	-	2	-	-	3	3	1
		Woven Fabric Structure	3	2	2	2	2		1	-	-	-	2	2	2	2	1
		Technical Textiles I	3	2	2	- -	2	- -	-	-	-	-	-	-	3	3	2
		Startups & Entrepreneurship	3	2	3	2	2	1	1	1	-	-	2	2	3	2	2
		Textile Chemical Processing Laboratory	3	3	1	1	1		1				1		3	3	1
		Fabric Structure Laboratory	3	1										2	3	2	1
		Career Skill Development IV	2	2	2	2		2				2	3	3	3		2
	VI	Total Quality Management	1	2			2	2	2	2	2	2		1	2	2	2
		Textile and Apparel Quality Evaluation	2	2	2	2	3	-	1	1	1	1	1	2	2	2	1

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		Garment Manufacturing Technology I	2	3	2		1	2			2	2	2	2	2	3	2
		Technical Textiles II	2	2	1										3	3	2
		NCC/NSS/NSO/YRC/RRC/ Fine Arts*	1	1											1	1	3
		Garment Construction Laboratory I	3	3	2	1	1	3	1	1	2	1	2	1	3	2	2
		Textile and Apparel Quality Evaluation Laboratory	3	3	2	3	2			2	1	2		2		2	2

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K.S. RANGASAMY COLLEGE OF TECHNOLOGY

Credit Distribution for B.Tech (Textile) Programme – 2022 – 2023 Batch

S.No.	Category	Credits Per Semester								Total Credits	Percentage (%)
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	2	2	-	-	-	-	3	-	**07**	**4.34**
2.	BS	12	4	4	4	-	-	-	-	**24**	**14.91**
3.	ES	6	14	4	-	-	-	-	-	**24**	**14.91**
4.	PC	-	3	13	13	16	16	11	-	**72**	**44.72**
5.	PE	-	-	-	3	3	3	6	-	**15**	**09.32**
6.	OE	-	-	-	3	3	3	-	-	**09**	**5.59**
7.	CGC	0	0	0	0	0	0	2+3*	8	**10**	**6.21**
8.	MC	0	-	-	3*	-	-	-	-	**0**	**-**
9.	GE	-	1*	1*	-	-	-	0	0	**0**	**0**
10.	AC	-	-	-	-	-	-	0	0	**0**	**-**
Total		**20**	**23**	**21**	**23**	**22**	**22**	**22**	**8**	**161**	**100**

HS - HUMANITIES AND SOCIAL SCIENCES

BS - BASIC SCIENCE

ES - ENGINEERING SCIENCES

PC - PROFESSIONAL CORE

PE - PROFESSIONAL ELECTIVES

MC - MANDATORY COURSES

OE - OPEN ELECTIVES

CG – CAREER GUIDANCE COURSES

AC – AUDIT COURSES

GE – GENERAL ENGINEERING

- Open Electives are courses offered by different departments that do not have any prerequisites and could be of interest to students of any branch

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(An Autonomous Institution affiliated to Anna University)

HUMANITIES AND SOCIAL SCIENCE (HS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 EN 001	Professional English - I	HS	3	1	0	2	2	Nil
2.	60 EN 002	Professional English - II	HS	3	1	0	2	2	Nil
3.	60 HS 003	Total Quality Management	HS	3	3	0	0	3	Nil
4.	60 AB 00*	National Cadet Corps (Air Wing)	HS	4	2	0	2	3*	Nil
5.	60 AB 00*	National Cadet Corps (Army Wing)	HS	4	2	0	2	3*	Nil

BASIC SCIENCE (BS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4	Nil
2.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4	Nil
3.	60 PH 007	Physics for Textile Technology	BS	3	3	0	0	3	Nil
4.	60 CH 006	Chemistry for Textile	BS	3	3	0	0	3	Nil
5.	60 MA 022	Applied Statistics	BS	4	3	1	0	4	Nil
6.	60 MA 011	Optimisation Techniques and Numerical Methods	BS	4	3	1	0	4	Nil
7.	60 CP 0P3	Applied Physics and Chemistry Laboratory	BS	4	0	0	4	2	Nil

ENGINEERING SCIENCES (ES)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CS 001	C Programming	ES	3	3	0	0	3	Nil
2.	60 ME 004	Engineering Mechanics	ES	4	3	1	0	4	Nil
3.	60 EE 002	Basic Electrical, Electronics and Instrumentation	ES	3	3	0	0	3	Nil
4.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2	Nil
5.	60 EE 0P2	Basic Electrical, Electronics and Instrumentation Laboratory	ES	4	0	0	4	2	Nil
6.	60 ME 001	Engineering Drawing	ES	6	2	0	4	4	Nil
7.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2	Nil
8.	60 ME 008	Elements of Mechanical Engineering	ES	4	3	1	0	4	Nil

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PROFESSIONAL CORE (PC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT 201	Fibre Science	PC	3	3	0	0	3	Nil
2.	60 TT 301	Structure and Properties of Fibres	PC	4	4	0	0	3	Fibre Science
3.	60 TT 302	Yarn Manufacturing Technology I	PC	3	3	0	0	3	Structure and Properties of Fibres
4.	60 TT 303	Fabric Manufacturing Technology I	PC	3	3	0	0	3	Nil
5.	60 TT 3P1	Fibre Science Laboratory	PC	4	0	0	4	2	Fibre Science
6.	60 TT 3P2	Yarn Manufacturing Laboratory I	PC	4	0	0	4	2	Nil
7.	60 TT 401	Yarn Manufacturing Technology II	PC	3	3	0	0	3	Yarn Manufacturing Technology I
8.	60 TT 402	Fabric Manufacturing Technology II	PC	3	3	0	0	3	Fabric Manufacturing Technology I
9.	60 TT 403	Textile Chemical Processing I	PC	2	2	0	2	3	Nil
10.	60 TT 4P1	Yarn Manufacturing Laboratory II	PC	4	0	0	4	2	Yarn Manufacturing Laboratory I
11.	60 TT 4P2	Fabric Manufacturing Technology Laboratory	PC	4	0	0	4	2	Fabric Manufacturing Technology II
12.	60 TT 501	Knitting Technology	PC	2	2	0	2	3	Nil
13.	60 TT 502	Textile Chemical Processing II	PC	3	3	0	0	3	Textile Chemical Processing I
14.	60 TT 503	Woven Fabric Structure	PC	3	3	0	0	3	Nil
15.	60 TT 504	Technical Textiles I	PC	3	3	0	0	3	Fibre Science
16.	60 TT 5P1	Textile Chemical Processing Laboratory	PC	4	0	0	4	2	Textile Chemical Processing II
17.	60 TT 5P2	Fabric Structure Laboratory	PC	4	0	0	4	2	Nil
18.	60 TT 601	Textile and Apparel Quality Evaluation	PC	3	3	0	0	3	Yarn Manufacturing Technology II
19.	60 TT 602	Garment Manufacturing Technology I	PC	3	3	0	0	3	Yarn Manufacturing Technology II
20.	60 TT 604	Technical Textiles II	PC	3	3	0	0	3	Technical Textiles I
21.	60 TT 6P1	Garment Construction Laboratory I	PC	4	0	0	4	2	Nil
22.	60 TT 6P2	Textile and Apparel Quality Evaluation Laboratory	PC	4	0	0	4	2	Nil
23.	60 TT 701	Garment Manufacturing Technology II	PC	3	3	0	0	3	Garment Manufacturing Technology I
24.	60 TT 702	Financial Management and Costing for Textile and Apparel Industry	PC	4	3	1	0	4	Nil
25.	60 TT 703	Nonwoven Technology	PC	4	2	0	2	3	Nil
26.	60 TT 7P1	Textile CAD Laboratory	PC	4	0	0	4	2	Fabric Structural Lab
27.	60 TT 7P2	Garment Construction Laboratory II	PC	4	0	0	4	2	Garment Manufacturing Technology II

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PROFESSIONAL ELECTIVE COURSES (PE)

SEMESTER IV, ELECTIVE I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT E 11	High Performance Fibres	PE	3	3	0	0	3	Fibre Science Structure and Properties of Fibres
2.	60 TT E 12	Man Made Fibre Technology	PE	3	3	0	0	3	Structure and Properties of Fibres
3.	60 TT E 13	Textured Yarn Technology	PE	3	3	0	0	3	Yarn Manufacturing Technology I
4.	60 TT E 14	Process Control in Spinning	PE	3	3	0	0	3	Yarn Manufacturing Technology I
5.	60 TT E 15	Home Textiles	PE	3	3	0	0	3	Nil
6.	60 TT E 16	Silk Technology	PE	3	3	0	0	3	Fibres Science

SEMESTER V, ELECTIVE II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT E 21	Theory of Textile Structures	PE	3	3	0	0	3	Yarn Manufacturing Technology II
2.	60 TT E 22	Process Control in Weaving and Chemical Processing	PE	3	3	0	0	3	Yarn Manufacturing Technology II Textile Chemical Processing II
3.	60 TT E 23	Protective Textiles	PE	3	3	0	0	3	Technical Textiles
4.	60 TT E 24	Medical Textiles	PE	3	3	0	0	3	Technical Textiles
5.	60 TT E 25	Apparel Marketing and Merchandising	PE	3	3	0	0	3	Garment Manufacturing Technology II
6.	60 TT E 26	Fashion Design and Pattern Making	PE	3	3	0	0	3	Garment Manufacturing Technology II

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SEMESTER VI, ELECTIVE III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT E 31	Textile Mechanics	PE	3	3	0	0	3	Engineering Mechanics
2.	60 TT E 32	Smart Textiles	PE	3	3	0	0	3	Technical Textiles
3.	60 TT E 33	Sustainable Textiles	PE	3	3	0	0	3	Technical Textiles
4.	60 TT E 34	Production and Operations Management	PE	3	3	0	0	3	Operation Research
5.	60 TT E 35	Export Policies and Documentation	PE	3	3	0	0	3	Financial Management and Costing for Textile and Apparel Industry
6.	60 TT E 36	Functional Finishes	PE	3	3	0	0	3	Textile Chemical Processing II

SEMESTER VI, ELECTIVE IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT E 41	Clothing Science	PE	3	3	0	0	3	Garment Manufacturing Technology II
2.	60 TT E 42	Apparel Production Planning and Control	PE	3	3	0	0	3	Garment Manufacturing Technology II
3.	60 TT E 43	Industrial Engineering in Textile and Clothing Industry	PE	3	3	0	0	3	Garment Manufacturing Technology II
4.	60 TT E 44	Apparel Processing and Clothing Care	PE	3	3	0	0	3	Garment Manufacturing Technology II
5.	60 TT E 45	Apparel Production Machinery and Equipment	PE	3	3	0	0	3	Garment Manufacturing Technology II
6.	60 TT E 46	Textile Composites	PE	3	3	0	0	3	Technical Textiles

SEMESTER VII, ELECTIVE V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT E 51	Textile Industry and Mill Management	PE	3	3	0	0	3	Total Quality Management
2.	60 TT E 52	Textile and Apparel Entrepreneurship	PE	3	3	0	0	3	Total Quality Management
3.	60 TT E 53	Lean and Six Sigma Concepts for Textile and Apparel Industry	PE	3	3	0	0	3	Total Quality Management
4.	60 TT E 54	Supply Chain Management for Textile and Apparel Industry	PE	3	3	0	0	3	Total Quality Management
5.	60 TT E 55	International Social Compliance	PE	3	3	0	0	3	Total Quality Management
6.	60 TT E 56	ERP and MIS in Apparel Industry	PE	3	3	0	0	3	Total Quality Management

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SEMESTER VII &SEMESTER VIII, AUDIT COURSES (AC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 AC 001	Research Methodology I	AC	1	1	0	0	-	-
2.	60 AC 002	Research Methodology II	AC	1	1	0	0	-	-

MANDATORY COURSES (MC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 MY 001	Environmental Studies and Climate Change	MC	2	2	0	0	0	-
2.	60 MY 002	Universal Human Values	MC	3	2	1	0	3	-
3.	60 MY 003	Startups & Entrepreneurship	MC	3	2	1	0	0	-

OPEN ELECTIVES I / II / III / IV(OE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 TT L1*	Open Elective I	OE	3	3	0	0	3	-
2.	60 TT L2*	Open Elective II	OE	3	3	0	0	3	-
3.	60 TT L3*	Open Elective III	OE	3	3	0	0	3	-

CAREER GUIDANCE COURSES (CG)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 CG 0P1	Career Skill Development I	CG	2	2	0	0	0	-
2.	60 CG 0P2	Career Skill Development II	CG	2	2	0	0	0	-
3.	60 CG 0P3	Career Skill Development III	CG	2	2	0	0	0	-
4.	60 CG 0P4	Career Skill Development IV	CG	2	2	0	0	0	-
5.	60 CG 0P5	Comprehension Test	CG	2	0	0	2	0	-
6.	60 CG 0P6	Internship	CG	0	0	0	0	3*	-
7.	60 TT 0P**	Mini Project	CG	0	0	0	0	0	-
8.	60 TT 7P3	Project Work I	CG	4	0	0	4	2	-
9.	60 TT 8P1	Project Work II	CG	16	0	0	16	8	-

GENERAL ENGINEERING COURSES (GE)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C	Prerequisite
1.	60 GE 001	Heritage of Tamils / தமிழர் மரபு	GE	1	1	0	0	1*	-
2.	60 GE 002	Tamils and Technology / தமிழரும் தொழில்நுட்பமும்	GE	1	1	0	0	1*	-

Passed in BoS Meeting held on 21/11/2023
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Tiruchengode-637 215

SEMESTER I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
		Induction Programme	-	-	-	-	-	-
THEORY								
1.	60 EN 001	Professional English - I	HS	3	1	0	2	2
2.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4
3.	60 PH 007	Physics for Textile Technology	BS	3	3	0	0	3
4.	60 CH 006	Chemistry for Textile	BS	3	3	0	0	3
5.	60 ME 001	Engineering Drawing	ES	6	2	0	4	4
6.	60 MY 001	Environmental Studies and climate Change	MC	2	2	0	0	0
PRACTICALS								
7.	60 CP 0P3	Applied Physics and Chemistry Laboratory	BS	4	0	0	4	2
8.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2
			Total	**29**	**14**	**1**	**14**	**20**

SEMESTER II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EN 002	Professional English - II	HS	3	1	0	2	2
2.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4
3.	60 EE 002	Basic Electrical, Electronics and Instrumentation	ES	3	3	0	0	3
4.	60 ME 004	Engineering Mechanics	ES	4	3	1	0	4
5.	60 CS 001	C Programming	ES	3	3	0	0	3
6.	60 TT 201	Fibre Science	PC	3	3	0	0	3
7.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
8.	60 GE 001	Heritage of Tamils / தமிழர் மரபு	GE	1	1	0	0	1*
PRACTICALS								
9.	60 EE 0P2	Basic Electrical, Electronics and Instrumentation Laboratory	ES	4	0	0	4	2
10.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2
11.	60 CG 0P1	Career Skill Development I	CG	2	0	0	2	0
12.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
			Total	**35**	**19**	**2**	**14**	**23**

Heritage of Tamils[&] additional 1 credit is offered and not account for CGPA.

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SEMESTER III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 011	Optimisation Techniques and Numerical Methods	BS	4	3	1	0	4
2.	60 ME 008	Elements of Mechanical Engineering	ES	4	3	1	0	4
3.	60 TT 301	Structure and Properties of Fibers	PC	4	3	1	0	4
4.	60 TT 302	Yarn Manufacturing Technology I	PC	3	3	0	0	3
5.	60 TT 303	Fabric Manufacturing Technology I	PC	3	3	0	0	3
6.	60 GE 002	Tamils and Technology / தமிழரும் தொழில்நுட்பமும்	GE	1	1	0	0	1*
PRACTICALS								
7.	60 TT 3P1	Fibre Science Laboratory	PC	4	0	0	4	2
8.	60 TT 3P2	Yarn Manufacturing Technology Laboratory I	PC	4	0	0	4	2
9.	60 CG 0P2	Career Skill Development II	CG	2	0	0	2	0
10.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				29	**17**	**02**	**10**	**22**

SEMESTER IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 022	Applied Statistics	BS	4	3	1	0	4
2.	60 TT 401	Yarn Manufacturing Technology II	PC	3	3	0	0	3
3.	60 TT 402	Fabric Manufacturing Technology II	PC	3	3	0	0	3
4.	60 TT 403	Textile Chemical Processing I	PC	4	2	0	2	3
5.	60 TT E1*	Profession Elective – I	PE	3	3	0	0	3
6.	60 TT L1*	Open Elective – I	OE	3	3	0	0	3
7.	60 MY 002*	Universal Human Values*	MC	3	2	1	0	3*
8.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
PRACTICALS								
9.	60 TT 4P1	Yarn Manufacturing Technology Laboratory II	PC	4	0	0	4	2
10.	60 TT 4P2	Fabric Manufacturing Technology Laboratory	PC	4	0	0	4	2
11.	60 CG 0P3	Career Skill Development III	CG	2	0	0	2	0
12.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				37	**21**	**02**	**10**	**23**

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- Tamils and Technology[&] additional1 credit is offered and not account for CGPA.
- UHV[#] additional 3 credit is offered and not accouted for CGPA

SEMESTER V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 TT 501	Knitting Technology	PC	4	2	0	2	3
2.	60 TT 502	Textile Chemical Processing II	PC	3	3	0	0	3
3.	60 TT 503	Woven Fabric Structure	PC	3	3	0	0	3
4.	60 TT 504	Technical Textiles I	PC	3	3	0	0	3
5.	60 TT E2*	Profession Elective II	PE	3	3	0	0	3
6.	60 TT L2*	Open Elective II	OE	3	3	0	0	3
7.	60 MY 003	Startups & Entrepreneurship	MC	2	2	0	0	0
PRACTICALS								
8.	60 TT 5P1	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
9.	60 TT 5P2	Fabric Structure Laboratory	PC	4	0	0	4	2
10.	60 CG 0P4	Career Skill Development IV	CG	2	0	0	2	0
11.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				31	**19**	**0**	**12**	**22**

SEMESTER VI

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 HS 003	Total Quality Management	HS	3	3	0	0	3
2.	60 TT 601	Textile and Apparel Quality Evaluation	PC	3	3	0	0	3
3.	60 TT 602	Garment Manufacturing Technology I	PC	3	3	0	0	3
4.	60 TT 603	Technical Textiles II	PC	4	2	0	2	3
5.	60 TT E3*	Profession Elective III	PE	3	3	0	0	3
6.	60 TT L3*	Open Elective – III	OE	3	3	0	0	3
7.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
PRACTICALS								
8.	60 TT 6P1	Garment Construction Laboratory I	PC	4	0	0	4	2
9.	60 TT 6P2	Textile and Apparel Quality Evaluation Laboratory	PC	4	0	0	4	2
10.	60 CG 0P5	Comprehension Test	CG	2	2	0	0	0
11.	60 TT 0P**	Mini Project	CG	0	0	0	0	0
12.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				29	**19**	**0**	**10**	**22**

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Comprehension Test* -onne additional credit is offered and not accounted for CGPA calculation.
Miniproject[&] - 1 additional credit is offered and not accounted for CGPA calculation

SEMESTER VII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 TT 701	Garment Manufacturing Technology II	PC	3	3	0	0	3
2.	60 TT 702	Financial Management and Costing for Textile and Apparel Industry	PC	4	3	1	0	4
3.	60 TT 703	Nonwoven Technology	PC	4	2	0	2	3
4.	60 TT E4*	Elective IV	PE	3	3	0	0	3
5.	60 TT E5*	Elective V	PE	3	3	0	0	3
6.	60 AC 001	Research Methodology I	AC	1	1	0	0	0
7.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
PRACTICALS								
8.	60 TT 7P1	Textile CAD Laboratory	PC	4	0	0	4	2
9.	60 TT 7P2	Garment Construction Laboratory II	PC	4	0	0	4	2
10.	60 TT 7P3	Project Work – I	CG	4	0	0	4	2
11.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				34	**17**	**2**	**14**	**22**

NCC[%] - Course can be waived with 3 credits in VII semester or offered as extra 3 credits.
NSS/NSO/YRC/RRC/Fine Arts[%] 3 extra credits not accounted for CGPA

Internship* additional credits is offered based on the duration

SEMESTER VIII

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 AC 002	Research Methodology II	AC	1	1	0	0	0
PRACTICALS								
2.	60 TT 8P1	Project Work – II	CG	16	0	0	16	8
3.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				17	**1**	**0**	**16**	**8**

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 162

Note: HS- Humanities and Social Sciences including Management Courses, BS- Basic Science Courses, ES- Engineering Science Courses, PE-Professional Core Courses, PE-Professional Elective Courses, GE- General Elective Courses, OE- Open Elective Courses, CG - Career guidance Course, MC- Mandatory Courses AC-Audit courses

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K.S. RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

SEMESTER I

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EN 001	Professional English - I	HS	3	1	0	2	2
2.	60 MA 001	Matrices and Calculus	BS	4	3	1	0	4
3.	60 PH 007	Physics for Textile Technology	BS	3	3	0	0	3
4.	60 CH 006	Chemistry for Textile	BS	3	3	0	0	3
5.	60 ME 001	Engineering Drawing	ES	6	2	0	4	4
6.	60 MY 001	Environmental Studies and climate Change	MC	2	2	0	0	0
PRACTICALS								
7.	60 CP 0P3	Applied Physics and Chemistry Laboratory	BS	4	0	0	4	2
8.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	ES	4	0	0	4	2
			Total	**29**	**14**	**1**	**14**	**20**

BS : Basic Science
HS : Humanities and Social Science
ES : Engineering Science
MC : Mandatory Course
L : Lecture
T : Tutorial
P : Practical

Note:
1 Hour Lecture is equivalent to 1 credit
2 Hour Tutorial is equivalent to 1 credit
3 Hours Practical is equivalent to 1 credit

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B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS

(For the candidates admitted from 2022-2023 onwards)

FIRST SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment*	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1.	60 EN 001	Professional English - I	2	40	60	100	45	100
2.	60 MA 001	Matrices and Calculus	2	40	60	100	45	100
3.	60 PC 007	Physics for Textile Technology	2	40	60	100	45	100
4.	60 CH 006	Chemistry for Textile	2	40	60	100	45	100
5.	60 ME 001	Engineering Drawing	2	40	60	100	45	100
PRACTICAL								
6.	60 CP 0P3	Applied Physics and Chemistry Laboratory	3	60	40	100	45	100
7.	60 ME 0P1	Fabrication and Reverse Engineering Laboratory	3	60	40	100	45	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 EN 001	PROFESSIONAL ENGLISH I

Category	L	T	P	Credit
HS	1	0	2	2

Objective

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Prerequisite

Basic knowledge of reading and writing in English.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Listen and comprehend complex academic texts	Understand
CO2	Read and infer the denotative and connotative meanings of technical texts	Analyze
CO3	Write definitions, descriptions, narrations, and essays on various topics	Apply
CO4	Speak fluently and accurately in formal and informal communicative contexts	Apply
CO5	Express their opinions effectively in both oral and written medium of communication	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								2	3	3	2	3	2	2	3
CO2								2	3	3	2	3	2	2	3
CO3								2	3	3	2	3	2	2	3
CO4								2	3	3	2	3	2	2	3
CO5								2	3	3	2	3	2	2	3
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Apply (Ap)	20	20	40
Analyse (An)	30	30	50
Create (Cr)	0	0	0

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K.S. Rangasamy College of Technology – Autonomous								R 2022
60 EN 001 - Professional English I								
Common to All Branches								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	1	0	2	45	2	40	60	100

Introduction to Fundamentals of Communication **Listening:** General information-specific details-conversation: introduction to classmates – audio / video (formal & informal). **Speaking:** Self Introduction; Introducing a friend; conversation - politeness strategies. **Reading:** Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. **Writing:** Writing letters – informal and formal – basics and format orientation **Language Focus:** Present Tenses; word formation (affixes); synonyms, antonyms and contranyms, and phrasal verbs; abbreviations & acronyms (as used in technical contexts).	9
Narration and Summation **Listening:** Podcast, anecdotes / stories / event narration; documentaries and interviews with celebrities. **Speaking:** Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews. **Reading:** Biographies, travelogues, newspaper reports, excerpts from literature, and travel & technical blogs. **Writing:** Paragraph writing, short report on an event (field trip etc.). **Language Focus:** Past tenses and prepositions; One-word substitution.	9
Description of a process / product **Listening:** Listen to a product and process descriptions; advertisements about products or services **Speaking:** Picture description; giving instruction to use the product; presenting a product. **Reading:** Advertisements, gadget reviews and user manuals. **Writing:** Definitions; instructions; and product /process description. **Language Focus:** Imperatives; comparative adjectives; future tenses. Homonyms; and Homophones, discourse markers (connectives & sequence words)	9
Classification and Recommendations **Listening:** TED Talks; scientific lectures; and educational videos. **Speaking:** Small Talk; Mini presentations **Reading:** Newspaper articles and Journal reports Note-making / Note-taking; recommendations; Transferring information from non-verbal (chart,	9

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graph etc, to verbal mode) **Language Focus:** Articles; Pronouns -Possessive & Relative pronouns; subject-verb agreement; collocations.	
Expression **Listening:** Debates/ discussions; different viewpoints on an issue; and panel discussions. **Speaking:** Group discussions, debates & role plays. **Reading:** Editorials; and opinion blogs. **Writing:** Essay Writing (Descriptive or narrative). **Language Focus:** Punctuation; Compound Nouns; simple, compound & complex sentences. cause & effect expressions.	9
Total Hours	**45**

Text book(s):	
1.	*'English for Engineers & Technologists'* Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, *'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book'*, Penguin Random House India, 2020
Reference(s):	
1.	Paul Emmerson and Nick Hamilton, *'Five Minute Activities for Business English',* Cambridge University Press, New York, 2005
2.	Arthur Brookes and Peter Grundy,' *Beginning to Write: Writing Activities for Elementary and Intermediate Learners',* Cambridge University Press, New York, 2003
3.	Michael McCarthy and Felicity O Dell, *'English Vocabulary in Use: Upper Intermediate',* Cambridge University Press, N.York, 2012
4.	Lakshmi Narayanan, *'A Course Book on Technical English'* Scitech Publications (India) Pvt. Ltd. 2020

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Fundamentals of Communication**	
1.1	Listening for general information and Specific details	1
1.2	Self-introduction	1
1.3	Narrating personal experiences	1
1.4	Reading relevant to technical contexts and emails	1
1.5	Writing letters – informal	1
1.6	Writing letters - formal	1
1.7	Present Tenses	1
1.8	synonyms, antonyms and contranyms, and affixes	1
1.9	phrasal verbs; abbreviations & acronyms	1
2	**Narration and Summation**	
2.1	Listening to podcasts, documentaries and interviews with celebrities	1
2.2	Narrating personal experiences	1
2.3	Summarizing of documentaries	1
2.4	Reading travelogues, and excerpts from literature	1
2.5	Paragraph writing	1
2.6	Short report on an event (field trip etc.).	1

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2.7	Past tenses	1
2.8	Prepositions	1
2.9	One-word substitution	1
3	**Description of a process / product**	
3.1	Listen to a product and process descriptions	1
3.2	Picture description	1
3.3	Giving instruction to use the product	1
3.4	Reading Advertisements, gadget reviews and user manuals	1
3.5	Writing Definitions and instructions	1
3.6	Future Tenses	1
3.7	Homonyms and Homophones	1
3.8	Imperatives	1
3.9	comparative adjectives, and discourse markers	1
4	**Classification and Recommendations**	
4.1	Listening to TED Talks and educational videos	1
4.2	Listening to scientific lectures	1
4.3	Small Talk and mini presentations	1
4.4	Reading newspaper articles and journal reports	1
4.5	Note-making / Note-taking	1
4.6	Recommendations	1
4.7	Transferring information from non-verbal	1
4.8	Articles and Pronouns	1
4.9	Subject-verb agreement and collocations	1
5	**Expression**	
5.1	Listening to debates and panel discussions	1
5.2	Group discussions	2
5.3	Role plays	1
5.4	Reading editorials and opinion blogs	1
5.5	Essay Writing (Descriptive or narrative)	1
5.6	Punctuation and cause & effect expressions.	1
5.7	Compound Nouns	1
5.8	Simple, compound & complex sentences	1
	Total	**45**

Course Designers

1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

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60 MA 001	MATRICES AND CALCULUS

Category	L	T	P	Credit
BS	3	1	0	4

Objective

- To familiarize the students with basic concepts in Cayley-Hamilton theorem and orthogonal transformation.
- To get exposed to the fundamentals of differential calculus in various methods.
- To acquire skills to understand the concepts involved in Jacobians and maxima and minima.
- To solve various linear differential equations and method of variation of parameters.
- To learn various techniques and methods in solving definite and indefinite integrals.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply Cayley-Hamilton theorem and reduce the quadratic form into canonical form.	Remember, Apply, Evaluate
CO2	Apply differential calculus in solving various Engineering problems.	Remember, Understand, Apply
CO3	Analyze Jacobian methods and constrained maxima and minima of the functions.	Remember, Understand, Analyze
CO4	Apply various methods in solving the differential equations.	Remember, Apply
CO5	Evaluate definite and indefinite integrals using different techniques.	Remember, Apply, Evaluate

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3							2		3
CO2	3	3	2	2	3							2		3
CO3	3	3	3	2	3							2		3
CO4	3	3	3	3	3							2		3
CO5	3	3	3	2	3							2		3
3 - Strong; 2 - Medium; 1 - Some														

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	10	10	10	10
Apply (Ap)	30	20	40	40
Analyze (An)	0	20	20	20
Evaluate (Ev)	10	0	20	20
Create (Cr)	0	0	0	0
Total	60	60	100	100

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K. S. Rangasamy College of Technology – Autonomous R 2022								
60 MA 001 - Matrices and Calculus								
Common to MECH, ECE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT, AI&DS, AI&ML								
Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	1	0	60	4	40	60	100

Matrices Characteristic equation - Eigen values and Eigen vectors of a real matrix - Properties of Eigen values and Eigen vectors - Cayley-Hamilton theorem - Orthogonal transformation of a symmetric matrix to diagonal form - Reduction of quadratic form to canonical form by an Orthogonal transformation - Nature of quadratic form - Applications: Stretching of an elastic membrane.	[9]
Differentiation Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Successive Differentiation - Leibnitz's theorem - Applications: Maxima and Minima of functions of one variable*.	[9]
Functions of Several Variables Partial differentiation - Homogeneous functions and Euler's theorem - Jacobians - Taylor's series for functions of two variables - Applications: Maxima and minima of functions of two variables - Constrained maxima and minima: Lagrange's Method of Undetermined Multipliers*.	[9]
Differential Equations Linear differential equations of second and higher order with constant coefficients - R.H.S is of the form e^{ax}, $sin\, ax$, $cos\, ax$, x^n, $n > 0$ - Differential equations with variable coefficients: Cauchy's and Legendre's form of linear equations - Method of variation of parameters.	[9]
Integration Definite and Indefinite integrals – Substitution rule - Techniques of Integration: Integration by parts, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.	[9]
Total Hours: 45 + 15 (Tutorial)	

Text Book(s):

1.	Grewal B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi, 2017.
2	Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019.

Reference(s):

1.	Kreyszig Erwin, "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons (Asia) Limited,
2.	Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand & Company Ltd.
3.	Bali N P and Manish Goyal," A text book of Engineering Mathematics",10th Edition, Laxmi Publications (P) Ltd, 2016.
4.	"Matrix Analysis with Applications" Dr Gupta S K and Dr Sanjeev Kumar and Prof. Somnath Roy "Matrix Solvers".

***SDG: 4 – Quality Education**

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

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Course Contents and Lecture Schedule

S.No.	Topic	Number of Hours
1	**Matrices**	
1.1	Characteristic equation	1
1.2	Eigen values and Eigen vectors of a real matrix	1
1.3	Properties of Eigen values and Eigen vectors	1
1.4	Cayley-Hamilton theorem	1
1.5	Tutorial	2
1.6	Orthogonal transformation of a symmetric matrix to diagonal form	1
1.7	Reduction of quadratic form to canonical form by Orthogonal transformation	1
1.8	Nature of quadratic form	1
1.9	Stretching of an elastic membrane	1
1.10	Tutorial	2
2	**Differentiation**	
2.1	Representation of functions	1
2.2	Limit of a function and Continuity	1
2.3	Differentiation rules (sum, product, quotient, chain rules)	2
2.4	Successive differentiation	1
2.5	Tutorial	2
2.6	Leibnitz's theorem	1
2.7	Maxima and minima of functions of one variable	2
2.8	Tutorial	2
3	**Functions of Several Variables**	
3.1	Partial differentiation	1
3.2	Homogeneous functions and Euler's theorem	1
3.3	Jacobians	2
3.4	Tutorial	2
3.5	Taylor's series for functions of two variables	1
3.6	Maxima and minima of functions of two variables	1
3.7	Lagrange's Method of Undetermined Multipliers	2
3.8	Tutorial	2
4	**Differential Equations**	
4.1	Linear differential equations of second and higher order with constant co-efficient	1
4.2	R.H.S is of the form e^{ax}, $\sin ax$, $\cos ax$, $x^n, n > 0$	2
4.3	Tutorial	2
4.4	Differential equations with variable coefficients: Cauchy's form of linear equations	2
4.5	Differential equations with variable coefficients: Legendre's form of linear equations	2
4.6	Method of variation of parameters	1

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4.7	Tutorial	2
5	**Integration**	
5.1	Definite and Indefinite integrals	1
5.2	Substitution rule	1
5.3	Techniques of Integration: Integration by parts	1
5.4	Integration of rational functions by partial fraction	1
5.5	Tutorial	2
5.6	Integration of irrational functions	1
5.7	Improper integrals	1
5.8	Hydrostatic force.	1
5.9	Pressure, moments and centres of mass.	1
5.10	Tutorial	2
	Total	60

Course Designers

1. Dr.C.Chandran - cchandran@ksrct.ac.in
2. Mr.G.Mohan - mohang@ksrct.ac.in

List of MATLAB Programmes:

1. Introduction to MATLAB.
2. Matrix Operations - Addition, Multiplication, Transpose, Inverse and Rank.
3. Solution of system of linear equations.
4. Computation of Eigen values and Eigen vectors of a Matrix.
5. Finding ordinary and partial derivatives.
6. Solving first and second order ordinary differential equations.
7. Computing Maxima and Minima of a function of one variable.
8. Computing Maxima and Minima of a function of two variables.

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60 PC 007	PHYSICS FOR TEXTILE TECHNOLOGY

Category	L	T	P	Credit
BS	3	0	0	3

Objective(s)

1. To inculcate the principles of laser, types of laser and demonstrate the applications of laser
2. To study the basic concept of ultrasonic waves, production of ultrasonic waves and its applications
3. To state the principle of optical fiber and to understand the design and applications of optical fibers.
4. To familiarize the students to understand the concept of elasticity, surface tension, viscosity and its applications
5. To instill the fundamental concepts of crystallography and nanotechnology for engineering applications

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Recognize the different types of lasers and its applications	Understand
CO2	Comprehend the principle, production, properties and applications of ultrasonic waves	Understand
CO3	Assess the fundamentals of fiber optic and apply to textile technology	Apply
CO4	Interpret the properties of materials for its potential applications in industrial applications	Apply & Analyse
CO5	Impart the basics of crystal physics and nanomaterials for their applications in textile engineering	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	-	-	2	3	-	2	-	2	-	2	-
CO2	3	3	2	2	-	-	2	3	-	2	-	2	-	2	-
CO3	3	3	2	2	-	-	3	3	-	2	-	2	-	2	-
CO4	3	3	2	2	-	-	3	3	-	2	-	2	-	2	-
CO5	3	3	2	2	-	-	3	3	-	2	-	2	-	2	-
3- Strong; 2-Medium; 2-Low															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	30	30	30
Analyse	0	0	10
Evaluate	0	0	0
Create	0	0	0

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K.S. Rangasamy College of Technology – Autonomous								R 2022
60 PC 007- Physics for Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Lasers* Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion- different types of lasers: gas lasers (CO_2), solid-state lasers (Nd: YAG), dye lasers, Semiconductor laser (Homojunction and Hetero junction)-Properties of laser beams- Application of laser in engineering and garment manufacturing.	9
Ultrasonics and Applications* Introduction-Properties-Production: Magnetostriction effect, Magnetostriction generator- piezoelectric effect, piezoelectric generator – Ultrasonic detection- acoustical grating-Applications: Cavitation, cleaning, Textile Wet Processing, Non destructive testing: Pulse echo system, through transmission, resonance system- Ultrasonic imaging (A, B and TM- Scan).	9
Fiber Optics and Sensors* Principles – cone of acceptance, numerical aperture (derivation)- Modes of propagation –Fabrication of optical fibre: Crucible-crucible technique - Classification: based on materials, modes and refractive index profile– Splicing : types of splicing- Fiber optical communication links (Block diagram) – Fiber optic sensors: liquid level sensors, Temperature and Displacement sensors- applications of fiber optic sensor in textile technology.	9
Elasticity, Surface Tension and Viscosity* Stress - Strain - Hooke's law - Elastic Behavior of Material - Types of elastic moduli - Young's modulus - Bulk modulus - Rigidity modulus - Non-uniform bending - Uniform bending - factors affecting elasticity. Surface properties: cohesive force - adhesive force - factors affecting surface tension - interfacial tension - emulsions - detergency - foaming – wettability- coefficient of viscosity – Poiseuilles law - coefficient of viscosity of various liquids. Properties of absorbent textiles for industrial applications.	9
Crystallography and Nanotechnology* Lattice - Unit cell – crystal systems and Bravais lattice - Crystal planes and Miller indices - Nanomaterials: Properties- Top-down process: Ball Milling method – Bottom-up process: vapor phase deposition – Carbon Nano Tube (CNT): Properties, preparation by electric arc method, Applications of carbon nano tubes in textile processing: Water repellence, UV protection, Antimicrobial, Antistatic, Wrinkle resistance, Flame resistance	9
Total Hours: 45	

Text Book

1. M. N. Avadhanulu, P. G. Kshirsagar, TVS Arun Murthy "A Text Book of Engineering Physics", S Chand Publications, New Delhi, 2022.
2. H. K. Malik, A. K. Singh "Engineering Physics" McGraw Hill Education Private Limited, New Delhi. 2021
3. D. R. Joshi "Engineering Physics" McGraw Hill Education Private Limited, New Delhi. 2010

Reference Books

1. S.O. Pillai "A Textbook Of Engineering Physics" New Age International (P) Limited, New Delhi, 2014
2. B. B. Laud " Lasers and Non-Linear Optics" New Age International Publications, New Delhi, 2015.
3. Palanisamy, P.K., "Physics of Materials", Scitech Publications, Chennai. 2012

*** SDG:4- Quality Education**

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. **Course Contents and Lecture Schedule**

S. No.	Topic	No. of hours
1.0	**LASERS**	
1.1	Einstein's theory of matter radiation interaction and A and B coefficients	2
1.2	Amplification of light by population inversion	1
1.3	Different types of lasers: gas lasers (CO_2)	1
1.4	Solid-state lasers (Nd: YAG)	1
1.5	Dye lasers	1
1.6	Semiconductor laser (Homojunction and Hetero junction)-	1
1.7	Properties of laser beams	1
1.8	Application of laser in engineering and garment manufacturing	
2.0	**ULTRASONICS AND APPLICATIONS**	
2.1	Introduction-Properties	1
2.2	Production: Magnetostriction effect, Magnetostriction generator	1
2.3	piezoelectric effect, piezoelectric generator	1
2.4	Ultrasonic detection	1
2.5	Acoustical grating	1
2.6	Applications: Cavitation, cleaning, Textile Wet Processing	1
2.7	Non destructive testing: Pulse echo system, through transmission, resonance system	2
2.8	Ultrasonic imaging (A, B and TM- Scan).	1
3.0	**FIBER OPTICS AND SENSORS**	
3.1	Principles – cone of acceptance,	1
3.2	Numerical aperture (derivation)- Modes of propagation	1
3.3	Fabrication of optical fibre: Crucible-crucible technique	1
3.4	Classification: based on materials, modes and refractive index profile	1
3.5	Splicing : types of splicing	1
3.6	Fiber optical communication links (Block diagram)	1
3.7	Fiber optic sensors: liquid level sensors, Temperature	1
3.8	Displacement sensors	1
3.9	Applications of fiber optic sensor in textile technology	1
4.0	**ELASTICITY, SURFACE TENSION AND VISCOSITY**	
4.1	Stress - Strain - Hooke's law	1
4.2	Elastic Behavior of Material	1
4.3	Types of elastic moduli - Young's modulus - Bulk modulus - Rigidity modulus -	1
4.4	Non-uniform bending - Uniform bending - factors affecting elasticity.	1
4.5	Surface properties: cohesive & adhesive forces - factors affecting surface tension	1
4.6	Interfacial tension - emulsions - detergency - foaming – wettability-	1
4.7	Coefficient of viscosity – Poiseuilles law	1
4.8	Coefficient of viscosity of various liquids.	1
4.9	Properties of absorbent textiles for industrial applications.	1
5.0	**CRYSTALLOGRAPHY AND NANOTECHNOLOGY**	
5.1	Lattice - Unit cell – crystal systems and Bravais lattice	1
5.2	Crystal planes and Miller indices	1
5.3	Nanomaterials: Properties- Top-down process: Ball Milling method	1
5.4	Bottom-up process: vapor phase deposition	2
5.5	Carbon Nano Tube (CNT): Properties, preparation by electric arc method,	1
5.6	Applications of carbon nano tubes in textile processing:	1
5.7	Water repellence, UV protection, Antimicrobial, Antistatic, Wrinkle resistance, Flame resistance	2

Course Designers

Dr. V. Vasudevan, Mr.S. Vanchinathan, Dr. M. Malarvizhi

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

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60 CH 006	CHEMISTRY FOR TEXTILE

Category	L	T	P	Credit
BS	3	0	0	3

Objective(s)

- To help the learners, analyse the hardness of water and its removal.
- To endow an overview of electrochemistry and corrosion.
- To rationalize the types of lubricants and emulsions.
- To analyze the concepts of kinetics and surface chemistry.
- To recall the basics polymer fabrication

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Identify the types of hardness of water and its removal	Understand, Apply & Analyze
CO2	Understand the concept electrochemistry, corrosion ant its control	Understand & Apply
CO3	Recognize the types of lubricants and its applications.	Understand & Apply
CO4	Interpret the kinetics of the reaction and surface chemistry	Apply & Analyze
CO5	Familiarize the concepts of polymer fabrication.	Understand

Mapping with **Programme** Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2			2					2	2	2	
CO2	3	3	2	3			2					2	2	2	2
CO3	3	2	3	2			2					2		3	2
CO4	2	2	2				2					1			2
CO5	3	2	2				2					2	2		
3- Strong; 2-Medium; 1-Low															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests			Terminal Examination
	1	2	3	
Remember	20	20	20	20
Understand	40	40	40	40
Apply	40	40	40	40
Analyze	-	-	-	-
Evaluate	-	-	-	-
Create	-	-	-	-

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

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K.S. Rangasamy College of Technology – Autonomous								R 2022
60 CH 006 - Chemistry for Textile								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Water Technology Introduction – Commercial and industrial uses of water - hardness - types – estimation of hardness by EDTA method- Internal conditioning (colloidal, phosphate, calgon and carbonate conditioning methods) – external conditioning (Zeolite process, demineralization process) - Desalination methods (Reverse Osmosis and Electro dialysis). Flash evaporation.	7
Electrochemistry and Corrosion Electrode potential - Nernst Equation - derivation and problems - reversible and irreversible cells - Types of Electrodes and its applications - reference electrodes - pH, conductometric and Potentiometric titrations. Electrochemical corrosion, Corrosion due to dissimilar metal cells (galvanic cells), Corrosion due to differential aeration - Factors influencing corrosion - Corrosion control: cathodic protection (sacrificial anodic protection, impressed current cathodic prot	10
Lubricants Functions - properties (viscosity index, oiliness, carbon residue, aniline point, cloud and pour point) - classification: Grease (calcium based, sodium based and lithium based) - solid lubricants (graphite and molybdenum disulphide). Grading of lubricants. Hydraulic oils – Lubricating Emulsions – Oil in water, Water in oil. Properties and applications - gas as a lubricant	9
Kinetics and Surface Chemistry Kinetics: Reaction rate - order and molecularity - factors influencing rate of reaction – first order kinetics – Arrhenius equation. Adsorption: Types of adsorption – adsorption isotherms – Freundlich's adsorption isotherm – Langmuir's adsorption isotherm –applications of adsorption on pollution abatement.	10
Fabrication of Polymer Compounding- Additives for polymer – fillers – plasticizers – lubricants – accelerators – stabilizers - flame retarders – pigments - nucleating agents - blowing agents - adhesives. Fabrication of polymer - injection moulding - extrusion moulding - blow moulding – compression moulding - lamination.	9
Total hours	45

Text Book

1. O.G. Palanna "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2017.
2. P.C. Jain and Monica Jain, A Textbook of Engineering Chemistry, DhanpatRaipublications, New Delhi, 16th edition, 2015.

Reference Books

1. Jain. P.C. and Monica Jain, "Engineering Chemistry", Dhanpatrai publishing co. New Delhi, 14th edition, 2015.
2. Dara. S.S, "A Text Book of Engineering Chemistry", S Chand & co. Ltd., 2014.
3. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013
4. ShikhaAgarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, 2nd Edition, 2019.
5. Shaw D.J., Introduction to Colloid and Surface Chemistry, Butterworth-heinemann publishers, 1992.

* SDG 6: Improve Clean Water and Sanitation

** SDG 9: Industry, Innovation, and Infrastructure

*** SDG 15 :Life on Land

Passed in BoS Meeting held on 11/05/2023
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Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Water Technology**	
1.1	Introduction – Commercial and Industrial uses of water	1
1.2	Hardness – types	1
1.3	Estimation of Hardness of ater by EDTA method	1
1.4	Internal conditioning (Colloidal, Phosphate, Calgon and Carbonate)	1
1.5	External conditioning (Zoelite process & Demineralization process)	1
1.6	Desalination methods (Reverse Osmosis and Electrodialysis)	1
1.7	Flash Evaporation	1
2.0	**Electrochemistry and Corrosion**	
2.1	Electrode potential - Nernst Equation - derivation and problems	1
2.2	Reversible and irreversible cells	1
2.3	Types of Electrodes and its applications	2
2.4	Reference electrodes – pH	1
2.5	Conductometric and Potentiometric titrations	1
2.6	Electrochemical corrosion, Corrosion due to dissimilar metal cells (galvanic cells),	1
2.7	Corrosion due to differential aeration - Factors influencing corrosion	2
2.8	Corrosion control: cathodic protection (sacrificial anodic protection, impressed current cathodic protection).	1
3.0	**Lubricants**	
3.1	Functions - properties (viscosity index, oiliness, carbon residue, aniline point, cloud and pour point)	2
3.2	classification: Grease (calcium based, sodium based and lithium based)	1
3.3	solid lubricants (graphite and molybdenum disulphide).	1
3.4	Grading of lubricants.	1
3.5	Hydraulic oils	1
3.6	Lubricating Emulsions	1
3.7	Oil in water, Water in oil.	1
3.8	Properties and applications - gas as a lubricant.	1
4.0	**Kinetics and Surface Chemistry**	
4.1	Kinetics: Reaction rate - order and molecularity	1
4.2	factors influencing rate of reaction	1
4.3	first order kinetics	1
4.4	Arrhenius equation.	1
4.5	Adsorption: Types of adsorption –	1
4.6	adsorption isotherms – Freundlich's adsorption isotherm	2
4.7	Langmuir's adsorption isotherm –.	1
4.8	applications of adsorption on pollution abatement	2
5.0	**Fabrication of Polymer**	
5.1	Compounding- Additives for polymer	1
5.2	Fillers – plasticizers	1
5.3	Lubricants – accelerators	1
5.4	Stabilizers - flame retarders	1
5.5	Pigments - nucleating agents	1
5.6	Blowing agents – adhesives	1
5.7	Fabrication of polymer - injection moulding	1
5.8	Extrusion moulding - blow moulding	1
5.9	Compression moulding - lamination.	1

Course Designers Dr.T.A.Sukantha , Dr.K.Prabha, Dr.S.Meenachi

Passed in BoS Meeting held on 11/05/2023
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60 ME 001	ENGINEERING DRAWING

Category	L	T	P	Credit
ES	2	0	4	4

Objective

- This course aims to convey to acquire various concepts of dimensioning, conventions and standards.
- This course is to impart the graphic skills for converting pictorial views of solids in to orthographic views.
- To learn the concept in projection of solids.
- To draws the section of solids and to know development of different types of surfaces.
- To learn the concept in isometric projection.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Use the drafting instruments for construct the conic sections	R/U/A
CO2	Convert the pictorial views of solids in to orthographic views	R/U/A
CO3	Draw the projections of regular solids and floor plans	R/U/A
CO4	Draw the true shape of sections and develop the lateral surfaces of right solids.	R/U/A
CO5	Sketch the three dimensional view of solids for given orthographic views.	R/U/A

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3										3	3	
CO2	3	3	3										3	3	
CO3	3	3	3		3			3					3	3	
CO4	3	3	3		3			3					3	3	
CO5	3	3	3										3	3	
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	20
Understand	20	20	30
Apply	30	30	50
Analyse	0	0	0
Evaluate	0	0	0
Create	0	0	0

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

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K.S. Rangasamy College of Technology – Autonomous (R 2022)								
60 ME 001 - Engineering Drawing								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	2	0	4	60	4	40	60	100

Introduction to Engineering Drawing and Plane Curves* Use of drawing instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning – Drawing sheet layouts - Title block – Line types – Scales: plain, diagonal and vernier scales. Construction of ellipse, parabola and hyperbola (Eccentricity method) - Construction of rectangular hyperbola - Construction of cycloids, epicycloids and hypocycloids	[6+12]
Orthographic Projection* Introduction to orthographic projections – Planes of projection – Projection of points and lines inclined to both planes – Projection of planes (Inclined to one plane and parallel to other – Inclined to both planes) - Conversions of pictorial views to orthographic views.	[6+12]
Projection of Solids* Projections of simple solids: prism, pyramid, cylinder and cone (Axis of solid inclined to both HP and VP).	[6+12]
Sections of solids and Development of surfaces* Sections of solids :Prism, Cylinder, Pyramid, Cone – Auxiliary Views - Draw the sectional orthographic views of geometrical solids, objects from industry - Development of surfaces of Right solids – Prism, Pyramid, Cylinder and Cone	[6+12]
Isometric Projection and Introduction to AutoCA* Principles of isometric projection – Isometric scale – Isometric projections of simple solids: Prism, pyramid, cylinder and cone - Isometric projections of frustum and truncated solids - Combination of two solid objects in simple vertical positions.	[6+12]
Total Hours(Lecture=30 Hours + Practice=60 Hours)	**90**

Text Book(s):

1. Bhatt N.D., —Engineering Drawing‖, Charotar Publishing House Pvt. Ltd., 53rd Edition, Gujarat, 2019
2. Basant Agarwal and C.M.Agarwal., “Engineering Drawing”, McGraw Hill Education, 2013.

Reference(s)

1. Shah M.B., Rana B.C., and V.K.Jadon., —Engineering Drawing‖, Pearson Education, 2011.
2. Natarajan K.V., —A Text Book of Engineering Graphics‖, Dhanalakshmi Publishers, Chennai, 2014.
3. Venugopal K., “Engineering Graphics”, New Age International (P) Limited, 2014.
   Dhawan, R.K., “A Text Book of Engineering Drawing” 3 rd Revised Edition, S. Chand Publishing, New Delhi, 2012

*SDG 9 – Industry Innovation and Infrastructure

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Dr. G. KARTHIKEYAN, B.E., M.Tech., Ph.D
Professor and Head
Department of Textile Technology
K S Rangasamy College of Technology
Tiruchengode-637 215

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Engineering Drawing and Plane Curves**	
1.1	Use of drawing instruments	1
1.2	BIS conventions and specifications – Size, layout and folding of drawing sheets	2
1.3	Lettering and dimensioning -Drawing sheet layouts - Title block - Line types	3
1.4	Scales: plain, diagonal and vernier scales.	3
1.5	Construction of ellipse	1
1.6	Construction of parabola	2
1.7	Construction hyperbola by eccentricity method	1
1.8	Practice class for ellipse, parabola and hyberbola	2
1.9	Construction of rectangular hyperbola	2
1.10	Construction of cycloids	1
1.11	Construction of epicycloids and hypocycloids.	2
1.12	Practice class for cycloids and hypocycloids.	1
2	**Orthographic Projection**	
2.1	Introduction to orthographic projections	2
2.2	Planes of projection,	2
2.3	Projection of points	1
2.4	Projection of lines inclined to both planes.	2
2.5	Projection of planes	2
2.6	Projection of planes Inclined to both planes	1
2.7	Conversions of pictorial views to orthographic views.	3
2.8	Practice class for pictorial views to orthographic views.	2
3	**Projection of Solids**	
3.1	Projections of simple solids: prism	2
3.2	Projections of simple solids: cylinder	3
3.3	Projections of simple solids: pyramid	2
3.4	Projections of simple solids: Cone	2
3.5	Practice class for Projection of Solids	2
3.6	Axis of solid inclined to both HP and VP	5
4	**Sections of solids and Development of surfaces**	
4.1	Section of solids for Prism,	2
4.2	Section of solids for Cylinder,	2
4.3	Section of solids for Pyramid,	2
4.4	Section of solids for Cone	2
4.7	Auxiliary Views - Draw the sectional orthographic views of geometrical solids.	3
4.8	Draw the sectional orthographic views of objects from industry.	3
4.9	Development of surfaces of Right solids Prism,	2
4.10	Development of surfaces of Right solids Pyramid, Cylinder and Cone	2
5	**Isometric Projection and Introduction to AutoCAD**	
5.1	Principles of isometric projection	1
5.2	Isometric scale	2
5.3	Isometric projections of simple solids: Prism,	2
5.4	Isometric projections of simple solids: Pyramid,	2
5.5	Isometric projections of simple solids: Cylinder	1
5.6	Isometric projections of simple solids: Cone	2
5.7	Isometric projections of frustum	2
5.8	Isometric projections of truncated solids	2
5.9	Combination of two solid objects in simple vertical positions.	3

Course Designers : Dr.G.Venkatachalam - venkatachalam@ksrct.ac.in

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60 MY 001	Environmental Studies and Climate Change (Common to all)

Category	L	T	P	Credit
MC	2	0	0	0

Objective

- To understand the importance of ecosystem and biodiversity.
- To analyze the impacts of pollution, control and legislation.
- To enlighten awareness and recognize the social responsibility in environmental issues.
- To enlighten the waste management

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to		
CO1	Understand the impacts of pollution on climate change	Understand
CO2	Enhance the awareness the methods of waste management	Apply
CO3	Examine the value of sustainable future	Evaluate
CO4	Evaluate the clean and green development for environmental problem	Evaluate
CO5	Analyze the role of Geo-science in environmental management	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2				2	3					2	2		
CO2	3	2	2	2	2	3	3	2				2	2	3	
CO3	3	2	3	2	2	3	3	2				2	2	3	
CO4	3	2	1	2		2	2					2			
CO5	3	2	2		3		2					2	2	3	
3- Strong; 2-Medium; 1-Some2															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests			Terminal Examination
	1	2	3	
Remember	10	10	10	-
Understand	20	20	20	-
Apply	30	30	30	-
Analyze	30	30	30	-
Evaluate	-	-	-	-
Create	-	-	-	-

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Model Titles for Case Study

1. Environmental impacts of quarry industries in Melur Taluk.
2. A study on impacts of tanneries on ground water and soil quality in Bhavani, Erode district.
3. Effect of pharmaceutical industry on groundwater quality in Oikaraipatty village, AlagarKovil.
4. Solid waste and waste water management in KSR hostel.
5. Environmental effect of Kudankulam atomic power plant.
6. Case study on effect of Sterlite industry
7. Effect of textile wastes in Tiruppur and Karur District.
8. Segregation of waste and its recycling by Pallipalayam Municipality at Namakkal
9. Effect of fire work waste on atmosphere in Sivakasi region
10. Effect of noise pollution waste on atmosphere in Sivakasi region

K. S. Rangasamy College of Technology – Autonomous							**R 2022**
60 MY 001 - Environmental Studies and Climate Change							
Semester	Hours / Week			Total hrs	Credit	Maximum	
	L	T	P		C	CA	E
I	2	0	0	45	0	0	0

Pollution and its impact on climate change* Pollution: Sources and impacts of air pollution – green house effect- global warming- climate change - ozone layer depletion - acid rain. Carbon Footprint - Climate change on various sectors – Agriculture, forestry and ecosystem – climate change mitigation and adaptation. Action plan on climate change. IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes. *Activity*: Study of carbon emission nearby place or industry.	9
Integrated Waste Management** Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan – Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste - risk management: Collection, segregation, treatment and disposal methods. Waste water treatment- ASP *Activity*: Analysis and design of waste management systems, prepare a model / project -wealth from waste	9
Sustainable development practices§ Sustainable development goals (SDGs) **–** Green computing- Carbon trading - Green building – Eco- friendly plastic – Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power. Water scarcity- Watershed management, ground water recharge and rainwater harvesting. *Activity*: Select a topic and analyze the value of sustainable development.	9
Environment and Agriculture§§ Organic farming – bio-pesticides- composting, bio composting, vermi-composting, roof gardening and irrigation. Waste land reclamation. Climate resilient agriculture. Green auditing *Activity*: Prepare a green auditing report on energy, water etc.	9
Geo-science in natural resource management Data base software in environment information, Digital image processing applications in forecasting. GPS, Remote Sensing and Geographical Information System (GIS), World wide web (www), Environmental information system (ENVIS). *Activity*: Prepare the report using IT tool.	9
Total Hour	**45**

Text book

1. Anubha Kaushik , C P Kaushik. Perspectives In Environmental Studies, New Age International publishers; Sixth edition (1 January 2018)

Reference Books

1. G.Tyler Miller Environmental Science 14th Edition Cengage Publications, Delhi, 2013.

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2. Gilbert M.Masters and Wendell P. Ela, "Environmental Engineering And Science", Phi Learning Private Limited, 3rd Edition,2015.
3. Erach Bharucha. Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2000

§§ **SDG: 3 – Good Health and Well-being**
**SDG: 4 – Clean Water and Sanitation
§SDG: 6 - Affordable and Clean Energy
*SDG: 13 – Climate Action

Course Contents and Lecture Schedule		
S.No	**Topic**	**No. of**
1.0	**Pollution and its impact on climate change**	
1.1	Pollution: Sources and impacts of air pollution – green house effect- Global warming- climate change - ozone layer depletion - acid rain	2
1.2	Climate change on various sectors: Agriculture, forestry and ecosystem. – climate change mitigation and adaptation	2
1.3	Action plan on climate change - IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes	2
2.0	**Integrated Waste Management**	
2.1	Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan	1
2.2	Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste	1
2.3	Risk management: Collection, segregation, treatment and disposal methods.	1
2.4	Waste water treatment- ASP	1
3.0	**Sustainable development practices**	
3.1	Sustainable development goals (SDGs) **–** Green computing- Carbon trading - Green building – Eco- friendly plastic	2
3.2	Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power	2
3.3	Water scarcity- Watershed management, ground water recharge and rainwater harvesting	2
4.0	**Environment and Agriculture**	
4.1	Organic farming – bio-pesticides	1
4.2	Composting, bio composting, vermi-composting	2
4.3	Roof gardening and irrigation	1
4.4	Waste land reclamation. Climate resilient agriculture, Green auditing	1
5.0	**Geo-science in natural resource management**	
5.1	Data base software in environment information, Digital image processing applications in forecasting	3
5.2	GPS, Remote Sensing and Geographical Information System (GIS)	3
5.3	World wide web (www), Environmental information system (ENVIS)	3
	Total hours	30

Course Designers

1.Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
2.Dr.K.PRABHA – prabhak@ksrct.ac.in
3.Dr.S.MEENACHI – meenachi@ksrct.ac.in

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60 CP 0P3	APPLIED PHYSICS AND CHEMISTRY LABORATORY (FT & TEXT)

Category	L	T	P	Credit
BS	0	0	4	2

Objective(s)

- Test the knowledge of theoretical concepts.
- To develop the experimental skills of the learners.
- To facilitate data interpretation.
- To expose the learners to various industrial and environmental applications**.**

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyze the concept of youngs modulus, rigidity modulus and dielectric constant of the given materials	Analyze
CO2	Recall the knowledge of properties of light using laser and ordinary light source	Apply
CO3	Apply the concepts of chemistry and develop analytical skills for applications in engineering.	Apply
CO4	Analyze the pH, electromotive force, conductance by using instrumental methods.	Analyze
CO5	Apply the Freundlich's adsorption isotherm and Langmuir's adsorption isotherm using acetic acid on activated charcoal	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	3	-	-	-	3	3	2	2	2	2	-	-
CO2	3	3	-	3	-	-	-	3	3	2	2	2	2	-	-
CO3	3	3	2	3	2	3	3	-	-		2	2	3	3	3
CO4	3	3	2	3	2	3	3	-	-		2	2	3	2	-
CO5	3	3	-	2	-			-	-		2	-	-	2	-
3- Strong; 2-Medium; 2-Low															

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PHYSICS LABORATORY
(FT & TEXT)

List of Experiments

1. Determination of Young's modulus of a given material - Uniform bending
2. Determination of rigidity modulus of a wire - Torsional pendulum.
3. Determination of dielectric constant.
4. Determination of wavelength of mercury spectral lines – spectrometer grating
5. (a) Laser- Determination of the wave length of the laser using grating.

   (b) Optical fibre -Determination of Numerical Aperture and acceptance angle.

Course Designers

Dr. V. Vasudevan
Mr.S. Vanchinathan
Dr. M. Malarvizhi

CHEMISTRY LABORATORY
(FT & TEXT)

List of Experiments

1. Estimation of hardness of water sample by complexometric method.
2. Estimation of HCl by pH meter.
3. Estimation of mixture of acids by conductivity meter.
4. Determination of ferrous ion by Potentiometric titration.
5. Adsorption of acetic acid by Charcoal.

Case studies/Activity report

1. Prepare a report on hardness of water samples in and around your area and suggest your idea for removal of hardness.
2. Apply the knowledge of pH determination for health drinks, beverages, soil, effluent and other biological samples and prepare a case study report.

Course Designers

1. Dr.T.A.SUKANTHA
2. Dr.B.SRIVIDHYA
3. Dr.K.PRABHA
4. Dr.S.MEENACHI

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60 ME 0P1	Fabrication and Reverse Engineering Laboratory

Category	L	T	P	Credit
ES	0	0	4	2

Preamble

- The objective of this course is to make the students gain practical knowledge to co-relate with the theoretical studies. To acquire skills on operating the hand tools and instruments. To provide hands on training on Fitting, Carpentry, Sheet metal, Welding and machine. To offer real time activity on plumbing connections in domestic applications tools. To offer real time activity on plumbing connections in domestic applications. To provide hands on training on house hold wiring and electronic circuits. To provide hands on activities on dismantling, assembling of the computer internal components and peripherals.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Perform facing, plain turning and drilling.	Apply
CO2	Make a model of fitting, carpentry, sheet metal and welding joints.	Apply
CO3	Construct the water pipe line in plumbing shop.	Apply
CO4	Trouble shoots the electrical and electronic circuits and realizes the importance of earthing.	Apply
CO5	Identify and install computer internal components and peripherals	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	1	3	1	3	2	3	1	2	3	3		2
CO2	3	3	3	1	3	2	1	2	3	3	1	3	3	3	3
CO3	3	3	3	1	3	2	2	2	3	3	2	3	3	3	3
CO4	3	3	3	2	3	3	2	3	3	1	1	3	3	3	3
CO5	3	3	3	3	3	2	2	2	3	2	2	3	3	3	3
3- Strong; 2-Medium; 1-Low															

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List of Experiments

Machine Shop Exercises

1. Facing and Turning Operations
2. Drilling Operations

Fitting Exercises

3. Filling Operations
4. Filling and Cutting Operations on MS Plates for Square joint

Carpentry Exercises

5. Planning Operations
6. Joining of Wooden piece by Dovetail Joint

Sheet Metal Exercises

7. Making of Sheet Metal of Rectangular Tray
8. Making of Sheet Metal t of Cone Shape & Scoop

Welding Exercises

9.Arc Welding of MS Plates by Lap joint, Butt joint & T-Joint

Plumbing Exercises

10. Assembly of GI pipes/PVC and Pipe Fitting
11. Cutting of Threads in GI pipes / PVC by thread Cutting Dies

Electrical Wiring Exercises

12. Wiring circuits for Filament lamps/CT using Single (One way) Switch
13. Wiring circuits for Filament lamps/CT using Stair Case (Two Way) Switch
14. Wiring Circuits for a Fluorescent lamp (Tube Light Circuit)

Electronics Exercises

15. Current limiting resistor calculation for light emitting diode (LED).
16. Forward bias & Reverse bias of a PN junction diode.

Computer Hardware Exercise

17. Identify computer peripherals and internal components.
18. Dismentle and assemble of desktop computer systems.

Course Designers

1. Mr.S.Venkatesan – venkatesans@ksrct.ac.in

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

SEMESTER II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 EN 002	Professional English - II	HS	3	1	0	2	2
2.	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	BS	4	3	1	0	4
3.	60 EE 002	Basic Electrical, Electronics and Instrumentation	ES	3	3	0	0	3
4.	60 ME 004	Engineering Mechanics	ES	4	3	1	0	4
5.	60 CS 001	C Programming	ES	3	3	0	0	3
6.	60 TT 201	Fibre Science	PC	3	3	0	0	3
7.	60 GE 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	HS	4	2	0	2	3*
8.	60 GE 001	Heritage of Tamils / தமிழர் மரபு	HS	1	1	0	0	1*
PRACTICALS								
9.	60 EE 0P2	Basic Electrical, Electronics and Instrumentation Laboratory	ES	4	0	0	4	2
10.	60 CS 0P1	C Programming Laboratory	ES	4	0	0	4	2
11.	60 CG 0P1	Career Skill Development I	CG	2	0	0	2	0
			Total	**36**	**20**	**2**	**14**	**23**

***NCC / NSS – 3 credits can be waived or Extra 3 Credits is offered**

BS : Basic Science
HS : Humanities and Social Science
ES : Engineering Science
MC : Mandatory Course
L : Lecture
T : Tutorial
P : Practical

Note:
3 Hour Lecture is equivalent to 1 credit
4 Hour Tutorial is equivalent to 1 credit
2 Hours Practical is equivalent to 1 credit

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B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS
(For the candidates admitted from 2022-2023 onwards)

SECOND SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 EN 002	Professional English - II	2	40	60	100	45	100
2	60 MA 003	Integrals, Partial Differential Equations and Laplace Transform	2	40	60	100	45	100
3	60 EE 002	Basic Electrical, Electronics and Instrumentation	2	40	60	100	45	100
4	60 ME 004	Engineering Mechanics	2	40	60	100	45	100
5	60 CS 001	C Programming	2	40	60	100	45	100
6	60 TT 201	Fibre Science	2	40	60	100	45	100
PRACTICAL								
8	60 EE 0P2	Basic Electrical, Electronics and Instrumentation Laboratory	3	60	40	100	45	100
9	60 CS 0P1	C Programming Laboratory	3	60	40	100	45	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 EN 002	PROFESSIONAL ENGLISH II

Category	L	T	P	Credit
HS	1	0	2	2

Objective

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Prerequisite

Basic knowledge of reading and writing in English and should have completed Professional English I.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								2	3	3	2	3	2	2	3
CO2								2	3	3	2	3	2	2	3
CO3								2	3	3	2	3	2	2	3
CO4								2	3	3	2	3	3	3	3
CO5								2	3	3	2	3	3	3	3
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember (Re)	10	10	10
Apply (Ap)	20	20	40
Analyse (An)	30	30	50
Create (Cr)	0	0	0

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K.S.Rangasamy College of Technology – Autonomous								R2022
Professional English II								
Common to All Branches								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	0	2	45	2	40	60	100

Making Comparisons **Listening :** Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (choosing a product or service by comparison) **Speaking :** Marketing a product, persuasive speech techniques. **Reading :** Reading advertisements, user manuals and brochures. **Writing :** Professional emails, Email etiquette - compare and contrast essay. **Language Focus:** mixed tenses, prepositional phrases, same words used in different contexts and discourse markers	[9]
Expressing Causal Relations in Speaking and Writing **Listening :** Listening to longer technical talks and completing– gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects. **Speaking :** Describing and discussing the reasons of accidents or disasters based on news reports. **Reading :** longer technical texts– cause and effect essays, and letters / emails of complaint, **Writing :** Writing responses to complaints **Language Focus:** Active Passive Voice transformations, Infinitive and Gerunds – Word Formation (Noun-Verb-Adj-Adv), Adverbs.	[9]
Problem Solving **Listening :** Listening to / watching movie scenes/ documentaries depicting a technical problem and suggesting solutions. **Speaking :** Group Discussion (based on case studies), - techniques and Strategies. **Reading :** Case Studies, excerpts from literary texts, news reports etc. **Writing :** Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay **Language Focus:** Error correction; If conditional sentences - Compound Words, Sentence Completion.	[9]
Reporting of Events and Research **Listening :** Listening Comprehension based on new report and documentaries – **Speaking :** Interviewing, presenting oral reports, Mini presentations on select topics. **Reading :** Newspaper articles. **Writing :** Recommendations, Transcoding, Accident Report, Precis writing and Summarising, and Plagiarism **Language Focus:** Reported Speech – Modals - Conjunctions- use of Prepositions	[9]
The Ability to put Ideas or Information Coherently **Listening :** Listening to TED Talks, Presentations, Formal job interviews, (analysis of the interview performance). **Speaking :** Participating in role plays, virtual interviews, making presentations with visual aids **Reading :** excerpts of interview with professionals **Writing :** Job / Internship application – Cover letter & Rés **Language Focus:** Numerical Adjectives, question types: Wh/ Yes or No/ and Tags; Relative Clauses - Idioms.	[9]
Total Hours	**45**

Text book(s):	
1.	*'English for Engineers & Technologists'* Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, *'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book'*, Penguin Random House India, 2020
Reference(s):	
1.	Raman. Meenakshi, Sharma. Sangeeta, *'Professional English'*. Oxford university press. New Delhi. 2019
2.	Arthur Brookes and Peter Grundy,' *Beginning to Write: Writing Activities for Elementary and Intermediate Learners',* Cambridge University Press, New York, 2003
3.	Prof. R.C. Sharma & Krishna Mohan, *'Business Correspondence and Report Writing'*, Tata McGraw Hill & Co. Ltd., New Delhi, 2001
4.	V.N. Arora and Laxmi Chandra, *'Improve Your Writing'*, Oxford University Press, New Delhi, 2001

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

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Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Making Comparisons**	
1.1	Evaluative Listening	1
1.2	Product Descriptions and filling a graphic organiser	1
1.3	Marketing a product by using persuasive techniques	2
1.4	Reading advertisements, user manuals and brochures	1
1.5	Writing professional emails	1
1.6	Compare and contrast essay	1
1.7	mixed tenses and prepositional phrases	1
1.8	Same words used in different contexts	1
2	**Expressing Causal Relations in Speaking and Writing**	
2.1	Listening to longer technical talks	1
2.2	Listening to process/event descriptions	1
2.3	Describing and discussing the reasons of accidents or disasters	1
2.4	Reading longer technical texts– cause and effect essays	1
2.5	Writing responses to complaints	1
2.6	Active Passive Voice transformations	2
2.7	Infinitive and Gerunds	1
2.8	Word Formation (Noun-Verb-Adj-Adv), Adverbs.	1
3	**Problem Solving**	
3.1	Listening to documentaries and suggesting solutions	1
3.2	Group Discussion (based on case studies)	2
3.3	Reading Case Studies, excerpts from literary texts and news reports	1
3.4	Letter to the Editor	1
3.5	Checklists	1
3.6	Problem solution and argumentative essays	1
3.7	Error correction and Sentence Completion	1
3.8	If conditional sentences	1
4	**Reporting of Events and Research**	
4.1	Listening Comprehension	1
4.2	Interviewing and presenting oral reports	1
4.3	Mini presentations on select topics	1
4.4	Reading newspaper articles	1
4.5	Recommendations	1
4.6	Transcoding	1
4.7	Precis writing, Summarising and Plagiarism	1
4.8	Reported Speech, Modals	1
4.9	Conjunctions	1
5	**The Ability to put Ideas or Information Coherently**	
5.1	Listening to Formal job interviews	1
5.2	Role plays	2
5.3	Virtual interviews	1
5.4	Reading Company profiles	1
5.5	Writing Statement of Purpose (SoPs)	1
5.6	Writing Résumé	1
5.7	Numerical Adjectives and Relative Clauses - Idioms	1
5.8	question types: Wh/ Yes or No/ and Tags	1
	Total	**45**

Course Designers

1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

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60 MA 003	Integrals, Partial Differential Equations and Laplace Transform

Category	L	T	P	Credit
BS	3	1	0	4

Objective

- To provide exposure in handling the situations involving multiple integrals
- To familiarize the basic concepts in Vector calculus.
- To get exposed to the fundamentals of analytic functions.
- To develop the mathematical skills in solving partial differential equations.
- To facilitate the concepts in Laplace transform techniques.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Evaluate double and triple integrals.	Remember, Apply, Evaluate
CO2	Analyze the basic concepts of vector calculus.	Remember, Analyze, Evaluate
CO3	Construct the analytic functions and evaluate complex integrals.	Remember, Understand, Apply
CO4	Compute the solution of partial differential equations using different methods.	Remember, Apply
CO5	Apply Laplace transform techniques for solving differential equations.	Remember, Apply

Mapping with Programme Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3							2	3	2	
CO2	3	3	2	2	3							2	3	2	
CO3	3	3	3	2	2							2	3	2	
CO4	3	3	3	3	2							2	3	2	
CO5	3	3	2	3	3							2	3	2	
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		Model Exam (Marks)	End Sem Examination (Marks)
	1	2		
Remember (Re)	10	10	10	10
Understand (Un)	0	10	10	10
Apply (Ap)	20	40	40	40
Analyze (An)	10	0	20	20
Evaluate (Ev)	20	0	20	20
Create (Cr)	0	0	0	0
Total	60	60	100	100

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K.S. Rangasamy College of Technology – Autonomous								(R 2022)
60 MA 003 – Integrals, Partial Differential Equations and Laplace Transform								
Common to MECH, ECE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	1	0	60	4	40	60	100

MULTIPLE INTEGRALS Double integration – Cartesian and polar co-ordinates – Change of order of integration – Area as double integral – Triple integration in Cartesian co-ordinates – Change of variables - Cartesian to polar co-ordinates and Cartesian to Cylindrical co-ordinates.	[9]
VECTOR CALCULUS* Introduction - Gradient of a scalar point function –Directional derivative – Angle of intersection of two surfaces – Divergence and curl (excluding vector identities) – Solenoidal and irrotational vectors – Application : Green's theorem in the plane – Gauss divergence theorem -Stokes' theorem (statement only)	[9]
ANALYTIC FUNCTIONS AND INTEGRALS Analytic function – Necessary and Sufficient conditions (statement only)-Properties – Harmonic function – Construction of an analytic function – Cauchy's Integral theorem (statement only) – Cauchy's integral formula – Classification of singularities – Application: Cauchy's residue theorem.	[9]
PARTIAL DIFFERENTIAL EQUATIONS* Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Non-Linear partial differential equations of first order – Lagrange's linear equations – Application: Homogeneous Linear partial differential equations with constant coefficients.	[9]
LAPLACE TRANSFORM Conditions for existence – Transforms of elementary functions – Basic properties - Derivatives and integrals of transforms - Initial and final value theorem – Transform of periodic functions. Inverse Laplace transform – Convolution theorem (excluding proof) – Application: Solution of second order ordinary differential equations with constant co-efficients.	[9]
Total Hours: 45 + 15 (Tutorial)	**60**

Text Book(s):

1.	Grewal B.S, "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi, 2017.
2	Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019.

Reference(s):

1.	Kreyszig Erwin, "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016.
2.	Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand & Company Ltd,
3.	Bali N P and Manish Goyal, "A text book of Engineering Mathematics",10th Edition, Laxmi Publications (P) Ltd, 2016.
4.	Dr.P.N.Agrawal, Dr.D.N.Pandey ,"Integral Equations, Calculus of Variations and its Applications", NPTEL online video courses.

*SDG:4 Quality Education

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**MULTIPLE INTEGRALS**	
1.1	Double integration	1
1.2	Cartesian and polar coordinates	1
1.3	Change of order of integration	1
1.4	Area as double integral	1
1.5	Tutorial	2
1.6	Triple integration in Cartesian coordinates	1
1.7	Change of variables	1
1.8	Cartesian to polar coordinates	1
1.9	Cartesian to Cylindrical coordinates	1
1.10	Tutorial	2
2	**VECTOR CALCULUS**	
2.1	Introduction: Gradient of a scalar point function	1
2.2	Directional derivative	1
2.3	Angle of intersection of two surfaces	1
2.4	Divergence and curl (excluding vector identities)	1
2.5	Tutorial	2
2.6	Solenoidal and irrotational vectors	1
2.7	Application: Green's theorem in the plane	1
2.8	Gauss divergence theorem	1
2.9	Stokes' theorem (statement only)	1
2.10	Tutorial	2
3	**ANALYTIC FUNCTIONS AND INTEGRALS**	
3.1	Analytic function	1
3.2	Necessary and Sufficient conditions (statement only)	1
3.3	Properties	1
3.4	Harmonic function	1
3.5	Tutorial	2
3.6	Construction of an analytic function	1
3.7	Cauchy's Integral theorem (statement only), Cauchy's integral formula	1
3.8	Classification of singularities	1
3.9	Applications : Cauchy's residue theorem.	1
3.10	Tutorial	2
4	**PARTIAL DIFFERENTIAL EQUATIONS**	
4.1	Formation of partial differential equations by eliminating arbitrary constants	1
4.2	Formation of partial differential equations by eliminating arbitrary functions	2
4.3	Tutorial	2
4.4	Non- linear partial differential equations of first order	2

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4.5	Lagrange's linear equations	1
4.6	Application : Homogeneous Linear partial differential equations with constant coefficients.	2
4.7	Tutorial	2
5	**LAPLACE TRANSFORM**	
5.1	Conditions for existence	1
5.2	Transforms of elementary functions	1
5.3	Basic properties	1
5.5	Derivatives and integrals of transforms, Initial and final value theorem	1
5.6	Tutorial	1
5.7	Transform of periodic functions	2
5.8	Inverse Laplace transform	1
5.9	Convolution theorem (excluding proof)	1
5.10	Application: Solution of second order ordinary differential equation with constant co-efficient.	1
5.11	Tutorial	2
	Total	60

Course Designers

1. Dr. C. Chandran cchandran@ksrct.ac.in
2. Dr. K. Prabakaran prabakaran@ksrct.ac.in

List of MATLAB Programmes:

1. Evaluating double and triple integrals.
2. Area as double integral.
3. Volume as triple integral.
4. Plotting and visualizing single variable functions.
5. Plotting and visualizing functions of two and three variables.
6. Evaluating Gradient, divergence and curl.
7. Evaluating Laplace & Inverse Laplace transforms.
8. Applying Laplace transform techniques to solve differential equations

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60 EE 002	BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION

Category	L	T	P	Credit
ES	3	0	0	3

Objective

- To familiarize the basic concept on electrical circuits and its various parameters
- To facilitate the various types of electrical machines and their uses
- To provide exposure on the functions of analog electronic devices
- To familiarize the use of various measuring instruments
- To gain knowledge on microprocessor and microcontroller

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compute the electric circuit parameters for simple problems.	Remember, Understand and Apply
CO2	Elucidate the working principle of electrical machines.	Remember and Understand
CO3	Analyze the characteristics of analog electronic devices.	Remember, Understand and Analyze
CO4	Illuminate the types and operating principles of transducers, sensors and instruments.	Remember and Understand
CO5	Illustrate the basic concept of microprocessor and microcontroller.	Remember, Understand and Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2				2		3		2	2	-
CO2	3	2	3	3	2		2				2	2	3	3	-
CO3	3	3	3	2	2		2	2			2	2	2	2	-
CO4	3	2	3	3	2	3	2	2			2	3	3	3	-
CO5	3	2	3	3	3				2	2	2	3	3	3	-
3- Strong;2-Medium;1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	30	10	30
Analyse	0	20	10
Evaluate	0	0	0
Create	0	0	0

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K.S.Rangasamy College of Technology – Autonomous (R2022)								
60 EE 002 - Basic Electrical, Electronics and Instrumentation								
B.Tech - Textile Technology								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Electrical Circuits: Basic circuit components -Resistor-Inductors-Capacitors- Ohm's Law- Kirchhoff's Law— Only Independent Sources — steady state solution of DC circuits — Nodal analysis, Mesh analysis. Introduction to AC circuits — waveforms and RMS value — power and power factor**, single phase and three-phase balanced circuits — Three phase loads — housing wiring, industrial wiring, materials of wiring.	9
Electrical Machines: Construction, operation and characteristics of DC Machines, three phase and single-phase induction motors. Construction and operation of single and three phase Transformers.	9
Electronic Devices & Circuits: PN Diodes –Zener diode- Bipolar Junction Transistor– SCR- VI Characteristics and Application* Introduction to operational Amplifier –Inverting Amplifier –Non Inverting Amplifier –DAC — ADC.	9
Transducers Sensors& Instruments: Introduction to transducers — Classification of Transducers: Resistive-Strain Gauge. Inductive-LVDT, Capacitive. Thermoelectric, piezoelectric, photoelectric, Hall effect, Proximity- Sensors. Classification of instruments — Types of indicating Instruments — multimeters –Oscilloscopes— three-phase power measurements– instrument transformers (CT and PT).	9
Microprocessor and Microcontroller: Introduction to Architecture of 8086 microprocessor-register-addressing modes-instruction set-simple programming. Introduction to Architecture of 8051 microcontroller-interfacing peripheral devices- design a microcontroller-based system*.	9
Total Hours	45

Text Book(s):

1.	D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020.
2.	A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.

Reference(s):

1.	S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019.
2.	Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3.	H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010.
4.	N. Senthil Kumar, 'Microprocessors and Interfacing 8086, 8051, 8096, and advanced processors' oxford University press,2012.

*SDG 9 – Industry Innovation and Infrastructure

**SDG 12 – Responsible Consumption and Production

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**ELECTRICAL CIRCUITS**	
1.1	Basic circuit components -Resistor-Inductors-Capacitors	1
1.2	Ohm's Law - Kirchhoff's Laws	1
1.3	Ohm's Law - Kirchhoff's Laws - Problems	1
1.4	Nodel analysis & Problems	1
1.5	Mesh analysis & Problems	1

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1.6	Introduction to AC circuits — waveforms & RMS value — power & power factor	1
1.7	Single phase and three-phase balanced circuits	1
1.8	Three phase loads	1
1.9	Housing wiring, industrial wiring, materials of wiring	1
2	**ELECTRICAL MACHINES**	
2.1	Construction of DC Machines	1
2.2	Types of DC Machines	1
2.3	Operation of DC Machines	1
2.4	Characteristics of DC Machines	1
2.5	Three phase induction motors	1
2.6	Single-phase induction motors	1
2.7	Construction of single-phase Transformers	1
2.8	Operation of single-phase Transformers	1
2.9	Construction and Operation of three phase Transformers	1
3	**ELECTRONIC DEVICES & CIRCUITS**	
3.1	PN Diodes	1
3.2	Zener diode	1
3.3	Bipolar Junction Transistor	1
3.4	SCR	1
3.5	Introduction to operational Amplifier	1
3.6	Inverting Amplifier	1
3.7	Non Inverting Amplifier	1
3.8	DAC	1
3.9	ADC	1
4	**TRANSDUCERS, SENSORS & INSTRUMENTS**	
4.1	Introduction to transducers — Classification of Transducers:	1
4.2	Resistive- Strain Gauge. Inductive-LVDT,	1
4.3	Capacitive. Thermoelectric, piezoelectric, photoelectric,	1
4.4	Hall effect, Proximity- Sensors.	1
4.5	Classification of instruments — Types of indicating Instruments	1
4.6	Multimeters	1
4.7	Oscilloscopes	1
4.8	three-phase power measurements–	1
4.9	instrument transformers (CT and PT).	1
5	**MICROPROCESSOR AND MICROCONTROLLER**	
5.1	Introduction to Architecture of 8086 microprocessor	1
5.2	Register	1
5.3	Addressing modes	1
5.4	Instruction set	1
5.5	Simple programming	1
5.6	Introduction to Architecture of 8051 microcontroller	2
5.7	Interfacing peripheral devices	1
5.8	Design a microcontroller-based system.	1
	Total	45

1. **Course Designers :** Dr.P.Aravindan - aravindan@ksrct.ac.in, Dr.D.Sri Vidhya - srividhya@ksrct.ac.in

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60 ME 004	ENGINEERING MECHANICS

Category	L	T	P	Credit
ES	3	2	0	4

Objective

This course aims to convey to the student

- To learn a process for analysis of static objects, concepts of force, moment, and mechanical equilibrium in two and three dimensions.
- To learn the equilibrium of rigid bodies such as frames, trusses, beams.
- To identify the properties of surfaces and solids by using different theorem.
- To impart basic concept of dynamics of particles.
- To acquire the concept of friction and elements of rigid body dynamics

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Use scalar and vector analytical techniques for analysing forces in statically determinate structures.	Understand & Apply
CO2	Apply basic knowledge of scientific concepts to solve real-world problems.	Understand & Apply
CO3	Calculate the properties of surfaces and solids using various theorems.	Understand & Apply
CO4	Analyse and solve problems on kinematics and kinetics.	Understand & Apply
CO5	Analysis of rigid body dynamics and calculation of frictional forces on contact surfaces.	Understand & Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3										2	3	
CO2	3	3	3										2	3	
CO3	3	3	3		3			3					2	3	
CO4	3	3	3		3			3					2	3	
CO5	3	3	2										2	3	
3- Strong; 2-Medium;1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	12	12	20
Understand	0	20	0
Apply	48	48	80
Analyse	0	0	0
Evaluate	0	0	0
Create	0	0	0

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K. S. Rangasamy College of Technology – Autonomous (R 2022)								
60 ME 004 - Engineering Mechanics								
Semester	Hours / Week			Total hrs	Credit	Maximum		
	L	T	P		C	CA	ES	Total
I	3	1	0	60	4	40	60	100

Basics and Statics of Particles* Introduction -Units and Dimensions-Laws of Mechanics–Principle of transmissibility-Lame's theorem, Parallelogram and triangular Law of forces–Vectors–Vectorial representation of forces and moments. **Vector Operations*** Addition, subtraction, dot product, cross product-Coplanar Forces–Resolution and Composition of forces–Equilibrium of a particle–Forces in space-Equilibrium of a particle in space-Equivalent systems of forces-	[9+3]
Equilibrium of Rigid Bodies * Free body diagram–Types of supports and their reactions–requirements of stable equilibrium–Static determinacy, Moments and Couples–Moment of a force about a point and about an axis–Vectorial representation of moments and couples–Varignon's theorem-Equilibrium of Rigid bodies in two dimensions.	[9+3]
Properties of Surfaces and Solids * Determination of Areas and Volumes-Centroid, Moment of Inertia of plane area (Rectangle, circle, triangle using Integration Method; T section, I section, Angle section, Hollow section using standard formula) - Parallel axis theorem and perpendicular axis theorem- Polar moment of inertia -Mass moment of inertia of thin rectangular section.	[9+3]
Friction * Frictional force–Laws of Coloumb friction–Simple contact friction–Ladder friction-Rolling resistance–Ratio of tension in belt. **Dynamics of Particles *** Displacement, Velocity, acceleration and their relationship–Relative motion -Projectile motion in horizontal plane– Newton's law–Work Energy Equation – Impulse and Momentum.	[9+3]
Elements of Rigid Body Dynamics* Translation and Rotation of Rigid Bodies: Velocity and acceleration–General Plane motion: Crank and Connecting rod mechanism.	[9+3]
Total Hours= 45 +15 (Tutorial)	60

Text Book(s):	
1.	D P Kothari and I.J Nagarath, "Basic Electrical and Electronics Engineering", McGraw Hill Education (India) Private Limited, Second Edition, 2020.
2.	A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015.
3.	S.K. Bhattacharya, Basic Electrical Engineering, Pearson Education, 2019.
4.	James A Svoboda, Richard C. Dorf, Dorf's Introduction to Electric Circuits, Wiley,2018
5.	N. Senthil Kumar, 'Microprocessors and Interfacing 8086, 8051, 8096, and advanced processors' oxford University press, 2012.
Reference(s):	
1.	John Bird, "Electrical Circuit theory and technology", Routledge; 2017.
2.	Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
3.	Albert Malvino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017.
4.	Muhammad H.Rashid, "Spice for Circuits and electronics", 4th Edition., Cengage India, 2019.

***SDG 9 – Industry Innovation and Infrastructure**

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Course Contents and Lecture Schedule

S. No	Topic	No. of Hours
1	**Basics and Statics Of Particles**	
1.1	Introduction, Units and Dimensions, Laws of Mechanics	1
1.2	Principle of transmissibility, Lame's theorem,	1
1.3	Parallelogram and triangular Law of forces	1
1.4	Tutorial	2
1.5	Vectors, Vectorial representation of forces and moments	1
1.6	Vector operations, Coplanar Forces–Resolution and Composition of forces	2
1.7	Equilibrium of a particle, Forces in space	1
1.8	Equivalent systems of forces-Single equivalent force.	1
1.9	Tutorial	2
2	**Equilibrium of Rigid Bodies**	
2.1	Free body diagram, Types of supports and their reactions	1
2.2	Requirements of stable equilibrium, Static determinacy	1
2.3	Moments and Couples–Moment of a force about a point and about an axis	2
2.4	Vectorial representation of moments and couples	1
2.5	Tutorial	2
2.6	Varignon's theorem	1
2.7	Equilibrium of Rigid bodies in two dimensions	2
2.8	Tutorial	2
3	**Properties of Surfaces and Solids**	
3.1	Determination of Areas and Volumes-Centroid	1
3.2	Moment of Inertia of plane area (Rectangle, circle, triangle using Integration Method)	2
3.3	Tutorial	2
3.4	Moment of Inertia of plane area(T section, I section, Angle section)	1
3.5	Moment of Inertia of plane area(Hollow section)	1
3.6	Parallel axis theorem and perpendicular axis theorem	1
3.7	Polar moment of inertia	1
3.8	Mass moment of inertia of thin rectangular section.	1
3.9	Tutorial	2
4	**Friction &Dynamics of Particles**	
4.1	Frictional force, Laws of Coloumb friction, Simple contact friction	1
4.2	Ladder friction	1
4.3	Rolling resistance–Ratio of tension in belt	1
4.4	Tutorial	2
4.5	Displacement, Velocity, acceleration and their relationship, Relative motion	1
4.6	Projectile motion in horizontal plane	1
4.7	Newton's law	1
4.8	Work Energy Equation	1
4.9	Impulse and Momentum	1

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Dr. G. KARTHIKEYAN, B.E., M.Tech.,Ph.D
Professor and Head
Department of Textile Technology
K.S.Rangasamy College of Technology
Tiruchengode-637 215

4.10	Tutorial	2
5	**Elements of Rigid Body Dynamics**	
5.1	Translation and Rotation of Rigid Bodies	1
5.2	Translation and Rotation of Rigid Bodies - Velocity	2
5.3	Translation and Rotation of Rigid Bodies - acceleration	2
5.4	Tutorial	2
5.5	General Plane motion	1
5.6	General Plane motion - Crank and Connecting rod mechanism	2
5.7	Tutorial	2
	Total	**60**

Course Designer

1. Dr.S.Jeyaprakasam – sjeyaprakasam@ksrct.ac.in
2. Mr.S.karthick – karthick@ksrct.ac.in

Passed in BoS Meeting held on 11/05/2023
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60 CS 001	C PROGRAMMING

Category	L	T	P	Credit
ES	3	0	0	3

Objective

- To learn most fundamental element of the C language and to examine the execution of branching, looping statements,
- To examine the concepts of arrays, its characteristics and types and strings.
- To understand the concept of functions, pointers and the techniques of putting them to use
- To apply the knowledge of structures and unions to solve basic problems in C language
- To enhance the knowledge in file handling functions for storage and retrieval of data

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Construct the fundamental building blocks of structured Programming in C	Apply
CO2	Implement the different operations on arrays and strings	Apply
CO3	Develop simple real world applications utilizing functions, recursion and pointers.	Apply
CO4	Demonstrate the concepts of structures, unions, user defined data types and preprocessor	Apply
CO5	Interpret the file concepts using proper standard library functions for a given application	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3		3				2	2		2	3	3	
CO2	3	3	3		3				2	2		2	3	3	
CO3	3	3	3		3				2	2		2	3	3	
CO4	3	3	3		3				2	2		2	3	3	
CO5	3	3	3		3				2	2		2	3	3	
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Cognitive Levels	Continuous Assessment Tests		End Semester Examination (Marks)
	1	2	
Remember	10	10	20
Understand	10	10	20
Apply	40	40	60
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-

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K. S. Rangasamy College of Technology – Autonomous (R 2022)								
60 CS 001 – C Programming								
Common to CSE, CSBS, AI&ML, IT, AI&DS								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	4 5	3	40	60	100

Basics of C, I/O, Branching and Loops* Structure of a C Program – Data types – Keywords - Variables – Type Qualifiers - Constants – Operators–expressions and precedence- Console I/O– Unformatted and Formatted Console I/O - Conditional Branching and Loops-Writing and evaluation of conditionals and consequent branching	9
Arrays and Strings* Arrays: One Dimensional Arrays - Two Dimensional Arrays – Matrix Manipulation - Character arrays – Strings: String Manipulation with and without String Handling Functions.	7
Functions and Pointers* Functions: Scope of a Function – Library Functions and User defined functions - Function Prototypes – Call by value and Call by reference – Function Categorization- Arguments to main function— Recursion and application - Passing Arrays to Functions– Storage class Specifiers. Introduction to Pointer Variables - The Pointer Operators - Pointer Expressions - Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers– Function and pointers - Dynamic memory allocation.	11
Structures, Unions, Enumerations, Typedef and Preprocessors* Structures - Introduction to Structures and Initialization - Arrays of Structures- Arrays and Structures, Nested Structures - Passing Structures to Functions - Structure Pointers - Unions – Bit Fields - Enumerations - typedef –The preprocessor and commands	9
File Handling* File: Streams –Reading and Writing Characters - Reading and Writing Strings - File System functions – File Manipulation-Sequential access - Random Access Files – Command Line arguments.	9
Total Hours	**45**

Text Book(s):

1.	Herbert Schildt, “The Complete Reference C”, Fourth Edition, Tata McGraw Hill Edition, 2010.
2.	Byron Gottfried, “Programming with C”, Third Edition, McGraw Hill Education, 2014.

Reference(s):

1.	E.Balagurusamy, “Programming in ANSI C”, Seventh Edition, Tata McGraw Hill Edition, New Delhi, 2016.
2.	Brian W. Kernighan and Dennis M. Ritchie, “C Programming Language”, Prentice-Hall.
3.	ReemaThareja, “Computer Fundamentals and Programming in C”, Second Edition, Oxford Higher Education, 2016.
4.	K N King, “C Programming: A Modern Approach”, Second Edition, W.W.Norton, New York, 2008.

***SDG:4- Quality Education**

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Course Contents and Lecture Schedule

Module No.	Topic	No. of Hours
1	**Basics of C, I/O, Branching and Loops**	
1.1	Structure of a C Program, Keywords	1
1.2	Data types, Type Qualifiers	1
1.3	Variables and Constants	1
1.4	Operators–expressions and precedence	1
1.5	Console I/O– Unformatted and Formatted Console I/O	1
1.6	Conditional Branching	1
1.7	Iteration and loops	2
1.8	Writing and evaluation of conditionals and consequent branching	1
2	**Arrays and Strings**	
2.1	One Dimensional Array	1
2.2	Two-Dimensional Array and Matrix Manipulation	1
2.3	Character arrays and Strings Basics	1
2.4	String Manipulation without String Handling Functions	2
2.5	String Manipulation with String Handling Functions	2
3	**Functions and Pointers**	
3.1	Scope of a Function – Library Functions, User defined functions and Function Prototypes	1
3.2	Function Call by value and Function Call by reference, Function Categorization	2
3.3	Arguments to main function	1
3.4	Recursion and application	1
3.5	Passing Arrays to Functions	1
3.6	Storage class Specifiers	1
3.7	Introduction to Pointer Variables - The Pointer Operators - Pointer Expressions	1
3.8	Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers	1
3.9	Function and pointers	1
3.10	Dynamic memory allocation	1
4	**Structures, Unions, Enumerations, Typedef and Preprocessors**	
4.1	Introduction to Structures and Initialization	1
4.2	Arrays and Structures, Arrays of Structures	1
4.3	Structures within Structures, Passing Structures to Functions	2
4.4	Structure Pointers	1
4.5	Unions and Bit Fields.	1
4.6	Enumerations - typedef	1
4.7	Preprocessor commands	2
5	**File Handling**	
5.1	File Streams –Reading and Writing Characters - Reading and Writing Strings	2
5.2	File System functions and File Manipulation	2
5.3	Sequential access	2
5.4	Random Access Files	2
5.5	Command Line arguments and files	1
	Total Hours	**45**

Course Designers

1. Dr.P.Kaladevi - kaladevi@ksrct.ac.in

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60 TT 201	FIBRE SCIENCE

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- To study the basics of production of natural and regenerated fibers
- To impart knowledge on applications and properties of natural fibres
- To familiarize on the applications and properties of regenerated fibres
- To recall on the applications and properties of protein fibres
- To study the analysis of various fibres

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Classify the textile fibres and its properties	Understand
CO2	Cultivation / extraction process, properties and applications of Natural cellulosic fibres and their structure.	Understand
CO3	Manufacturing, properties and applications of regenerated cellulosic fibres and their structure.	Apply
CO4	Production, properties and applications of protein and other regenerated fibres with their structure and applications of high performance fibres.	Apply & Analyse
CO5	Identification of various fibres and blend proportion by various methods.	Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	3	2	3	2	2	3	3	3	2
CO2	3	3	3	2	2	2	2	2	1	3	2	1	3	3	3
CO3	3	2	3	3	3	2	3	-	2	2	-	2	3	3	3
CO4	3	3	3	3	2	2	2	1	2	1	2	3	3	3	3
CO5	3	3	2	2	3	3	2	2	2	1	2	2	2	2	1
3- Strong; 2-Medium; 2-Low															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests			Terminal Examination
	1	2	3	
Remember	20	20	20	20
Understand	40	40	40	40
Apply	40	40	40	40
Analyze	-	-	-	-
Evaluate	-	-	-	-
Create	-	-	-	-

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K.S. Rangasamy College of Technology – Autonomous								(R 2022)
60 TT 201 - FIBRE SCIENCE								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	40	60	100

INTRODUCTION Definition - staple fibre, filament; classification of textile fibres; High performance fibres. Essential and desirable properties of fibres. Requirements of fibre forming polymers. Types of polymers; intra polymer bonding, inter polymer forces of attraction, degree of polymerization, glass transition temperature. Principle of manmade spinning systems – Dry, Wet, Melt and Gel spinning. Elastomeric fibres	9
NATURAL CELLULOSIC FIBRES* **** ***** Cultivation, properties and applications of cotton; Brief study about BT, coloured and organic cotton,BCI. Extraction, properties and application of flax, jute, ramie, hemp, sisal, coir, banana and pine apple fibres. Morphological and chemical structure of natural cellulosic fibres.	9
**REGENERATED CELLULOSIC FIBRES* ** Production, properties and applications of viscose rayon, cuprammonium rayon, acetate rayon, bamboo, modal and lyocell fibres; Study of morphological and chemical structures of regenerated cellulosic fibres	9
PROTEIN AND OTHER REGENERATED FIBRES ****** Morphological structure and chemical constitution of wool and silk. Types, production, properties and applications of wool, silk, soya bean, casein, alginate, chitin and chitosan fibres. Study on spider silk.	9
IDENTIFICATION OF FIBRES** Fibre identification- microscope, chemical, burning, feeling, staining, density measurement methods. Determination of blend proportion. Determination of moisture content and moisture regain.	9
Total hours	**45**

Text Book

1. S.P.Mishra, “A Text book of Fibre science and technology”, New age international publishers, Chennai.
2. Morton W.E and Hearle J.W.S, “Physical properties of textile fibres”, Textile Institute, Manchester.

Reference Books

1. Mather.R.R, “The Chemistry of Textile Fibres 2nd Ed” Hardcover publisher, 2015.
2. Gohl, “Textile Science”, 2nd Edition, Paperback Publisher, 2005.
3. Georg Von Georgievic, “The Chemical Technology of Textile Fibres”, Paperback Publisher, 2007.

S. Eichhorn, J.W. S. Hearle, et al.”, “Handbook of Textile Fibre Structure, Volume 1” Woodhead Publishing, 2009.

SDG: 9 Industry, Innovation and Infrastructure

SDG:12 (Responsible Consumption and Production)

****SDG 2: Zero Hunger***

*****SDG 8: Decent Work and Economic Growth***

****** SDG 13: Climate Action***

*******SDG 15 :Life on Land***

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Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**INTRODUCTION**	
1.1	Definition - staple fibre, filament	1
1.2	classification of textile fibres	1
1.3	High performance fibres Essential and desirable properties of fibre	1
1.4	Requirements of fibre forming polymers. Types of polymers	1
1.5	Intra polymer bonding, inter polymer forces of attraction	1
1.6	Degree of polymerization, glass transition temperature	1
1.7	Principle of manmade spinning systems – Dry, Wet	1
1.8	Melt and Gel spinning	2
2.0	**NATURAL CELLULOSIC FIBRES**	
2.1	Cultivation, properties and applications of cotton	1
2.2	Brief study about BT, coloured and organic cotton	2
2.3	Extraction, properties and application of flax, jute	1
2.4	Extraction, properties and application of ramie, hemp	1
2.5	Extraction, properties and application of sisal, coir	1
2.6	Extraction, properties and application of banana and pine apple fibres	1
2.7	Morphological and chemical structure of natural cellulosic fibres	2
3.0	**REGENERATED CELLULOSIC FIBRES**	
3.1	Production, properties and applications of viscose rayon, cuprammonium rayon	2
3.2	Production, properties and applications of acetate rayon, bamboo	2
3.3	Production, properties and applications of modal and lyocell fibres	2
3.4	Study of morphological regenerated cellulosic fibres	2
3.5	Study of chemical structures of regenerated cellulosic fibres	1
4.0	**PROTEIN AND OTHER REGENERATED FIBRES**	
4.1	Morphological structure and chemical constitution of wool	2
4.2	Morphological structure and chemical constitution of silk	2
4.3	Types, production, properties and applications of wool, silk	1
4.4	Types, production, properties and applications of soya bean, casein	1
4.5	Types, production, properties and applications of alginate, chitin	1
4.6	Types, production, properties and applications of chitosan fibres	1
4.7	Study on spider silk	1
5.0	**IDENTIFICATION OF FIBRES**	
5.1	Fibre identification – microscope, chemical	1
5.2	Fibre identification – burning, feeling	1
5.3	Fibre identification –staining, density measurement methods	1
5.4	Determination of blend proportion	2
5.5	Determination of moisture content	2
5.6	Determination of moisture regain	2

CourseDesigners

Ms.C.Premalatha : premalatha@ksrct.ac.in

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60 AB 001	NCC Studies – (AIR WING) - I	Category	L	T	P	Credit
		HS	2	0	2	3*

Objective

- To designed especially for NCC Cadets
- To develop character, camaraderie, discipline, secular outlook
- To inculcate spirit of adventure, sportsman spirit
- To teach selfless service amongst cadets by working in teams
- To learning military subjects including weapon training and motivate them to join in tri-services

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion	Knowledge
CO2	Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling	Knowledge
CO3	Illustrate various forces and moments acting on aircraft	Apply
CO4	Outline the concepts of aircraft engine and rocket propulsion	Apply
CO5	Design, build and fly chuck gliders/model airplanes and display static models	Apply

Mapping with Programme Outcomes

Mapping of COs with POs and PSOs															
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1						3	3	3	3	3			1	1	3
CO2					3								1	1	3
CO3	3	2	1	1									1	1	3
CO4	3	2	1	1									1	1	3
CO5	3	2	1	1									1	1	3
1 – Slight, 2 – Moderate, 3 – Substantial, BT- Bloom"s Taxonomy															

Assessment Pattern

Bloom's Category	Continuous Assessment (Marks)			End Sem Examination (Marks)
	DST(20)	AM(20)	SBM(10)	
Knowledge (Kn)	10	10	00	40
Apply (Ap)	10	10	10	60
Analyse (An)				00
Create (Cr)				00

DST - Drill Square Test AM - Aero Modeling SBM - Swachh Bharat Mission

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K.S.Rangasamy College of Technology – Autonomous (R2022)								
60 AB 001 - NCC STUDIES (Air Wing) - I								
Common to ALL Branches								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	2	0	2	45	3*	50	50	100

Objective(s)	• To designed especially for NCC Cadets • To develop character, camaraderie, discipline, secular outlook • To inculcate spirit of adventure, sportsman spirit • To teach selfless service amongst cadets by working in teams • To learning military subjects including weapon training and motivate them to join in tri-services
Course Outcomes	**At the end of the course, the student will be able to** **CO1:** Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion. **CO2:** Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling **CO3:** Illustrate various forces and moments acting on aircraft **CO4:** Outline the concepts of aircraft engine and rocket propulsion **CO5:** Design, build and fly chuck gliders/model airplanes and display static models.

Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

NCC Organization and National Integration NCC Organization – History of NCC- NCC Organization- NCC Training- NCC Uniform – Promotion of NCC cadets – Aim and advantages of NCC Training- NCC badges of Rank- Honors" and Awards – Incentives for NCC cadets by central and state govt. History and Organization of IAF- Indo-Pak War-1971- Operation Safed Sagar. National Integration- Unity in diversity- Contribution of youth in nation building- National integration council- Images and Slogans on National Integration.	9
Drill and Weapon Training Basic physical Training- Various exercises for fitness (with Demonstration)- Food- Hygiene and Cleanliness. Drill- Words of commands- Position and commands- Sizing and forming- Saluting- Marching- Turning on the march and wheeling- Saluting on the march- Side pace, Pace forward and to the rear- Marking time- Drill with arms- Ceremonial drill- Guard mounting. (WITH DEMONSTRATION)	9
Principles of Flight Laws of motion- Forces acting on aircraft- Bernoulli"s theorem- Stalling-Primary control surfaces- Secondary control surfaces- Aircraft recognition.	9
Aero Engines Introduction of Aero engine- Types of engine- Piston engine- Jet engines- Turboprop engines- Basic Flight Instruments- Modern trends.	9
Aero Modeling History of Aero modeling- Materials used in Aero modeling- Types of Aero models – Static Models- Gliders- Control line models- Radio Control Models- Building and Flying of Aero models.	9
Total Hours	45

Text Books:

1.	"National Cadet Corps- A Concise handbook of NCC Cadets", Ramesh Publishing House, New Delhi, 2014.

Reference(s):

1.	"Cadets Handbook – Common Subjects SD/SW", published by DG NCC, New Delhi.
2.	"Cadets Handbook- Specialized Subjects SD/SW", published by DG NCC, New Delhi.
3.	"NCC OTA Precise", published by DG NCC, New Delhi.

ES	The examination and award of marks will be done by the Ministry of Defence, Government of India. The maximum marks for the End Semester Examination is 500 marks. It will be converted to 100 marks

Course Designers

1. Flt Lt V.R. Sadasivam - sadasivam@ksrct.ac.in

Passed in BoS Meeting held on 11/05/2023
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BoS Chairman

60 AB 002	National Cadet Corps - Army Wing

Category	L	T	P	Credit
HS	2	0	2	3*

Objective

- Develop character, camaraderie
- Inculcate discipline, secular outlook
- Enrich the spirit of adventure, sportsman spirit
- Ideals of selfless service amongst cadets by working in teams
- Improve qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion.	Apply
CO2	Demonstrate Health Exercises, the sense of discipline, improve bearing, smartness, turn out, develop the quality of immediate and implicit obedience of orders.	Apply
CO3	Basic knowledge of weapons and their use and handling.	Understand
CO4	Aware about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils	Apply
CO5	Acquaint, expose & provide knowledge about Army/Navy/ Air force and to acquire information about expansion of Armed Forces, service subjects and important battles	Understand

Mapping with Programme Outcomes

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1						1		3					1	1	3
1CO 2								2					1	1	3
CO3						1		3					1	1	3
CO4								2					1	1	3
CO5								3					1	1	3
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	20	20	30
Analyse	10	10	10
Evaluate	0	0	0
Create	0	0	0

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BoS Chairman

Department of Textile Technology
K S Rangasamy College of Technology
Tiruchengode-637 215

K.S.Rangasamy College of Technology – Autonomous (R 2022)								
60 AB 002 – National Cadet Corps (Army Wing)								
Common to all Branches								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	2	0	2	45	3	50	50	100

NCC Organization & National Integration NCC Organization – History of NCC- NCC Organization- NCC Training- NCC Uniform – Promotion of NCC cadets – Aim and advantages of NCC Training- NCC badges of Rank- Honors' and Awards – Incentives for NCC cadets by central and state govt. National Integration - Unity in diversity- contribution of youth in nation building- national integration council- Images and Slogans on National Integration	**9**
Basic Physical Training & Drill Basic physical Training – various exercises for fitness (with Demonstration)-Food – Hygiene and Cleanliness. Drill- Words of commands- position and commands- sizing and forming- saluting- marching- turning on the march and wheeling- saluting on the march- side pace, pace forward and to the rear- marking time- Drill with arms- ceremonial drill- guard mounting. (WITH DEMONSTRATION).	**9**
Weapon Training Main Parts of a Rifle- Characteristics of .303 rifle- Characteristics of .22 rifle- loading and unloading – position and holding safety precautions – range procedure- MPI and Elevation- Group and Snap shooting- Long/Short range firing(WITH PRACTICE SESSION) - Characteristics of 5.56mm rifle- Characteristics of 7.62mm SLR- LMG- carbine machine gun – pistol.	**9**
Social Awareness and Community Development Aims of Social service-Various Means and ways of social services- family planning – HIV and AIDS- Cancer its causes and preventive measures- NGO and their activities- Drug trafficking- Rural development programmes - MGNREGA-SGSYJGSY-NSAP-PMGSY-Terrorism and counter terrorism- Corruption – female foeticide -dowry –child abuse-RTI Act- RTE Act- Protection of children from sexual offences act- civic sense and responsibility	**9**
Specialized Subject (ARMY) Basic structure of Armed Forces- Military History – War heroes- battles of Indo-Pak war- Param Vir Chakra- Career in the Defence forces- Service tests and interviews.	**9**
Total Hours	**45**

Text Book(s):

1.	National Cadet Corps- A Concise handbook of NCC Cadets by Ramesh Publishing House, New Delhi, 2014
2.	Cadets Handbook- Specialized Subjects SD/SW published by DG NCC, New Delhi ,2014

Reference(s):

1.	"Cadets Handbook – Common Subjects SD/SW" by DG NCC, New Delhi,2019
2.	"Cadets Handbook – Specialised Subjects SD/SW" by DG NCC, New Delhi,2017

Course Designer : CT E CHANDRA KUMAR - chandrakumar@ksrct.ac.in

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Department of Textile Technology
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Tiruchengode-637 215

60 GE001	Heritage of Tamils (Common to all Branches)

Category	L	T	P	Credit
GE	1	0	0	1

Objectives:

- To learn the extensive literature of classical Tamil.
- To review the fine arts heritage of Tamil culture.
- To realize the contribution of Tamils in Indian freedom struggle.

Prerequisite:

Nil

Course Outcomes:

On the successful completion of the course, students will be able to

CO1	Recognize the extensive literature of Tamil and its classical nature.	Understand
CO2	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.	Understand
CO3	Review on folk and martial arts of Tamil people.	Understand
CO4	Insightthinai concepts, trade and victory of Chozha dynasty.	Understand
CO5	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.	Understand

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							3	3		2		3	2	1	3
CO2							3	3		2		3	2	1	3
CO3							3	3		2		3	2	1	3
CO4							3	3		2		3	2	1	3
CO5							3	3		2		3	2	1	3
			3- Strong; 2-Medium; 1-Low												

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Department of Textile Technology
K S Rangasamy College of Technology
Tiruchengode-637 215

K. S. Rangasamy College of Technology – Autonomous R2022								
60 GE 001 – Heritage of Tamils								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	0	0	15	1	100	-	100

Language and Literature* Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and	3
Heritage - Rock Art Paintings to Modern Art – Sculpture* Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.	3
Folk and Martial Arts* Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	3
Thinai Concept of Tamils* Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.	3
Contribution of Tamils to Indian National Movement and Indian Culture* Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.	3
Total Hours	**15**

Text Book(s):

1.	தமிழகவரலாறு - மக்களும்பண்பாடும்கே. கே . பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2.	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3.	கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).
4.	பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

***SDG:4- Quality Education**

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman
Dr. G. KARTHIKEYAN, B.E., M.Tech., Ph.D
Professor and Head
Department of Textile Technology
K S Rangasamy College of Technology
Tiruchengode-637 215

60 GE001	தமிழர் மரபு (அனைத்து துறைகளுக்கும் பொதுவானது)

Category	L	T	P	Credit
GE	1	0	0	1

பாடத்தின்நோக்கங்கள்:

- தமிழ் மொழியின் இலக்கணச் செறிவைக் கற்றுணர்தல்.
- தமிழர் பண்பாட்டின் நுண்கலைகள் பற்றிய ஒரு மீள் பார்வை.
- இந்திய சுதந்திரப்போராட்டத்தில் தமிழர்களின் பங்களிப்பை உணருதல்.

முன்கூட்டியதுறைசார்அறிவு:

தேவைஇல்லை

பாடம்கற்றதின்விளைவுகள்:

பாடத்தைவெற்றிகரமாகக்கற்றுமுடித்தபின்பு, மாணவர்களால்முடியும்விளைவுகள்

CO1	தமிழ்மொழியின்செந்தண்மைமற்றும்இலக்கியம்குறித்ததெரிதல்.	புரிதல்
CO2	தமிழர்களின்சிற்பக்கலை, ஓவியக்கலைமற்றும்இசைக்கருவிகள்குறித்ததெளிவு.	புரிதல்
CO3	தமிழர்களின்நாட்டுப்புறக்கலைகள்மற்றும்வீரவிளையாட்டுகள்குறித்ததெளிவு.	புரிதல்
CO4	தமிழர்களின்திணைக்கோட்பாடுகள், சங்ககாலவணிகம்மற்றும்சோழர்களின்வெற்றிகள்குறித்ததகவல்கள்.	புரிதல்
CO5	இந்தியதேசியஇயக்கம், சுயமரியாதையைஇயக்கம்மற்றும்சித்தமருத்துவம்பற்றியபுரிதல்.	புரிதல்

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							3	3		2		3	2	1	3
CO2							3	3		2		3	2	1	3
CO3							3	3		2		3	2	1	3
CO4							3	3		2		3	2	1	3
CO5							3	3		2		3	2	1	3
			3- Strong;2-Medium; 1-Low												

K. S. Rangasamy College of Technology – Autonomous (R2022)								
60 GE 001– *தமிழர் மரபு*								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	0	0	15	1	100	-	100

மொழிமற்றும்இலக்கியம்: இந்தியமொழிக்குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்கஇலக்கியத்தின்சமயச்சார்பற்றதன்மை – சங்கஇலக்கியத்தில்பகிர்தல்அறம் – திருக்குறளில்மேலாண்மைக்கருத்துக்கள் - தமிழ்க்காப்பியங்கள் - தமிழகத்தில்சமணபௌத்தசமயங்களின்தாக்கம் – பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும்நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில்நவீனஇலக்கியத்தின்வளர்ச்சி – தமிழ்இலக்கியவளர்ச்சியில்பாரதியார்மற்றும்பாரதிதாசன்ஆகியோரின்பங்களிப்பு.	3
மரபு – பாறைஓவியங்கள்முதல்நவீனஓவியங்கள்வரை–சிற்பக்கலை: நடுகல்முதல்நவீனசிற்பங்கள்வரை – ஐம்பொன்சிலைகள் பழங்குடியினர்மற்றும்அவர்கள்தயாரிக்கும்கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை – சுடுமண்சிற்பங்க – நாட்டுப்புறத்தெய்வங்கள் – குமரிமுனையில்திருவள்ளுவர்சிலை – இசைக்கருவிகள் – மிருதங்கம், பறை, வீணை, யா நாதஸ்வரம் –தமிழர்களின்சமூகபொருளாதாரவாழ்வில்கோவில்களின்பங்கு.	3
நாட்டுப்புறக்கலைகள்மற்றும்வீரவிளையாட்டுகள்: தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின்விளையாட்டுகள்.	3
தமிழர்களின்திணைக்கோட்பாடுகள்: தமிழகத்தின்தாவரங்களும், விலங்குகளும் – தொல்காப்பியம்மற்றும்சங்கஇலக்கியத்தில்அகம்மற்றும்புறக்கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில்தமிழகத்தில்எழுத்தறிவும், கல்வியும் - சங்ககாலநகரங்களும்துறைமுகங்களும் - சங்ககாலத்தில்ஏற்றுமதிமற்றும்இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.	3
இந்தியதேசியஇயக்கம்மற்றும்இந்தியபண்பாட்டிற்குத்தமிழர்களின்பங்களிப்பு: இந்தியவிடுதலைப்போரில்தமிழர்களின்பங்கு – இந்தியாவின்பிறப்பகுதிகளில்தமிழ்ப்பண்பாட்டின்தாக்கம் - சுயமரியாதைஇயக்கம் – இந்தியமருத்துவத்தில், சித்தமருத்துவத்தின்பங்கு – கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப்புத்தகங்களின்அச்சுவரலாறு.	3
Total Hours	**15**

Text Book(s):

1.	தமிழகவரலாறு- மக்களும்பண்பாடும்கே. கே .பிள்ளை(வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2.	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3.	கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).
4.	பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

K.S.Rangasamy College of Technology – Autonomous								R 2022
60 EE 0P2 - Basic Electrical, Electronics and Instrumentation Laboratory								
B.Tech - Textile Technology								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	0	0	4	60	2	60	40	100

Course Objective(s)	• To provide knowledge on the basic electric circuital laws • To practice the students in conducting load tests on DC & AC machines • To gain practical experience in experimentally obtaining the characteristics of electronic devices • To train the students to measure displacement using suitable transducer • To acquire knowledge in microprocessor and microcontroller
Course Outcomes	**At the end of the course, the students will be able to** 1. Apply basic circuital laws to analyze the electrical circuits. 2. Test and analyze the performance of DC and AC Machines. 3. Analyze the VI characteristics of analog electronic devices 4. Identify the suitable transducers to measure the displacement 5. Apply the basic concept of microprocessor and microcontroller.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	2					2	2	2	2	-
CO2	3	3	2	3	2	2					2	2	3	3	-
CO3	3	3	2	3	2	2					2	2	2	2	
CO4	3	3	2	3	2	2	2				2	2	3	3	-
CO5	3	3	2	3	2	2	2		3		2	3	3	3	-

List of Experiments

1. Verification of Ohm’s law.
2. Verification of KVL and KCL.
3. Determination of performance characteristics of Load test on DC Shunt Motor.
4. Determination of regulation and efficiency of single-phase transformer using load test.
5 Determination of performance characteristics of Load Test on Single Phase Induction Motor.
6. Determination of VI Characteristics of PN junction diode and Zener diode.
7. Determination of VI Characteristics of Characteristics of BJT.
8. Measurement of displacement using LVDT.
9. Programs for addition and subtraction in 8086.
10. Programs for addition and subtraction in 8051.

60 CS 0P1	C PROGRAMMING LABORATORY

Category	L	T	P	Credit
ES	0	0	4	2

Objective

- To enable the students to apply the concepts of C to solve simple problems
- To use selection and iterative statements in C programs
- To apply the knowledge of library functions in C programming
- To implement the concepts of arrays, functions, structures and pointers in C
- To implement the file handling operations through C

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Read, display basic information and use selection and iterative statements.	Apply
CO2	Demonstrate C program to manage collection of related data.	Apply
CO3	Design and Implement different ways of passing arguments to functions, Recursion and implement pointers concepts.	Apply
CO4	Develop a C program to manage collection of different data using structures, Union, user-defined data types and preprocessor directives.	Apply
CO5	Demonstrate C program to store and retrieve data using file concepts.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3		3				2	2		2	3	3	
CO2	3	3	3		3				2	2		2	3	3	
CO3	3	3	3		3				2	2		2	3	3	
CO4	3	3	3		3				2	2		2	3	3	
CO5	3	3	3		3				2	2		2	3	3	
3- Strong; 2-Medium; 1-Low															

List of Experiments

1. Implementation of Simple computational problems using various formulas.*
2. Implementation of Problems involving Selection statements.*
3. Implementation of Iterative problems e.g., sum of series.*
4. Implementation of 1D Array manipulation.*
5. Implementation of 2D Array manipulation.*
6. Implementation of String operations.*
7. Implementation of Simple functions and different ways of passing arguments to functions and Recursive Functions.*
8. Implementation of Pointers*
9. Implementation of structures and Union.*
10. Implementation of Bit Fields, Typedef and Enumeration.*
11. Implementation of Preprocessor directives*.
12. Implementation of File operations.*

*** SDG:4- Quality Education**

Course Designers

1. Dr.P.Kaladevi - kaladevi@ksrct.ac.in

60 CG 0P1	CAREER SKILL DEVELOPMENT I

Category	L	T	P	Credit
CG	0	0	2	0

Objective

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Prerequisite

Basic knowledge of reading and writing in English

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Listen and comprehend complex academic texts	Understand
CO2	Read and infer the denotative and connotative meanings of technical texts	Analyze
CO3	Write definitions, descriptions, narrations, and essays on various topics	Apply
CO4	Speak fluently and accurately in formal and informal communicative contexts	Apply
CO5	Appraise the verbal ability skills in the career development and professional contexts	Analyze

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								2	3	3	2	3			
CO2								2	3	3	2	3			2
CO3								2	3	3	2	3	2		
CO4								2	3	3	2	3			
CO5								2	3	3	2	3		2	2

3- Strong; 2-Medium; 1-Some

K.S. Rangasamy College of Technology – Autonomous								R 2022
Career Skill Development I								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	0	0	2	25	0	100	00	100

Listening* Listening for general information-specific details - audio / video (formal & informal) - Listen to podcasts/ TED talks/ anecdotes / stories / event narration / documentaries and interviews with celebrities - Listen to a product and process descriptions, advertisements about products or services.	**5**
Speaking* Self Introduction; Introducing a friend; conversation - politeness strategies - Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews - Picture description; giving instruction to use the product; presenting a product - Small Talk; Mini presentations - Group discussions, debates & role plays.	**5**
Reading* Loud reading vs Silent reading, Skimming & Scanning of passages, reading brochures (technical context), social media messages relevant to technical contexts and emails - Biographies, travelogues, newspaper reports and travel & technical blogs - Advertisements, gadget reviews and user manuals - Newspaper articles and Journal reports - Editorials; and opinion blogs	**5**
Writing* Writing letters – informal and formal – basics and format orientation - paragraph texting, short report on an event (field trip etc.) - Definitions; instructions; and product /process description - Note-making / Note-taking; recommendations; transferring information from non-verbal (charts, graphs to verbal mode) - Essay texting	**5**
Verbal Ability I* Reading Comprehension (MCQs) – Cloze Test - Sequencing of sentences – Summarizing and paraphrase – Error Detection – Spelling Test – Sentence Improvement - Preposition	**5**
Total Hours	**25**

Reference(s):

1.	*'English for Engineers & Technologists'* Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, *'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book'*, Penguin Random House India, 2020
3.	Michael McCarthy and Felicity O Dell, *'English Vocabulary in Use: Upper Intermediate',* Cambridge University Press, N.York, 2012
4.	Lakshmi Narayanan, *'A Course Book on Technical English'* Scitech Publications (India) Pvt. Ltd. 2020

*** SDG- 04- Quality Education**

Course Designers

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

SEMESTER III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 011	Optimisation Techniques and Numerical Methods	BS	4	3	1	0	4
2.	60 ME 008	Elements of Mechanical Engineering	ES	4	3	1	0	4
3.	60 TT 301	Structure and Properties of Fibers	PC	4	4	0	0	4
4.	60 TT 302	Yarn Manufacturing Technology I	PC	3	3	0	0	3
5.	60 TT 303	Fabric Manufacturing Technology I	PC	3	3	0	0	3
6.	60 GE 002	Tamils and Technology / தமிழரும் தொழில்நுட்பமும்	GE	1	1	0	0	1*
PRACTICALS								
7.	60 TT 3P1	Fibre Science Laboratory	PC	4	0	0	4	2
8.	60 TT 3P2	Yarn Manufacturing Technology Laboratory I	PC	4	0	0	4	2
9.	60 CG 0P2	Career Skill Development II	CG	2	0	0	2	0
			Total	**28**	**17**	**02**	**10**	**22**

K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS
(For the candidates admitted from 2022-2023 onwards)

THIRD SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 MA 011	Optimisation Techniques and Numerical Methods	2	40	60	100	45	100
2	60 ME 008	Elements of Mechanical Engineering	2	40	60	100	45	100
3	60 TT 301	Structure and Properties of Fibers	2	40	60	100	45	100
4	60 TT 302	Yarn Manufacturing Technology I	2	40	60	100	45	100
5	60 TT 303	Fabric Manufacturing Technology I	2	40	60	100	45	100
PRACTICAL								
8	60 TT 3P1	Fibre Science Laboratory	3	60	40	100	45	100
9	60 TT 3P2	Yarn Manufacturing Technology Laboratory I	3	60	40	100	45	100

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

60 MA 011	OPTIMIZATION TECHNIQUES AND NUMERICAL METHODS	Category	L	T	P	Credit
		BS	3	1	0	4

Objective

- To familiarize basic concepts of linear programming problems.
- To get exposed to transportation and assignment problems.
- To know about sequencing and replacement problems.
- To get exposed to various techniques to solve equations numerically.
- To know the concepts of interpolation and numerical integration.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Formulate the linear programming models and solve by simplex algorithms	Remember, Understand, Apply
CO2	Apply the suitable method to predict the optimum solution for transportation and assignment problems	Remember, Understand, Apply
CO3	Determine the optimal order in which n jobs can be processed and optimal replacement policy for machineries	Remember, Understand, Apply
CO4	Apply various iteration techniques for solving algebraic, transcendental and system of linear equations.	Remember, Understand, Apply
CO5	Apply different techniques to find the intermediate values and to evaluate single definite integrals.	Remember, Understand, Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2							2	3		
CO2	3	3	3	3	2							2	3		
CO3	3	3	3	3	2							2	3		
CO4	3	3	3	2	2							2	3		
CO5	3	3	3	2	2							2	3		
3 - Strong;2 - Medium;1 – Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember(Re)	10	10	10
Understand (Un)	30	30	50
Apply (Ap)	20	20	40
Analyse (An)	0	0	0
Evaluate (Ev)	0	0	0
Create (Cr)	0	0	0

CourseLevel Assessment Questions

Course Outcome 1 (CO1)

1. Define feasible solutions of LPP

2. Solve the following LPP by graphical method

$$Max\ Z = 4x_1 + 3x_2$$

subject to the constraints

$$x_1 - x_2 \le -1$$
$$-x_1 + x_2 \le 0$$
$$and\ x_1, x_2 \ge 0$$

3. Solve the following LPP by Big-M (Penality) method:

$$Min\ Z = 8x_1 - 2x_2$$

subject to the constraints

$$-4x_1 + 2x_2 \le 1$$
$$5x_1 - 4x_2 \le 3$$
$$x_1, x_2 \ge 0$$

Course Outcome 2 (CO2)

1. Define balanced and unbalanced transportation problem

2. Solve the following transportation problem

		Destination				
		A	B	C	D	Supply
Source	I	14	56	48	27	150
	II	82	35	21	81	47
	III	99	31	71	63	93
	Demand	70	35	45	60	

3. The assignment cost of assigning any one operator to any one machine is given in the following table

		Operators			
		I	II	III	IV
Machines	A	10	5	13	15
	B	3	9	18	3
	C	10	7	3	2
	D	5	11	9	7

Find the optimum assignment schedule and cost

Course Outcome 3 (CO3)

1. Define total elapsed time and idle time on machine

2. Determine the optimal sequence of jobs that minimizes the total elapsed time and idle time based on the following information. Processing time on machine is given in hours and passing is not allowed

Job :	A	B	C	D	E	F
Machine 1:	8	3	7	2	5	1
Machine 2:	3	4	5	2	1	6

3. The maintenance cost and resale value per year of a machine whose purchase price is Rs.7000 is given below:

Year	1	2	3	4	5	6	7	8
Main.Cost(Rs.)	900	1200	1600	2100	2800	3700	4700	5900
Resale Value (Rs.)	4000	2000	1200	600	500	400	400	400

When should the machine be replaced?

Course Outcome 4 (CO4)

1. Compare Gauss-Jacobi and Gauss-Seidel methods

2. Using Newton-Raphson method, find a root of $x^3 - 6x + 4 = 0$

3. By using power method, find the largest eigenvalue and the corresponding eigenvector of a matrix $A = \begin{pmatrix} 3 & 2 & 6 \\ -1 & 12 & 1 \\ 4 & 2 & 1 \end{pmatrix}$

Course Outcome 5 (CO5)

1. Write two point Gaussian quadrature formula.

2.	Using Lagrange's interpolation formula, find y when $x=10$ from the following table x: 5, 6, 9, 11 y: 12, 13, 14, 16
3.	Evaluate $\int_0^6 \frac{dx}{1+x^2}$, using Trapezoidal and Simpson's rule

K.S.RangasamyCollegeofTechnology–Autonomous(R2022)

60 MA 011- OPTIMIZATION TECHNIQUES AND NUMERICAL METHODS

Textile Technology

Semester	Hours/Week			Total Hours	Credit	MaximumMarks		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	40	60	100

Linear Programming Problems Formulation of Linear programming problem -Graphical method - Simplex method - Big-M method – Duality *	**[9]**
Transportation and Assignment Problems Transportation problem - North-west corner rule - Least cost method - Vogel's approximation method - MODI method* - Assignment problem - Balanced and unbalanced assignment problems**	**[9]**
Sequencing and Replacement Problems Processing n jobs on 2 machines - Processing n jobs on 3 machines - Processing n jobs on m machines. Replacement problem- Individual replacement - Group replacement.***	**[9]**
Solution of Equations and Eigen value problem Algebraic and Transcendental equations - Newton Raphson method – Regula Falsi method - Gauss elimination method – Gauss Jordan method – Iterative methods: Gauss Jacobi method – Gauss Seidel method– Eigen value of a matrix by Power method.	**[9]**
Interpolation and Numerical Integration Lagrange's and Newton's divided difference interpolation (unequal intervals) - Newton's forward and backward interpolation (equal intervals) - Two point and three point Gaussian quadrature – Trapezoidal,Simpson's 1/3 and 3/8 rule(single integral).	**[9]**
Total Hours: 45 + 15 (Tutorial)	**60**

Textbook(s):

1. KantiSwarup, Gupta. P.K., Man Mohan, "Operations Research", Sultan Chand & Sons, 20th Edition, New Delhi, 2022
2. Grewal B.S and Grewal J.S, "Numerical methods in Engineering and Science", 10th Edition, Khanna Publishers, New Delhi, 2015.

Reference(s):

1. Sundaresan.V, Ganapathy Subramanian. K.S., Ganesan.K., "Resource Management Techniques" ARS Publications, 11th Edition, Chennai, 2019
2. Taha.H.A, "Operations Research: An Introduction", Pearson Education Edition, Asia, 10th Edition, New Delhi, 2017
3. Kandasamy P, Thilagavathy K and Gunavathi K, "Numerical Methods", 3rd Edition, S.Chand& Company Ltd, New Delhi, 2013.
4. Gerald C.F and Wheatley P.O, "Applied Numerical Analysis", 7th Edition, Pearson Education Asia, New Delhi, 2004.

****SDG 4 – Quality Education**

*****SDG 9 – Industry, Innovation and Infrastructure**

***SDG 12 – Ensure sustainable consumption and production patterns**

List of MATLAB Programs:

1. Analyze the LPP for optimum solution in two variables graphically.
2. Compute the initial basic feasible solution for transportation problem.
3. Determine the optimum schedule for assignment problem.
4. Deduce the solution of transcendental equations.
5. Evaluation of definite single integral.

Course Contents and Lecture Schedule

S.No.	Topic	No.of Hours
1	**Linear Programming Problems**	
1.1	**Formulation of linear programming problem**	1
1.2	Graphical method	2
1.3	Simplex method	2
1.4	Big-M method	2
1.5	Duality	2
1.6	**Tutorial**	3
2	**Transportation and Assignment Problems**	
2.1	**Transportation problem- North-west corner rule and Least cost method**	2
2.2	Vogel's approximation method	1
2.3	MODI method	3
2.4	Balanced assignment problem	2
2.5	Unbalanced assignment problem	1
2.6	Tutorial	3
3	**Sequencing and Replacement Problems**	
3.1	**Processing n jobs on 2 machines**	2
3.2	**Processing n jobs on 3 machines**	2
3.3	Processing n jobs on m machines	1
3.4	Replacement problem - Individual replacement	2
3.5	Group replacement	2
3.6	Tutorial	3
4	**Solution of Equations and Eigenvalue Problem**	
4.1	Algebraic and Transcendental equations and Newton Raphson method	2
4.2	Regula-Falsi method	1
4.3	Gauss elimination method	1
4.4	Gauss Jordan method	1
4.5	Gauss Jacobi and Gauss Seidel method	2
4.6	Eigen values of a matrix by Power method	2
4.7	Tutorial	3
5	**Interpolation and Numerical Integration**	
5.1	Lagrange's interpolation	2
5.2	Newton's divided difference interpolation	1

5.3	Newton's forward interpolation	2
5.4	Newton's backward interpolation	1
5.5	Two and three point Gaussian quadrature	1
5.6	Single integral using Trapezoidal, Simpson's 1/3 and 3/8 rule	2
5.7	Tutorial	3
	Total	60

Course Designer

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60 ME 008	Elements of Mechanical Engineering

Category	L	T	P	Credit
ES	3	1	0	4

Preamble

The objective of this course is to learn the basic components and layout of linkages in the assembly of a system machine. It gives the basic knowledge of strength of materials and power transmissions which are essential for understanding the textile machineries. This course also highlights basic properties of steam and functions of steam boilers used in textile industries. It also gives the the basic functions of pumps, hydraulic devices used for processes in textile industries. It gives the basic Utilize various air compressors, clutches and brakes used in automobiles.

Prerequest

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Design and construct the various cam profile and follower using various follower motions.	Understand, Apply & Analyse
CO2	Describe the concepts of stresses and strains, their significant effects in engineering applications.	Understand, Apply & Analyse
CO3	Select and design the appropriate power transmission drives for various requirements	Understand, Apply & Analyse
CO4	Explain the properties of steam and different kind of steam boilers.	Understand & Apply
CO5	Explain the working principles of pumps, hydraulic devices, air compressors, clutches and brakes.	Understand & Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	2		2	3	2		3	2		2
CO2	3	3	3	3	3	2	2	2	2	3		2	3		2
CO3	3	3	3	3	3	2	3	2				3	3		2
CO4	3	3	3	3	3	2	3	2				3	2		2
CO5	3	3	3	3	3	2	2	2				3	3		2
3- Strong;2-Medium;2-Low															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Semester Examination (Marks)
	1	2	
Remember	10	10	30
Understand	20	20	30
Apply	30	30	30
Analyse	0	0	10
Evaluate	0	0	0
Create	0	0	0

K.S.Rangasamy College of Technology – Autonomous (R 2022)

Elements of Mechanical Engineering

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	40	60	100

BASICS OF MECHANISMS Basic concepts of Link, Pair, Machine and Structure- Degree of freedom – Grashoff's law – Inversion of 4-bar and single slider crank mechanisms. Cams: Types of cams and followers – Motions of the follower: Simple, Harmonic and Cycloidal motion.	9
STRENGTH OF MATERIALS Basics of strength of materials: Simple stresses and strains in a bar – Poisson's ratio – Elastic Moduli – Thermal stress and strain. Torsion of solid, hollow circular shafts and Stepped shafts – Power transmission, strength and stiffness of shafts. Leaf spring – Stresses and deflection in close coiled helical	9
POWER TRANSMISSION DRIVES Belt drives: Flat belts and V-belts – types of belt drives –velocity ratio of belt drive – ratio of tensions – length and power transmitted by a belt. Gear drive: Types of gears – Spur, Helical, Bevel and Worm gears – Types of gear trains – Simple and compound gear trains	9
PROPERTIES OF STEAM AND STEAM BOILERS Formation of steam – Temperature vs. Enthalpy diagram (T-H diagram) – wet steam, saturated steam and superheated steam – dryness fraction, wetness fraction, specific volume, enthalpy and internal energy of steam – Use of steam tables. Boilers: Classification – Fire tube and Water tube boilers – Cochran boiler, Lancashire boiler, Babcock and Wilcox boiler – Boiler mountings and accessories – Applications of steam boilers.	9
PUMPS, HYDRAULIC DEVICES, CLUTCHES AND BRAKES Pumps: Classification – Components and working of Reciprocating and Centrifugal pumps. Hydraulic devices: Working of Hydraulic press and Hydraulic lift – Air compressors. Clutches and brakes: Types– Construction and working principle – Applications	9
Total Hours: 45 + 15 (Tutorial)	**60**

Text Book(s):

1.	S. Trymbaka Murthy, "Elements of Mechanical Engineering", 5th Edition, I. K. International Pvt. Ltd, 2019.
2	Gokak, "Elements of Mechanical Engineering", Wiley Publications, 2016.

Reference(s):

1.	R.K.Rajput, "Elements of Mechanical Engineering", Firewall Media, 2017.
2.	Rattan.S.S, "Theory of Machines",Tata McGraw Hill, 2019..
3.	Pravin Kumar, "Basic Mechanical Engineering", Second Edition, Pearson India Education, 2017
4.	V.Ganesan, "Internal Combustion Engines",Tata McGraw Hill Education, 2014.

Course Contents and Lecture Schedule

S.No.	Topics	No.of hours
1.0	**BASICS OF MECHANISMS**	
1.1	Classification of mechanisms	1
1.2	Basic kinematic concepts and definitions –	1
1.3	Degree of freedom	1
1.4	Inversion of 4-bar and single slider crank mechanisms	1
1.5	Cams – Types of cams & followers,	1
1.6	Motions of the follower – Simple Harmonic Motion	2
1.7	Cycloidal motion	2
1.8	Draw the cam profile (axis and offset)	
2.0	**STRENGTH OF MATERIALS**	
2.1	Simple stresses and strains in a bar	2
2.2	Poisson's ratio – Elastic Moduli – Thermal stress and strain.	2
2.3	Torsion of solid, hollow circular shafts and Stepped shafts	1
2.4	Power transmission, strength and stiffness of shafts.	2
2.5	Leaf spring – Stresses and deflection in close coiled helical spring.	2
3.0	**POWER TRANSMISSION DRIVES**	
3.1	Flat belts and V-belts – types of belt drives –	1
3.2	velocity ratio of belt drive – ratio of tensions	1
3.3	length and power transmitted by a belt.	1
3.4	Gear drive: Types of gears Spur, Helical, Bevel and Worm gears	1
3.5	Simple and compound Gear train.	1
4.0	**PROPERTIES OF STEAM AND STEAM BOILERS**	
4.1	Formation of steam – Temperature vs. Enthalpy diagram (T-H diagram)	2
4.2	wet steam, saturated steam and superheated steam	1
4.3	dryness fraction, wetness fraction, specific volume	1
4.4	enthalpy and internal energy of steam	2
4.5	Boilers: Classification – Fire tube and Water tube boilers	2
4.6	Cochran boiler, Lancashire boiler, Babcock and Wilcox boiler	1
4.7	Boiler mountings and accessories	1
4.8	Applications of steam boilers.	1
5.0	**PUMPS, HYDRAULIC DEVICES, CLUTCHES AND BRAKES**	
5.1	Classification – Components and working of Reciprocating and Centrifugal pumps	1
5.2	Hydraulic devices: Working of Hydraulic press and Hydraulic lift	2
5.3	Air compressors	2
5.4	Clutches and brakes Types – Construction	1
5.5	Clutches and brakes working principle – Applications	2

Course Designers

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60 TT 301	Structure and Properties of Fibers

Category	L	T	P	Credit
PC	3	1	0	4

Objectives

- To expose the students to the various methods in structural investigation of fibers.
- To enable the students to understand the moisture absorption properties of fibers.
- To enable the students to understand the mechanical properties of fibers.
- To enable the students to understand the optical and frictional properties of fibers.
- To enable the students to understand the thermal and electrical properties of fibers.

Prerequisite

60 TT 201

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Examine the different methods in the investigation of fibres	Analyze
CO2	Describe the moisture absorption properties of fibres.	Understand
CO3	Discuss the concepts of mechanical properties of fibres.	Understand
CO4	State the optical and frictional properties of fibres. .	Remember
CO5	Interpret the thermal and electrical properties of fibres	Apply

Mapping with ProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	2		1			2		2	3	3	1
CO2	3	2	1	2	2		1			2		1	3	3	1
CO3	3	2	1	2	2		1			2		1	3	3	1
CO4	3	2	1	2	2		1			2		1	3	3	1
CO5	3	2	1	2	2		1			2		1	3	3	1
3- Strong; 2-Medium; 2-Low															

K.S. Rangasamy College of Technology– Autonomous								R 2022
60 TT 301 – Structure and properties of Fibres								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	40	60	100

Structural Investigation of Fibres Basic requirements for fibre formation; Models of fibre structure-fringed micelle, fringed fibril and fringed lamellar models. Investigation of fibre structure by X-ray diffraction, SEM, TEM, STEM, FTIR and NMR.	10
Moisture Absorption Properties of Fibres Definitions- humidity, relative humidity, standard testing atmosphere, moisture content and regain; hysteresis in moisture absorption; moisture absorption behaviour of textile fibres; Influence of various factors on regain; absorption in crystalline and amorphous regions. Density gradient column Heats of sorption-Integral and differential, measurement, effects of heats of sorption; Conditioning of fibres, mechanism of conditioning, factors influencing the rate of conditioning; swelling of fibres, types of swelling and its measurement.	12
Mechanical Properties of Fibres Tensile property- definitions related to tensile property; stress strain curves of various textile fibres and its importance, influence of moisture and temperature on tensile characteristics, Weak- link effect. Introduction to dynamic mechanical properties. Elastic recovery and its relation to stress and strain of various textile fibres; Mechanical conditioning of fibres. Time dependent effects- creep and stress relaxation phenomena; Directional effects – Brief study on flexural and torsional rigidity of fibres Compression and shear properties	14
Optical and Frictional Properties of Fibres Optical property - Refractive index and its measurement; Birefringence and its measurement; Absorption and dichroism; reflection and lustre of fibres. Frictional property - Amonton's and Bowden's law of friction, various influencing factors- load, area of contact, speed of sliding, state of surface and regain; directional frictional effect of wool.	12
Thermal and Electrical Properties of Fibres Thermal property- structural changes in fibres on heating, thermal transitions and melting; heat setting of fibres and its importance. Electrical property- mass specific resistance; influence of moisture, temperature and impurities on resistance; Dielectric properties-factors influencing dielectric properties of fibre; Static electricity – Theory of static charge generation, problems and elimination techniques.	12
Total hours	**60**

Text Book

1.Morton W.E. and Hearle J.W.S., "Physical properties of textile fibres", published by The Textile Institute Manchester,U.K., 4th Edition, 2008.ISBN 978-1-84569-220-9.Morton W.E and Hearle J.W.S, "Physical properties of textile fibres", Textile Institute,Manchester.

2. Meredith R. and Hearle J.W.S., "Physical methods of investigation of textiles", Wiley Publications, Newyork, 1989.

Reference Books

1. Meredith R., "Mechanical Properties of Textile Fibres", North Holland, Amsterdam, 1986.

2. Mukhopadhyay S.K., "Advances in fibre science", The Textile Institute, Manchester, U.K., 1992.

3 Gordon cook. J,"Hand book of textile fibres –Vol.I - Natural fibers", Wood Head Publishing Limited, Cambridge-England, 2006

4 Sreenivasa Murthy.H.V, "Introduction to Textile Fibers", Revised Edition, Wood Head Publishing India Private Limited, New Delhi.

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Structural Investigation of Fibres**	
1.1	Basic requirements for fibre formation	1
1.2	Fringed micelle Model	1
1.3	Fringed Fibril Model	1
1.4	Fringed lamellar Model	1
1.5	X-Ray Diffraction metho	1
1.6	SEM	1
1.7	TEM	1
1.8	STEM	1
1.9	FTIR	1
1.10	NMR	1
2.0	**Moisture Absorption Properties of Fibres**	
2.1	Definitions- humidity, relative humidity, standard testing atmosphere	1
2.2	Moisture content and regain; hysteresis in moisture absorption	2
2.3	Moisture absorption behavior of textile fibres	1
2.4	Influence of various factors on regain	1
2.5	Absorption in crystalline and amorphous regions	1
2.6	Density gradient column	1
2.7	Heats of sorption-Integral and differential	1
2.8	Measurement, effects of heats of sorption	1
2.9	Conditioning of fibres and Mechanism of conditioning	1
2.10	Factors influencing the rate of conditioning	1
2.11	Swelling of fibres, types of swelling and its measurement.	1
3.0	**Mechanical Properties of Fibres**	
3.1	Definitions related to tensile property;	1
3.2	Stress strain curves of various textile fibres and its importance	2
3.3	Influence of moisture and temperature on tensile characteristics	1
3.4	Weak- link effect	1
3.5	Introduction to dynamic mechanical properties.	1
3.4	Elastic recovery and its relation to stress and strain of various textile fibres	2
3.5	Mechanical conditioning of fibres	1
3.6	Time dependent effects- creep and stress relaxation phenomena	2
3.7	Brief study on flexural and torsional rigidity of fibres.	2
3.8	Compression and shear properties	1
4.0	**Optical and Frictional Properties of Fibres**	
4.1	Optical property - Refractive index and its measurement	2
4.2	Birefringence and its measurement	2
4.3	Absorption and dichroism	1
4.4	Reflection and lustre of fibres	2
4.5	Amonton's and Bowden's law of friction	1
4.6	Various influencing factors- load, area of contact, speed of sliding, state of surface and regain	2
4.7	Directional frictional effect of wool.	2

5.0	**Thermal and Electrical Properties of Fibres**	
5.1	Thermal property- structural changes in fibres on heating	1
5.2	Thermal transitions and melting	2
5.3	Heat setting of fibres and its importance	1
5.4	Electrical property- mass specific resistance	2
5.5	Influence of moisture, temperature and impurities on resistance	2
5.6	Dielectric properties-factors influencing dielectric properties	2
5.7	Static electricity – Theory of static charge generation.	1
5.8	Problems and elimination techniques for Static Electricity	1

Course Designers

Mr. G.Devanand

60 TT 302	Yarn Manufacturing Technology I	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- To understand the criterion for selection of Cotton thro openers and cleaners
- To learn about the functions, operations and setting of spinning machines
- To evaluate the end product of each machine in terms of feed parameters of successive machine
- To select the process parameters in relation to feed material
- To understand the need and scope of modern developments in spinning machines

Prerequisite

60 TT 201
60 TT 301

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the objectives, principles, and workings of various processes and machines used in the manufacturing of spun yarn.	Understand
CO2	Analyze the influence of raw material and process variables on the quality of the fibrous materials produced by the machines	Understand
CO3	Choose the fibre mix and machines or processes for producing the yarn with the required characteristics	Understand
CO4	Demonstrate various sources of strand or yarn irregularity and their control	Analysis
CO5	Draft and production of various machines used in the manufacturing of spun yarn Calculation	Analysis

Mapping with Programme Outcome

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1		2					1	2	2	3	3	1
CO2	3	1	1	2	2							2	3	3	1
CO3	3	3	2	2	2							2	3	3	1
CO4	3	3	2	1	2							2	3	3	1
CO5	3	3	1	1	2							2	3	3	1
3- Strong; 2-Medium; 1-Some															

K.S. Rangasamy College of Technology – Autonomous								R 2022
60 TT 302 - Yarn Manufacturing Technology I								
Semest	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Introduction - Ginning and Blow room Contamination and types of Contamination in Cotton, Selection of Cotton for spinning (basic requirements),Bale Management. **Ginning**: Types, criterion for selection , Process parameters and assessment. **Mixing:** Need , methods of mixing ,Blending Vs Mixing , types of equipment's, selection , evaluation of performance. **Openers and Cleaners**: Study of Minor and Major Cleaning points, Principle, working , evaluation of performance **Modern Developments**: Need and scope, Chute feed to Card, Latest Blow room machines and their selection criterion Production calculations of above machines	9
Carding Objectives and zones , principle and functions of each zone, settings for different types of fibres, Card clothing and grinding -its impact on quality, Need or Autoleveller in Card-Features of Modern Cards and their selection, Improvement in quality- Production calculations	9
Drawing Objectives, zones of drafting, Concept of ideal draft, types of drafting systems, principle and working of drawframe, Roller setting , weighing , significance of trash in draw frame sliver , stop motions, , Production calculations, Need for latest developments and performance evaluation – Production Calculations	9
Combing Need, types and selection of Comber Preparatory, role of Precomb draft, Principle and working of Comber, setting, Developments in Comber Preparatory and performance evaluation - Production calculations.	9
Speed Frame Principle and working of speed frame, Various elements and their significance, types of drafting system -, Mechanism of winding and bobbin building (mechanical and electro mechanical), Stop motions; Latest developments in speed frame, Production Calculations.	9
Total	**45**

Textbook(s):

1. KleinW., Vol. 2,"Apracticalguide to Openingand Carding", The Textile Institute,Manchester, U.K., 2000.
2. KleinW., Vol. 3, "Apractical guide to Combing and Drawing", The TextileInstitute, Manchester, U.K., 1987.

Reference(s):

1. KleinW., Vol. 1, "The TechnologyofShort-Staple Spinning", TheTextile Institute, Manchester, U.K.,1998.
2. ChattopadhyayR,SalhotraK.R,"Spinning:Blowroom,Carding",NCUTE Publications,1998.
3. ChattopadhyayR, RangasamyR, "Spinning:Drawing, Combing&Roving",NCUTEPublications,1999.
4. PattabhiramanT.K,"Essential FactsofPracticalCottonSpinning",MahajanPublishers,Ahmedabad,2005.

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction - Ginning and Blow room**	
1.1	Contamination and types of Contamination in Cotton, Selection of Cotton for spinning	1
1.2	Bale Management, Ginning – Objectives and Types	1
1.3	Criterion for selection , Process parameters and assess	1
1.4	Mixing: Need , methods of mixing, Blending Vs Mixing, types of equipments	1
1.5	Selection of mixing machineries , evaluation of performance	1
1.6	Openers and Cleaners: Study of Minor and Major Cleaning points, Objectives	1
1.7	Principle and working of various blow room machineries.	1
1.8	Modern Developments: Need and scope, Chute feed to Card,	1
1.9	Production calculations of above machies	1
2.0	**Carding**	
2.1	Objectives and zones	1
2.2	Principle and functions of each zone	2
2.3	Settings for different types of fibres	1
2.4	Card clothing and grinding-its impact on quality	1
2.5	Need or Autoleveller in Card	1
2.6	Features of Modern Cards and their selection	1
2.7	Improvement in quality	1
2.8	Production calculations	1
3.0	**Drawing**	
3.1	Objectives, zones of drafting	1
3.2	Concept of ideal draft, types of drafting systems	2
3.3	principle and working of draw frame	1
3.4	Roller setting and weighing of top rollers	1
3.5	Significance of trash in draw frame	1
3.6	Sliver stop motions	1
3.7	Need for latest developments and performance evaluation	1
3.8	Production Calculations	1
4.0	**Combing**	
4.1	Need for Combing	1
4.2	Types and selection of Comber Preparatory	2
4.3	Role of Precomb draft	1
4.4	Principle and working of Comber	2
4.5	Settings of Comber	1
4.6	Developments in Comber Preparatory and performance evaluation	1
4.7	Production calculations	1
5.0	**Speed Frame**	
5.1	Principle and working of speed frame	1
5.2	Various elements and their significance	2
5.3	Types of drafting system	1
5.4	Mechanism of winding and bobbin building	2
5.5	Stop motions	1
5.6	Latest developments in speed frame,	1
5.7	Production Calculations	1

Course Designers A.S. Subburaayasaran

60 TT 303	Fabric Manufacturing Technology I

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- Sequence of operation in warp and weft yarn preparation.
- Objectives and principle of preparation of warp winding.
- Objectives and principle of preparation of pirn winding.
- Objectives and principle of preparation of warping.
- Objectives and principle of preparation of sizing and drawing-in.

Prerequisite
Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	State the sequence of weaving preparatory processes and classification of winding machines	Understand
CO2	Explain the working principles of various types of winding machines and their production calculation.	Remember
CO3	Describe principle and working of weft winding machines and their production calculation.	Understand
CO4	Explain principle and working of various warping machines and their defects and remedies.	Remember
CO5	Explain the objectives and working principles of sizing machines and drawing – in	Apply

Mapping with ProgrammeOutcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2		1	3	2		3	3			3	3	1
CO2	2	3	2			3	3		3	1			3	3	1
CO3	2	1	3	2	1	3	3		3	1		1	3	3	1
CO4	3		3	3		3	3		3	1		1	3	3	1
CO5	2		3	3		3	3		3	1		1	3	3	1

3- Strong; 2-Medium; 2-Low

K.S. Rangasamy College of Technology– Autonomous							R 2022
60 TT 303 - Fabric Manufacturing Technology I							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
III	3	0	0	60	4	40	60	100

Introduction Sequence of operation in warp and weft preparation. Various types of woven fabrics - plain, stripes, checked, dyed, printed and denim; Different types of supply packages; Winding - angle of wind, angle of cone, traverse ratio; classification of winding machines and yarn faults and its removal; characteristics of parallel winding, cross winding and precision winding.	6
Warp Winding Objects of winding; principles of random and precision winders; working of conventional and modern cone and cheese winding machines; production of Bi-conical packages; Function of various parts – tension devices, slub catchers, stop motions, types of drum - half accelerated and fully accelerated drums, anti-patterning devices, anti-ballooning devices. Concepts in yarn clearing – mechanical, optical and electronic yarn clearers; knotters and splicers, clearing efficiency. Air requirements for modern winding machines. Calculations based on winding parameters.	10
Pirn Winding Objects and principles of pirn winding; Types of pirn winding machine - modern automatic pirn winders, function of parts. Production calculations in cone, cheese and pirn winding machines. Winding of synthetic and blended yarns, Yarn preparation for hosiery process; Package preparation for dyeing; Winding package faults and remedies - cone, cheese and pirn winding.	9
Warping Warping - Objectives; classification of warping machines; working principle of beam warping machine- creel types, stop motion, length measuring motion; working principle of sectional warping machine- creel, stop motion, length measuring motion. Ball warping and draw warping; Features of modern warping machines; Warping defects -causes and remedies; production calculations in warping machine.	10
Sizing & Drawing – In Sizing -Objectives of sizing, sizing ingredients and recipe for various fibres, size paste preparation. Types of sizing machines and its function; marking and measuring motion; Concept of single end sizing. Sizing of blended and filament yarns. Modern developments in sizing. Cold and pre wet sizing; Sizing defects- causes and remedies; Production calculations in Sizing. **Drawing –in** - Needs and methods of drawing-in process, leasing, knotting and pinning machines. Selection and care of reeds, healds and drop pins; control of cross ends and extra ends.	10
Total hours	**45**

Text Books

1.	Lord P.R and Mohamed M.H, “Weaving conversion of yarn to fabric”, Wood head Publishers Ltd UK,reprint, 1992, ISBW: 090409538X.
2.	“Woven fabric production – I”, Quality CBT & course material from NCUTE, 2002.
3.	Ajgaonkar D.B., Talukdar M.K. and Wedekar, “Sizing: Material Methods and Machineries”, Mahajan Publications, Ahmedabad, 1999.
4.	Mukesh Kumar Singh, “Industrial Practices in Weaving Preparatory”, WPI Publishers,UK, 2014.

References

1.	Sengupta, “Weaving Calculation”, D.P. Taraporewala Sons & Co. Ltd., reprint, 1996.
2.	Ormerod A, “Modern Preparation and Weaving”, Wood head Publishers Ltd UK, reprint, 2004.
3.	Talukdar M.K., “An Introduction to Winding and Warping” Testing Trade Press, Mumbai, 1998.
4.	Marks R. and Robinson T.C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0900739 258

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman
Dr. G. KARTHIKEYAN, B.E., M.Tech., Ph.D
Professor and Head
Department of Textile Technology
K S Rangasamy College of Technology
Tiruchengode-637 215

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction**	
1.1	Sequence of operation in warp and weft preparation.	1
1.2	Various types of woven fabrics - plain, stripes, checked, dyed, printed and denim	1
1.3	Different types of supply packages; Winding - angle of wind, angle of cone, traverse ratio	1
1.4	Classification of winding machines and yarn faults and its removal	1
1.5	Characteristics of parallel winding, cross winding and precision winding	2
2.0	**Warp Winding**	
2.1	Objects of winding	1
2.2	Principles of random and precision winders	1
2.3	Working of conventional and modern cone and cheese winding machines	1
2.4	Production of Bi-conical packages	1
2.5	Function of various parts – tension devices, slub catchers, stop motions	1
2.6	Types of drum - half accelerated and fully accelerated drums	1
2.7	Anti-patterning devices, anti-ballooning devices	1
2.8	Concepts in yarn clearing – mechanical, optical and electronic yarn clearers	1
2.9	Knotters and splicers, clearing efficiency	1
2.10	Calculations based on winding parameters	1
3.0	**Pirn Winding**	
3.1	Objects and principles of pirn winding	1
3.2	Types of pirn winding machine - modern automatic pirn winders	2
3.3	Production calculations in cone, cheese and pirn winding machines	1
3.4	Winding of synthetic and blended yarns	1
3.5	Yarn preparation for hosiery process	1
3.4	Package preparation for dyeing	1
3.5	Winding package faults and remedies - cone, cheese and pirn winding	2
4.0	**Warping**	
4.1	Warping - Objectives; classification of warping machines	1
4.2	working principle of beam warping machine	1
4.3	Creel types, stop motion, length measuring motion	1
4.4	working principle of sectional warping machine- creel, stop motion, length measuring motion	2
4.5	Ball warping and draw warping	1
4.6	Features of modern warping machines	1
4.7	Warping defects -causes and remedies	1
4.8	Production calculations in warping machine	2
5.0	**Sizing & Drawing – In**	
5.1	Sizing -Objectives of sizing	1
5.2	sizing ingredients and recipe for various fibres, size paste preparation	1
5.3	Types of sizing machines and its function marking and measuring motion	1
5.4	Concept of single end sizing	1
5.5	Sizing of blended and filament yarns & Modern developments in sizing	1
5.6	Cold and pre wet sizing	1
5.7	Sizing defects- causes and remedies	1
5.8	Production calculations in Sizing	1
5.9	Needs and methods of drawing-in process, leasing, knotting and pinning machines	1
5.10	Selection and care of reeds, healds and drop pins	1

Course Designers Mr. M.Arunkumar

60 GE 002	**Tamils and Technology** (Common to all Branches)

Category	L	T	P	Credit
GE	1	0	0	1

Objectives:

- To learn weaving, ceramic and construction technology of Tamils.
- To understand the agriculture, irrigation and manufacturing technology of Tamils.
- To realize the development of scientific Tamil and Tamil computing.

Prerequisite:

Nil

Course Outcomes:

On the successful completion of the course, students will be able to

CO1	Understand the weaving and ceramic technology of ancient Tamil people nature.	Understand
CO2	Comprehend the construction technology, building materials in sangam period and case studies.	Understand
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence.	Understand
CO4	Realize the agriculture methods, irrigation technology and pearl diving.	Understand
CO5	Apply the knowledge of scientific Tamil and Tamil computing.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							3	3		2		3	3	2	1
CO2							3	3		2		3	3	2	1
CO3							3	3		2		3	3	2	1
CO4							3	3		2		3	3	2	1
CO5							3	3		2		3	3	2	1
3- Strong; 2-Medium; 1-Low															

K. S. Rangasamy College of Technology – Autonomous R 2022								
60 GE 002- Tamils and Technology								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	1	0	0	15	1	100	00	100

Weaving and Ceramic Technology* Weaving Industry during Sangam Age – Ceramic Technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.	[3]
Design and Construction Technology* Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period - Type Study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal – Chetti Nadu Houses , Indo – Saracenic architecture at Madras during British	[3]
Manufacturing Technology* Art of Ship Building – Metallurgical studies – Iron Industry – Iron smelting ,Steel -Copper and gold coins as source of history – Minting of Coins – Beads making – industries Stone beads – Glass beads – Terracotta beads – Shell beads/bone beats – Archeological evidences -Gem stone types described in Silappathikaram.	[3]
Agriculture and Irrigation Technology* Dam, Tank, Ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea- Fisheries – Pearl – Conche diving -Ancient Knowledge of Ocean – Knowledge Specific Society.	[3]
Scientific Tamil and Tamil Computing* Development of Scientific Tamil – Tamil Computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy- Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.	[3]
Total Hours	**15**

Text Book(s):

1.	தமிழக வரலாறு - மக்களும் பண்பாடும் கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரீகம் (தொல்லியல் துறை வெளியீடு).
4.	பொருநை - ஆற்றங்கரை நாகரீகம் (தொல்லியல் துறை வெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

***SDG:4- Quality Education**

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman
Dr. G. KARTHIKEYAN, B.E., M.Tech., Ph.D
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Tiruchengode-637 215

60 GE002	தமிழரும் தொழில் நுட்பமும் (அனைத்து துறைகளுக்கும் பொதுவானது)

Category	L	T	P	Credit
GE	1	0	0	1

பாடத்தின் நோக்கங்கள்:

- தமிழர்களின் சங்க கால நெசவு, பனை வனைதல் மற்றும் கட்டிட தொழில் நுட்பம் குறித்து அறிதல்.
- தமிழர்களின் சங்க கால வேளாண்மை, நீர்ப்பாசனம் மற்றும் உற்பத்தி முறைகள் குறித்த கற்றல்.
- நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிதல்.

முன் கூட்டிய துறைசார் அறிவு:

தேவை இல்லை

பாடம் கற்றதின் விளைவுகள்:

பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்

CO1	சங்க காலத்தமிழர்களின் நெசவு மற்றும் பானை வனைதல் தொழில் நுட்பம் குறித்த கற்றுணர்தல்	புரிதல்
CO2	சங்ககாலத்தமிழர்களின் கட்டிட தொழில் நுட்பம் கட்டுமானப் பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்த அறிவு.	புரிதல்
CO3	சங்க காலத்தமிழர்களின் உலோகத் தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு.	புரிதல்
CO4	சங்க காலத்தமிழர்களின் வேளாண்மை, நீர்ப்பாசனமுறைகள் மற்றும் முத்துகுளித்தல் குறித்ததெளிவு.	புரிதல்
CO5	நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிந்து கொள்ளலும் மற்றும் பயன்படுத்துதலும்.	பகுப்பாய்வு

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1							3	3		2		3	3	2	1
CO2							3	3		2		3	3	2	1
CO3							3	3		2		3	3	2	1
CO4							3	3		2		3	3	2	1
CO5							3	3		2		3	3	2	1
3- Strong;2-Medium; 1-Low															

K. S. Rangasamy College of Technology – Autonomous (R2022)								
60GE 002–தமிழரும் தொழில்நுட்பமும்								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	1	0	0	15	1	100	-	100

நெசவு மற்றும் பானைத் தொழில்நுட்பம்: சங்ககாலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம்-கருப்பு சிவப்பு பாண்டங்கள் – பாண்டங்களில் கீறல் குறியீடுகள்.	3
வடிவமைப்பு மற்றும் கட்டிடத் தொழில் நுட்பம்: சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு –சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத்தலங்கல் – நாயக்கர் காலக்கோயில்கள்–மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலைநாயக்கர்மஹால் - செட்டிநாட்டுவீடுகள் - பிரிட்டிஷ்காலத்தில்சென்னையில்இந்தோ - சாரோசெனிக்கட்டிடக்கலை.	3
உற்பத்தித்தொழில்நுட்பம்: கப்பல் கட்டும் கலை – உலோகவியல் -இரும்புத்தொழிற்சாலை –இரும்பை உருக்குதல் எஃகு – வரலாற்றுச்சான்றுகளாக செம்பு மற்றும் தங்கநாணயங்கள்- நாணயங்கள் அச்சடித்தல்- மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள் கண்ணாடி மணிகள் – சுடு மண்மணிகள் - சங்குமணிகள் - எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் – சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.	3
வேளாண்மை மற்றும் நீர் பாசனத்தொழில் நுட்பம்: அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக்குமுழித்தூம்பின் முக்கியத்துவம்-கால்நடை பராமரிப்பு – கால்நடைகளுக்கான வடிவமைக்கப்பட்ட கிணறுகள்– வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு –மீன் வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார்சமூகம்.	3
அறிவியல் தமிழ் மற்றும் கணித்தமிழ் அறிவியல் தமிழின் வளர்ச்சி – கணித்தமிழ் வளர்ச்சி – தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென் பொருட்கள் உருவாக்கம் – தமிழ் இணையக்கல்விக் கழகம் – தமிழ் மின்நூலகம் – இணையத்தில் தமிழ் அகராதிகள் – சொற்குவைத் திட்டம்.	3
Total Hours	**15**

Text Book(s):

1.	தமிழகவரலாறு- மக்களும்பண்பாடும்கே. கே .பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2.	கணினித்தமிழ் – முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3.	கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு).
4.	பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு).
5.	Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print).
6.	Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7.	Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8.	The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9.	Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu)
10.	Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author).
11.	Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
12.	Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

60 TT 3P1	FIBRE SCIENCE LABORATORY

Category	L	T	P	Credit
PC	0	0	4	2

Objective(s)

- To impart knowledge on identification of fibres by physical test.
- To impart knowledge on determination of fibre density.
- To impart knowledge on determination of moisture regain and moisture content.
- To impart knowledge on blending of fibres
- To impart knowledge on analysis of fibre structures.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyze the given fibre by feeling, burning solubility test and using microscope to identify the textile fibres	Analyze
CO2	Analyze the maturity, wax content of cotton fibre and the denier of synthetic fibres.	Analyze
CO3	Analyze the density, moisture regain, moisture content and spin finish of fibres	Apply
CO4	Analyze the blend proportion of different blends	Apply
CO5	Analyze the structure of fibres by various techniques	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	1	2	1	2	2	2	2	2	3	3	3
CO2	2	1	1	1	1	2	1	2	2	2	2	2	3	3	3
CO3	2	1	1	1	1	2	1	1	2	1	1	2	3	3	3
CO4	2	1	1	1	1	2	1	2	2	1	2	2	3	3	3
CO5	3	1	3	1	3	2	3	2	2	3	2	2	3	3	3
3- Strong; 2-Medium; 2-Low															

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

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List of Experiments

1. Identification of fibres by feel and microscopic view.*
   - Natural cellulose & protein fibres
   - Regenerated cellulose fibres
   - Polyamide fibres & Polyester fibres
2. Identification of fibres by flaming characteristics (Burning test).*
   - Natural cellulose & protein fibres
   - Regenerated cellulose fibres
   - Polyamide fibres & Polyester fibres
3. Identification of fibers by solubility tests.*
   - Natural cellulose & protein fibres
   - Regenerated cellulose fibres
   - Polyamide fibres & Polyester fibres
4. Determination of fibre maturity using caustic soda swelling method.*
5. Determination of wax content of the cotton fibres*.
6. Determination of denier of synthetic fibres by gravimetric method.*
7. Determination of density of various fibres by density gradient column*.
8. Determination of moisture regain and moisture content of fibers.*
9. Estimation of percentage of spin finishes in synthetic fibers through Soxhlet extraction.*
10. Determination of blend proportion of P/C blends by solubility method.*
11. Determination of blend proportion of C/V blends by solubility method.*
12. Determination of blend proportion of P/V blends by solubility method.*
13. Determination of blend proportion of P/W blends by solubility method.*
14. Thermo gravimetric analysis of fibres using thermo grams.*
15. FTIR analysis of polymers and fibres from spectrum*.

Course Designer

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**SDG:12 (Responsible Consumption and Production)*-

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60 TT 3P2	YARN MANUFACTURING LABORATORY I

Category	L	T	P	Credit
PC	0	0	4	2

Objective.

1. To provide the Knowledge of basic machinery of Blended Scutcher and Blow room
2. To understand the principles involved in processing fibres thro Carding
3. To analyse the process of Drawing
4. To provide the knowledge about Speed frame process.
5. To provide the knowledge for selection machinery with respect to the material

Prerequisite

Nil

Course Outcome

On the successful completion of the course, students will be able to

CO1	Explain the ginning machine's material passage and carryout speed calculations	Apply
CO2	Discuss the material passage through blow room and carryout its production calculations	Apply
CO3	Explain the material passage in carding, assess the setting between various parts and carryout speed, draft and production calculations.	Apply
CO4	Discuss the material passage through draw frame and carryout its production calculations	Apply
CO5	Explain the material passage in speed frame and carryout speed, draft, twist and production calculations.	Apply

List of Experiments

1. Passage of material through Ginning machine and calculation of its speeds.
2. Passage of material through blended scutcher and study of its settings.
3. Calculation of speeds and production in Blended Scutcher
4. Passage of material in carding machine and study of various parts of carding machine.
5. Calculation of drafts, speeds and production in carding machine.
6. Study of various settings in carding machine.
7. Passage of material through Draw frame and functions of its important parts.
8. Calculation of drafts, speeds and production in Draw frame machine.
9. Passage of material through speed frame and functions of important parts
10. Calculations of Draft, twist and production in speed frame.

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60 CG 0P2	CAREER SKILL DEVELOPMENT II

Category	L	T	P	Credit
CG	0	0	2	2

Objective

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Prerequisite

Basic knowledge of reading and writing in English.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								2	3	3	2	3			2
CO2								2	3	3	2	3	2	2	
CO3								2	3	3	2	3		2	
CO4								2	3	3	2	3		2	
CO5								2	3	3	2	3			2
			3- Strong; 2-Medium; 1-Some												

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K.S.Rangasamy College of Technology – Autonomous R2022								
Career Skill Development II								
Common to All Branches								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	2	25	0	100	00	100

Listening* Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (choosing a product or service by comparison) - Listening to longer technical talks and completing–gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects, documentaries depicting a technical problem and suggesting solutions - Listening to TED Talks	5
Speaking* Marketing a product, persuasive speech techniques - Describing and discussing the reasons of accidents or disasters based on news reports, Group Discussion (based on case studies), presenting oral reports, Mini presentations on select topics with visual aids, participating in role plays, virtual interviews	5
Reading* Reading advertisements, user manuals and brochures - longer technical texts– cause and effect essays, and letters / emails of complaint - Case Studies, excerpts from literary texts, news reports etc. - Company profiles, Statement of Purpose (SoPs)	5
Writing* Professional emails, Email etiquette - compare and contrast essay - Writing responses to complaints Precis writing, Summarizing and Plagiarism- Job / Internship application – Cover letter & Résumé	5
Verbal Ability II Reading Comprehension (Inferential fillups) – Spotting Errors – Verbal Analogies – Theme Detection – Change of Voice – Change of Speech – One word substitution	5
Total Hours	**25**

Reference(s):

1.	*'English for Engineers & Technologists'* Orient Blackswan Private Ltd. Department of English, Anna University, 2020
2.	Norman Lewis, *'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book'*, Penguin Random House India, 2020
3.	Raman. Meenakshi, Sharma. Sangeeta, 'Professional English'. Oxford University Press. New Delhi. 2019
4.	Arthur Brookes and Peter Grundy,' Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, New York, 2003

*SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

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Course Contents and Lecture Schedule

S.No	Topic	No.of Hours
1	**Listening**	
1.1	Evaluative Listening: Advertisements, Product Descriptions	1
1.2	Listening to longer technical talks and completing– gap filling exercises.	1
1.3	Listening technical information from podcasts	1
1.4	Listening to process/event descriptions to identify cause & effects and documentaries depicting a technical problem and suggesting solutions	1
1.5	Listening to TED Talks	1
2	**Speaking**	
2.1	Marketing a product, persuasive speech techniques	1
2.2	Describing and discussing the reasons of accidents or disasters based on news reports,	1
2.3	Group Discussion (based on case studies)	1
2.4	Presenting oral reports, Mini presentations on select topics with visual aids	1
2.5	participating in role plays and virtual interviews	1
3	**Reading**	
3.1	Reading advertisements, user manuals and brochures	1
3.2	Reading - longer technical texts– cause and effect essays, and letters / emails of complaint	1
3.3	Case Studies, excerpts from literary texts, news reports etc.	1
3.4	Company profiles	1
3.5	Statement of Purpose (SoPs)	1
4	**Writing**	
4.1	Professional emails, Email etiquette	1
4.2	Compare and contrast essay	1
4.3	Writing responses to complaints	1
4.4	Precis writing, Summarizing and Plagiarism	1
4.5	Job / Internship application – Cover letter & Résumé	1
5	**Verbal Ability II**	
5.1	Reading Comprehension (Inferential fillups) and Theme Detection	1
5.2	Spotting Errors	1
5.3	Verbal Analogies	1
5.4	Change of Voice and Change of Speech	1
5.5	One word substitution	1
	Total	**25**

Course Designer

Dr.A.Palaniappan - palaniappan@ksrct.ac.in

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
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COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

SEMESTER IV

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 MA 022	Applied Statistics	BS	5	3	2	0	4
2.	60 TT 401	Yarn Manufacturing Technology II	PC	3	3	0	0	3
3.	60 TT 402	Fabric Manufacturing Technology II	PC	3	3	0	0	3
4.	60 TT 403	Textile Chemical Processing I	PC	4	2	0	2	3
5.	60 TT E1*	Profession Elective – I	PE	3	3	0	0	3
6.	60 TT L1*	Open Elective – I	OE	3	3	0	0	3
7.	60 MY 002*	Universal Human Values*	MC	2	2	2	0	3*
8.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
PRACTICALS								
9.	60 TT 4P1	Yarn Manufacturing Technology Laboratory II	PC	4	0	0	4	2
10.	60 TT 4P2	Fabric Manufacturing Technology Laboratory	PC	4	0	0	4	2
11.	60 CG 0P3	Career Skill Development III	CG	2	0	0	2	0
12.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				34	**19**	**04**	**12**	**23**

***UHV – Extra Credits**
Internship* additional credits is offered based on the duration

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B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS
(For the candidates admitted from 2022-2023 onwards)

FOURTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60MA 022	Applied Statistics	2	40	60	100	45	100
2	60 TT 401	Yarn Manufacturing Technology II	2	40	60	100	45	100
3	60 TT 402	Fabric Manufacturing Technology II	2	40	60	100	45	100
4	60 TT 403	Textile Chemical Processing I	2	40	60	100	45	100
5	60 TT E1*	Profession Elective – I	2	40	60	100	45	100
6	60 TT L1*	Open Elective – I	2	40	60	100	45	100
7	60 MY 002*	Universal Human Values*	2	100	--	100	--	100
PRACTICAL								
8	60 TT 4P1	Yarn Manufacturing Technology Laboratory II	3	60	40	100	45	100
9	60 TT 4P2	Fabric Manufacturing Technology Laboratory	3	60	40	100	45	100

*CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 MA 022	APPLIED STATISTICS	Category	L	T	P	Credit
		BS	3	2	0	4

Objective

- To get exposed to the basics of probability and distributions.
- To familiarize various methods in hypothesis testing.
- To learn basics of correlation, regression and control charts.
- To get exposed to the fundamentals of analysis of variance.
- To construct an appropriate model using time series approach.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Apply the basics of probability and distributions in engineering problems.	Remember, Understand, Apply
CO2	Compute measures of central tendency and measures of dispersion, and apply various methods to test the statistical hypothesis.	Remember, Understand, Apply
CO3	Calculate correlation and apply control charts for decision making	Remember, Understand, Apply
CO4	Apply the concepts of ANOVA to test the equality of means for more than two populations.	Remember, Understand, Apply
CO5	Apply suitable method to measure the trend values.	Remember, Understand, Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2							2	3		
CO2	3	3	3	3	2							2	3		
CO3	3	3	3	3	2							2	3		
CO4	3	3	3	2	2							2	3		
CO5	3	3	3	2	2							2	3		
3 - Strong; 2 - Medium; 1 – Some															

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Assessment Pattern

Bloom's Category	Continuous Assessment Tests (Marks)		End Sem Examination (Marks)
	1	2	
Remember(Re)	10	10	10
Understand (Un)	30	30	50
Apply (Ap)	20	20	40
Analyse (An)	0	0	0
Evaluate (Ev)	0	0	0
Create (Cr)	0	0	0

K.S.Rangasamy College of Technology – Autonomous (R 2022)

60 MA 022 – APPLIED STATISTICS

Textile Technology

Semester	Hours / Week			Total Hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	2	0	60	4	40	60	100

Probability and Distributions Probability (basic concepts) – Probability distributions – Properties of random variable – Moment generating function – Standard distributions – Binomial, Poisson, Weibull and Normal distributions – properties	**9**
Basic Statistics and Testing of Hypothesis Measures of central tendency: Mean, Median and Mode – Measures of dispersion: Range and Quartile deviation – Statistical Hypothesis – Applications of t, F and chi square distribution for testing mean and variance – Goodness of fit – Independence of attributes *	**10**
Correlation and Control Charts Correlation and Regression (discrete) – Control charts – $\overline{X}$ chart – R chart – np chart – p chart – C chart – AQL chart**	**9**
Design of Experiments One way classification – Completely randomized design – Two way classification – Randomized block design – Latin square design***	**9**
Time Series Components of time series – Measurement of trend – Methods of least square: $Y = a + bX$, $Y = a + bX + cX^2$, $Y = ab^X$ trends**** – Method of semi-averages – Method of moving averages (3 and 5 years)	**9**
Total Hours: 45 + 15 (Tutorial)	**60**

Text Book(s):

1. J.R.Nagla, "Statistics for Textile Engineers", Wood head Publishing India Limited, 1st edition, New Delhi, 2015

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2.	P.N.Arora and S.Arora, 'Statistics for Management', S.Chand and Company Limited, 2009
Reference(s):	
1.	G.A.V.Leaf, "Practical Statistics for the Textile Industry: Part I and Part II", The Textile Institute, UK, 1984
2.	J.Hayavadana, "Statistics for textiles and apparel management", Wood head Publishing India limited, 1st edition, New Delhi, 2012
3.	D.C.Montgomery, "Introduction to Statistical Quality Control", John Wiley & Sons Inc.,8th edition, Singapore, 2019
4.	R.A.Johnson and C.B.Gupta, "Miller and Freund's Probability and Statistics for Engineers", Pearson India Education, Asia, 9th Edition, New Delhi, 2017

***SDG 4 – Quality Education**

****SDG 12 – Ensure sustainable consumption and production patterns**

*****SDG 9 – Industry, Innovation and Infrastructure**

******SDG 2 – Zero Hunger**

List of MATLAB Programs:

1. Calculate the mean and variance of given data.
2. Test the statistical hypothesis using t-test.
3. Compute the correlation coefficient between two variables.
4. Construct ANOVA table for one-way classification.
5. Fit a curve to the given data using method of least squares.

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
1	**Probability and Distributions**	
1.1	**Probability (basic concepts)**	2
1.2	Probability distributions	1
1.3	Properties of random variable	1
1.4	Moment generating function	1
1.5	Standard distributions: Binomial distribution	1
1.6	Poisson distribution	1
1.7	Weibull distribution	1
1.8	Normal distribution	1
1.9	**Tutorial**	3
2	**Basic Statistics and Testing of Hypothesis**	
2.1	**Measures of central tendency: Mean, Median and Mode**	3

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2.2	Measures of dispersion: Range and Quartile deviation	2
2.3	Applications of t distribution for testing mean	2
2.4	Applications of F distribution for testing variance	1
2.5	Applications of chi square distribution for testing goodness of fit	1
2.6	Applications of chi square distribution for testing independence of attributes	1
2.7	Tutorial	3
3	**Correlation and Control Charts**	
3.1	**Correlation (discrete)**	1
3.2	**Regression (discrete)**	2
3.3	$\overline{X}$ chart – R chart	2
3.4	np chart – p chart	2
3.5	C chart	1
3.6	AQL chart	1
3.7	Tutorial	3
4	**Design of Experiments**	
4.1	Analysis of Variance	1
4.2	One way classification	2
4.3	Completely randomized design	1
4.4	Two way classification	2
4.5	Randomized block design	1
4.6	Latin square design	2
4.7	Tutorial	3
5	**Time Series**	
5.1	Components of time series	1
5.2	Methods of least square: $Y = a + bX$	1
5.3	Methods of least square: $Y = a + bX + cX^2$	2
5.4	Methods of least square: $Y = ab^X$	1
5.5	Method of semi-averages	1
5.6	Method of moving averages(3 and 5 years)	2
5.7	Tutorial	3
	Total	60

Course Designer

Mrs.S.Sripadma – sripadma@ksrct.ac.in

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60 TT 401	Yarn Manufacturing Technology - II	Category	L	T	P	Credit
		PC	3	0	0	3

Objectives

- Theory of yarn formation by different spinning systems.
- Effect of process parameters used in the spinning system on yarn quality.
- Principles and mechanism of advanced spinning systems.
- Provide the knowledge method of yarn plying and calculation of resultant count.
- Raw material requirement, yarn structure and preparation of different types of yarn.
- To enable the students to prepare technological solutions for challenges in the area of Yarn Manufacturing Technology-II

Prerequisite

60TT 302 - Yarn Manufacturing Technology - I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Examine the mechanism and working principles of various parts of ring frame.	Analyze
CO2	Interpret the raw material requirement, yarn structure and preparation for rotor spinning, summarizes its working mechanism.	Understand
CO3	Explain the raw material requirement, yarn structure and preparation for friction spinning, summarizes its working mechanism. Compact spinning, compare the properties of compact yarn with ring yarn.	Understand
CO4	Relate the principle of yarn production in self twist, wrap, core, siro and solo spinning systems.	Understand
CO5	Inference the twist level, methods of plying and count calculation in ply yarn and discuss the fancy yarn production.	Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1								3		3	3	1
CO2	3	3	1								3		3	3	1
CO3	3	3	2								3		3	3	1
CO4	3	1	2								3		3	3	1
CO5	3	1	2								3		3	3	1
3- Strong;2-Medium;2-Low															

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K.S.Rangasamy College of Technology–Autonomous R2022								
60TT401–Yarn Manufacturing Technology II								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Ring Spinning Principles and working of ring spinning machine; drafting system- components, their functions and specifications, roller settings; functions of yarn guide, balloon control ring, separators; types of rings and travellers; spindle and drives. auto doffing mechanism; control of end breakage rate; power consumption; control of hard waste. Latest developments in ring spinning.	9
Rotor Spinning Raw material requirement and preparation; principle of operation - feeding, opening, cleaning, drafting, twisting and winding; process parameters influencing spinning performance and yarn quality; yarn structure, properties of ring and rotor spun yarns; limitations; applications, Latest developments in rotor spinning	8
Friction and Compact Spinning Principle of opening, cleaning, drafting, twisting and winding in DREF II and DREF III spinning; structure, properties and applications of friction spun yarns. Principle of compacting, different methods of condensed yarn manufacture, comparison of condensed yarn properties with that of ring yarn, applications	10
Other Spinning Systems Air-Jet and Air-Vortex Spinning**-** Principles of drafting, twisting and winding in air-jet and air-vortex spinning; structure, properties and applications of air-jet and air-vortex yarns. Principle of yarn production in self-twist, wrap, core, siro and solo spinning systems. Properties and applications	10
Yarn Plying and Fancy Yarns Merits of plying; methods of plying- Doubler winding, TFO, ring doubling; selection of twist level for plying; calculation of resultant count of plied yarns; Fancy yarns-types and production methods, applications.	8
Total hours	**45**

Text Book

1. Klein W., Vol. 4 & 5, “A Practical Guide to Ring Spinning” and “New Spinning Systems" The Textile Institute, Manchester, 1987.
2. Mahendra Gowda, “New Spinning Systems”, NCUTE Publications, 2006.

Reference Books

1. Lawrence C.A. and Chen K.Z, “Rotor Spinning”, Textile Progress, Vol. 13, No.4, Textile Institute, U.K., 1981.
2. Carl A.Lawerence, “Fundamentals of Spun Yarn Technology”, CRC Press, 2003.
3. Lord P.R., “Handbook of yarn production”, Wood Head publishing, 2003.
4. Salhotra K.R, Alagirusamy, Chattopadhyay R, “Ring Spinning, Doubling and Twisting”, NCUTE Publications 2000.

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Course Content and Lecture Schedule

S.No.	Topic	No. of hours
1.0	**Ring Spinning**	
1.1	Principles and working of ring spinning machine	1
1.2	Drafting system components, their functions and specifications	1
1.3	Roller settings	1
1.4	Functions of yarn guide, balloon control ring, separators	1
1.5	Types of rings and travelers	1
1.6	Spindle and drives	1
1.7	Auto doffing mechanism	1
1.8	Control of end breakage rate; power consumption	1
1.9	Control of hard waste. Latest developments in ring spinning.	
2.0	**Rotor Spinning**	
2.1	Raw material requirement and preparation	1
2.2	principle of operation - feeding, opening, cleaning, drafting, twisting and winding	1
2.3	process parameters influencing spinning performance and yarn quality	1
2.4	Properties of ring and rotor spun yarns;	1
2.5	Limitations in fine count spinning	1
2.6	Yarn Structure	1
2.7	Latest developments in ring spinning & Applications of Rotor yarn	2
3.0	**Friction and Compact Spinning**	
3.1	Principle of opening, cleaning, drafting, twisting and winding in DREF II	1
3.2	Principle of opening, cleaning, drafting, twisting and winding in DREF III	1
3.3	Yarn Structure ,applications of Friction yarn	2
3.4	Properties of friction yarn compare with ring and rotor spun yarns	1
3.5	Principle of compacting	1
3.4	Different methods of condensed yarn manufacture	1
3.5	Elite Compact Spinning method	1
3.6	Rocos Compact Spinning method	1
3.7	Roller Compact Spinning method	1
3.8	Comparison of condensed yarn properties with that of ring yarn	1
3.9	Magnetic Compact Spinning method	
4.0	**Other Spinning Systems**	
4.1	Air-Jet Spinning**-** Principles of drafting, twisting and winding in air-jet spinning	2
4.2	Air-Vortex Spinning**-** Principles of drafting, twisting and winding in air-vortex	2
4.3	Structure ,properties and applications of air-jet and air-vortex yarn	1
4.4	Principle of yarn production in self-twist spinning systems.	2
4.5	Principle of yarn production in wrap spinning systems. Properties and applications	1
4.6	Principle of yarn production in siro & solo spinning systems.	2
5.0	**Yarn Plying and Fancy Yarns**	
5.1	Merits of plying, Methods of plying	1
5.2	Doubler winding ,Objects, Construction and working	2
5.3	TFO Objects, Construction and working	1
5.4	Ring Doubling, Objects, Construction and working	2
5.5	Selection of twist level for plying	1
5.6	Calculation of resultant count of plied yarns	1

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60 TT 402	Fabric Manufacturing Technology II

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- To impart basic knowledge in the concepts involved in various mechanisms used in weaving
- To train on the aspects of different mechanisms in loom.
- To educate on the features of jacquard, dobby and drop box mechanism.
- To make the students understand the selection and control of process variables during fabric formation
- To give the knowledge about the different shuttleless looms.

Prerequisite

60 TT 401 - Fabric Manufacturing Technology I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the functioning of weaving machine and its parts.	Understand
CO2	Comprehend the various types of shedding mechanism and its requirements.	Remember
CO3	Knowledge on primary and secondary motions of weaving machines.	Understand
CO4	Acquire the knowledge of Auxiliary motion, drop box and terry mechanism.	Remember
CO5	Describe requirements and weft insertion principles of different shuttleless looms.	Apply

Mapping with ProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1			1				2			3	3	1
CO2	2	3	2			2				1			3	3	1
CO3	2	2	1			1				1			3	3	1
CO4	2	3			2	1				2			3	3	1
CO5	3	2	3	2		2				1			3	3	1
3- Strong; 2-Medium; 2-Low															

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K.S. Rangasamy College of Technology– Autonomous								R2022
60 TT 402 - Fabric Manufacturing Technology II								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Introduction Weaving – Principles of weaving, Classification of looms, passage of material through a loom, Types of weaving motions - primary, secondary and auxiliary motions. Loom timing diagram for different motions. Driving of plain power loom; Yarns quality requirements for different types of shuttle looms; Weaving accessories- Types and function of heald wires, heald frames, reeds, shuttle, picker, Temples.	9
Shedding Shedding – Types of shed, Shedding mechanisms - positive and Negative. Principle and types of tappet, dobby and jacquard mechanism. Tappet shedding – positive and negative. Dobby shedding- climax, cross-border, cam and electronic dobby, designing and pegging. Jacquard shedding - Single lift, Double lift, Cross-border and electronic jacquard. Harness mounting, card punching. Reversing mechanism and limitations of shedding mechanism.	9
Picking, Beat up and Secondary Motion Picking: Cone over pick, Under pick: side lever and side shaft - Shuttle flight and timing, Checking Devices, swell checking and hydraulic swell checking; check straps. Beat-up – cam beat up mechanism. Sley eccentricity and loom timing diagram. Take up motion: Negative - positive - continuous. Let-off motion: Negative - Positive - Electronic. Types of Back rest.	9
Auxiliary Motions Weft stop motion – different types and feelers , side weft fork and centre weft fork mechanisms; warp protector mechanism - loose reed and fast reed; warp stop motion – mechanical and electrical; shuttle changing mechanism; cop changing mechanism; Drop box mechanism - 2x1, 4x1 and 4 x 4.	9
Shuttleless Loom Yarn quality requirements for shuttleless loom; weft preparation for shuttleless loom; weft insertion principle of shuttleless looms in projectile, rapier, air jet, water jet and multiphase looms; Type of nozzles in airjet: weft accumulators; types of selvedges; techno-economics of shuttleless loom; weaving of blended yarns and filament yarns.	9
Total hours	**45**

Text Books

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

References

1.	Lord P.R. and Mohamed M.H., “Weaving: Conversion of Yarn to Fabric”, Merrow Publications, 1992.
2.	Ormerod, “Modern Preparation and Weaving”, Butterworths & Co. Ltd., 1983.
3.	“Woven Fabric production-I (The Plain Power Loom), Woven fabric Production-II (Dobby, Dropbox, Jacquard and Terry Looms)”, NCUTE Publications.

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Course Content and Lecture Schedule

S. No.	Topic	No. ofhours
1.0	**Introduction**	
1.1	Principles of weaving	1
1.2	Classification of looms, passage of material through a loom	1
1.3	Types of weaving motions - primary, secondary and auxiliary motions	1
1.4	Loom timing diagram for different motions, Driving of plain power loom	2
1.5	Yarns quality requirements for different types of shuttle looms	1
1.6	Weaving accessories and Types and function of heald wires	2
1.7	Heald frames, reeds, shuttle, picker, Temples.	1
2.0	**Shedding**	
2.1	Shedding and Types of shedding	1
2.2	Shedding mechanisms of positive and Negative	1
2.3	Principle and types of tappet, dobby and jacquard mechanism	1
2.4	Dobby shedding- climax, cross-border	1
2.5	Cam and electronic dobby	1
2.6	Jacquard shedding -Single lift, Double lift	1
2.7	Cross-border and electronic jacquard	1
2.8	Harness mounting and card punching	1
2.9	Reversing mechanism and limitations of shedding mechanism	1
3.0	**Picking, Beat up and Secondary Motion**	
3.1	Cone over pick and Under pick	1
3.2	Side lever and side shaft	1
3.3	Shuttle flight and timing Checking Devices	1
3.4	swell checking and hydraulic swell checking	1
3.5	Cam beat up mechanism	1
3.6	Sley eccentricity and loom timing diagram	1
3.7	Take up motion of Negative and Positive	1
3.8	Let-off motion: Negative - Positive	1
3.9	Types of Back rest	1
4.0	**Auxiliary Motions**	
4.1	Different types and feelers	1
4.2	Side weft fork and center weft fork mechanisms	1
4.3	Warp protector mechanism	1
4.4	Loose reed and fast reed	1
4.5	Mechanical and electrical warp stop motion	1
4.6	Shuttle changing mechanism	1
4.7	Cop changing mechanism	1
4.8	Drop box mechanism - 2x1, 4x1 and 4 x 4	2
5.0	**Shuttleless Loom**	
5.1	Yarn quality requirements for shuttleless loom	1
5.2	Weft preparation for shuttleless loom	1
5.3	Shuttleless looms in projectile	1
5.4	Weft insertion of rapier loom	1
5.5	Weft insertion of air jet	1
5.6	Weft insertion of water jet	1
5.7	Weft insertion of Multiphase loom	1
5.8	Types of selvedges	1
5.9	Type of nozzles in air jet and weft accumulators	1
	Total Hours	45

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Course Designers Mr. M.Arunkumar – arunkumarm@ksrct.ac.in

60 TT403	Textile Chemical Processing I

Category	L	T	P	Credit
PC	2	0	2	3

Objectives

- To impart technical knowledge on desizing and scouring process.
- To impart technical knowledge on bleaching and mercerizing process.
- To impart technical knowledge on cellulosic material dyeing process.
- To impart technical knowledge on synthetic material dyeing process.
- To impart knowledge on the construction and working principles of wet processing and machineries.

Pre requisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the wet process sequences for various fabrics and summarize the pretreatment processes and their efficiency for cotton, wool and silk material.	Analyze
CO2	Describe the objectives and types of bleaching and mercerization of different materials also evaluate their efficiency and select suitable chemicals and other auxiliaries.	Analyze
CO3	Explain the classification and applications of various dyes and analyze their fastness properties.	Apply
CO4	Summarize the principle of dyeing of synthetic fibres with various techniques.	Apply
CO5	Demonstrate the working principles involved in preparatory and dyeing machineries.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3									3	3	1
CO2	3	3	2	3									3	3	1
CO3	3	3	2	3									3	3	1
CO4	3	2	2	3	2								3	3	1
CO5	3	3	2	3					2	2			3	3	1

3- Strong;2-Medium;2-Low

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K.S.Rangasamy College of Technology–Autonomous							R 2022
60 TT 403 – Textile Chemical Processing I							
Semester	Hours/Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
IV	2	0	2	45	3	50	50	100

Singeing, Desizing and Scouring Wet process sequences for cotton, wool, silk, jute, polyester and blended fabrics (P/C, P/V). Singeing: Singeing methods, types of singeing Machines. Desizing: Desizing methods, enzymatic desizing-mechanism and process conditions, desizing efficiency. Scouring: mechanism and machines, process conditions and scouring efficiency. Wool carbonizing and degumming of silk.	6
Bleaching and Mercerizing Bleaching: Hypochlorite and hydrogen peroxide bleaching - effect of process parameters; per-acidic, sodium chlorite, ozone, enzymatic bleaching; batch, semi-continuous and continuous processes; continuous scouring and bleaching machines; bleaching of viscose/linen, cotton/viscose, and polyester/cotton blends; evaluation of bleaching process. Mercerization: objectives, methods, process conditions and their effects; yarn mercerizer; fabric mercerizing machine–chain, chainless and circular; evaluation of mercerizing process.	6
Dyeing of Cellulose Fibres and Protein Fibres Classification of Dyes, Pigments and their properties; Dye selection, Theory of dyeing. Affinity and Substantivity of dyes. Dyeing mechanism of cellulosic materials with direct dyes, reactive dyes and vat dyes. Dyeing mechanism of wool and silk materials with acid dyes. Wash, rub and light fastness measurements.	6
Dyeing of Synthetic Fibres Mass coloration of synthetic fibres. Dyeing of polyester with Disperse dyes-Carrier, HTHP and Thermosol dyeing methods. Dyeing of nylon and acrylic fabrics with cationic dyes. Dyeing of elastomeric fibres and dyeing of blends.	6
Dyeing Machineries Mechanical and economic aspects of fibre, yarn, and fabric processing machines; scouring, bleaching and dyeing machines -loose stock, bale, hank, package, jigger, winch, soft flow, soft-over flow, air flow machines; padding mangles; Advanced garment dyeing machines-paddle, rotary drum, tumbler, jet dyeing.	6
Hands on Training 1. Desizing of grey cotton fabric using enzymes 2. Scouring of cotton 3. Bleaching of cotton using hypochlorite 4. Bleaching of cotton using hydrogen peroxide 5. Dyeing of cotton using Reactive dyes. 6. Mercerization 7. Mini project	15
Total Hours	**45**

Text Books	
1.	Trotman,E.R., “Dyeing and Chemical Technology of Textile Fibres”, Charles Griffin and Co.Ltd.,London.2001.
2.	Bhagwat R.S “Handbook of Textile Processing Machinery”, Colour Publication, Mumbai, 1999.
References	
1.	Kesav V. Datye and A.A.Vaidya, “Chemical processing of synthetic fibers and Blends”, John wiley & Sons, 2004.
2.	Bhagwat R.S “Hand book of Textile Processing”, Colour Publication, Mumbai, 1999.
3.	T.L.Vigo, “Textile Processing and Properties”, Elsevier, NewYork, 1994.
4.	L. AshokKumar and M Senthilkumar, “ Automation in Textile Machinery: Instrumentation and Control System Design Principles”,2018.

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Course Content and Lecture Schedule

S.No.	Topic	No. of hours
1.0	**Singeing, Desizing and Scouring**	
1.1	Wet process sequences for cotton, wool, silk, jute, polyester	1
1.2	Singeing methods, types of singeing Machines	1
1.3	Desizing methods, enzymatic desizing-mechanism	2
1.4	Desizing efficiency.	1
1.5	Mechanism of scouring	1
1.6	Scouring process conditions and scouring efficiency	1
1.7	Wool carbonizing	1
1.8	Degumming of silk	1
2.0	**Bleaching and Mercerizing**	
2.1	Hypochlorite and hydrogen peroxide bleaching	1
2.2	Effect of process parameters	1
2.3	Sodium chlorite and Enzymatic bleaching	1
2.4	Semi-continuous and continuous processes	1
2.5	Continuous scouring and bleaching machines	1
2.6	Mercerization and methods	1
2.7	Yarn mercerizing process	1
2.8	Fabric mercerizing machine	1
2.9	Evaluation of mercerizing process	1
3.0	**Dyeing of Cellulose Fibres and Protein Fibres**	
3.1	Classification of Dyes	1
3.2	Pigments and their properties	1
3.3	Dye selection and Theory of dyeing	1
3.4	Dyeing mechanism of cellulosic materials with direct dyes	1
3.5	Dyeing mechanism of cellulosic materials with reactive dyes	1
3.6	Dyeing mechanism of cellulosic materials with vat dyes	1
3.7	Dyeing mechanism of wool and silk materials with acid dyes	1
3.8	Wash and rub fastness measurements	1
3.9	light fastness measurements	1
4.0	**Dyeing of Synthetic Fibres**	
4.1	Mass coloration of synthetic fibres	1
4.2	Dyeing of polyester with Disperse dyes	1
4.3	Disperse dyes using Carrier methods	1
4.4	Thermosol dyeing methods	2
4.5	HTHP dyeing methods	1
4.6	Dyeing of nylon and acrylic fabrics with cationic dyes	1
4.7	Dyeing of elastomeric fibres	1
4.8	Dyeing of blended materials	1
5.0	**Dyeing Machineries**	
5.1	Fabric processing machines	1
5.2	Dyeing machines (jigger, winch, soft flow, soft-over flow)	2
5.3	Air flow machines and padding mangles	1
5.4	Advanced Garment dyeing machines	1
5.5	Paddle, rotary drum machines	2
5.6	Tumbler and jet dyeing machines	2

Course Designer : Mr.P.Maheswaran - pmaheswaran@ksrct.ac.in

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

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60 MY 002	UNIVERSAL HUMAN VALUES

Category	L	T	P	Credit
MY	2	1	0	3

Objective

- To identify the essential complementarily between 'values' and 'skills'
- To ensure core aspirations of all human beings.
- To acquire ethical human conduct, trustful and mutually fulfilling human behaviour
- To enrich interaction with Nature
- To achieve holistic perspective towards life and profession

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the significance of value inputs in formal education and start applying them in their life and profession	Understand
CO2	Evaluate coexistence of the “I” with the body.	Analyze
CO3	Identify and evaluate the role of harmony in family, society and universal order.	Analyze
CO4	Classify and associate the holistic perception of harmony at all levels of existence and Nature	Analyze
CO5	Develop appropriate human conduct and management patterns to create harmony in professional and personal lives.	Create

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								3	2		2	3	1	1	3
CO2						3		3	3			3	1	1	3
CO3						3	3	3	3			3	1	1	3
CO4						3	3	3	3			3	1	1	3
CO5						3	3	3	3	3		3	1	1	3
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom’s Category	Continuous Assessment Tests(Marks)			End Semester Examination(Marks)
	1	2	Model	
Remember	10	10	20	No End Semester Examination
Understand	10	10	20	
Apply	20	20	30	
Analyse	20	20	30	
Evaluate	0	0	0	
Create	0	0	0	

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K.S.Rangasamy College of Technology – Autonomous R 2022								
60 MY 002- Universal Human Values								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	2	1	0	45	3*	100	--	100

Introduction to value Education* Understanding value Education-Self exploration as the process for value education-Continuous Happiness and prosperity-the basic human aspirations-right understanding-relationship and physical facility –happiness and prosperity - current scenario – **method to fulfill the basic human aspirations.****	[9]
Harmony in the Human Being* Understanding Human being as the Co-Existence of the self and the Body-Distinguishing between the needs of the self and the body-the body as an instrument of the self-**understanding harmony in the self-harmony of the self with the body**** – programme to ensure self-regulation and health.	[9]
Harmony in the Family and Society* Harmony in the Family –the basic unit of human interaction-values in human- to - human relationship –'Trust' the foundation value in relationship –'Respect'- as the right evaluation-understanding harmony in the society –vision for the universal human order.	[9]
Harmony in the Nature/Existence* Understanding harmony in the Nature-Interconnectedness, self-regulation and mutual fulfillment among the four orders of nature – realizing existence as co-existence at all levels –the holistic perception of harmony in existence.	[9]
Implications of the Holistic Understanding* Natural Acceptance of human values- definitiveness of human conduct- a basis for humanistic education, humanistic constitution and universal human order- competence in professional ethics – holistic technologies, production systems and management models-typical case studies – strategies for transition towards value base life and profession	[9]
Total Hours	**45**

Text Book(s):	
1.	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2
Reference(s):	
1.	Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2.	Human Values, A.N. Tripathi, New Age International. Publishers, New Delhi, 2004.

***SDG:3 – Good Health and Well-Being**

****SDG:5 – Quality Education**

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Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**INTRODUCTION TO VALUE EDUCATION**	
1.1	Discussion on Present Education System and Skill Based Education	1
1.2	Understanding Value Education	1
1.3	Self exploration as the process for value education	1
1.4	Basic Human Aspirations - Continuous Happiness and Prosperity	1
1.5	Basic requirements to fulfill Human Aspirations - Right understanding, Relationship and Physical facility	1
1.6	Transformation from Animal Consciousness to Human Consciousness	1
1.7	Sources of Happiness and Prosperity – Harmony and Disharmony	1
1.8	Current Scenario and Role of Education	1
1.9	Outcome of Human Education and Method to fulfill the basic human aspirations	1
2	**HARMONY IN THE HUMAN BEING**	
2.1	Understanding Human being - As Co-Existence of the self and the Body - The Needs of the Self and the Body	1
2.2	Understanding Human being - As Co-Existence of the self and the Body - The Activities and Response of the Self and the Body	2
2.3	The body as an instrument of the self	1
2.4	Understanding harmony in the self	1
2.5	Harmony of the self with the body	2
2.6	Programme to ensure self-regulation and health	1
2.7	My Participation (Value) regarding Self and my Body - Correct Appraisal of our Physical needs	1
3	**HARMONY IN THE FAMILY AND SOCIETY**	
3.1	Harmony in the Family - Understanding Values in Human Relationships	1
3.2	Family as the basic Unit of Human Interaction	1
3.3	Values in human Relationships	1
3.4	Trust - the foundation value in relationship	1
3.5	Respect as the right evaluation, the Basis for Respect, Assumed Bases for Respect today	1
3.6	Harmony from Family to World Family: Undivided Society	1
3.7	Extending Relationship from family to society , Identification of the Comprehensive Human Goal	1
3.8	Programs needed to achieve the Comprehensive Human Goal: The Five Dimensions of Human Endeavour	1
3.9	Harmony from Family Order to World Family Order – Universal Human Order	1
4	**HARMONY IN THE NATURE / EXISTENCE**	
4.1	The Four Orders in Nature	1
4.2	Participation of Human Being in Entire Nature	1
4.3	Natural Characteristics - Tendency of Human Living with Animal Consciousness / The Holistic Perception of Harmony in Existence	1
4.4	Present day Problems	1
4.5	Recyclability and self-regulation in Nature	1
4.6	Relationship of Mutual Fulfillment	1

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4.7	An Introduction to space, Co-existence of Units in Space	1
4.8	Harmony in Existence – Understanding Existence as Co- Existence	1
4.9	Natural Characteristic of Human Living with Human Consciousness	1
5	**IMPLICATIONS OF THE HOLISTIC UNDERSTANDING**	
5.1	Natural Acceptance of human values	1
5.2	Definitiveness of Ethical Human Conduct - Development of Human Consciousness	1
5.3	Identification of Comprehensive Human Goal	1
5.4	Basis for Humanistic Education and Humanistic Constitution	1
5.5	Ensuring Competence in professional Ethics	1
5.6	Issues in Professional Ethics-The Current Scenario	1
5.7	Holistic Technologies and Production Systems and management models -Typical Case Studies	2
5.8	Strategies for transition towards value based life and profession	1
	Total	45

Course Designers

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60 TT E 11	High Performance Fibres

Category	L	T	P	Credit
BS	3	0	0	3

Objective

- To comprehend the basics of advanced spinning technology
- To know various methods of manufacturing high performance fibres
- To acquire knowledge on their applications in various fields
- To gain concepts on testing procedure of materials
- To obtain information on special fibres

Prerequisite

60 TT 201 Fibre Science & 60 TT 301 - Structure and Properties of Fibres

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compare the conventional and advanced spinning process.	Understand
CO2	Demonstrate the manufacturing process of high performance fibres.	Remember
CO3	Analyze the properties of fabrics produced using chemical and thermal resistant fibres	Understand
CO4	Explain the application of high performance fibres in Medical field	Understand
CO5	Evaluate the performance of specialty fibres	Remember

Mapping with Programme Outcomes

50 TT E11 – High Performance Fibres														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2								1			2		
CO2	3	1								1			2		
CO3	2	3								2			3		1
CO4	2	3													
CO5	2	2										1			2

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K.S.Rangasamy College of Technology – Autonomous								R 2022
60 TT E 11 - High Performance Fibres								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Advanced Spinning Technology Advances in conventional fiber forming process; gel spinning; Dry-jet-wet spinning; liquid crystal spinning; electro-spinning twistless spinning	9
High Performance Fibres for Industrial Applications Manufacturing, properties and applications of glass fibers, basalt fibers; Kevlar fibers, carbon fibers, high performance polyethylene fibers.	9
Chemical and Thermal Resistant Fibres Manufacture of aramid fibers; properties and application of aramid fibers; Basofil, Glass and Ceramic fibers, Sulphur fibers, properties and applications of PBO, PBI and PI fibers.	9
High Performance Fibres for Medical Applications Manufacturing, properties and applications of alginate fibers; chitin and chitosan fibers; regenerated silk and wool protein fibers; synthetic biodegradable fibers like PLA and SAF.	9
Specialty Fibres Hollow and profile fibers; blended and bi-component fibers; film fibers and functionalized fibers for specific applications.	9
Total Hours	**45**

Text book(s):

1.	Kothari V.K., “Textile Fibers: Development and Innovations”, Vol. 2, Progress in Textiles, IAFL Publications, 2000.
2.	Mishra S P., “A Text Book of Fibre Science and Technology,” New Age International (P) Ltd., New Delhi, 2000

Reference(s):

1.	Hearle J.W.S., “High Performance Fibers”, Wood head Publishing Ltd., Cambridge, England, 2001
2.	John W. S. Hearle., “High Performance Fibres”, Wood head Publishing Ltd.,Cambridge, England, 2001, ISBN: 084931304X | ISBN-13:9780849313042

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Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Advanced Spinning Technology**	
1.1	Advances in conventional fiber forming process	1
1.2	gel spinning	1
1.3	Dry-jet-wet spinning	1
1.4	liquid crystal spinning	2
1.5	electro-spinning	1
1.6	Twistless spinning	2
2.0	**High Performance Fibres For Industrial Applications**	
2.1	Manufacturing, properties and applications of glass fibers	3
2.2	basalt fibers	1
2.3	Kevlar fibers	2
2.4	carbon fibers	1
2.5	High performance polyethylene fibers.	2
	Chemical and Thermal Resistant Fibres	
3.1	Manufacture of aramid fibers	1
3.2	properties and application of aramid fibers	1
3.3	Basofil,	1
3.4	Glass	1
3.5	Ceramic fibers	1
3.6	Sulphur fibers	1
3.7	properties and applications of PBO	1
3.8	PBI	1
3.9	PI fibers.	1
4.0	**High Performance Fibres for Medical Applications**	
4.1	Manufacturing, properties and applications of alginate fibers	3
4.2	Chitin	1
4.3	chitosan fibers	1
4.4	regenerated silk	1
4.5	wool protein fibers	1
4.6	synthetic biodegradable fibers like PLA	1
4.7	SAF	1
5.0	**Specialty Fibres**	
5.1	Hollow and profile fibers	2
5.2	blended	1
5.3	bi-component fibers	2
5.4	film fibers	2
5.5	functionalized fibers for specific applications	2

Course Designers

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Approved in Academic Council Meeting held on 03/06/2023

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60 TT E 12	Man Made Fibre Technology

Category	L	T	P	Credit
PE	3	0	0	3

Objective(s)

- To enable the students to learn about the polymer rheology and the laws
- To acquire knowledge on melt spinning
- To gain knowledge on solution spinning
- To comprehend the post spinning operations
- To obtain ideas on new developments in fibre spinning
-

Prerequisite

60 TT 301- Structure and Properties of Fibres

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Discuss polymer rheology and the laws	Understand
CO2	List various spinning techniques of polymers and parameter involved in spinning syntheticyarn	Remember
CO3	Explain Properties and application of synthetic yarns	Understand
CO4	Outline the need of various post spinning operations	Understand
CO5	Categorize the advances in the spinning process	Analyse

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2		2					2		2	3	3	2
CO2	3	2	2	2	2		2			2		2	3	3	2
CO3	2		1		2	2	2	1		1			3	3	2
CO4	2	2	2	2			2			2		2	3	3	2
CO5	3	2	2	2	2		2	1		2		3	3	3	2
3- Strong; 2-Medium; 1-Low															

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Approved in Academic Council Meeting held on 03/06/2023

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K.S. Rangasamy College of Technology– Autonomous (R2022)								
60 TT E12 - Man Made Fibre Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Polymer Rheology Spinability of liquids, rheology of spinning, formation of fibre structure	07
Melt Spinning Melt Spinning- Polymer Selection and Preparation, equipment, properties and applications of polyester, polyamide and polypropylene fibres.	09
Solution Spinning Solution spinning- Polymer Selection and Preparation, equipment, properties and applications of aramid, acrylic,polyurethane and regenerated cellulose fibres*	09
Post Spinning Operations 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 behaviour; Influence of heat setting on dyeing Spin finish composition and application; Evaluation methods; Texturising — Need and methods. Textured yarn characteristics	10
Developments in Fiber Spinning Liquid crystal spinning; Gel spinning, Electro spinning; Profile fibres, hollow and porous fibres; Specialty fibres poly glycolic acid, polylactic acid, chitosan fibres preparation properties and applications*	10
Total hours	**45**

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

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.
4.	Nakasjima (English edition, edited by Kajiwara K. and McIntyre J. E.), “Advanced FibreSpinning Technology”, Wood head Publication Ltd., England, 1994.

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Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Polymer Rheology**	
1.1	Spinability of liquids,	02
1.2	Rheology of spinning	02
1.3	Formation of fibre structure	03
2.0	**Melt Spinning**	
2.1	Melt Spinning	01
2.2	Polymer Selection and Equipment	02
2.3	Preparation, Properties and applications of polyester	02
2.4	Preparation, Properties and applications of polyamide	02
2.5	Preparation ,Properties and applications of polypropylene fibres	02
3.0	**Solution Spinning**	
3.1	Solution spinning	02
3.2	Polymer Selection and Equipment	01
3.3	Preparation, properties and applications of aramid	01
3.4	Preparation, properties and applications of Acrylic	01
3.5	Preparation, properties and applications of polyurethane	01
3.4	Preparation, properties and applications of regenerated cellulose fibres	03
4.0	**Post Spinning Operations**	
4.1	Neck drawing, drawing systems	1
4.2	Influence of drawing on structure and properties of fibres	1
4.3	Types of heat setting	1
4.4	Influencing parameters on heat setting	2
4.5	Influence of heat setting on fibre behavior	1
4.6	Influence of heat setting on dyeing	1
4.7	Spin finish composition and application	1
4.8	Evaluation methods	2
5.0	**Developments in Fiber Spinning**	
5.1	Liquid crystal spinning;	01
5.2	Gel spinning,	01
5.3	Electro spinning	01
5.4	Profile fibres, hollow and porous fibres	01
5.5	Specialty fibres -poly glycolic acid preparation properties and application	02
5.6	Specialty fibres -polylactic acid preparation properties and applications	02
5.7	Specialty fibres -chitosan fibres preparation properties and applications	02

Course Designers

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60 TT E 13	Textured Yarn Technology

Category	L	T	P	Credit
PE	3	0	0	3

Objectives

- To impart knowledge on heat setting and mechanism of texturing.
- To understand the different methods of texturing
- To impart the knowledge on characteristics and various end uses of texturing
- To explain the concepts of different textured yarns

Prerequisite

60 TT 302 – Yarn Manufacturing Technology I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the raw materials required for texturing and explain basic principles and methods of texturing.	Analyze
CO2	Infer the factors involved and mechanism of heat setting, discuss the fiber morphology and yarn properties during heat setting.	Understand
CO3	Interpret about the twisting device ,heating ,cooling and take-up systems of false twist texturing and discuss about characteristics of feed yarns and process parameter like time and temperature	Understand
CO4	Relate the air jet texturing yarn production, express airflow pattern in different types of nozzles, loop formation mechanism and analyze the evaluation of air-jet textured yarn.	Remember
CO5	Examine the working procedure of stuffer box, edge crimping, and knit-de-knit, gear crimping, bicomponent filament texturing and differential shrinkage texturing.	Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1										3	3	1
CO2	3	2	1										3	3	1
CO3	2	1	1										3	3	1
CO4	2	2	2										3	3	1
CO5	2	2	2										3	3	1
3- Strong;2-Medium;2-Low															

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K.S.Rangasamy College of Technology–Autonomous								R2022
60TTE13–Textured Yarn Technology								
Semester	Hours /Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Introduction Need for bulking of synthetic yarns; texturability of fibres, state and quality of raw material required; classifications, Basic principles and methods of texturing.	8
Heat Setting Heat setting – need, types of setting, mechanism, factors involved; effect on fibre morphology and yarn properties; evaluation of heat setting processes; fundamentals of thermo-mechanical texturing, Helanca process.	9
False Twist Texturing Draw texturing - simultaneous and sequential draw texturing; twisting devices; heating and cooling systems; Positorque System take-up systems; characteristics of feed yarns; process parameters-time, temperature, twist, tension; evaluation of false twist. Textured yarns; end-uses.	9
Air Jet Texturing Types of yarns produced; airflow pattern in different types of nozzles; loop formation mechanism, factors involved;evaluation of air-jet textured yarn; comparison of air-jet textured yarn with spun and false twist textured yarns; end uses.	10
Other Methods of Yarn Texturing Stuffer box, edge crimping, knit-de-knit and gear crimping methods; bi-component filament texturing; differential shrinkage texturing; chemo - mechanical texturing; limitations and applications	9
Total hours	**45**

Text Book(s):

1	Hes L. Ursiny P., “Yarn Texturing Technology”, Eurotex, U.K., 1994.
2	Behery H.M. and Demir A., “Synthetic Filament Yarn Texturing Technology”, Prentice Hall, 1996 ISBN 0134400259.,

Reference Book(s):

1.	Guirajani M.L. (Edr.), “Annual Symposium of Texturing”, I.I.T Delhi, 1977
2.	Wilson D.K. and Kollu T., “Production of Textured Yarns by the False Twist Technique”, Textile Progress, Vol. 21,No.3, Textile Institute, Manchester, U.K., 1991.
3.	Gupta V.B. (Edr.), “Winter School on Man-made Fibers – Production, Processing, Structure, Properties and Applications”, Vol. 1, 1988.
4.	J.W.S. Hearle, L.Hollick, D.K.Wilson, “Yarn Texturing Technology”, Wood head, 2001, ISBN 0849313104, 9780849313103.

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Course Content and Lecture Schedule

S.No.	Topic	No. of hours
1.0	**Introduction**	
1.1	Introduction of Texturising	1
1.2	Texturability of fibres	1
1.3	State and quality of raw material required	1
1.4	Classification of Texturising	1
1.5	Basic Principles of Texturising	1
1.6	Need for bulking of synthetic yarns	1
1.7	Methods of Texturising	1
1.8	Properties of fibres required for Texturising	1
2.0	**Heat Setting**	
2.1	Definitions- Heat Setting and its need	1
2.2	Types of Heat setting	1
2.3	Mechanism of heat setting	1
2.4	Factors Involved in heat setting	1
2.5	Effect of fibre morphology	1
2.6	Yarn properties	1
2.7	Evaluation of heat setting processes	1
2.8	Fundamentals of thermo-mechanical texturing	1
2.9	Helanca Process	1
3.0	**False Twist Texturing**	
3.1	Draw texturing – Definition	1
3.2	Draw texturing - simultaneous draw texturing	1
3.3	Draw texturing – Sequentional draw texturing	1
3.4	Twisting devices; heating and cooling systems	1
3.5	Take systems	1
3.4	Characteristics of feed yarns; process parameters-time, temperature, twist, tension; evaluation of false twist . Textured yarns; end-uses.	2
3.5	Process parameters-time, temperature	1
3.6	Twist, tension.	2
3.7	Evaluation of false twist	1
3.8	Textured yarns ,End Uses	1
4.0	**Air Jet Yarn Texturising**	
4.1	Types of yarns produced	1
4.2	Airflow pattern in different types of nozzles	2
4.3	Loop Formation Mechanism	1
4.4	Factors involved in loop formation	1
4.5	Evaluation of air jet textured yarn	1

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4.6	Comparison of air jet textured yarn with spun yarn	2
4.7	False twist textured yarn and its end uses.	2
5.0	**Other Methods of Yarn Texturing**	
5.1	Stuffer box texturising	1
5.2	Edge crimping	1
5.3	Bear crimping methods	1
5.4	Bi-component filament texturing	1
5.5	Differential shrinkage texturing	1
5.6	Chemo - mechanical texturing	2
5.7	Limitations and applications	1

Course Designers

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Category	L	T	P	Credit

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60TTE14	Process Control in Spinning

PE	3	0	0	3

Objective

1. To make the student to be conversant with following studies of process and quality control in spinning and the scope of process control and applicable relevant statistical tools
2. To know raw material inspection, in process inspection and final lot inspection along with process capability index, the contamination levels in cotton, measurement techniques and contamination clearers in Blow room/Auto coner clearers
3. To know the control of saleable and usable waste generation and to the systems to enhance raw material conservation (YR-Yarn realisation) and to achieve consistent yarn quality and higher productivity
4. To select suitable raw material and machinery sequence for the manufacturing of the yarn and fabrics with required quality and end use performance characteristics
5. To understand the end use performance characteristics of different type of customers like knitters/weavers/processors/value added yarn manufacturers and outline of parameters for the satisfactory performance of various intermediate processes involved in spinning.
6. To know `how to build quality into the product', 'cost of quality', how to conduct `process audit` and `quality audits`` in a Spinning mill

Prerequisite

60 TT 302 - Yarn Manufacturing -I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Understand the process control know how, key process variables that affect the spinning process and concepts of statistical approaches in Process control of spinning.	Understand
CO2	Develop the knowledge and skills for controlling raw material quality, analyzing fiber characteristics, predicting spinnability and yarn quality, minimizing irregularities, and implementing online monitoring and performance evaluation in the spinning process.	Analysis
CO3	Understand the knowledge and skills for controlling yarn realization, estimating and minimizing yarn waste, optimizing cleaning efficiency, evaluating comber waste, and implementing measures to control hard waste and improve contamination clearing efficiency in the spinning process.	Understand
CO4	Analyse the assessing and controlling yarn quality, including count variations, unevenness, imperfections, hairiness, faults, variability in strength, elongation, and hairiness, as well as conducting simulation studies for end-use performance assessment.	Analyse
CO5	Understand the optimizing factors affecting productivity in ring spinning, including spindle point production standards, productivity indices, methods for maximizing production, the effect of machinery maintenance and humidity on production, and machinery balancing.	Understand

Mapping with Programme Outcomes

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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1										3	2	
CO2	3	2	1			2					1		3	2	
CO3	2	1	1			2					2		2	2	
CO4	2	2	1			2					1		2	2	
CO5	2	2	1			2					1		2	2	

K.S.Rangasamy College of Technology – Autonomous						**R2022**	
60TTE14-Process Control in Spinning							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
IV	3	0	0	45	3	40	60	100

Unit – 1 Process Control Concept and Statistical Application Scope of process control in spinning - Identification of process variables and product characteristics to control process in the Cotton godown, blow room, card, draw frame, comber, speed frame and yarn spinning - Concepts of developing norms and standards for spinning process. Application of statistical techniques in process and quality control. Use of HVI and AFIS for process control operation.	9
Unit – 2 Control of Raw Material Quality including contaminations, Quality control of mixing quality through fibre quality characteristics – Concept of fibre quality index and its application – Prediction of spinnability and yarn quality – Blending irregularity;- fibre rupture analysis- Causes of nep and hook generation –.nep removal in carding and combing machines. Online monitoring and control of neps and hooks on modern cards; Measurement of neps and hooks, performance evaluation parameters for each department	9
Unit -3 Control of Yarn Realization and Waste Estimation of yarn realization – Determination of trash content and cleaning efficiency, cleaning intensity in blow room and carding – Determination of comber noil and combing efficiency – Control of waste in blow room, Contamination clearing efficiency. carding and comber - Control of hard waste.	9
Unit - 4 Yarn Quality Control Assessment of within and between bobbin count variations, Assessment and control of count variations in preparatory machines and ring frame –Assessment of yarn unevenness and imperfections - causes for unevenness and imperfections- analysis and interpretation spectrograms – unevenness caused by random fibre arrangement – Drafting waves – Periodic variation. Yarn hairiness and Compact yarn quality, Yarn faults – classification – assessment of faults – causes and methods to reduce faults. Causes for variability in strength, elongation and hairiness and measures for their control, Simulation studies for end use performance assessment	9
Unit -5 Production Control Factors affecting the productivity in ring spinning,Spindle point production standards, Productivity indices like Utilisation.Production efficiency,HOK etc,. Methods for maximizing production in spinning machinery – New concepts like individual spindle monitoring systems,. Effect of Machinery maintenance and Humidity on production; balancing of machineries.	9
Total Hours	**45**

TextBook(s):

1. Garde.A.R.&SubramaniamT.A.,“ProcessControlinSpinning”,ATIRA,Ahmedabad1989.
2. RatnamT.V.&Chellamani.K.P.,“QualityControlinSpinning”,SITRACoimbatore

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2.	A.Kanthimathinathan,"Manufacturing Excellence in Spinning mills``
Reference(s):	
1.	ChattopadhyayR.,"AdvancesinTechnologyofYarnProduction",NCUTEPublication,NewDelhi,2002.
2.	LordP.R,"YarnProduction;Science,Technology,andEconomics",TheTextileInstitute,Manchester,1999.
3.	Furter.R.,"StrengthandElongationTestingofSingleandPlyYarns",&"EvenessTestinginYarnProduction", (PartII),TheTextileInstitute,Manchester,U.K.,1985.
4.	Furter.R.,"EvenessTestinginYarnProduction",(PartII),TheTextileInstitute,Manchester,U.K.,1982

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Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	Unit 1	
1.1	Process Control Concept and Statistical Application Scope of process control in spinning	2
1.2	Identification of process variables	1
1.3	Identification of process variables and product characteristics to control process in the blow room, card,	1
1.4	Identification of process variables	1
1.5	Identification of process variables and product characteristics to control process in speed frame and yarn spinning	1
1.6	Concepts of developing norms and standards for spinning process.	1
1.7	Application of statistical techniques in process and quality control.	1
1.8	Use of HVI and AFIS for process control operation.	
2.0	**Unit – 2**	
2.1	Control of Raw Material Quality including contaminations, Quality control of mixing quality through fibre quality characteristics	1
2.2	Concept of fibre quality index and its application – Prediction of spinnability and yarn quality	2
2.3	Blending irregularity;- fibre rupture analysis	1
2.4	Causes of nep and hook generation –.nep removal in carding and combing machines.	1
2.5	Online monitoring and control of neps and hooks on modern cards;	2
2.6	Measurement of neps and hooks, performance evaluation parameters for each department	2
3.0	**Unit 3**	
3.1	Control of Yarn Realization and Waste Estimation of yarn realization	1
3.2	Determination of trash content and cleaning efficiency, cleaning intensity in blow room	1
3.3	Determination of trash content and cleaning efficiency, cleaning intensity in carding	1
3.4	Determination of comber noil and combing efficiency	1
3.5	Control of waste in blow room	1
3.6	Contamination clearing efficiency	1
3.7	Carding and comber	1
3.8	Control of hard waste	1
4.0	**Unit 4**	
4.1	Yarn quality control assessment of within and between bobbin count variations	1
4.2	Assessment and control of count variations in preparatory machines and ring frame	1
4.3	Assessment of yarn unevenness and imperfections - causes for unevenness and imperfections- Analysis and interpretation spectrograms	1
4.4	Unevenness caused by random fibre arrangement – drafting waves – periodic variation.	1
4.5	Yarn hairiness and compact yarn quality,	1
4.6	Yarn faults – classification – assessment of faults – causes and methods to reduce faults.	1
4.7	Causes for variability in strength, elongation and	1

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4.8	Hairiness and measures for their control	1
4.9	Simulation studies for end use performance assessment	1
5.0	Unit 5	
5.1	Production Control Factors affecting the productivity in ring spinning	1
5.2	Spindle point production standards, Productivity indices like Utilisation	1
5.3	Production efficiency ,HOK	1
5.4	Methods for maximizing production in spinning machinery	2
5.5	New concepts like individual spindle monitoring systems,	2
5.6	Effect of Machinery maintenance and Humidity on production & Balancing of machineries	2

Course Designer

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60 TT E 15	Home Textiles

Category	L	T	P	Credit
PE	3	0	0	3

Objectives

- To acquire knowledge on recent developments in furnishing and other home textile products.
- To analyze textiles based products used in home textiles.
- To acquire knowledge on various flammability requirements of home textiles.
- To acquire knowledge on recent developments in floor covering home textile products.
- To know the various designs / styles of bed linen classification, types of mattresses and mattresses covers

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Describe different types fabrics, finishes and surface ornamentation on home textiles.	Understand
CO2	Compare different furnishings and analyzing factors influencing in the selection of home furnishings for different products	Analyze
CO3	Discuss the type sand end uses of different floor coverings and analyze the types and factors influencing of different floor coverings.	Understand
CO4	Describe the types of doors, windows and their choice of fabrics used in curtains and draperies	Understand
CO5	Evaluate the properties of home textiles and describe the home decoration articles and bed linens	Understand

Mapping with Programme Outcomes

60 TT E 15 - Home Textiles														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3									2			3	2	
CO2	3	2								2			3	2	
CO3	3	2								2			3	2	
CO4	3									2			3	2	
CO5	3	3	3	3	3					2			3	2	

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60 TT E 15 - Home Textiles								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Introduction Introduction to home textiles; definition and classification of home textiles, Furnishing materials - woven, non-woven and knitted; different types of fibres used for home textile; eco-friendly home textiles; Special finishes and surface ornamentation on home textile products; Indian home textiles industry and its future prospects.	9
Furnishings Types of furnishings used for different interiors- living room, dining room, kitchen, bed room, bathroom and kids room. Home decorations- sofa covers, cushion, cushion cover, upholsteries, wall hangings, bolster, bolster covers and throws;Factors influencing the selection of home furnishings for different interiors; Requirements of furnishing for different interiors, role of fabrics in interior furnishing.	9
Floor Coverings Soft floor covering; Types of floor covering -carpet, rugs, pads and carpet cushion; Fibres used; salient of features of carpet, rugs, cushions and pads ; Factors influencing the selection of different floor covering and its maintenance, recent developments.	9
Curtains and Draperies Different types of doors and windows used; Curtains and draperies- types and choice of fabrics, calculating the material required for curtains, construction of curtains for different types of windows and doors; Method of finishing draperies; Developments in tucks, pleats, uses of drapery rods, hooks, tape rings and pins.	9
Linens Bed linens- classification and types of mattresses and mattresses covers; quilt, quilt cover, bed spreads, blankets, comforts and comfort covers, pads, pillows ; Properties required for hotel and hospital linens; recent developments. Testing of home textile-abrasion, antimicrobial, flammability, shrinkage and color fastness.	9
	Total Hours: 45

Text Book(S) :

1. Alexander. N. G., “Designing Interior Environment”, Mas Court Brace Covanorich, New York, 2001
2. Wingate IB &Mohlen J.F. “Soft Furnishings”. Prentice Hall Inc, New York, 2000

Reference(S) :

1. Donserkery K. G., “Interior Decoration in India”, D. B. Taraporevala Sons and Co. Pvt Ltd., 1993
2. Robert Harding, “Curtains, Blinds and Valances”, Egatemoss, Ohio, 1998
3. Brian D Coleman, “Luxurious Home Interiors”, Gibbs Smith Publication, Hong Kong, 2004
4. Wingate IB &Mohlen J.F. “Textile Fabrics and Their Selection,” Prentice Hall Inc, New York, 2000

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Course Contents and Lecture Schedule

S.No.	Topic	No. of hours
1.0	**Introduction**	
1.1	Introduction to home textiles	1
1.2	definition and classification of home textiles	1
1.3	Furnishing materials - woven, non-woven and knitted	1
1.4	different types of fibres used for home textile	2
1.5	eco-friendly home textiles	1
1.6	Special finishes and surface ornamentation on home textile products	2
1.7	Indian home textiles industry and its future prospects	1
2.0	**Furnishings**	
2.1	Types of furnishings used for different interiors- living room, dining room kitchen, bed room, bathroom and kids room	3
2.2	Home decorations- sofa covers, cushion, cushion cover, upholsteries, wall hangings, bolster, bolster covers and throws	2
2.3	Factors influencing the selection of home furnishings for different interiors	2
2.4	Requirements of furnishing for different interiors, role of fabrics in interior furnishing.	2
3.0	**Floor Coverings**	
3.1	Soft floor covering Types of floor covering -carpet, rugs, pads and carpet cushion	2
3.2	Fibres used	2
3.3	Salient of features of carpet,rugs, cushions and pads	2
3.4	Factors influencing the selection of different floor covering and its maintenance, recent developments.	3
4.0	**Curtains and Draperies**	
4.1	Different types of doors and windows used	1
4.2	Curtains and draperies- types and choice of fabrics	2
4.3	Calculating the materialrequired for curtains	1
4.4	Construction of curtains for different types of windows and doors	2
4.5	Method of finishing draperies	1
4.6	Developments in tucks, pleats, uses of drapery rods, hooks, tape rings and pins	2
5.0	**Linens**	
5.1	Bed linens- classification and types of mattresses and mattresses covers	2
5.2	quilt, quilt cover, bed spreads, blankets, comfortsand comfort covers, pads, pillows	2
5.3	Properties required for hotel and hospital linens	1
5.4	recent developments	2
5.5	Testing of home textile-abrasion, antimicrobial, flammability, shrinkage and color fastness	2

Course Designers

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60 TT E 16	SILK TECHNOLOGY

Category	L	T	P	Credit
PE	3	0	0	3

Objectives

To gain knowledge in silk preparation and its machineries.

- To correlate the theoretical importance of silk, silk rearing and silk reeling.

Prerequisite

60 TT 201- Fibre Science

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Know the sericulture and silk industry and cultivation and grading of silk.	Remember
CO2	Express the classification and varieties of mulberry and non-mulberry silks	Understand
CO3	Explain the principle of silk worm rearing and various methods of silk worm rearing.	Apply
CO4	Explain the silk reeling and machineries used for silk reeling.	Remember
CO5	Describe the silk throwing, winding, doubling, twisting and grading of silk	Understand

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1		2					1	2	2	3	3	1
CO2	3	1	1	2	2							2	3	3	1
CO3	3	3	2	2	2							2	3	3	1
CO4	3	3	2	1	2							2	3	3	1
CO5	3	3	1	1	2							2	3	3	1

3- Strong; 2-Medium; 1-Some

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60 TT E 16 - Silk Technology								
	Hours / Week			Total hrs	Credit	Maximum Marks		
Elective	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Introduction Geographical distribution, cultivation & grading of silk fibre; Introduction to sericulture and silk industry; Classification & varieties of mulberry & non mulberry silk; Species – multivoltine, bivoltine and univoltine species; Scope for non-mulberry silk in India.	9
Silk Rearing General principles of silk worms rearing; Environmental conditions for silk worm rearing; various methods; Precautions during rearing; Rearing equipment and their maintenance; Silk worm seed production and activities in a grainage house.	9
Cocoon Cocoon quality; Stifling and conditioning of cocoons, boiling and brushing of cocoons; Different types of cocoons; Importance of cocoon quality; Pretreatment of cocoons; Factors influencing quality of cocoon; Cocoon characteristics; Storage of cocoons; Cocoon sorting.	9
Silk Reeling and Throwing Cocoon cooking – objectives, various methods cooking; Silk reeling - systems of silk reeling, factors influencing silk reeling, silk reeling machinery; Re-reeling, skein finishing & packing; Recent developments in reeling of silk; Wild silk reeling; Throwing – objectives, winding, doubling, re-winding and twisting; Manufacture of yarns for use in ordinary, chiffon, crepe, georgette fabrics; Recent developments in silk throwing machinery.	9
Quality Control and Testing of Silk Quality Control in Reeling: Characteristics of water, Raw silk testing & grading – National & International methods of testing & grading of raw silk, shell ratio, assessment of reelability. Application and end uses of silk. Different types blended fabric, modal, union fabric and spun silk. Market potential and demand of silk fibre, furnishing cloth, silk needs, Branded product in silk,varities of banaras silk .	9
Total hours	**45**

Textbook(s):

1.	Sonwalker T.A., “Handbook of silk technology”, Wiley Eastern, Chennai, 1992
2.	Shekar P. and Ardingham, “Sericulture and silk production – A hand book”, Intermediate Technology, U.K., 1995.

Reference(s):

1.	“Manuals on Sericulture”, Food and agriculture organisation of the United Nations, Rome, 1976
2.	Nanavathy M., “Silk production, processing and marketing”, Wiley Eastern, 1991.

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction**	
1.1	Geographical distribution	1
1.2	Cultivation & grading of silk fibre	1
1.3	Introduction to sericulture and silk industry	2
1.4	Classification & varieties of mulberry & non mulberry silk	2
1.5	Species – multivoltine, bivoltine and univoltine species	2

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1.6	Scope for non-mulberry silk in India	1
2.0	**Silk Rearing**	
2.1	General principles of silk worms rearing	1
2.2	Environmental conditions for silk worm rearing	1
2.3	Various methods of silk worm rearing	2
2.4	Precautions during rearing	1
2.5	Rearing equipment and their maintenance	2
2.6	Silk worm seed production and activities in a grainage house	2
3.0	**Cocoon**	
3.1	Cocoon quality	1
3.2	Stifling and conditioning of cocoons	1
3.3	Boiling and brushing of cocoons	1
3.4	Different types of cocoons	1
3.5	Importance of cocoon quality & Pretreatment of cocoons	2
3.6	Factors influencing quality of cocoon	1
3.7	Cocoon characteristics	1
3.8	Storage of cocoons; Cocoon sorting	1
3.9	**Silk Reeling and Throwing**	
4.0	Cocoon cooking – objectives, various methods cooking	1
4.1	Silk reeling - systems of silk reeling, factors influencing silk reeling	1
4.2	Silk reeling machinery	2
4.3	Re-reeling, skein finishing & packing	1
4.4	Recent developments in reeling of silk; Wild silk reeling	1
4.5	Throwing – objectives, winding, doubling, re-winding and twisting	1
4.6	Manufacture of yarns for use in ordinary, chiffon, crepe, georgette fabrics	1
4.7	Recent developments in silk throwing machinery	1
4.8	**Quality Control and Testing of Silk**	
5.0	Quality Control in Reeling: Characteristics of water	1
5.1	Raw silk testing– National & International methods of testing of raw silk	2
5.2	Raw silk grading	2
5.3	Application and end uses of silk	1
5.4	Different types blended fabric, modal, union fabric and spun silk	1
5.5	Market potential and demand of silk fibre, furnishing cloth	1
5.6	Branded product in silk,varities of Banaras silk	1

Course Designers

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60 TT 4P1	Yarn Manufacturing Technology Laboratory II

Category	L	T	P	Credit
PC	0	0	4	2

Objectives

- To enable the students to learn material passage in the machine.
- To know the important parts of machines, draft, twist and production calculations in spinning machines.
- To train the students to handle machine and operate them practically.
- To make the students to know about optimum settings on various mechanism of spinning machine based on the process variables.
- To Know the production and characteristics of fancy yarns and doubled yarn

Prerequisite

Yarn Manufacturing Technology Laboratory I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Demonstrate the working of ring spinning frame and builder motion Calculate the speedand production of ring spinning frame	Analyze
CO2	Calculate the twist and set the machine variables in ring spinning frame	Understand
CO3	Calculate the twist and production of rotor spinning machine	Understand
CO4	Select optimum process variables and produce two ply yarn using two-for-one twister.and calculate the twist and production of two-for-one twister	Remember
CO5	Produce fancy yarns on fancy Doubler winder machine Set the variables and produce quality yarns using fancy doubler machine	Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1										3	3	1
CO2	3	3	1								2		3	3	1
CO3	3	3	2								3		3	3	1
CO4	3	1	2								3		3	3	1
CO5	3	1	2								2		3	3	1
3- Strong;2-Medium;2-Low															

LIST OF EXPERIMENTS

1. Passage of material through ring frame, production of yarn and testing of yarn count.
2. Different settings in ring frame and selection of rings and travellers for different counts.

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3. Calculation of Draft and production in ring frame.
4. Calculation of Twist and production in ring frame.*
5. Study of builder mechanism in ring frame.*
6. Passage of material through Rotor spinning machine.*
7. Calculation of Rotor spinning production of yarn and testing of yarn count.
8. Calculation of Twist in Rotor spinning machine.*
9. Passage of material through ring doubling machine, production of yarn and testing of yarn count. Process sequence for production of sewing threads.*
10. Passage of material through Two-For-One twister (TFO), production of ply yarn and measurement of plyyarn count. Calculation of twist in TFO.*
11. Production and quality characterization of two-fold yarns.*
12. Production of fancy yarns using fancy doublers.*
13. Passage of material through Doubler Winding, production of ply yarn and measurement of plyyarn count.

*SDG 12: Ensure sustainable consumption and production patterns

Course Designers

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT 4P2	Fabric Manufacturing Technology Laboratory

Category	L	T	P	Credit
PC	0	0	4	2

Objective(s):

- To develop skills in the operation and maintenance of weaving preparatory machines.
- To develop practical knowledge of dismantling, assembling and setting of basic weaving mechanisms.
- To prepare the pattern card for a given design.
- To develop the design using drop box mechanism.

Prerequisite

Fabric Manufacturing Technology I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Set the optimum process variables and carry out winding using supply package winding machine.	Apply
CO2	Calculate the production in winding machine	Understand
CO3	Practice dismantling, assembling and setting of primary motions.	Understand
CO4	Perform dismantling, assembling and setting of secondary motions	Understand
CO5	Perform dismantling, assembling and setting of auxiliary motions.	Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2			3			3	1	2		2	3	1
CO2	3	3	2			3			2	2	3		3	2	2
CO3	3	3	2	2		3			2	1	3		3	1	1
CO4	3	3	2	2		3			2	2	3		2	1	1
CO5	3	2	3	3		3			2	1	3		2	2	1
3- Strong; 2-Medium; 2-Low															

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List of Experiments

1. Passage of material through the cone winding machine. Setting of tensioners and slub catchers in cone winding machine. Calculation of drum speed, traverse speed, production in cone winding machine.*
2. Passage of material through the pirn winding machine. Calculation of production in pirn winding machine.
3. Passage of material through sectional warping machine.*
4. Dismantling and assembling of tappet shedding mechanism in plain power loom.*
5. Dismantling and assembling of cone over pick mechanism and study the adjustment of picking force.
6. Dismantling and assembling of cone under pick mechanism and study the adjustment of picking force.
7. Dismantling and assembling of beat –up mechanism and calculation of sley eccentricity.*
8. Dismantling and assembling of negative let-off mechanism and adjustment of warp tension.*
9. Dismantling and assembling of seven-wheel take-up mechanism and calculation of dividend.*
10. Dismantling and assembling of five-wheel take-up mechanism and calculation of dividend
11. Dismantling and assembling of weft stop motion.
12. Dismantling and assembling of warp stop motion.
13. Designing of pegging plan on wooden lags and preparation of punched card for 4x4 drop box mechanism for a given design.

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60 CG 0P3	CAREER SKILL DEVELOPMENT III

Category	L	T	P	Credit
CG	0	0	2	2

Objective

- To help learners improve their logical reasoning skills at different academic and professional contexts.
- To help learners relate basic quantitative problems and solve them.
- To help learners Infer critically the statements with optimal conclusions and assumptions.
- To Solve the quantitative problems pertaining to calculations of averages, ratio and proportions, and profit and loss effectively
- To compute quantitative problems related to time and work, speed and distance, and simple and compound interest

Prerequisite

Basic knowledge of Arithmetic and Logical Reasoning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Deduce the topics in logical reasoning at the preliminary and intermediate level.	Analyze
CO2	Relate basic quantitative problems and solve them effectively at the preliminary level	Apply
CO3	Infer critically the statements with optimal conclusions and assumptions with the data and information given.	Analyze
CO4	Solve the quantitative problems pertaining to calculations of averages, ratio and proportions, and profit and loss effectively at the pre-intermediate level.	Apply
CO5	Compute quantitative problems related to time and work, speed and distance, and simple and compound interest at intermediate level.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3		3				2	3	3	3		2
CO2	3	3	3	3		2				2	3	3	3		2
CO3	2	2	2	2		3				2	3	3	3		2
CO4	3	3	3	3		2				2	3	3	3		2
CO5	3	3	3	3		2				2	3	3	2		2

3- Strong; 2-Medium; 1-Some

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Career Skill Development III

Common to All Branches

Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	0	0	2	25	0	100	00	100

Logical Reasoning

Analogies - Alpha and numeric series - Number Series - Coding and Decoding - Blood

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Relations - Coded Relations - Order and Ranking – odd man out - Direction and distance	
Quantitative Aptitude – Part 1 Number system - Squares & cubes - Divisibility - Unit digits - Remainder Theorem - HCF & LCM - Geometric and Arithmetic progression - Surds & indices	**5**
Critical Reasoning Syllogism - Statements and Conclusions, Cause and Effect, Statements and Assumptions - identifying Strong Arguments and Weak Arguments – Cause and Action -Data sufficiency	**5**
Quantitative Aptitude – Part 2 Average - Ratio and proportion – Ages – Partnership– Percentage - Profit & loss – Discount - Mixture and Allegation	**5**
Quantitative Aptitude – Part 3 Time & Work - Pipes and cistern – Time, Speed & distance - Trains - Boats and Streams - Simple interest and Compound interest	**5**
Total Hours	**25**

Reference(s):

1.	Aggarwal, R.S. *'A Modern Approach to Verbal and Non-verbal Reasoning'*, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.
2.	Abhijit Guha, *'Quantitative Aptitude'*, McGraw Hill Education, 6th edition, 2016
3.	Dinesh Khattar, 'Quantitative Aptitude For Competitive Examinations', Pearson Education 2020
4.	Anne Thomson, *'Critical Reasoning: A Practical Introduction'* Lexicon Books, 3rd edition, 2022. Warszaw

SDG 4 – Quality Education

SDG 8 – Decent work and Economic growth

SDG 9 – Industry, innovation and Infrastructure

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Logical Reasoning**	
1.1	Analogies - Alpha and numeric series	1
1.2	Number Series - Coding and Decoding	1
1.3	Blood Relations - Coded Relations	1
1.4	Order and Ranking – odd man out	1
1.5	Direction and distance	1
2	**Quantitative Aptitude – Part 1**	

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2.1	Number system	1
2.2	Squares & cubes - Divisibility	1
2.3	Unit digits - Remainder Theorem	1
2.4	HCF & LCM- Geometric and Arithmetic progression	1
2.5	Surds & indices	1
3	**Critical Reasoning**	
3.1	Syllogism	1
3.2	Statements and Conclusions, Cause and Effect	1
3.3	Statements and Assumptions	1
3.4	identifying Strong Arguments and Weak Arguments	1
3.5	Cause and Action -Data sufficiency	1
4	**Quantitative Aptitude – Part 2**	
4.1	Average - Ratio and proportion	1
4.2	Ages – Partnership	1
4.3	Percentage	1
4.4	Profit & loss	1
4.5	Discount - Mixture and Allegation	1
5	**Quantitative Aptitude – Part 3**	
5.1	Time & Work	1
5.2	Pipes and cistern	1
5.3	Time, Speed & distance - Trains	1
5.4	Boats and Streams	1
5.5	Simple interest and Compound interest	1
	Total	**25**

Course Designer

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COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

SEMESTER V

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 TT 501	Knitting Technology	PC	4	2	0	2	3
2.	60 TT 502	Textile Chemical Processing II	PC	3	3	0	0	3
3.	60 TT 503	Woven Fabric Structure	PC	3	3	0	0	3
4.	60 TT 504	Technical Textiles I	PC	3	3	0	0	3
5.	60 TT E2*	Profession Elective II	PE	3	3	0	0	3
6.	60 TT L2*	Open Elective II	OE	3	3	0	0	3
7.	60 MY 003	Startups & Entrepreneurship	MC	2	2	0	0	0
PRACTICALS								
8.	60 TT 5P1	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
9.	60 TT 5P2	Fabric Structure Laboratory	PC	4	0	0	4	2
10.	60 CG 0P4	Career Skill Development IV	CG	2	0	0	2	0
11.	60 CG 0P6	Internship	CG	0	0	0	0	1/2/3*
				31	**19**	**04**	**12**	**22**

Internship* additional credits is offered based on the duration

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B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS
(For the candidates admitted from 2022-2023 onwards)

FIFTHTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 TT 501	Knitting Technology	2	40	60	100	45	100
2	60 TT 502	Textile Chemical Processing II	2	40	60	100	45	100
3	60 TT 503	Woven Fabric Structure	2	40	60	100	45	100
4	60 TT 504	Technical Textiles I	2	40	60	100	45	100
5	60 TT E2*	Profession Elective II	2	40	60	100	45	100
6	60 TT L2*	Open Elective II	2	40	60	100	45	100
PRACTICAL								
8	60 TT 5P1	Textile Chemical Processing Laboratory	3	60	40	100	45	100
9	60 TT 5P2	Fabric Structure Laboratory	3	60	40	100	45	100

*CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.
** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

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60 TT 501	Knitting Technology

Category	L	T	P	Credit
PE	2	0	2	3

Objectives

- To explain the mechanism of weft knitting of various knitted structures.
- To demonstrate the mechanism of warp knitting of various knitted structures.
- To impart knowledge on basic knitted structures of various knitted fabrics.
- To explain the modern development in the mechanism of various knitted fabric production.
- To impart knowledge on recent trends in knitted garment production.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the classification of weft knitting machines with its yarn quality and the terminology used in knitting.	Understand
CO2	Attribute the selection of weft knitting elements and weft knitting structures.	Analyze
CO3	Classify warp knitting and its structures.	Understand
CO4	Categorize the elements of flat knitting machines and its types.	Understand
CO5	Analyze the developments and quality control in knitting.	Understand

Mapping with Programme Outcomes

60 TT 501 – Knitting Technology														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3									2			3	2	
CO2	3	2								2			3	2	
CO3	3	2								2			3	2	
CO4	3									2			3	2	
CO5	3	3	3	3	3					2			3	2	

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60 TT 501 – Knitting Technology								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hours	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	2	0	2	60	3	40	60	100

Weft Knitting Characteristics of woven and knitted fabrics; classification of weft knitting machines; yarn quality requirements for knitting and its impact; terminology of the basic circular knitting machine, single jersey, rib, interlock and purl knitting machines – construction and knitting operation. production calculations in weft knitting*.	9
Weft Knitting elements and Structures Needle selection in weft knitting - multi-cam tracks, pattern wheels, pattern drums, programmed and punched tapes Single jersey, rib, purl and interlock structures – characteristics and their derivatives – half and full cardigan, eight locks, single pique; fundamentals of formation of knit, tuck and float stitches.	9
Warp Knitting Comparison of warp and weft knitting; Classification of warp knitting machines; preparation of yarns for warp knitting; knitting elements and working of Raschel and Tricot knitting machines, production of elementary warp knitted structures - lapping diagrams and notations. Open lap, closed lap, overlap, underlap, swinging, and shogging. Warp knit structures - chain stitch, tricot, lock knit structures, satin, blind lap and inlay. Production calculations in warp knitting	9
Flat Knitting 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*;	9
Recent developments and Quality Control in knitting Seamless garments, Fascinated garments; mechanism of socks knitting and process flow. Process control in knitting; defects in knitted fabrics- causes and remedies; dimensional stability, spirality; Fabric rejection cost and its impact on the supply.	9
Hands on Training: 1. Single jersey and derivatives, 2. Rib, interlock and derivatives 3. Purl structures 4. Socks Knitting 5. Material passage and production calculation for single jersey / rib weft knitting machine. 6. Material passage and production calculation for interlock weft knitting machine.	15
	Total Hours: 60

Text Book(S) :	
1.	Ajgaonkar. D.B., “Knitting Technology”, Universal Publication Corporation, Mumbai, 2006 (Second Edition).
2.	David J Spencer, “Knitting Technology”, Elsevier, 20-May-2014.
Reference(S) :	
1.	N. Anbumani., “Knitting fundamentals, machines, structures and developments”, New Age International (P) Ltd., Publisher, 2007.
2.	Samuel Raz., “Flat Knitting; The new generation”, Meisenbach GmbH, Bamberg, 1993.
3.	Gajjap B.J., “Handbook of warp Knitting Technology”, Textile Institute, Manchester, 2004.
4.	Maity, S., et. al., (Ed.). Advanced Knitting Technology, Woodhead Publishing, UK. 2021.
5.	Bipin Kumar, “Weft and Warp Knitting Technology”, NPTEL web course

*** SDG12: Ensure sustainable consumption and production patterns**

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Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Weft Knitting**	
1.1	Characteristics of woven and knitted fabrics	2
1.2	Classification of weft knitting machines	1
1.3	Yarn quality requirements for knitting and its impact	2
1.4	Terminology of the basic circular knitting machine, single jersey, rib, interlock and purl knitting machines	2
1.5	Construction and knitting operation. production calculations in weft knitting	1
2.0	**Weft Knitting elements and Structures**	
2.1	Needle selection in weft knitting - multi-cam tracks, pattern wheels	1
2.2	Pattern drums, programmed and punched tapes.	1
2.3	Single jersey, rib, purl and interlock structures, characteristics and their derivatives	1
2.4	Half and full cardigan, Eight locks, Single pique Structures	1
2.5	Fundamentals of formation of knit, tuck and float stitches	1
3.0	**Warp Knitting**	
3.1	Comparison of warp and weft knitting	1
3.2	Classification of warp knitting machines, Preparation of yarns for warp knitting	1
3.3	Knitting elements and working principles of Raschel and Tricot knitting machine	1
3.4	Production of elementary warp knitted structures - lapping diagrams and notations	1
3.5	Open lap, closed lap, overlap, underlap, swinging, and shogging	1
3.6	Warp knit structures - chain stitch, tricot, lock knit structures, satin, blind lap and inlay	1
3.7	Production calculations in warp knitting	1
4.0	**Flat Knitting**	
4.1	Basic principles and elements of flat knitting machines;	1
4.2	Different types of flat knitting machines- manual, mechanical	1
4.3	Different types of flat knitting machines- computer-controlled;	1
4.4	Production of various weft knitted structures using flat knitting machines	1
5.0	**Recent developments and Quality Control in knitting**	
5.1	Seamless garments, Fascinated garments	1
5.2	Mechanism of socks knitting and process flow	1
5.3	Process control in knitting; defects in knitted fabrics- causes and remedies	1
5.4	Dimensional stability, spirality	1
5.5	Fabric rejection cost and its impact on the supply.	1
	Hands On Training	
	Single jersey and derivatives,	3
	Rib, interlock and derivatives	3
	Purl structures	3
	Socks Knitting	2
	Material passage and production calculation for single jersey / rib weft knitting machine.	2
	Material passage and production calculation for interlock weft knitting machine.	2
	Total Hours	45

Course Designers

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60 TT 602	Textile Chemical Processing II

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- To impart knowledge on methods and styles of printing.
- To impart knowledge on various printing process.
- To impart knowledge on various methods of finishing.
- To impart knowledge on various functional finishing process.
- To impart knowledge on effluent treatment and ISO concepts.

Pre requisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the ingredients, methods of printing and styles of printing. Printing defects and limitations.	Understand
CO2	Describe the printing procedure of cotton, polyester, silk, wool and garment. Discuss its faults- cause & remedies.	Analyze
CO3	Explain the procedure involved in finishing of cotton materials using various machines and procedure involved in finishing of denims.	Understand
CO4	Describe the procedure involved in crease resistance, water proof, water repellent, flame proof and value added finishing.	Apply
CO5	Summarize the various treatments of textile effluents, waste disposal & solid waste reduction techniques and concepts of ISO14000 & of ISO 8000.	Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3				2					2			3	3	1
CO2	3	3	2	3						2			3	3	1
CO3	3		2							2			3	3	1
CO4	3		2							3			3	3	1
CO5	3	3	3			2	2			3		3	3	3	1
3- Strong;2-Medium;2-Low															

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K.S.Rangasamy College of Technology–Autonomous								
60TT602– Textile Chemical Processing II								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Methods and Styles of Printing Essential ingredients and properties of printing paste; Screen preparation: methods of printing-roller, screen (manual and flatbed) and rotary printing method; styles of printing-direct, discharge and resist. Modern Printing Techniques -transfer printing, foam printing; ink jet printing, UV printing, 3D printing and Laser printing.	9
Printing of Fabrics Printing of cotton fabric using direct, reactive, Natural dyes and pigment; printing of polyester with disperse dyes; printing of silk and wool with acid and basic dyes; digital printing; garment printing; printing faults- causes and remedies.	9
Finishing Introduction to finishing- objectives- mechanical and chemical finishing; durable and non-durable finishes on cotton fabrics; back filling; raising and brushing; calendaring; anti shrink finish; felt compacting; softening, Denim finishing- stone, enzyme wash; bio-polishing.	9
Special Finishes Crease resist finish; water proof and repellent finishes for cotton and synthetics; flame resistance finishes for cellulose and blends; antimicrobial finishes; softeners; finishing of knits; value added finishing of garments; Soil release finishing; Fragrance finishing.	9
Effluent Treatment** Textile effluent–textile waste water problems, textile waste water characteristics, chemicals used in textile industry; treatment of textile effluents – primary, secondary and tertiary techniques for effluent treatment; solid waste reduction and disposal; concepts of ISO 14000 and ISO 8000	9
Total Hours	**45**

TextBooks

1.	K.L.Mittal and Thomas Bhaners,“Textile Finishing: Recent development and Future Trends” ISBN 9781119426769,2017.
2.	Marie Christine Noel and Michael Cailloux, “ Printed Textile Design” Paperback publisher, 2015

References

1.	Peter J. Hauser, “Advances in Treating Textile Effluent”, InTech, October 2011
2.	W.D.Schindler, “Chemical Finishing of Textiles”, Wood Head Publishing Ltd, 2004.
3.	Padmavankar, “Textile Effluent NCUTE", IIT, Publication, 2002.
4.	Prof. Dr. rer. nat. Hans-Karl Rouette, “Encyclopedia of Textile Finishing”, Springer Verlag, 2002.

**SDG 6: Ensure availability and sustainable management of water and sanitation for all

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Course Content and Lecture Schedule

S.No.	Topic	No. of hours
1.0	**Methods and Styles of Printing**	
1.1	Essential ingredients and properties of printing paste;	1
1.2	Screen preparation techniques	1
1.3	Methods of printing- roller printing and screen printing (manual and flatbed)	1
1.4	Methods of printing- rotary printing method	1
1.5	Styles of printing-direct styles of printing	1
1.6	Styles of printing -discharge styles of printing	1
1.7	Styles of printing -resist styles of printing	1
1.8	Modern Printing Techniques -transfer printing, foam printing and ink jet printing	1
1.9	Modern Printing Techniques - UV printing, 3D printing and Laser printing	1
2.0	**Printing of Fabrics**	
2.1	Printing of cotton fabric using direct dyes	1
2.2	Printing of cotton fabric using reactive and Natural dyes	1
2.3	Printing of cotton fabric using pigment	1
2.4	Printing of polyester with disperse dyes	1
2.5	Printing of silk with acid and basic dyes	1
2.6	Printing of wool with acid and basic dyes	1
2.7	Digital printing	1
2.8	Garment printing	1
2.9	Printing faults- causes and remedies	1
3.0	**Finishing**	
3.1	Introduction to finishing	1
3.2	Objectives of mechanical and chemical finishing	1
3.3	Durable and non-durable finishes on cotton fabrics	1
3.4	Back filling; raising and brushing	1
3.5	Calendaring and anti-shrink finishing	1
3.6	Felt compacting	1
3.7	Softening	1
3.8	Denim finishing- stone washing	1
3.9	Enzyme wash and bio-polishing	1
4.0	**Special Finishes**	
4.1	Crease resist finish	1
4.2	Water proof and repellent finishes for cotton and synthetics	1
4.3	Flame resistance finishes for cellulosic and blends	1
4.4	Antimicrobial finishes	1

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4.5	Softeners	1
4.6	Finishing of knits	1
4.7	Value added finishing of garments	1
4.8	Soil release finishing	1
4.9	Fragrance finishing	1
5.0	**Effluent Treatment**	
5.1	Textile effluent–textile waste water problems	1
5.2	Textile waste water characteristics	1
5.3	Chemicals used in textile industry	1
5.4	Treatment of textile effluents – primary techniques for effluent treatment	1
5.5	Treatment of textile effluents- secondary techniques for effluent treatment	1
5.6	Treatment of textile effluents- tertiary techniques for effluent treatment	1
5.7	Solid waste reduction	1
5.8	Solid waste disposal	1
5.9	Concepts of ISO 14000 and ISO 8000	1
	Total Hours	**45**

Course Designer

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT 503	Woven Fabric Structure

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- Teaching the foundational principles of woven fabric design and how they influence fabric characteristics
- Instructing on various weaves and production techniques
- Providing insight into color theory and its application in woven fabrics
- Exploring concepts related to pile and multi-layer fabrics
- Disseminating knowledge on advanced fabric structures

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Elaborate on the components of fabric structure and basic weaving patterns.	Understand
CO2	Provide insights into the loom specifications for special weaves and color theory, while examining the interplay of color and weave effects.	Remember
CO3	Discuss the loom prerequisites and applications of additional thread figuring, while scrutinizing backed fabrics and the concept of Bedford cords.	Understand
CO4	Evaluate the design principles behind pile fabrics, multilayer fabrics, and double cloths.	Remember
CO5	Examine advanced weave structures and their corresponding loom requirements.	Understand

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	3	2				2		3	2	3	2	2
CO2	3	2	3	3	2		2				2	2	2	2	2
CO3	3	3	3	2	2		2	2			2	2	2	3	1
CO4	3	3	2	3	2		2	2	2		2	3	2	3	1
CO5	3	3	2	3	2					2	2	3	2	3	1
			3- Strong; 2-Medium; 2-Low												

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

K.S. Rangasamy College of Technology– Autonomous								
60 TT 503 – Woven Fabric Structure								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Elements of Simple Structure * Elements of fabric structure and the devices used for analyzing the fabrics; elementary weaves — plain weave and its derivatives, twill weave and its derivatives, twill and twist interaction, twill angle; satin, sateen weaves and their derivatives; methods of representation on point paper; different types of drafts; loom requirements for producing primary weaves.	9
Special Weaves and Colour Theory ** Design, characteristics, loom requirements and uses of special weaves – ordinary honey comb, brighton honey comb, huck –a – back and its modifications, mock leno, crepe weaves; colour theory – light and pigment theory, modification of colours, application of colours, colour and weave effects.	9
Compound Structure * Design, characteristics, loom requirements and uses of extra warp, extra weft figuring and backed fabrics; extra warp and extra weft figuring with single and two colours; backed fabrics, bed ford cords, plain faced, twill faced and wadded bed ford cords; welts, piques and wadded piques.	9
Pile Fabrics and Multi-Layer Fabrics *** Design, characteristics, loom requirements and uses of pile fabrics and multilayer fabrics –Warp pile: wire pile, fast wire pile. Weft Pile: plain back, twill back velveteen; Double cloths-classification, types of stitches, wadded double cloth, warp and weft wadded double cloth, centre stitched warp and weft way double cloth; multi-layer fabrics.	9
Advanced Structures ** Design, characteristics, loom requirements and uses of advanced structures – damask, brocades, tapestry, gauze and leno weaves, types of sheds, doup wire, easer bar motion and jumper motion; Russian cords – net leno.	9
Total hours	**45**

Text Books

1.	Grosicki Z.J, “Advanced Textile Design” - Textile Institute, Universal book publisher ltd, Mumbai 2007.
2.	Grosicki Z. J., “Watson’s Textile Design and Colour”, Vol.1, Woodhead Publications, Cambridge, England, 2004

References

1.	B.K.Behra and P.K.Hari, “Woven Textile Structure (Theory and Application), Woodhead Publishing Limited, 2010.
2.	Grosicki Z J, “Advanced Textile Design and Color” – Butterworths London, 2004.
3.	Seyam A. M., “Structural Design of Woven Fabrics, Theory and Practice”, Textile Institute, Manchester, 2002.

*SDG 9: Industry, Innovation, and Infrastructure, **SDG 12: Responsible Consumption and Production, ***SDG 8: Decent Work and Economic Growth

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Elements of Simple Structure**	
1.1	Introduction of weave structure	1
1.2	Plain weave and its derivatives	1
1.3	Warp rib, weft rib and Matt rib	1
1.4	Twill weave and its derivatives	2
1.5	Pointed , Herring bone and Broken twill	1
1.6	Satin & Sateen Weaves , Types	2
1.7	Types of Draft	1
2.0	**Special Weaves and Colour Theory**	
2.1	Loom requirements and uses of special weaves	1
2.2	Honey comb weaves and its types	1
2.3	Brighton honey comb	1
2.4	Huck –a – back and its modifications	1
2.5	Mock leno weaves	1
2.6	Crepe weaves & types	1
2.7	Colour theory – light and pigment theory	1
2.8	Modificationof colours,	1
2.9	Application of colours, colour and weave effects	1
3.0	**Compound Structure**	
3.1	Introduction of extra warp, extra weft	1
3.2	Methods of producing extra warp and weft	1
3.3	Extra warp with single and two colours	1
3.4	Extra weft f with single and two colours	1
3.5	Principles of backed fabric	1
3.6	Bed ford cords - Plain faced	1
3.7	Twill faced and wadded bed ford cords	1
3.8	Welts, piques and wadded piques	2
4.0	**Pile Fabrics and Multi-Layer Fabrics**	
4.1	Pile fabrics – Warp pile and wire pile	1
4.2	Terry weaves - stripe and check	1
4.3	Double cloths and its classification	1
4.4	Types of stitches	1
4.5	Wadded double cloth	1
4.6	Warp and weft wadded double cloth	1
4.7	Centre stitched warp and weft way double cloth	2
4.8	Multi-layer fabrics	1
5.0	**Advanced Structures**	
5.1	Loom requirements and uses of advanced structures	1
5.2	Damask and Brocades design	1
5.3	Tapestry and gauze	1
5.4	Leno weaves	1
5.5	types of sheds and Doup wire	2
5.6	Easer bar motion and jumper motion	1
5.7	Russian cords structure	1
5.8	Net leno structure	1
	Total Hours	**45**

Course Designers Mr. M.Arunkumar -arunkumar@ksrct.ac.in

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT 504	Technical Textiles I

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- To share information about different fibers utilized in industrial textiles.
- To provide insights into the realm of medical textiles.
- To gain a foundational understanding of geotextiles.
- To convey knowledge about protective textiles.
- To explore the diverse applications of textiles in the field of transportation.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Summarize the categorization of technical textiles with the fibers, yarns, and fabric varieties employed in technical textiles	Understand
CO2	Explain the role of textile materials in the medical textiles product development.	Understand
CO3	Categorize the essential properties for fabric components utilized and applications of Geo textiles.	Analyze
CO4	Define the functions and diverse criteria for protective textiles.	Remember
CO5	Outline the functions and various requirements of transportation textiles.	Understand

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	1	3			1		1			3	3	2
CO2	3	2	3	1	2								3	3	2
CO3	3	2	3	1	2		1				1		3	3	2
CO4	2	2	2		2								3	3	2
CO5	3	2	2		2	1							3	3	2
3- Strong; 2-Medium; 2-Low															

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BoS Chairman

K.S. Rangasamy College of Technology– Autonomous								
60 TT 504 – Technical Textiles I								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Introduction, Fibres & Structures* Introduction: Technical Textiles: Definition and scope of technical textiles, Global and Indian Scenario,Classification of technical textiles. Fibres used in Technical textiles, Technical yarns: staple yarns,monofilament, multifilament yarns. Technical fabrics: knitted, woven, nonwoven and braided structures.	9
Medical Textiles** Medical Textiles: Introduction, Materials used & its requirements. Classification of Medical textiles - Textiles for implantations, Non- implantations textiles, Extra-corporeal devices, Healthcare & Hygiene Products.	9
Geo Textiles*** Geo Textiles: introduction to geo textile, Geo synthetics, Fibres and its selection for Geo textiles, Functions of Geo textiles, Engineering properties of Geo textiles, Geo textile structure, Applications for natural Geo textiles.	9
Protective Textiles** Protective Textiles: Introduction, Selection of protective clothing materials, fibres and fabrics for Protective Textiles, Textiles for environmental protection; Thermal insulation materials; Biological and chemical warfare protection, nuclear protective fabrics	9
Transportation textiles* Textiles in Transportation, Textiles in road vehicles: car seat, air bag, seat belt, filters, carpets Belts, Tyre cords and hoses. Textiles in Rail applications, Textiles in aircraft and marine applications	9
Total hours	**45**

Text Books

1.	A.R.Horrocks& S.C. Anand (Edrs.), “Handbook of Technical Textiles”, The Textile Institute, Manchester, U.K.,WoodheadPublishing Ltd., Cambridge, England, 2000.
2.	E.Willusz, “Military Textiles”, Woodhead Publishing Ltd, 2008.
3.	Richard. A.Scott, “Textiles for Protection”, CRC press, Woodhead Publication, USA, 2005.

References

1.	N.W.M. John, “Geotextiles”, Blackie, London, ISBN: 0-216-91995-9, 1987.
2.	S. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennsylvania, ISBN:1-56676-340-1, 1995.
3.	S. Anand, “Medical Textiles”, Text. Inst., 1996, ISBN: 185573317X.
4.	T.Matsuo, “Fiber materials for Advanced Technical Textiles”, CRC publication, 2008.

***SDG: 9 Industry, Innovation and Infrastructure**

**** SDG: 3 Good Health and Well Being**

***** SDG: 15 Life on Land**

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction, Fibres& Structures**	
1.1	Introduction: Technical Textiles	1
1.2	Definition and scope of technical textiles	1
1.3	Global and Indian Scenario	1
1.4	Classification of technical textiles	1
1.5	Fibres used in Technical textiles	1
1.6	Technical yarns: staple yarns,monofilament, multifilament yarns	2
1.7	Technical fabrics: knitted, woven, nonwoven and braided structures	2
2.0	**Medical Textiles**	
2.1	Medical Textiles-Introduction,	1
2.2	Materials used & its requirements.	1
2.3	Classification of Medical textiles	2
2.4	Textiles for implantations	1
2.5	Non- implantations textiles	1
2.6	Extra-corporeal devices	1
2.7	Healthcare & Hygiene Products	2
3.0	**Geo Textiles**	
3.1	Geo Textiles: Introduction to geo textile	1
3.2	Geo synthetics	2
3.3	Fibres and its selection for Geo textiles	1
3.4	Functions of Geo textiles,	2
3.5	Engineering properties of Geo textiles	1
3.6	Geo textile structure	1
3.7	Applications for natural Geo textiles	1
4.0	**Protective Textiles**	
4.1	Protective Textiles: Introduction,	1
4.2	Selection of protective clothing materials,	1
4.3	Fibres and fabrics for Protective Textiles	2
4.4	Textiles for environmental protection;	1
4.5	Thermal insulation materials	1
4.6	Biological and chemical warfare protection	2
4.7	Nuclear protective fabrics	1
5.0	**Transportation textiles**	
5.1	Textiles in Transportation,	1
5.2	Textiles in road vehicles car seat and air bag	1
5.3	Textiles in road vehicles seat belt and filters	1
5.4	Textiles in road vehicles carpets and belts,	1
5.5	Tyre cords and hoses.	2
5.6	Textiles in Rail applications,	1
5.7	Textiles in aircraft applications	1
5.8	Textiles in marine applications	1
	Total Hours	**45**

Course Designers Mrs.C.Premalatha: premalatha@ksrct.ac.in

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT E21	Theory of Textile Structures	Category	L	T	P	Credit
		OE	3	0	0	3

Objectives

- To enable the students to learn about the basic knowledge of yarn geometry.
- To impart the fundamental knowledge about fibre migration.
- To enable the students to learn about basic mechanics of staple fibre and filament yarns.
- To impart the fundamental knowledge on geometry of fabric structure.
- To enable the students to learn about geometry of knitted and non-woven fabrics

Prerequisite

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the geometry of twisted yarn and concept of packing of fibers in yarn	Understand
CO2	Explain the mechanism of yarn migration and twisting.	Understand
CO3	Discuss the tensile behavior and concept of fiber slippage and its effect.	Understand
CO4	Explain the geometry of fabric during deformation on shear and drape.	Understand
CO5	Discuss the geometry and mechanics of knitted and non-woven structures	Understand

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	1			1	1	1	1	3	2	1
CO2	2	2	1	1	2	1			1	1	1		3	2	1
CO3	2	2			2	1	1	1	1	2	1		3	2	1
CO4	3	2		1	2	1	1	1	1	2	1	1	3	2	1
CO5	2	2	1	1	2	1	1	1	1	2	1	1	3	2	1
3- Strong; 2-Medium; 1-Some															

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

K.S. Rangasamy College of Technology – Autonomous							R 2022
60 TT E21 – Theory of Textile Structures							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	40	60	100

Yarn Geometry Basic geometry of twisted yarn; Idealized helical yarn structure; Yarn count & twist factor; Twist contraction; Limits of twist; Packing of fibres in yarn - idealized packing, packing in yarns, specific volume of yarns; Relation between twist, diameter and twist angle.	9
Fibre Migration Ideal migration; Characterization of migration behavior; Migration in spun rayon yarns; Mechanism of migration; Form of yarn twisting: Cylindrical and ribbon twisting.	9
Mechanics of Filament / Staple Fibre Yarns Filament Yarn: Analysis of tensile behavior; Analysis for large extension; Prediction of breakage; Analysis of yarn mechanics by energy method; Observed extension and breakage of continuous filament yarns. Staple fibre yarn: Theoretical analysis of yarn geometry; Stress-strain distribution in yarn; Fibre obliquity and slippage; Influence of fibre length, fineness and friction on fibre slippage and yarn strength.	9
Geometry of Fabric Structure Geometry of Pierce, Olofson and Hamalton"s models; cover factor; crimp interchange; Modification to Pierce model - race track, saw tooth and bilinear models; Application of cloth geometry; Geometrical solution during extension of cloths; Load - extension modulus; Concept of maximum weavability in woven fabrics; Deformation on shear and drape of fabrics.	9
Geometry of Knitted Fabrics and Non Wovens* Geometry of plain knitted structures and complex knitted structures; Mechanics of knitted fabrics- warp wise load extension, biaxial stress behavior, weft wise extension. Geometry of non-woven fabrics.	9
Total hours	**45**

Textbook(s):

1.	J.W.S.Hearle, P.Grosberg, and S.Backer, "Structural Mechanics of Fibres, Yarns and fabrics", Willre Interscience, New york, 1969.
2.	B.C. Goswami, J. Martindale and Scandio, "Textile Yarns: Technology, Structure and Application",Wiley-Interscience, New York, 1977

Reference(s):

1.	Peirce F T and Womersley J R, "Cloth Geometry", reprint, The Textile Institute, Manchester 1978.
2.	Clifton G.Overholser, "Theory of Textile Structure", Random Publications, 2013.
3.	B K Behera and P K Hari, "Woven Textile Structure - Theory and Applications", Wood head Publishing Ltd., 2010.
4.	Jinlian Hu, "Structure and Mechanics of Woven Fabrics", Wood head Publishing Ltd., 2004.

*** SDG: 12: Ensure sustainable consumption and production patterns**

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Yarn Geometry**	
1.1	**Basic geometry of twisted yarn**	1
1.2	Idealized helical yarn structure	1
1.3	Yarn count & twist factor,	1
1.4	Twist contraction and twist limits.	1
1.5	Packing of fibres in yarn - idealized packing	1
1.6	Packing in yarns, Specific volume of yarns	2
1.7	Relation between twist, diameter and twist angle	2
2.0	**Fibre Migration**	
2.1	Ideal migration	1
2.2	Characterization of migration behavior	2
2.3	Migration in spun rayon yarns	1
2.4	Mechanism of migration	2
2.5	Form of yarn twisting	1
2.6	Cylindrical and ribbon twisting.	2
3.0	**Mechanics of Filament / Staple Fibre Yarns**	
3.1	Analysis of tensile behavior	1
3.2	Prediction of breakage	1
3.3	Analysis of yarn mechanics by energy method	1
3.4	Observed extension and breakage of continuous filament yarns.	1
3.5	Theoretical analysis of staple yarn geometry	1
3.6	Stress – strain distribution in yarn	1
3.7	Fibre obliquity and slippage	1
3.8	Influence of fibre length, fineness and friction on fibre slippage and yarn strength.	2
4.0	**Geometry of Fabric Structure**	
4.1	Geometry of Pierce, Olofson and Hamalton"s models	1
4.2	Cover factor and crimp interchange	1
4.3	Modification to Pierce model - racetrack, saw tooth and bilinear models	2
4.4	Application of cloth geometry;	1
4.5	Geometrical solution during extension of fabrics; Load – extension modulus	1
4.6	Concept of maximum weavability in woven fabrics	1
4.7	Deformation on shear and drape of fabrics.	2
5.0	**Geometry of Knitted Fabrics and Non Wovens**	
5.1	Geometry of plain knitted structures	1
5.2	Geometry of complex knitted structures	1
5.3	Mechanics of knitted fabrics- warp wise load extension	2
5.4	Mechanics of knitted fabrics - biaxial stress behavior,	2
5.5	Mechanics of knitted fabrics - weft wise extension	2
5.6	Geometry of non-woven fabrics.	1
	Total Hours	**45**

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Designer

A.S. Subburaayasaran

60 TT E 22	Process Control in Weaving and Chemical Processing

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- Conveying expertise in process control for winding.
- Disseminating knowledge on process control in warping and sizing
- Transmitting insights into process control within the weaving stage.
- Providing understanding of process control in preparatory processes.
- Offering insights into process control in dyeing, printing, and finishing.

Prerequisite

- Yarn Manufacturing Technology II
- Textile Chemical Processing I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	State the process control in warp and weft winding.	Understand
CO2	Describe the process control of warping and sizing	Remember
CO3	Explain the control of loom shed, loss of efficiency by snap reading and hard waste control.	Understand
CO4	Organize process control measures in preparatory process.	Understand
CO5	Develop process control measures in dyeing, printing and finishing process.	Remember

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2							2	3	2	3	2	
CO2	3	2	2							2	3	2	3	1	
CO3	3	2	2							2	3	3	2	2	
CO4	3	2	2							2	3	3	2	2	
CO5	3	2	2							2	3	3	3	1	
3- Strong; 2-Medium; 2-Low															

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

K.S. Rangasamy College of Technology– Autonomous								
60 TT E 22 - Process Control In Weaving and Chemical Processing								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	40	60	100

Process control in winding* Scope and approach of process control in warp winding - control of quality of knot, producing good packages, control of efficiency of fault removal, process parameters, performance in winding; Process control in pirn winding-Scope and approach, Minimizing end breaks, stoppages due to mechanical failures.	9
Process control in warping and sizing** Scope and approach of process control in warping and sizing- minimizing end breaks in warping, performance, quality and productivity in warping; Choice of size recipe and size pick-up, preparation of size recipe, control of size pick-up, control of yarn stretch and moisture in sized yarns, quality of sized beams, control of productivity and size losses.	9
Process control in weaving** Scope and approach of process control in weaving- control of loom speed and loom efficiency, control of loss of efficiency by snap reading, loom performance, quality of yarn and loom allocation; Fabric defects, causes, control measures. Inspection standard, cloth realization. Online and off-line process control; Cost control in weaving.	9
Process control in Wet processing (Preparatory Process)*** Process control in Preparatory Process- Grey Inspection of Fabrics, Process control measures in desizing, scouring, bleaching and mercerization; Important functions of a control laboratory in a modern process house. Quality evaluation of preparatory processed material.	9
Process control in Dyeing , Printing and Finishing*** Process control measures in dyeing, printing and finishing - Process control in dyeing of various materials; Process control in various printing methods; Process control in various finishing methods.	9
Total hours	**45**

Text Books

1.	AbihijitMajumdar, Apurba Das, Algarsamy.R and Kothari.V.K, "Process manufacring", Woodhead Publishing Ltd, New Delhi, 2013.
2.	Thilagavathi.G and Karthi.T "Process control and yarn quality in Spinning" Woodhead Publishing,2015.

References

1.	Stanley Bernard Brahams, "The Fundamentals of Quality Assurance in the Textile Industry" Hardcoverpublisher, 2016
2.	Georgi Damyanov and Diana Germanova-Krasteva, **"**Textile Processes: Quality Control and Design ofExperiments" Hard cover publisher, 2013.
3.	Chemical Processing Tablet, "Process and Quality Control in Chemical Processing" – Textile Association of India publication, 1984.

***SDG 9: Industry, Innovation, and Infrastructure**

****SDG 12: Responsible Consumption and Production**

***** **SDG 14 - Life below Water**

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Process control in winding**	
1.1	Introduction of process control in winding	1
1.2	Scope and approach of process control in warp winding	1
1.3	Control of quality of knot	1
1.4	Control of efficiency of fault removal	1
1.5	Performance in winding	1
1.6	Process control in pirn winding	1
1.7	Minimizing end breaks	1
1.8	Stoppages due to mechanical failures	2
2.0	**Process control in warping and sizing**	
2.1	Introduction of process control in warping & sizing	1
2.2	Minimizing end breaks in warping, performance	1
2.3	Quality and productivity in warping	1
2.4	Size recipe and size pick- up	1
2.5	Preparation of size recipe	1
2.6	Control of yarn stretch and moisture in sized yarns	2
2.7	Quality of sized beams	1
2.8	Control of productivity and size losses	1
3.0	**Process control in weaving**	
3.1	Introduction of process control in weaving	1
3.2	Control of loom speed and loom efficiency	1
3.3	Control of loss of efficiency	1
3.4	Loom performance, quality of yarn and loom allocation	1
3.5	Fabric defects, causes, control measures	1
3.6	Inspection standard and cloth realization	1
3.7	Online and off-line process control	1
3.8	Cost control in weaving	2
4.0	**Process control in wet processing (Preparatory Process)**	
4.1	Process control in Preparatory Process	1
4.2	Inspection of grey fabrics	1
4.3	Process control measures in desizing and scouring	1
4.4	Process control measures in scouring	1
4.5	Process control measures in bleaching	1
4.6	Process control measures in mercerization	1
4.7	Functions of control laboratory in modern process house	2
4.8	Quality evaluation of preparatory process	1
5.0	**Process control in Dyeing , Printing and Finishing**	
5.1	Introduction of process control in wet process	1
5.2	Process control measures in dyeing	1
5.3	Process control measures in printing	2
5.4	Process control measures in finishing	1
5.5	Process control in dyeing of various materials	2
5.6	Process control in various printing methods	1
5.7	Process control in various finishing methods	1
	Total Hours	**45**

Course Designers Mr. M.Arunkumar – arunkumar@ksrct.ac.in

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT E23	Protective Textile

Category	L	T	P	Credit
P	3	0	0	3

Objective

- To provide an overview about the material selection, design and standard for protective textiles.
- To taught the various hazards and treatment methods to vanquish the hazards
- To educate the scope and functions of intelligent textiles in protective applications.
- To inculcated the construction of various protective garments.
- To enlighten the requirement for defense application and to evaluate the protective garment.

Course Outcomes

On the successful completion of the course, students will be able to

- Exceeded safety standards, establishing new industry benchmarks through critical analysis.
- Pioneered user-centric protective textiles using innovative, problem-solving approaches.
- Engineered hazard-specific textiles through comprehensive threat analysis.
- Customized textiles for diverse sectors, demonstrating adaptive, needs-focused thinking.
- Enhanced textile performance continuously, utilizing reflective assessment strategies.

Mapping with Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	2	1	1	1	2	2	2	3	2	3	2
2	2	2	3	2	3	1	1	1	2	3	2	2	3	2	1
3	3	3	3	3	2	1	2	1	2	2	3	2	3	3	1
4	2	2	2	2	2	2	2	2	3	3	3	2	2	3	2
5	2	2	2	3	3	1	1	2	2	3	2	3	2	2	1

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		End Sem Examination(Marks)
	1	2	
Remember (Re)	10	10	20
Understand (Un)	20	20	40
Apply (Ap)	30	30	40
Create (Cr)	0	0	0

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BoS Chairman

K. S. Rangasamy College of Technology – Autonomous R2022								
60 TT E 23 Protective Textiles								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	50	50	100

Materials, Standards and Design for Protective Textiles* Introduction, Definition, Classification, Materials and technologies, Fibres and Fabrics for protective textiles. Steps in the selection of protective clothing materials. Requirements, International standards, Certification. Design - Factors influencing the design development process, Clothing systems and functionality, Harmonize fashion and function.	9
Hazards &Surface treatments for protective textiles* Introduction, Types of hazards, Mechanical hazards - Ballistic and knife protection, Blunt impact protection. Chemical and biological hazards. Electrical and radiation hazards Environmental and fire hazards, Surface treatment – Types, pre treatments for protective textiles, Different finishes for protective textiles, Fundamental & Modern treatment process.	9
Intelligent textiles and Protection against UV, Thermal, Ballistic & other hazards** Smart textiles, Application of smart textiles for protective purposes, Sensor function, Data processing, Actuators, Energy, Communication, Electric actuation. Textiles for UV protection, Textiles for protection against cold, Thermal (heat and fire) protection, Ballistic protection, Microorganism protection, Textiles for respiratory protection, Electrostatic protection.	9
Protection against Civilian, Chemical and biological protection & defense*** Classification of chemical protective clothing, Garment types, materials, design features and sizing, Garment material chemical resistance testing, Chemical protective clothing integrity performance & properties. Protective clothing for Firefighters and Protection for workers in the oil and gas industries Introduction, General requirements for military protective textiles, Camouflage, concealment and deception, NBC protection.	9
Evaluation of Protective Textiles****** Standards and test method for protective fabric performance – flame retardant finishes, liquid repellent finishes, antistatic, liquid repellent, antibacterial, UV protection, mite protection; manikins-thermal manikins, segmented thermal manikins; evaporative resistance measurement-moisture permeability index, skin model; concept of dynamic manikins; permeation resistance test-index of penetration and index of repellency; liquid tight integrity and gas tight integrity.	9
Total Hours	**45**

Text Book(s):	
1.	Shahid ul-Islam, Abhijit Majumdar, Bhupendra Butola,In The Textile Institute Book Series,Advances in Healthcare and Protective Textiles,Woodhead Publishing,2023,ISBN 9780323911887
2.	F. Wang and C. Gao., “Protective Clothing Managing Thermal Stress” Woodhead Publishing Series in Textiles,2014.
Reference(s):	
1.	ASTM Standards on Protective Clothing Textbook Solutions
2.	Shahid Ul Islam, Bhupendra Singh Butola, **Advances in Functional and Protective Textiles,** 1st Edition - June 11, 2020: ISBN: 9780128202579, The Textile Institute Publisher.
3.	Krister Forsberg, Ann Van den Borre, Norman Henry, III, James P. Zeigler, Quick Selection Guide to Chemical Protective Clothing, 6th Edition, Wiley, June 2014.
4.	T.Matsuo, “Fiber materials for Advanced Technical Textiles”, CRC publication, 2008.

*** SDG:03 Ensure healthy lives and promote well-being for all at all age**

****SDG:09 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**

*****SDG:15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**

******SDG: 04 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

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Course Contents and Lecture Schedule

Unit	Specific Topic	No. of Hours
Unit 1: Introduction to Protective Textiles & Design and Functionality of Protective Textiles		
1.1	Overview, Definition, and Classification	1
1.2	Materials and Technologies in Protective Textiles	1
1.3	Fibers and Fabrics for Protective Textiles	1
1.4	Steps in the Selection of Protective Clothing Materials	1
1.5	Requirements and International Standards for Protective Textiles	1
1.6	Certification Processes for Protective Textiles	1
1.1	Factors Influencing Design Development	1
1.2	Clothing Systems and Functionality	1
1.3	Harmonizing Fashion and Function in Protective Textiles	1
1.4	Design Considerations for Different Protective Needs	1
Unit 2: Hazards and Surface Treatments		
2.1	Introduction to Types of Hazards	1
2.2	Mechanical Hazards: Ballistic and Knife Protection	1
2.3	Blunt Impact Protection	1
2.4	Chemical and Biological Hazards	1
2.5	Electrical and Radiation Hazards	1
2.6	Environmental and Fire Hazards	1
2.7	Surface Treatments: Types and Applications	1
2.8	Pre-treatments and Finishing Processes for Protective Textiles	1
Unit 3: Intelligent Textiles and Specific Hazard Protection		
3.1	Introduction to Smart Textiles	1
3.2	Applications of Smart Textiles in Protection	1
3.3	Textiles for UV Protection	1
3.4	Textiles for Thermal (Heat and Fire) Protection	1
3.5	Textiles for Ballistic Protection	1
3.6	Protection against Cold: Materials and Designs	1
3.7	Microorganism Protection and Respiratory Protective Textiles	2
Unit 4: Protective Textiles in Specific Sectors		
4.1	Chemical Protective Clothing: Classification and Design	1
.2	Garment Material Chemical Resistance Testing	1
4.3	Protective Clothing for Firefighters	1
4.4	Protection for Workers in the Oil and Gas Industries	1
4.5	Military Protective Textiles: Requirements and Camouflage	1
4.6	NBC (Nuclear, Biological, Chemical) Protection	1
Unit 5: Evaluation of Protective Textiles		
5.1	Standards and Test Methods for Protective Fabric Performance	1
5.2	Evaluation Techniques: Manikins, Skin Models, Permeation Tests	

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5.3	Liquid Tight Integrity and Gas Tight Integrity Tests	1
5.4	Evaluating Flame Retardant and Liquid Repellent Finishes	1
5.5	Testing for Antistatic, Antibacterial, and UV Protection Properties	1
Additional Units		
Review and Recap	Review of Topics, Recap, and Q&A Sessions	1
Exam Preparation	Focused Examination Preparation Sessions	1
Student Presentations	Presentations on Student-selected Topics	1
Course Closure	Final Review, Feedback, and Course Wrap-up	11
	Total Hours	**45**

Designers

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BoS Chairman

Passed in BoS Meeting held on 11/05/2023
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60 TT E24	Medical Textiles

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- To explain key concepts associated with healthcare textiles.
- To explore manufacturing techniques employed in the production of diverse implantable medical textile products.
- To impart knowledge on the characteristics and varied applications of non-implantable and extracorporeal medical textile products.
- To develop an understanding of the materials utilized in wound dressing and their respective applications.
- To impart knowledge on smart medical textiles and legal issues in medical textiles.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the concepts related to healthcare textiles.	Understand
CO2	Interpret techniques involved in the production of various implantable medical textile products.	Understand
CO3	Develop knowledge on the characteristics and uses of non-implantable and extracorporeal medical textile products.	Apply
CO4	Define the materials used in wound dressing	Remember
CO5	Explain the concepts related to smart medical textiles.	Understand

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2										3	3
CO2	3	2												3	3
CO3	3	3												3	3
CO4	3	3		2										3	3
CO5	3	3		2										3	3
3- Strong; 2-Medium; 2-Low															

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K.S. Rangasamy College of Technology– Autonomous								
60 TT E24 – Medical Textiles								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Health Care Textiles * Classification of medical textiles, current market scenario in international and national level – government initiatives. Operating room garments- personal health care and hygiene products and their testing methods; applications of non-woven in medicine; textiles in infection prevention control.	9
Implantable Textiles * Implantable textiles: hernia mesh – vascular prostheses – stents. Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.	9
Non-Implantable And Extra Corporeal Textiles * Bandages-types, properties and applications; compression garments-types, properties and applications; sutures: types and properties; Extra corporeal materials: Cartilage nerves – liver ligaments, kidney, tendons, cornea; Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications.	9
Wound Dressing Materials** 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.	9
Smart Medical Textiles And Legal Issues Smart textiles – types, characteristics – smart textiles in wound care; applications of phase change and shape memory materials –mobile health monitoring; electronics in medical textiles; Smart textiles in rehabilitation and applications. Legal and ethical values involved in the medical textile materials.	9
Total hours	**45**

Text Books

1.	Rajendran.S, “Advanced Textiles for Wound Care”, Wood Head publishing in Textiles:Number 85, 2009.
2.	Bartel.V.T, “Handbook of medical textiles”, Wood Head publishing, 2011.
3.	Van Langenhove, “Smart textiles for medicine and health care – materials, systems and applications”, Wood Head publishing, 2007.
4.	Ray smith, “Biodegradable polymers for industrial application”, CRC press, 2005

References

1.	Buddy D.Ratner and Allan S. Hoffman, “Biomaterials science – An introduction tomaterials in medicine”, Academic press, 1996.
2.	Pourdegtimi.B, “Vascular grafts: Textile structures and their performance”, Textileprogress, vol. 15, No. 3, the Textile Institute, 1986.
3.	Cusick. GE and Teresa Hopkins, “Absorbent incontinence products”, the TextileInstitute, 1990.
4.	Kothari.V.K. “Progress in textiles: Technology developments and applications”,volume 3, IAFL Publications, 2008.

*****SDG: 3 Good Health and Well Being

**SDG: Responsible Consumption and Production

Course Content and Lecture Schedule

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S. No.	Topic	No. of hours
1.0	**Health Care Textiles**	
1.1	Classification of medical textiles	1
1.2	Current market scenario in international and national level	1
1.3	Government initiatives	1
1.4	Operating room garments	2
1.5	Personal health care and hygiene products	1
1.6	Testing methods	1
1.7	Applications of non-woven in medicine	1
1.8	Textiles in infection prevention control	1
2.0	**Implantable Textiles**	
2.1	Implantable textiles-Hernia mesh	1
2.2	Vascular prostheses	1
2.3	Stents	1
2.4	Tissue engineering	1
2.5	Properties and materials of scaffolds	1
2.6	Relationship between textile architecture and cell behavior	2
2.7	Applications of textile scaffolds in tissue engineering	2
3.0	**Non-Implantable And Extra Corporeal Textiles**	
3.1	Bandages-types	1
3.2	Properties and applications	1
3.3	Compression garments types, properties and applications	1
3.4	Sutures: types and properties	1
3.5	Extra corporeal materials cartilage nerves – liver ligaments	1
3.6	Kidney, tendons, cornea	1
3.7	Drug delivery textiles	1
3.8	Classification – mechanism various fabrication methods	1
3.9	Characterization – applications	1
4.0	**Wound Dressing Materials**	
4.1	Wound: types and healing mechanism	1
4.2	Textile materials for wound dressing	1
4.3	Bio active dressing	1
4.4	Anti-microbial textiles dressing -composite dressing	1
4.5	Testing of wound care materials	1
4.6	Woundcompression textiles	1
4.7	Reusable medical textiles: types, advantages	1
4.8	Physical properties and performance	1
4.9	Reusable processing methods	1

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5.0	**Smart Medical Textiles And Legal Issues**	
5.1	Smart textiles – types, characteristics	1
5.2	Smart textiles in wound care;	1
5.3	Applications of phase change materials	1
5.4	Shape memory materials	1
5.5	Mobile health monitoring;	2
5.6	Electronics in medical textiles;	1
5.7	Smart textiles in rehabilitation and applications.	1
5.8	Legal and ethical values involved in the medical textile materials	1
	Total Hours	**45**

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Passed in BoS Meeting held on 11/05/2023
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60 TT E 25	Apparel Marketing and Merchandising

Category	L	T	P	Credit
BS	3	0	0	3

Objectives

- To impart the knowledge of apparel marketing.
- To impart the knowledge of apparel marketing strategy
- To impart the knowledge of apparel merchandising.
- To impart the knowledge of process flow in merchandising
- To impart the knowledge of sourcing.

Prerequisite
Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Comprehend the basic functions of apparel marketing, concepts of marketing and buying behaviour.	Understand
CO2	Understand the marketing strategy, new product development and various types of advertising.	Remember
CO3	Discuss the roles & responsibilities of a merchandiser and purpose of visual merchandising	Understand
CO4	Practice the process flow in merchandising and prepare the time and action calendar.	Remember
CO5	Discuss the need for sourcing, material resource planning and sourcing strategies.	Apply

Mapping with ProgrammeOutcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2		1	3	2		3	3			3	2	
CO2	2	3	2			3	3		3	1			3	2	
CO3	2	1	3	2	1	3	3		3	1		1	3	2	
CO4	3		3	3		3	3		3	1		1	3	2	
CO5	2		3	3		3	3		3	1		1	3	2	
3- Strong; 2-Medium; 2-Low															

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K.S. Rangasamy College of Technology– Autonomous								
60 TT E 25 - Apparel Marketing and Merchandising								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	40	60	100

Apparel Marketing Introduction, Meaning, nature, functions, importance, marketing environment - Definitions of Marketing, Concept of Marketing - Marketing Mix - Segmentation, Targeting ,Positioning - Analysis of consumer markets and buyer behaviour - Product Mix, Product Life Cycle.	9
Marketing Strategy New Product Development - Pricing objectives & Pricing methods - Distribution Channels: Types, Levels, Development - Promotion Mix - Marketing channels, retailing and its types , wholesaling - Domestic and international markets, E- Marketing - Advertising - types of advertising.	9
Apparel Merchandising Merchandising - definition, functions of merchandising division- roles and responsibilities of a merchandiser, quality of a merchandiser, importance of lead time and implications of lead time, visual merchandising–definition, objectives, purpose of visual merchandising.	9
Process flow in Merchandising * Tech Pack-Importance and contents of Tech pack, merchandiser's perspective of tech pack. Sampling: Importance of sampling, different forms of sampling. Approvals- Types of approvals. Pre-Production meeting, Production scheduling- Time and Action calendar, Fabric and trims consumption.	9
Sourcing Sourcing: Definition, need for sourcing, method of sourcing;; Manufacturing resources planning (MRP); Sourcing strategies- Overseas sourcing. Supply chain and demand chain analysis- Materials management for quick response	9
Total hours	**45**

Text Books	
1.	Philip Kotler, Kelvin Lane Keller, Abraham Koshy and MithileshwarJ ha, "Marketing Management a South Asian Perspective" Pearson Education India, 2006.
2.	John Donnellan "Merchandise Buying and Management", Farichild Publications, inc., New York ,2002.

References	
1.	Gilbert, " Retail Marketing Management" Pearson India, 2014
2.	Dr. V.R. Sampath, Garment Marketing and Merchandising, Published by Kalaiselvi Pathippakam.
3.	Virginia Grose, Basics Fashion Management 01: Fashion Merchandising, AVA publiser,switerland, 2011
4.	Fashion Merchandising: Principles and practice by James Clark, published by Palgrave Macmillan, 2014.

***SDG 12 : ENSURE SUSTAINABLE CONSUMPTION AND PRODUCTION PATTERNS**

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Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Apparel Marketing**	
1.1	Introduction, Meaning, nature, functions	2
1.2	**I**mportance, marketing environment, Product Mix, Product Life Cycle	2
1.3	Definitions of Marketing, Concept of Marketing - Marketing Mix	2
1.4	Segmentation, Targeting ,Positioning	1
1.5	Analysis of consumer markets and buyer behavior	2
2.0	**Marketing Strategy**	
2.1	New Product Development - Pricing objectives & Pricing methods	2
2.2	Distribution Channels: Types, Levels, Development	1
2.3	Promotion Mix - Marketing channels	1
2.4	Retailing and its types , Wholesaling and its types	2
2.5	Domestic and International Marketing, E - marketing	2
2.6	Advertising - types of advertising	1
3.0	**Apparel Merchandising**	
3.1	Merchandising - definition, functions of merchandising division	1
3.2	Roles and responsibilities of a merchandiser, quality of a merchandiser	2
3.3	Importance of lead time and implications of lead time	2
3.4	Visual merchandising definition, objectives	2
3.5	Purpose of visual merchandising	2
4.0	**Process flow in Merchandising**	
4.1	Tech Pack-Importance and contents of Tech pack, merchandiser's perspective of tech pack.	2
4.2	Sampling: Importance of sampling, different forms of sampling	2
4.3	Approvals- Types of approvals	1
4.4	Pre-Production meeting, Production scheduling	2
4.5	Time and Action calendar	1
4.6	Fabric and trims consumption.	1
5.0	**Sourcing**	
5.1	Sourcing: Definition, need for sourcing, method of sourcing	2
5.2	Manufacturing resources planning (MRP)	2
5.3	Sourcing strategies- Overseas sourcing.	2
5.4	Supply chain and demand chain analysis-	2
5.5	Materials management for quick response	1
	Total Hours	45

Course Designers

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60 TT E 26	Fashion Design and Pattern Making

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- Understand the Foundations of Fashion Design
- Analyze Fashion Movements and Designer Roles
- Gain proficiency in color theory and color schemes
- Develop skills in Designer boards and portfolio presentation
- Comprehend the objectives, nature, and structure of the apparel industry

Prerequisite

Basic knowledge on different types of fabrics

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Mastery of Design Elements and Principles	Remember
CO2	Understand the stages of the fashion cycle , structure of market and types of designers	Understand
CO3	Develop Skills in Fashion Rendering using various mediums	Application
CO4	Acquire Fashion Design and Development Techniques	Understand
CO5	Acquire general knowledge about the textile and garment manufacturing industry	Remember

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1		1	2			2	2	2	1	3	2	2
CO2	2	2	1		1	2			2	2	2	2	3	2	2
CO3	3	2	2		2	2	2		3	2	2	3	3	2	2
CO4	3	2	2		3	2	3		3	3	2	3	3	2	2
CO5	2	2	2		1	2			1	1	2	1	3	2	2
3- Strong; 2-Medium; 2-Low															

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BoS Chairman

K.S. Rangasamy College of Technology– Autonomous								
60 TT E 26 Fashion Design and Pattern Making								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Classification of fashion;style, classic, fad, fashion trend and fashion forecasting; philosophy of design – structural and decorative design; elements of design – silhouette, line, color, pattern and texture; principle of design – proportion, balance, unity, rhythm and emphasis	9
Fashion Movement and Types of Designers Fashion cycle - stages of fashion cycle; motives for consumer buying; factors influencing fashion movement; recurring fashion; structure of fashion market- haute couture, designer wear and street fashion; role of designer; types of designers; sources of inspiration for designers; theories of fashion adoption-trickle up, trickle down and trickle across theories.	9
Fashion Colour Rendering Color theory, Psychological primary colors & secondary colors, Different types of color schemes. Color rendering - water colors, color pencils, oil pastels and acrylics. Features of painted Artefacts. Elements and principles of design in Art and sculpture	9
Design and Development Designer boards - Mood board, fabric board, colour board, accessory board. Fashion illustration – head theories, Illustration techniques – strokes, hatching, shading; Colouring techniques – Medias for colouring. Portfolio presentation – styles of presentation - Fashion shows.	9
Organization of the Apparel Business Objectives; Nature of apparel-timing of product change, quality, price; structure of apparel industry –types of contractors, retailing, business concepts, apparel trade association; General information about textile & garment manufacturing industry in India.	9
Total hours	**45**

Text Books

1.	Amaden-Crawford, C. “A Guide to Fashion Sewing- with studio”. Bloomsbury Academic, USA, 2016
2.	Munslow, Janine, McKelvey, Kathryn “Fashion Design Process Innovation and Practice”, 2nd Edition, wiley, 2012.
1.	Jelka Gersak, “Design of Clothing Manufacturing Processes” , Elsevier Science & Technology, 2016
2.	Kathryn McKelvey “Fashion Source Book” Balckwell Publishing, New Delhi, 2012
3.	Jane Mills and Janet K.Smith “Design Concepts” Fairchild Publications, New York.2013

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Classification of fashion**	
1.1	Definition of fashion, Classification of fashion-style, classic, fad	1
1.2	fashion trend and fashion forecasting	1
1.3	philosophy of design	1
1.4	structural and decorative design	2
1.5	elements of design – silhouette, line, color, pattern and texture	1
1.6	principle of design	2
1.7	proportion, balance, unity, rhythm and emphasis.	1
2.0	**Fashion Movement and Types of Designers**	
2.1	Fashion cycle - stages of fashion cycle	1
2.2	motives for consumer buying; factors influencing fashion movement	1
2.3	recurring fashion; structure of fashion market- haute couture	1
2.4	designer wear and street fashion	2
2.5	role of designer; types of designers	1
2.6	sources of inspiration for designers	1
2.7	theories of fashion adoption-trickle up	1
2.8	trickle down and trickle across theories.	1
3.0	**Fashion Colour Rendering**	
3.1	Color theory, Psychological primary colors & secondary colors	2
3.2	Different types of color schemes	1
3.3	Color rendering - water colors, color pencils, oil pastels and acrylics	2
3.4	Features of painted Artefacts	2
3.5	Elements and principles of design in Art and sculpture	2
4.0	**Design and Development**	
4.1	Designer boards - Mood board, fabric board, colour board, accessory board	1
4.2	Fashion illustration – head theories	1
4.3	Illustration techniques – strokes, hatching, shading	1
4.4	Colouring techniques – Medias for colouring	1
4.5	Portfolio presentation	2
4.6	styles of presentation	1
4.7	Fashion shows	2
5.0	**Organization of the Apparel Business**	
5.1	Objectives; Nature of apparel-timing of product change, quality, price	2
5.2	structure of apparel industry	1
5.3	types of contractors, retailing, business concepts	2
5.4	apparel trade association	2
5.5	General information about textile & garment manufacturing industry in India.	2
	Total Hours	45

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT L01	Fibre Science and Technology

Category	L	T	P	Credit
BS	3	0	0	3

Objective(s)

- To impart knowledge on the basic textile terms.
- To impart knowledge on the production of natural, fibres.
- To impart knowledge on the production of synthetic and regenerated fibres.
- To impart knowledge on applications and properties of natural and synthetic fibres.
- To impart knowledge on applications and properties of regenerated cellulosic fibres.

Prerequisite
Nil

Course Outcomes
On the successful completion of the course, students will be able to

CO1	Classify the textile fibres and its identification.	Understand & Analyze
CO2	Summarize the cultivation / extraction process, properties and applications of cellulosic fibres	Understand & Analyze
CO3	Explain the production, properties and applications of manmade regenerated cellulosic fibres.	Understand & Apply
CO4	Summarize the production, properties and applications of protein fibres.	Understand & Analyze
CO5	Describe the production, properties and applications of synthetic fibres.	Understand & Analyze

60 TT L01 – Fibre Science and Technology															
	PO 1	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO6**	**PO 7**	**PO8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO 3**
CO1	2	2												2	
CO2	3	1											2		
CO3	2	3													
CO4	2	3													2
CO5	2	2										1			1

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BoS Chairman

Assessment Pattern

Bloom's Category	Continuous Assessment Tests			Terminal Examination
	1	2	3	
Remember	20	20	20	20
Understand	40	40	40	40
Apply	20	20	20	20
Analyze	20	20	20	20
Evaluate	-	-	-	-
Create	-	-	-	-

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BoS Chairman

K.S. Rangasamy College of Technology – Autonomous								R 2022
60 TT L01 - Fibre Science and Technology								
Common to all Branches (Open Elective Course)								
Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	
	3	0	0	45	3	40	60	100

Introduction * Definitions–Fibre: Textile fibre, staple fibre, filament; Yarn: Spun, Continuous filament, Monofilament and Multifilament; Fabric: Woven, Knitted and Non-woven. Classification of textile fibres with examples. Essential and desirable properties of textile fibres. Standard moisture regain of common fibres. Identification of textile fibres by Microscopic test, burning test and solubility test.	**9**
Cellulosic Fibres * Cultivation, properties and applications of cotton; Extraction, properties and application of flax and jute. Study of morphological and chemical structure of natural cellulosic fibres.	**9**
Man made Regenerated Cellulosic Fibres ** Production process, properties and applications of viscose rayon, modal, lyocell and bamboo fibres; Study of morphological and chemical structure of regenerated cellulosic fibres.	**9**
Protein Fibres * Morphological structure and chemical constitution of wool and silk. Types, production process, properties and applications of wool and silk fibres.	**9**
Synthetic Fibres ** Production, properties and applications of Polyester, Nylon and Polypropylene. Study of morphological and chemical structures of synthetic fibres. Study of properties of .high performance fibres, - Kevlar,Nomex,Carbon and glass fibres.	**9**
	Total Hours: 45

Text book(s):

1.	S.P.Mishra, "A Text book of Fibre science and Technology", New Age International Publishers, New Delhi. ISBN:8122412505.
2.	H.V.Srinivasamoorthy, "Introduction to Textile Fibres", Revised Edition, Wood head Publishing India ISBN: 9385059572.

Reference(s):

1.	E.P.G.Gohl and L.D.Vilensky, "Textile Science", CBS Publishers and Distributors, New Delhi.
2.	Cook, J. Gordon, "Hand Book of Textile Fibres: Man-Made Fibres", Vol. 1 and 2, Merrow Publishing Co. Ltd.,England.
3.	Morton W.E and Hearle J.W.S, "Physical properties of textile fibres", Textile Institute, Manchester.
4.	S.Eichhorn, J.W. S. Hearle, et al.", "Handbook of Textile Fibre Structure, Volume 1" Wood head Publishing, 2009.

SDG: 15 Life on Land

****SDG: 9 Industry, Innovation and Infrastructure***

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Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction**	
1.1	Definitions–Fibre: Textile fibre, staple fibre, filament; Yarn: Spun, Continuous filament, Monofilament and Multifilament; Fabric: Woven, Knitted and Non-woven.	2
1.2	Classification of textile fibres with examples.	2
1.3	Essential and desirable properties of textile fibres	2
1.4	Standard moisture regain of common fibres	1
1.5	Identification of textile fibres by Microscopic test, burning test and solubility test.	1
2.0	**Cellulosic Fibres**	
2.1	Cultivation, properties and applications of cotton	2
2.2	Extraction, properties and application of flax	2
2.3	, Extraction, properties and application of Jute	2
2.4	Study of morphological structure of natural cellulosic fibres.	1
2.5	Study of chemical structure of natural cellulosic fibres.	1
3.0	**Man made Regenerated Cellulosic Fibres**	
3.1	Production process, properties and applications of viscose rayon fibre	2
3.2	Production process, properties and applications of modal fibre	2
3.3	Production process, properties and applications of lyocell fibre	2
3.4	Production process, properties and applications of bamboo fibre	2
3.5	Study of morphological structure of regenerated cellulosic fibres.	1
3.6	Study of chemical structure of regenerated cellulosic fibres.	1
4.0	**Protein Fibres** .	
4.1	Morphological structure of wool fibre	1
4.2	Chemical constitution of wool fibre	1
4.3	Morphological structure of silk fibre	1
4.4	Chemical constitution of silk fibre	2
4.5	Types, production process, properties and applications of wool fibres	2
4.6	Types, production process, properties and applications of silk fibres	2
5.0	**Synthetic Fibres**	
5.1	Production, properties and applications of Polyester	1
5.2	Production, properties and applications of nylon	2
5.3	Production, properties and applications of polypropylene	2
5.4	. Study of properties of kevlar,Nomex fibres ,	2
5.5	Study of properties of carbon and glass fibres ,	1
5.6	Study of morphological and chemical structures of synthetic fibres	2
	Total Hours	45

Course Designers Mr.G.Devanand : devanandg@ksrct.ac.in

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 TT L02	Basics of Textile Technology	Category	L	T	P	Credit
		OE	3	0	0	3

Objectives

- To enable the students to learn about the basics of textile fibers and yarn production.
- To enable the students to learn about the basic mechanisms involved in fabric production.
- To enable the students to learn about the basics of knitted and non-woven fabrics
- To enable the students to learn about the coloration of fabrics.
- To enable the students to learn about the basics of garment manufacturing.

Prerequisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Classify the textile fibres and explain the functioning of spinning machine	Understand
CO2	Explain the functioning of weaving machine	Understand
CO3	Summarize the non-woven and knitted fabric types and processes	Understand
CO4	Discuss the wet process sequences for various fabrics and summarize the pre-treatment processes	Understand
CO5	Elucidate the basics of garment preparatory and garment manufacturing process	Understand

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1					2	2	2	3	2	1
CO2	3	2	1	2	1					2	2	2	3	2	1
CO3	3	2	1	2	1					2	2	2	3	2	1
CO4	3	2	1	2	1					2	2	2	3	2	1
CO5	3	2	1	2	2					2	2	2	3	2	1
3- Strong; 2-Medium; 1-Some															

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

K.S. Rangasamy College of Technology – Autonomous							R 2022
60 TT L02 - Basics of Textile Technology							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	40	60	100

Basics of Fibre Science and Spinning Definition of fibre, classification of textile fibers; essential fibre properties; sequence of machineries in short staple yarn spinning from ginning to cone winding and their objectives; yarn numbering systems; essential yarn properties.	9
Basics of Woven Fabric Production Woven fabric — warp, weft, weaving, path of warp; looms — classification, handloom, power loom, automatic looms, shuttleless looms, special type of looms; preparatory machines for weaving process and their objectives; basic weaving mechanism - primary, secondary and auxiliary mechanisms; essential fabric properties.	9
Basics of Knitted and Non-Woven Fabric Production Knitting – classification, warp and weft knitting principles, properties of fabrics; nonwoven process –classification, principle, types of fabrics. End uses.	9
Basics of Chemical Processing* Objectives of the processes - singeing, de-sizing, scouring, bleaching, mercerization; dyeing - classification of dyes, methods and types of dyeing; printing - types and styles of printing.	9
Basics of Garment Manufacturing Fabric sourcing; Basic principles of pattern making and grading, marker planning, laying, cutting, sorting, sewing, finishing and packing.	9
Total hours	**45**

Textbook(s):

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" Blackwell Science, U.K., 1994, ISBN: 0632037482 / ISBN:13: 9780632037483

Reference(s):

1.	Banerjee N. N., "Weaving Mechanism", Textile Book House, ISBN: B001A1S41A, 1986.
2.	Marks R. and Robinson T. C., "Principles of Weaving", The Textile Institute, Manchester,1989, ISBN: 0900739258
3.	Oxtoby E., "Spun Yarn Technology ", Butterworth, London, 1987, ISBN: 1483129381 / ISBN: 9781483129389.
4.	Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", B.I Publishing Pvt. Ltd., New Delhi, 1994, ISBN: 0471809101 / ISBN: 9780471809104.

***SDG 6: Ensure availability and sustainable management of water and sanitation for all**

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

Course Content and Lecture Schedule

S. No.	Topic	No. ofhours
1.0	**Basics of Fibre Science and Spinning**	
1.1	Definition of fibre, classification of textile fibers	1
1.2	Essential fibre properties	1
1.3	Sequence of machineries in short staple yarn spinning	1
1.4	Ginning and Blow room process and their objectives.	1
1.5	Carding and draw frame process and their objectives	1
1.6	Comber and speed frame process and their objectives	1
1.7	Ring frame and winding process and their objectives	1
1.8	Yarn numbering systems and essential yarn properties	2
2.0	**Basics of Woven Fabric Production**	
2.1	Woven fabric — warp, weft, weaving, path of warp	1
2.2	Looms — classification, handloom, power loom,	2
2.3	Looms - automatic looms, shuttleless looms, special type of looms	2
2.4	Preparatory machines for weaving process and their objectives	1
2.5	Basic weaving mechanism - primary, secondary and auxiliary mechanisms;	2
2.6	Essential fabric properties	1
3.0	**Basics of Knitted and Non-Woven Fabric Production**	
3.1	Knitting – classification	1
3.2	Warp and weft knitting principles	2
3.3	Properties of fabrics	1
3.4	Nonwoven process – classification,	1
3.5	Principle and types of fabrics	2
3.6	Properties of non-woven fabrics	1
3.7	End uses of non – woven fabrics	1
4.0	**Basics of Chemical Processing**	
4.1	Objectives of the processes - Singeing and desizing	1
4.2	Scouring, bleaching and mercerization process	2
4.3	Dyeing - classification of dyes	1
4.4	Methods and types of dyeing	2
4.5	Printing - types of printing	2
4.6	Styles of printing	1
5.0	**Basics of Garment Manufacturing**	
5.1	Fabric sourcing	1
5.2	Basic principles of pattern making and grading	1
5.3	Marker planning and laying	1
5.4	Cutting and Sorting	2
5.5	Sewing process	2
5.6	Finishing and packing.	2
	Total Hours	45

Course Designers

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

60 MY 003	STARTUPS AND ENTREPRENEURSHIP

Category	L	T	P	Credit
MY	2	0	0	-

Objective

- To provides practical proven tools for transforming an idea into a product or service that creates value for others.
- To build a winning strategy, how to shape a unique value proposition, prepare a business plan
- To impart practical knowledge on business opportunities
- To inculcate the habit of becoming entrepreneur
- To know the financing, growth and new venture & its problems

Prerequisite

Basic knowledge of reading and writing in English.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Listen and comprehend Meaning and concept of Entrepreneurship	Understand
CO2	Identify the business opportunities and able prepare business plan	Analyze
CO3	Comprehend the process of innovation, incubation, prototyping and marketing	Understand
CO4	Executing a new venture through various financial resources	Apply
CO5	Grasp the managing growth and rewards in new venture	Understand

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	1	3	1	2	1		2	2	2	1	3
CO2	2	3	3	2	2		2	2	2		2	2	3	3	2
CO3	3	2	3	1	2				1	3	1	3	3	3	2
CO4	3	3	3	3	3	2	2	1		1	3	3	3	3	2
CO5	3	2	3	3	3			2			3	2	3	3	3
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	**Continuous Assessment Tests(Marks)**		**Case Study Report**
	1 (25 Marks)	**2 (25 Marks)**	
Remember (Re)	10	10	**50 Marks**
Apply (Ap)	20	20	
Analyse (An)	30	30	
Create (Cr)	0	0	

Passed in BoS Meeting held on 20/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman

K.S. Rangasamy College of Technology – Autonomous								R
60 MY 003 – Startups and Entrepreneurship								
Common to all								
Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	0	30	-	100	--	100

Introduction to Entrepreneurship & Entrepreneur* Meaning and concept of Entrepreneurship, the history of Entrepreneurship development, Myths of Entrepreneurship, role of Entrepreneurship in Economic Development, Agencies in Entrepreneurship Management and Future of Entrepreneurship. The Entrepreneur*:* Meaning, the skills required to be an entrepreneur, the entrepreneurial decision process, Role models, Mentors and Support system.	6
Business Opportunity Identification and Preparing a Business Plan* Business ideas, methods of generating ideas, and opportunity recognition, Idea Generation Process, Feasibility study,preparing a Business Plan: Meaning and significance of a business plan, components of a business plan.	6
Innovations** Innovation and Creativity - Introduction, Innovation in Current. Environment, Types of Innovation, School of Innovation, Analysing the Current Business Scenario, Challenges of Innovation, Steps of Innovation Management, Experimentation in Innovation Management, Participation for Innovation, Co-creation for Innovation, Proto typing to Incubation. Blue Ocean Strategy-I, Blue Ocean Strategy-II. Marketing of Innovation, Technology Innovation	6
Financing and Launching the New Venture* Importance of new venture financing, types of ownership, venture capital, types of debt securities, determining idealdebt-equity mix, and financial institutions and banks. Launching the New Venture: Choosing the legal form of new venture, protection of intellectual property, and formationof the new venture.	6
Managing Growth and Rewards in New Venture* Characteristics of high growth new ventures, strategies for growth, and building the new ventures. Managing Rewards: Exit strategies for Entrepreneurs, Mergers and Acquisition, Succession and exit strategy, managing failures– bankruptcy.	6
Total Hours	**30**

Text Book(s):	
1.	Stephen Key, “One Simple Idea for Startups and Entrepreneurs: Live Your Dreams and Create Your Own Profitable Company” 1st Edition, Tata Mc Grawhill Company, New Delhi, 2013.
2	Charles Bamford and Garry Bruton, “Entrepreneurship: The Art, Science, and Process for Success”, 2nd Edition, Tata Mc Grawhill Company, New Delhi, 2016.
Reference(s):	
1.	Philip Auerswald, “The Coming Prosperity: How Entrepreneurs Are Transforming the Global Economy”, Oxford University Press, 2012.
2.	Janet Kiholm Smith; Richard L. Smith; Richard T. Bliss, “Entrepreneurial Finance: Strategy, Valuation and Deal Structure, Stanford Economics and Finance”, 2011
3.	Edward D. Hess, “Growing an Entrepreneurial Business: Concepts and Cases”, Stanford Business Books, 2011
4.	Howard Love, “The Start-Up J Curve: The Six Steps to Entrepreneurial Success”, Book Group Press, 2011.

***SDG:8 – Decent Work and Economic Growth**
***SDG:12 – Responsible Consumption and Production**
****SDG:9 – Industry, Innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	No. of Periods
1	**Introduction to Entrepreneurship & Entrepreneur**	
1.1	Meaning and concept of Entrepreneurship, the history of Entrepreneurship development,	1
1.2	Myths of Entrepreneurship, role of Entrepreneurship in Economic Development,	1
1.3	Agencies in Entrepreneurship Management and Future of Entrepreneurship.	1
1.4	The Entrepreneur*:* Meaning, the skills required to be an entrepreneur,	1
1.5	The entrepreneurial decision process	1
1.6	Role models & Mentors and Support system.	1
2	**Business Opportunity Identification and Preparing a Business Plan**	
2.1	Business ideas, methods of generating ideas	1
2.2	Opportunity recognition	1
2.3	Idea Generation Process	1
2.4	Feasibility study	1
2.5	Preparing a Business Plan	1
2.6	Meaning and significance of a business plan & Components of a business plan	1
3	**Innovations**	
3.1	Innovation and Creativity - Introduction, Innovation in Current. Environment	1
3.2	Types of Innovation, School of Innovation,Analyzing the Current Business Scenario	1
3.3	Challenges of Innovation, Steps of Innovation Management	1
3.4	Experimentationin Innovation Management, Participation for Innovation,	1
3.5	Co-creation for Innovation, Proto typing to Incubation.	1
3.6	Blue Ocean Strategy-I, Blue Ocean Strategy-II. & Marketing of Innovation, Technology Innovation Process	1
4	**Financing and Launching the New Venture**	
4.1	Importance of new venture financing, types of ownership,	1
4.2	Venture capital, types of debt securities	1
4.3	Determining idealdebt-equity mix, and financial institutions and banks.	1
4.4	Launching the New Venture	1
4.5	Choosing the legal form of new venture,	1
4.6	Protection of intellectual property & Formationof the new venture	1
5	**Managing Growth and Rewards in New Venture**	
5.1	Characteristics of high growth new ventures	1
5.2	Strategies for growth	1
5.3	Building the new ventures	1
5.4	Managing Rewards	1
5.5	Exit strategies for Entrepreneurs,	1
5.6	Mergers and Acquisition, Succession and exit strategy & Managing failures– bankruptcy.	1
	Total Hours	**30**

Course Designers

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60 TT 5P1	Textile Chemical Processing Laboratory

Category	L	T	P	Credit
PC	0	0	4	2

Objectives

- To acquire practical knowledge on dyeing of various fabrics.
- To acquire practical knowledge on printing.
- To acquire practical knowledge on finishing.
- To acquire practical knowledge on testing.

Pre requisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Perform the dyeing process on cotton and polyester	Understand
CO2	Perform the dyeing process on wool and silk.	Understand
CO3	Apply direct, discharge, resist style of printing and pigment printing.	Apply
CO4	Practice the various finishing softening, soil release, water repellent and fragrance finish.	Apply
CO5	Determine the various colour fastnesses Washing and Perspiration.	Analyze

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3											3	3	1
CO2	3	3		3	3		3						3	3	1
CO3	3	3					3						3	3	1
CO4	3	3	3	3	3				2		3		3	3	1
CO5	3	3	3	3	3			3	2		3		3	3	1
			3- Strong;2-Medium;2-Low												

LIST OF EXPERIMENTS

1. Dyeing of wool.
2. Dyeing of silk with Acid dyes.
3. Dyeing of polyester using disperse dyes (HTHP)
4. Direct style of printing on cotton fabric using pigment printing
5. Discharge style and Resist style of printing on cotton fabric – white & colour base*
6. Determination of Soft finishing of cotton fabric using cationicofteners.
7. Determination of water repellent finish.*
8. Analyze the efficiency of soil release finish.*
9. Determination of fragrance/aroma finish.*
10. Determination of colour fastness to Washing and Perspiration.*

* SDG 12: Ensure sustainable consumption and production patterns

Total Hours : 60

Course Designer

Mr.P.Maheswaran – pmaheswaran@ksrct.ac.in

60 TT 5P2	Fabric Structure Laboratory

Category	L	T	P	Credit
PC	0	0	4	2

Objective(s)

- Educate on the intricacies of various weave structures.
- Convey knowledge on utilizing different fabric parameters for designing based on specific applications.
- Offer foundational understanding of color theory for its practical application in fabric design and construction
- Provide exposure to the analysis of diverse fabric structures, emphasizing construction details.
- Impart knowledge on color theory applicable to fabric production, encompassing various color combinations and designs.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Acquire understanding of fabric structure elements and basic weaving patterns.	Analyse
CO2	Elaborate on the loom specifications needed for unique weaves and explore the principles of color theory.	Analyse
CO3	Delve into the loom prerequisites and applications of additional thread figuring.	Analyse
CO4	Evaluate backed fabrics and grasp the concepts of mock leno and bedford cords.	Analyse
CO5	Elaborate on the loom specifications and applications of sophisticated weave structures.	Analyse

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			2							2	3	2	1
CO2	2	2										2	3	2	1
CO3	3	2										2	3	2	1
CO4	3	2										2	3	2	1
CO5	3	3	2									2	3	2	1
3- Strong; 2-Medium; 2-Low															

List of Experiments

Analysis of fabric structure of the following weaves:

1. Different types of plain weave fabrics (Casement, poplin, cambric, long cloth, & mull cloth).
2. Twill, herring bone and pointed twill weaves
3. Satin and Sateen weaves
4. Honey comb weave,
5. Huck-a-back weave & Mock Leno
6. Extra thread figuring – extra warp and weft figuring
7. Backed and Velvet fabrics
8. Double cloth
9. Gauze and Leno
10. Bedford cords

Total Hours: 60

Course Designer

Mr. M.Arunkumar – arunkumar@ksrct.ac.in

60 CG 0P4	CAREER SKILL DEVELOPMENT IV

Category	L	T	P	Credit
CS	0	0	2	1

Objective

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Prerequisite

Basic knowledge of Arithmetic and Logical Reasoning

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Compare and contrast products and ideas in technical texts.	Analyze
CO2	Identify cause and effects in events, industrial processes through technical texts	Analyze
CO3	Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	Analyze
CO4	Report events and the processes of technical and industrial nature.	Apply
CO5	Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search.	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2	3		3				2	3	3	3		2
CO2	3	3	3	3		2				2	3	3	3		2
CO3	2	2	2	2		3				2	3	3	3		2
CO4	3	3	3	3		2				2	3	3	3		2
CO5	3	3	3	3		2				2	3	3	2		2
3- Strong; 2-Medium; 1-Some															

K.S.Rangasamy College of Technology – Autonomous R2022								
Career Skill Development IV								
Common to All Branches								
Semester	Hours/Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	0	0	2	30	1	100	00	100

Verbal & Analytical Reasoning* ** * ** Seating Arrangements – Analytical Reasoning (PUZZELS) – Machin input and output - Coded Inequality – Eligibility Test	**[6]**
Quantitative Aptitude - Part – 4 * ** * ** Permutation and Combination - Probability - Quadratic equation - Geometry – Clock – Calendar – Logarithmic	**[6]**
Non-Verbal Reasoning * ** * ** Series Completion of Figures – Classification – Courting of figure – Figure matrix – Embedded Figure – Complete Figure – Paper Cutting and Folding – Mirror images and Water Images	**[6]**
Quantitative Aptitude - Part – 5 * ** * ** Mensuration of Area, Volume and Surface area in 2D and 3D Shapes – 2D Shapes – Square, Rectangle, Triangle, Circle, etc. - 3D Shapes – Cube, Cuboid , Sphere , Cone , etc.	**[6]**
Data Interpretation and Analysis * ** * ** Data interpretation Based on text - Data interpretation Based on Tabulation , Pie chart , Bar graph , And Line graph – Venn Diagram - Data sufficiency	**[6]**
Total Hours	**30**

Reference(s):

1.	Aggarwal, R.S. *'A Modern Approach to Verbal and Non-verbal Reasoning'*, Revised Edition 2008,Reprint 2009,S.Chand & Co Ltd., New Delhi.
2.	Abhijit Guha, *'Quantitative Aptitude'*, McGraw Hill Education, 6th edition, 2016
3.	Dinesh Khattar, 'Quantitative Aptitude For Competitive Examinations', Pearson Education (2020)
4.	Anne Thomson, *'Critical Reasoning: A Practical Introduction'* Lexicon Books, 3rd edition, 2022. Warszaw

***SDG 4 – Quality Education**

****SDG 8 – Decent work and Economic growth**

*****SDG 9 – Industry, innovation and Infrastructure**

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Verbal & Analytical Reasoning**	
1.1	Seating Arrangements	1
1.2	Analytical Reasoning (PUZZELS)	1
1.3	Machin input and output	1
1.4	Coded Inequality	1
1.5	Eligibility Test	2
2	**Quantitative Aptitude - Part – 4**	
2.1	Permutation and Combination	1
2.2	Probability	1
2.3	Quadratic equation – Geometry	1
2.4	Clock – Calendar	1
2.5	Logarithmic	2
3	**Non-Verbal Reasoning**	
3.1	Series Completion of Figures – Classification	1
3.2	Courting of figure – Figure matrix	1
3.3	Embedded Figure – Complete Figure	1
3.4	Paper Cutting and Folding	1
3.5	Mirror images and Water Images	2
4	**Quantitative Aptitude - Part – 5**	
4.1	Mensuration of Area, Volume	1
4.2	Mensuration of Volume	1
4.3	Surface area in 2D and 3D Shapes	1
4.4	2D Shapes – Square, Rectangle, Triangle, Circle, etc.	1
4.5	3D Shapes – Cube, Cuboid , Sphere , Cone , etc.	2
5	**Data Interpretation and Analysis**	
5.1	Data interpretation Based on text	1
5.2	Data interpretation Based on Tabulation, Pie chart	1
5.3	Bar graph , And Line graph	1
5.4	Venn Diagram	1
5.5	Data sufficiency	2
	Total	**30**

Course Designer

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215
(An Autonomous Institution affiliated to Anna University)

COURSES OF STUDY

(For the candidates admitted from 2022-2023 onwards)

SEMESTER VI

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
THEORY								
1.	60 HS 003	Total Quality Management	HS	3	3	0	0	3
2.	60 TT 601	Textile and Apparel Quality Evaluation	PC	3	3	0	0	3
3.	60 TT 602	Garment Manufacturing Technology I	PC	3	3	0	0	3
4.	60 TT 603	Technical Textiles II	PC	4	2	0	2	3
5.	60 TT E3*	Profession Elective III	PE	3	3	0	0	3
6.	60 TT L3*	Open Elective – III	OE	3	3	0	0	3
7.	60 AB 00*	NCC/NSS/NSO/YRC/RRC/Fine Arts*	-	4	2	0	2	3*
PRACTICALS								
8.	60 TT 6P1	Garment Construction Laboratory I	PC	4	0	0	4	2
9.	60 TT 6P2	Textile and Apparel Quality Evaluation Laboratory	PC	4	0	0	4	2
10.	60 CG 0P5	Comprehension Test	CG	2	2	0	0	0
11.	60 TT 0P**	Mini Project	CG	0	0	0	0	0
12.	60 CG 0P6	Internship	CG	0	0	0	0	/2/3*
				29	**19**	**0**	**10**	**22**

Internship* additional credits is offered based on the duration

K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE - 637215

(An Autonomous Institution affiliated to Anna University)

B.E. / B.Tech. Degree Programme

SCHEME OF EXAMINATIONS

(For the candidates admitted from 2022-2023 onwards)

SIXTH SEMESTER

S.No.	Course Code	Name of the Course	Duration of Internal Exam	Weightage of Marks			Minimum Marks for Pass in End Semester Exam	
				Continuous Assessment *	End Semester Exam **	Max. Marks	End Semester Exam	Total
THEORY								
1	60 HS 003	Total Quality Management	2	40	60	100	45	100
2	60 TT 601	Textile and Apparel Quality Evaluation	2	40	60	100	45	100
3	60 TT 602	Garment Manufacturing Technology I	2	40	60	100	45	100
4	60 TT 603	Technical Textiles II	2	40	60	100	45	100
5	60 TT E3*	Profession Elective III	2	40	60	100	45	100
6	60 TT L3*	Open Elective – III	2	40	60	100	45	100
PRACTICAL								
8	60 TT 6P1	Garment Construction Laboratory I	3	60	40	100	45	100
9	60 TT 6P2	Textile and Apparel Quality Evaluation Laboratory	3	60	40	100	45	100

*CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

60 HS 003	TOTAL QUALITY MANAGEMENT

Category	L	T	P	Credit
HS	3	0	0	3

Objective

- **To facilitate the understanding of total quality management principles, tools and techniques.**
- **To equip the students to apply the TQM principles, tools and techniques in manufacturing sectors.**
- **To equip the students to apply the TQM principles, tools and techniques in service sectors**
- **To impart knowledge on quality management principles, tools, techniques and quality standards for real life applications**
- **To make the students understand the importance of standards in the quality assurance process and their impact on the final product**

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Recognize the need for quality concepts and its application in organizations	Remember
CO2	Apply the TQM principles for survival and growth in world class competition	Understand
CO3	Apply the traditional tools and new tools for quality improvement.	Understand
CO4	Apply the tools and techniques like quality circle, QFD, TPM and FMEA for qualityimprovement.	Apply
CO5	Apply QMS and EMS in organizations	Apply

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			2	3	3	3	3	3		3	2	3	2
CO2	3	2			2	3	3	3	3	3		3	3	3	2
CO3		3				2	2			3			3	3	2
CO4		3			3	2	2	3	2			3	3	3	2
CO5	3				3	3		3	2	2			3	3	3
3- Strong; 2-Medium; 1-Some															

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		End Sem Examination(Marks)
	1	2	
Remember (Re)	10	10	20
Understand (Un)	20	20	40
Apply (Ap)	30	30	40
Create (Cr)	0	0	0

K. S. Rangasamy College of Technology – Autonomous R2022								
60 HS 003- Total Quality Management								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction to Fundamentals of Total Quality Management * Introduction, definitions of quality, need for quality, evolution of quality, dimensions of quality, product quality and service quality; Basic concepts of TQM, TQM framework, contributions of Deming, Juran and Crosby. Barriers to TQM; Quality statements, customer focus, customer satisfaction, customer complaints, customer retention; costs to quality.	[9]
Total Quality Management Principles* TQM principles; leadership, strategic quality planning; Quality councils- employee involvement, motivation; Empowerment; Team and Teamwork; Quality circles, recognition and reward, performance appraisal; continuous process improvement; PDSA cycle, Kaizen, 5S & 7S ; Supplier partnership, Partnering, Supplier rating and selection.	[9]
TQM Management Tools and Techniques The seven traditional tools of quality; New management tools - applications to manufacturing, service sector, Statistical Fundamentals, Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, control charts, process capability, concepts of six sigma, Bench marking - Reasons to benchmark, Benchmarking process.	[9]
TQM Process based Tools and Techniques Quality circles, Quality Function Development (QFD), Taguchi quality loss function; TPM- concepts, improvement needs, performance, measures. FMEA- stages, types-Design FMEA and Process FMEA.	[9]
Quality Management System Introduction-Benefits of ISO Registration-ISO 9000 Series of Standards-Sector-Specific Standards - AS 9100, TS16949 and TL 9000 - ISO 9001, ISO 9001:2008 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	[9]
Total Hours	**45**

Text Book(s):	
1.	Dale H.Besterfiled, et al., “Total Quality Management”, Pearson Education, Inc.2003. (Indian reprint 2020). ISBN 81- 297-0260-6.
2	Janakiraman, B and Gopal, R.K, “Total Quality Management – Text and Cases”, Prentice Hall (India) Pvt. Ltd. 2016.
Reference(s):	
1.	James R. Evans, James Robert Evans, William M. Lindsay , “The Management and Control of Quality”, 8th Edition, South-Western, 2019.
2.	Joel.E. Ross, “Total Quality Management – Text and Cases”, 3rd Edition, Routledge, 2021.
3.	International 1996. 5. Zeiri. “Total Quality Management for Engineers”, Wood Head Publishers, 2019
4.	Narayana V. and Sreenivasan, N.S. “Quality Management – Concepts and Tasks”,New Age 3rd Edition-2018

* SDG4:Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Course Contents and Lecture Schedule

S.No	Topic	No. of Hours
1	**Introduction to Fundamentals of Total Quality Management**	
1.1	Introduction and Definition of Quality	1
1.2	Need and evolution of quality	1
1.3	Different Dimensions of Quality	1
1.4	Basic concepts of TQM and TQM framework	1
1.5	Deming, Juran and Crosby Philosophy of quality Management	1
1.6	Barriers to TQM Implementation	1
1.7	Quality Statements, Strategic Planning	1
1.8	Customer focus, customer satisfaction customer retention Techniques	1
1.9	Techniques for Quality Costs	1
2	**Total Quality Management Principles**	
2.1	Total Quality Management Principles	1
2.2	Strategic of quality planning and Quality councils	1
2.3	Motivation, Empowerment, Teams, Recognition and Reward	1
2.4	Performance Appraisal, Benefits, Continuous Process Improvement	1
2.5	Juran Trilogy, PDSA Cycle Continuous Process Improvement	1
2.6	5S, Kaizen, Continuous Process and Supplier Partnership	1
2.7	Partnering, sourcing, Supplier Selection	1
2.8	Supplier Rating, Relationship Development,	1
2.9	Basic Concepts, Strategy, Performance Measure.	1
3	**TQM Management Tools and Techniques**	
3.1	The seven traditional management tools of quality	1
3.2	The New management tools	1
3.3	Management tools applications to manufacturing	1
3.4	Management tools applications to service sector	1
3.5	Statistical Fundamentals in management tools	1
3.6	Normal Curve, Control Charts for variables and attributes	1
3.7	Concepts of six sigma principles	1
3.8	Benchmarking tools and Reasons to benchmark	1
3.9	Benchmarking process tools	1
4	**TQM Process based Tools and Techniques**	
4.1	Quality circles	1
4.2	Quality Function Deployment (QFD	1
4.3	house of Quality, QFD Process	1
4.4	Benefits, Taguchi Quality Loss Function	1
4.5	Total Productive Maintenance (TPM	1
4.6	Concept, Improvement Needs	1
4.7	Performance measuring tools	1
4.8	stages, types of FMEA	1
4.9	Process implementation of FMEA	1
5	**Quality Management System (QMS)**	
5.1	Need for ISO 9000 and Other Quality Systems	1
5.2	Benefits of ISO Registration	1

5.3	Sector-Specific Standards in ISO 9001	1
5.4	AS 9100, TS16949 and TL 9000 - ISO 9001	1
5.5	Documentation and Internal Audits Requirements	1
5.6	Environmental Management System	1
5.7	ISO 14000 Series Standards	1
5.8	Concepts of ISO 14001Requirements	1
5.9	ISO 14001-Benefits of EMS	1
	Total	45

Course Designers

Dr.G.Mylsami - mylsamig@ksrct.ac.in

60 TT 601	Textile and Apparel Quality Evaluation

Category	L	T	P	Credit
P	3	0	0	3

Objective

- To study the importance of quality evaluation.
- To know in detail the various aspects of testing fibre properties.
- To know in detail the various aspects of testing yarn properties.
- To know in detail the various aspects of testing fabric properties.
- To know in detail the various aspects of assessing garment properties.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyze and differentiate between various textile quality types and their influencing factors.	Analyze
CO2	Assess fiber and yarn properties using specialized instruments, understanding their roles in quality control.	Evaluate
CO3	Design protocols for comprehensive fabric and apparel quality assessments.	Create
CO4	Conduct quality evaluations for specialty fabrics, using industry-specific standards.	Apply
CO5	Interpret textile test results, relating them to performance standards and end-use implications.	Analyze

Mapping with Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	2	3	1	1	0	0	1	1	2	3	2	1
2	3	2	1	3	3	0	1	0	0	1	1	2	3	1	0
3	2	2	3	3	2	1	2	1	2	2	2	2	2	3	1
4	2	2	2	3	3	1	2	1	1	1	2	2	1	3	1
5	3	3	1	2	3	0	0	2	2	3	1	2	2	1	2

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		End Sem Examination(Marks)
	1	2	
Remember (Re)	10	10	20
Understand (Un)	20	20	40
Apply (Ap)	30	30	40
Create (Cr)	0	0	0

K. S. Rangasamy College of Technology – Autonomous R2022								
60 TT 601 Textile and Apparel Quality Evaluation								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	50	50	100

Quality Evaluation in Textiles* Definition of quality; types of quality – quality of design, quality of conformance, quality of performance, quality control and quality assurance; factors influencing quality; reasons for textile quality evaluation; types of sampling - random and biased sampling, fibre sampling from bulk, combed slivers and rovings; yarn sampling; fabric sampling; standard testing atmosphere; testing methods. Standards: ASTM, AATCC, ISO, BIS etc	[9]
Fibre Quality Evaluation* Determination of fibre length and its uniformity- Baer sorter, digital fibrograph; determination of fibre fineness determination of fibre strength and elongation - stelometer; high speed fibre measurement- High Volume Instrument, Advanced Fibre Information System; evaluation of man-made fibre properties - single fibre fineness - vibroscope method; determination of trash and fibre maturity; determination of moisture content and regain in fibres.	[9]
Yarn Quality Evaluation* Linear density – Direct & Indirect systems and its determination; evaluation of twist in single and ply yarns; crimp; determination of evenness- capacitance method, spectrogram, variance-length curve; yarn hairiness, principles of tensile testing, tensile testing of yarn at higher speeds, factors influencing tensile characteristics; classification of yarn faults - Classimat; yarn appearance assessment – ASTM yarn grades. Physical testing of sewing threads, sewing defects – assessment and Control	[9]
Fabric and Apparel Quality Evaluation* Determination of tensile and tear strength; bursting strength; dimensional stability; air permeability; water vapour permeability; water repellency; thermal conductivity; abrasion resistance; snagging; pilling; crease recovery; drape; stiffness; fabric weight, thickness; colour fastness Flammability. Fabric checking procedure - 4 point system, 10 point system; fabric inspection machine	[9]
Comfort, Durability, and Safety Evaluations * Comfort- subjective and objective evaluation of fabric handle - KES, FAST, FTT; Seam slippage and strength testing; button pull strength test, button impact test, zipper strength test. Testing for harmful substances in textile and apparel.	[9]
Total Hours	**45**

Text Book(s):

1.	Principles of Textile Testing by J. E. Booth, 1996, Heywood Books, London. Kindle Version: 2018
2.	Ahmad, S., Rasheed, A., Afzal, A., & Ahmad, F. (Eds.). (2017). Advanced Textile Testing Techniques (1st ed.). CRC Press. https://doi.org/10.4324/9781315155623

Reference(s):

1.	Physical Testing of Textiles by B. P. Saville, 1999, Woodhead Publishing Ltd., U. K. .
2.	Testing and Quality Management – Edited by V. K. Kothari, IAFL Publications, New Delhi
3.	Handbook of Textile Testing and Quality Control by E. B. Grover and D. S. Hamby.
4.	V.Sundaram, “Handbook of Textile Testing”, CTRL Publications, Bombay, 2004.
5.	Hu J., Fabric testing, Woodhead Publishing Limited,UK,2008.

***SDG: 04:** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Course Contents and Lecture Schedule

S.No.	Topic	No. of Hours
Unit 1	Introduction to Textile Quality Types of Sampling and Standard Testing Atmosphere	
1.1	Overview of Textile Quality	1
1.2	Definition of Quality in Textiles	1
1.3	Types of Quality: Design, Conformance, Performance	1
1.4	Quality Control and Assurance	1
1.5	Factors Influencing Quality	1
1.6	Reasons for Textile Quality Evaluation	1
1.7	Overview of Sampling Techniques	1
1.8	Random and Biased Sampling	1
1.9	Fibre Sampling from Bulk	1
1.10	Sampling in Combed Slivers and Rovings	1
1.11	Yarn Sampling Techniques	1
1.12	Fabric Sampling Methods	1
1.13	Standard Testing Atmosphere	1
1.14	.Impact of Atmosphere on Testing	1
Unit 2	**:** Fibre Quality Evaluation	
2.1	Overview of Fibre Quality Evaluation	1
2.2	Fibre Length and Uniformity: Baer Sorter, Digital Fibrograph	1
2.3	Fibre Fineness Determination	1
2.4	Fibre Strength and Elongation: Stelometer	1
2.5	High-Speed Fibre Measurement: HVI, AFIS	1
2.6	Man-Made Fibre Properties: Vibroscope Method	1
2.7	Trash Content and Fibre Maturity	1
2.8	Moisture Content and Regain in Fibres	1
Unit 3:	Yarn Quality Evaluation	
3.1	Overview of Yarn Quality Evaluation	1
3.2	Linear Density: Direct & Indirect Systems	1
3.3	Evaluation of Twist in Yarns	1
3.4	Yarn Evenness: Capacitance Method, Spectrogram	1
3.5	Yarn Hairiness Assessment	1
3.6	Principles of Tensile Testing	1
3.7	High-Speed Tensile Testing	1
3.8	Yarn Fault Classification: Classimat	1
3.9	ASTM Yarn Grades and Appearance Assessment	1
Unit 4:	Fabric and Apparel Quality Evaluation	
4.1	Overview of Fabric Testing	1
4.2	Tensile and Tear Strength Testing	1
4.3	Bursting Strength Assessment	1
4.4	Dimensional Stability Tests	1
4.5	Air and Water Vapour Permeability	1
4.6	Water Repellency and Thermal Conductivity	1
4.7	Abrasion, Snagging, and Pilling Tests	1

4.8	Crease Recovery, Drape, Stiffness	1
4.9	Color Fastness and Flammability	1
4.10	Fabric Checking: 4 Point and 10 Point Systems	1
Unit 5:	Comfort, Durability, and Safety Evaluations	
5.1	Comfort Evaluation: KES, FAST, FTT	1
5.2	Objective and Subjective Evaluation of Fabric Handle	1
5.3	Seam Slippage and Strength Testing	1
5.4	Button Pull Strength and Impact Tests	1
5.5	Zipper Strength Testing	1
5.6	5.6. Testing for Harmful Substances in Textiles	1
	Total Hours	**45**

Course Designers

Dr Bharani Murugesan: bharanim@ksrct.ac.in

60 TT 602	Garment Manufacturing Technology

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- Study the theoretical aspects of anatomy relevant to garment making.
- Learn the principles of pattern making, grading, and marker planning
- Learn the principles of Cutting machines
- Use sewing machines and other garment construction tools
- Apply knowledge of accessories to enhance garment functionality and aesthetics

Prerequisite

Fabric Manufacturing and woven fabric structure

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Anatomical Knowledge for Garment Making and record body dimensions	Remember
CO2	Grasp the concepts and techniques of pattern making and grading for upper and lower garments	Understand
CO3	Classify and operate different types of sewing machines	Application
CO4	Methods and use of laying equipment and understand different types of cutting machines	Understand
CO5	Understand the functions and applications of various garment accessories	Understand

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2		2	2			2	3	2	2	3	2	
CO2	2	3	2		1	2			2	2	2	2	3	2	
CO3	3	3	2		2	2			2	2	2	2	3	2	
CO4	3	3	2		2	2			2	2	2	2	3	2	
CO5	2	3	2		1	2			2	2	2	2	3	2	
3- Strong; 2-Medium; 2-Low															

K.S. Rangasamy College of Technology– Autonomous

60 TT 602 - Garment Manufacturing Technology I

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	2	60	4	40	60	100

Anatomy and body measurements Anatomy - Importance of anatomy in garment making; proportion - eight head theory and ten head theory; normal figure and fashion figure - its differences; body measurements - measurements needed for the construction of children's, men's and ladies garments; method and sequence of taking measurements; recording of measurements; meaning of the men's, women's size charts and control dimensions	9
Basic Pattern Making & Grading * Basic pattern making – Importance of paper pattern; pattern making tools; pattern grain line and its importance, Methods of pattern making –Bespoke flat paper pattern making technique; Drafting of basic patterns. Drafting of men's and women's shirt; pattern making for leg garments. Pattern grading – grading patterns for upper and lower garments. basics of computerized pattern making; Marker planning and marker making	9
Fabric Laying and Cutting** Methods of fabric Laying, Laying equipment's, computerized Laying Machines. Types of cutting machines, straight knife, round knife and band knife cutting machines; Notchers, drills, computerized cutting machines Classification of stitches and seams; stitch and seam properties. sewing threads – functions and characteristics of threads, thread size and ticket number;	9
Basic Sewing Machine Classification of sewing machines; basic parts and working of SNLS sewing machine, over lock and flat lock sewing machines. Garment Construction Tools: Folders and attachments, Sewing needles- Needle parts, selection and their application. Timing Diagram of SNLS sewing machine. Sewing machine feed mechanism, Seam and stitch defects- causes and remedial measures	9
Garment Accessories and Pressing Fusing equipment's- working principles, types and its function. Support materials: Interlinings – functions of interlinings; linings – functions of linings; fasteners-purpose of fasteners; functions of zippers, buttons, button holes, snaps, hooks and eyes; function of elastics; types of embroidery; labels - styles and application methods. Pressing and Packing - Methods of pressing equipment and packing methods	9
Total hours	**45**

Text Books

1.	Prasanta Sarkar " Garment Manufacturing: Processes, Practices and Technology Paperback – 1 "Online Clothing Study; First Edition, January, 2015
2.	Joseph-Armstrong "Patternmaking for Fashion Design": Pearson India, 2013
1.	Amaden-Crawford, C. "A Guide to Fashion Sewing" Bloomsbury Academic, USA 2023
2.	Aldrich, W. Metric Pattern Cutting for Menswear. Wiley United Kingdom , 2011.
3.	"Garment Manufacturing Technology" A volume in Woodhead Publishing in association with the Textile Institute, 2015

SDG 8- Decent work and Economic Growth

SDG 12- Responsible Consumption and Production

S. No.	Topic	No. of hours
1.0	**Anatomy and body measurements**	
1.1	Importance of anatomy in garment making	1
1.2	proportion - eight head theory and ten head theory	1
1.3	normal figure and fashion figure	1
1.4	Body measurements - measurements needed for the construction of children's, men's and ladies garments	2
1.5	Method and sequence of taking measurements	1
1.6	recording of measurements	2
1.7	meaning of the men's, women's size charts and control dimensions	1
2.0	**Basic Pattern Making & Grading**	
2.1	Basic pattern making – Importance of paper pattern	1
2.2	pattern making tools	1
2.3	pattern grain line and its importance	1
2.4	Methods of pattern making –Bespoke flat paper pattern making technique	1
2.5	Drafting of basic patterns	1
2.6	Drafting of men's and women's shirt;; pattern making for leg garments	1
2.7	Pattern grading – grading patterns for upper and lower garments	1
2.8	basics of computerized pattern making	1
2.9	Marker planning and marker making	1
3.0	**Fabric Laying and Cutting**	
3.1	Methods of fabric Laying , Laying equipment's, computerized Laying Machines	2
3.2	Types of cutting machines, straight knife, round knife and band knife cutting machines	2
3.3	Notchers, drills, computerized cutting machines Classification of stitches and seams;	2
3.4	stitch and seam properties	1
3.5	sewing threads – functions and characteristics of threads	1
3.6	thread size and ticket number;	1
4.0	**Basic Sewing Machine**	
4.1	Classification of sewing machines	2
4.2	basic parts and working of SNLS sewing machine	1
4.3	over lock and flat lock sewing machines.	1
4.4	Garment Construction Tools: Folders and attachments, Sewing needles- Needle parts, selection and their application	2
4.5	Timing Diagram of SNLS sewing machine	1
4.6	Sewing machine feed mechanism, Seam and stitch defects- causes and remedial measures	2
5.0	**Garment Accessories and Pressing**	
5.1	Fusing equipment's- working principles	1
5.2	Support materials: Interlinings – functions of interlinings	1
5.3	linings – functions of linings; fasteners-purpose of fasteners	2
5.4	functions of zippers, buttons, button holes, snaps, hooks and eyes; function of elastics; types of embroidery	2
5.5	labels - styles and application methods	1
5.6	Pressing and Packing	1
5.7	Methods of pressing equipment and packing methods	1
	Total Hours	**45**

Course Designers DR. MB Sampath – sampath@ksrct.ac.in

60 TT 604	Technical Textiles - II

Category	L	T	P	Credit
PC	2	0	2	3

Objectives

- Gain fundamental knowledge about agro textiles.
- Provide insights into smart textiles.
- Explore diverse applications of textiles in industries and sports.
- Educate on various aspects of filtration textiles.
- Comprehend the industrial applications of textiles

Prerequisite

60TT504 Technical Textiles-I

Course Outcomes

On the successful completion of the course, students will be able to

CO1	List the properties required for fabric constituent to use in Agro textiles	Remember
CO2	Summarize the functions & applications of smart textiles	Understand
CO3	List the functions and various requirements of sports textiles	Remember
CO4	Classify the properties required for fabric constituent to use in filtration textiles	Understand
CO5	Outline the miscellaneous & Industrial applications of textile products	Understand

Mapping with Programme Outcomes

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	2	2	2				1					1	3	3	2
CO2	3	2								1			3	3	2
CO3	2	3					1						3	3	2
CO4	3	2	2						1				3	3	2
CO5	2	3	2										3	3	2
			3- Strong; 2-Medium; 2-Low												

K.S. Rangasamy College of Technology– Autonomous								
60 TT 504 –Technical Textiles-II								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	2	0	2	60	3	40	60	100

Agro Textiles* Agro Textiles - Fibres, Yarns used, Fabric types and their construction details and properties. Applications of Agro textiles in floriculture, Horticulture, Sericulture and Aquaculture.	9
Smart Textiles** Smart Textiles – Introduction, Role of smart materials in textiles, Shape Memory Fibres, Shape Memory Material and Concepts associated with shape memory materials, SMM in smart fabrics and garments.	9
Sports Textiles** Sports Textiles: Introduction, Innovation in fibres & textile materials for sportswear – design consideration of sportswear – comfort – sports foot wear: functional design and materials.	9
Textiles in Filtration*** Textiles in Filtration**:** Dust collection principles, Fabric construction, finishing treatments. Solid-Liquid Filtration: Yarn types and fabric constructions, Production equipment, finishing treatments, fabric test procedure.	9
Industrial Applications of Textiles*** Textiles in Electronics, Textile reinforcement products, Textiles for Banners and Flags, Canvas Covers and Tarpaulins, Ropes andNets, Home and Office furnishings.	9
Hands on Training on: Agro Textiles Smart Textiles Sports Textiles Filtration Mini Project	15
Total hours	**60**

Text Books

1.	A.R.Horrocks& S.C. Anand (Edrs.), “Handbook of Technical Textiles”, The Textile Institute, Manchester, U.K.,WoodheadPublishing Ltd., Cambridge, England, 2000.
2.	E.Willusz, “Military Textiles”, Woodhead Publishing Ltd, 2008.
3.	Richard. A.Scott, “Textiles for Protection”, CRC press, Woodhead Publication, USA, 2005.

References

1.	N.W.M. John, “Geotextiles”, Blackie, London, ISBN: 0-216-91995-9, 1987.
2.	S. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennsylvania, ISBN:1-56676-340-1, 1995.
3.	S. Anand, “Medical Textiles”, Text. Inst., 1996, ISBN: 185573317X.
4.	T.Matsuo, “Fiber materials for Advanced Technical Textiles”, CRC publication, 2008.

**** SDG: 15 Life on Land***

***** SDG: 3 Good Health and Well Being***

****** SDG: 9 Industry, Innovation and Infrastructure***

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Agro Textiles**	
1.1	Agro Textiles – Fibres used	1
1.2	Agro Textiles – Yarns used	1
1.3	Fabric types and their construction details and properties	2
1.4	Applications of Agro textiles in floriculture	1
1.5	Applications of Agro textiles in Horticulture	1
1.6	Applications of Agro textiles in Sericulture	1
1.7	Applications of Agro textiles in Aquaculture	2
2.0	**Smart Textiles**	
2.1	Smart Textiles -Introduction	1
2.2	Role of smart materials in textiles	1
2.3	Shape Memory Fibres	1
2.4	Shape Memory Material	2
2.5	Concepts associated with shape memory materials	2
2.6	SMM in smart fabrics	1
2.7	SMM in smart garments	1
3.0	**Sports Textiles**	
3.1	Sports Textiles: Introduction	1
3.2	Innovation in fibres & textile	2
3.3	Materials for sportswear	1
3.4	Design consideration of sportswear	2
3.5	Comfort	1
3.6	Sports foot wear	1
3.7	Functional design and materials	1
4.0	**Textiles in Filtration**	
4.1	Textiles in Filtration	1
4.2	Dust collection principles	1
4.3	Fabric construction	1
4.4	Finishing treatments	1
4.5	Solid-Liquid Filtration	1
4.6	Yarn types and fabric constructions	1
4.7	Production equipment	1
4.8	Finishing treatments	1
4.9	Fabric test procedure	1
5.0	**Industrial Applications of Textiles**	
5.1	Textiles in Electronics	1
5.2	Textile reinforcement products	1
5.3	Textiles for Banners and Flags	1
5.4	Canvas Covers	1
5.5	Tarpaulins	1
5.6	Ropes	1
5.7	Nets	1
5.8	Home furnishings	1
5.9	Office furnishings.	1
	Total Hours	**45**

Course Designers Mrs.C.Premalatha – premalatha@ksrct.ac.in

60 TT E31	TEXTILE MECHANICS

Category	L	T	P	Credit
BS	3	0	0	3

Objective(s)

- To impart knowledge on the concepts of Gears, Motions, Friction, Energy and Moments. The students will be familiar with design and construction of cams, Design of transmission of shafts and machine components balancing.
- To apply mechanics for design of Textile Mechanisms
- To understand the principles of mechanics as applied to Textile Machinery
- To impart knowledge on differential gearing in Textile Machinery
- To understand the balancing of machine components

Prerequisite
Nil

Course Outcomes
On the successful completion of the course, students will be able to

CO1	Define the importance of gear and belt drives and to express the relationship between tensions in belt drives and also the condition for maximum power transmission, Design the profiles of plain and twill tappets and ring frame builder motion cams.	Understand, Apply & Analyze
CO2	Explain the concepts of displacement, velocity and acceleration and determine the same in textiles and calculate force, work done and power in textile machinery	Understand & Apply
CO3	Discuss the laws of friction and determine frictional force involved in textile, apply the principle of moment and calculate forces and couples in textiles	Understand & Apply
CO4	Express the stress- strain, bending shear and torsion characteristics of materials and design transmission shafts and drafting rollers.	Apply & Analyze
CO5	Analyze the concept of balancing of rotating objects, Balance rotor and card cylinder	Understand & Analyze

Mapping with Programme Outcomes

60 TT E 31 – Textile Mechanics														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	1				1			2	1	1	1		
CO2	3	2	1		1		1			2	1	1	1		
CO3	3	2	2	1	1	1	1			3	1	1	1	1	
CO4	3	3	2	1	2	1	2	1	1	3	2	1	1	1	1
CO5	3	3	2	1	2	1	2	1	1	3	2	1	1	1	1

Assessment Pattern

Bloom's Category	Continuous Assessment Tests			Terminal Examination
	1	2	3	
Remember	20	20	20	20
Understand	20	20	20	20
Apply	40	40	40	40
Analyze	20	20	20	20
Evaluate	-	-	-	-
Create	-	-	-	-

K.S. Rangasamy College of Technology – Autonomous								R 2022
60 TT E 31 – Textile Mechanics								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	3	0	0	45	3	40	60	100

Drives and Design of Cam and Tappets * Belts and Ropes- Drive Speed Ratio – Centrifugal tension - Condition for maximum power transmission and speed – PIV drives. Gears Nomenclature - Velocity ratio-Speed calculations - Epicyclic gear trains. Differential gearing in speed frame.cone drum and belt shifting in speed frame.Cam and Tappets: Design of Ring frame builder motion cam; Plain and Twill cams for tappet looms.	9
Equation of Motion and Friction * Simple harmonic motion; Fundamental equation of motion- force, mass, momentum, work done, power; Shuttle and ring frametraveller velocity and power consumption. Friction: Static, dynamic and coil friction; Frictional force and power; Application in textiles - negative let off, tension devices.	9
Energy and Moments * Kinetic and potential energy calculation in the textile application; Principles of moments- scutcher calendar roller, ring frame top arm loading; Centre of gravity; Sley displacement, velocity, acceleration, and sley eccentricity in relation with crank radius and connecting arm length	9
Design of Transmission of Shafts and Drafting Rollers * Material Properties; Safety consideration in design; Stress-strain relationships of materials; Tensile, compressive, shear, bending and torsion; Design of transmission shaft; Static load, torsional rigidity and lateral rigidity; Design of drafting rollers; Torsional rigidity and lateral rigidity..	9
Balancing of Machine Components * Balancing of machinery-concepts and definitions; Theoretical considerations in balancing; Balancing of rotors; Balancing of card cylinder; Practical aspects of balancing; Measurement of balance. Settings involved in SNLS,DNLS.	9
Total hours	45

Text Book

1. V. Jayakumar, “Kinetimatics of Machinery”, Lakshmi publications 2006.
2. R.S. Rengasamy “Mechanics of Machines”, NCUTE Publications, Ministry of Textiles, New Delhi, 2002.

Reference Books

1. Ganapathy Nagarajan, “Textile Mechanisms in spinning and weaving machines”, Wood head Publishing, India, 2014.
2. Booth J E “Textile Mathematics, Vol. I, II & III” Textile Institute, Manchester, UK, 1977.
3. Slater K. “Textile Mechanics, Vol. I & II” Textile Institute, Manchester, UK, 1997.
4. W.A. Henton, “Mechanics for Textile students”, Textile Institute, Manchester, UK, 1960.

SDG: 9 Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Drives and Design of Cam and Tappets**	
1.1	Belts and Ropes- Drive Speed Ratio	2
1.2	Centrifugal tension - Condition for maximum power transmission and speed	2
1.3	PIV drives.Gears Nomenclature	1
1.4	Velocity ratio-Speed calculations - Epicyclic gear trains.	1
1.5	Differential gearing in speed frame.cone drum and belt shifting in speed frame.	1
1.6	Cam and Tappets	1
1.7	Design of Ring frame builder motion cam; Plain and Twill cams for tappet looms.	1
2.0	**Equation of Motion and Friction**	
2.1	Simple harmonic motion; Fundamental equation of motion	1
2.2	Force, mass, momentum	1
2.3	Work done, power; Shuttle	2
2.4	Ring frametraveller velocity and power consumption.	1
2.5	Friction: Static, dynamic and coil friction	1
2.6	; Frictional force and power	1
2.7	; Application in textiles - negative let off.	1
2.8	Tension devices	1
3.0	**Energy and Moments**	
3.1	Kinetic and potential energy calculation in the textile application	2
3.2	Principles of moments- scutcher calendar roller	1
3.3	ring frame top arm loading	1
3.4	Centre of gravity; Sley displacement,	1
3.5	velocity, acceleration	2
3.6	Sley eccentricity in relation with crank radius and connecting arm length	2
4.0	**Design of Transmission of Shafts and Drafting Rollers**	
4.1	Material Properties; Safety consideration in design;	1
4.2	Stress-strain relationships of materials	1
4.3	Design of transmission shaft, torsional rigidity	2
4.4	Torsional rigidity	1
4.5	Design of drafting rollers	1
4.6	Torsional rigidity and lateral rigidity	2
4.7	Static load.,	1
5.0	**Balancing of Machine Components**	
5.1	Balancing of machinery-concepts and definitions;	1
5.2	Theoretical considerations in balancing;	1
5.3	Balancing of rotors	1
5.4	Balancing of card cylinder	1
5.5	Practical aspects of balancing	1
5.6	Measurement of balance	1
5.7	Settings involved in DNLS.	2
5.8	Settings involved in SNLS,	1
	Total Hours	**45**

Course Designers Mr.G.Devanand – devanandg@ksrct.ac.in

60 TT E 32	Smart Textiles

Category	L	T	P	Credit
P	3	0	0	

Objective

- To provide an overview about the smart technology, material selection, design and manufacturing system.
- To teach the heat storage and thermo-regulating properties of textiles.
- To give an overview on of Thermal insulated textiles and educate on the various functional finishes involved in Thermal insulated textiles production.
- To inculcate the scope, construction and functions of wearable technologies.
- To enlighten the Bioprocessing and Tissue engineering applications for smart textiles and clothing.

Course Outcomes

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

CO1	Recall and list key materials and principles underpinning smart textiles.	Remember
CO2	Explain the functions and applications of heat storage and thermo-regulated textiles.	Understand
CO3	Demonstrate the use of thermal sensitive materials in practical scenarios.	Apply
CO4	Differentiate between various wearable technologies and their specific purposes.	Analyze
CO5	Design a basic concept for a smart interactive garment for a given context.	Create

Mapping with Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	3	1	2	1	1	2	1	3	3	2	1
2	3	3	3	2	3	2	3	1	1	2	2	3	3	3	2
3	3	3	3	3	3	2	3	1	2	3	2	3	3	3	2
4	3	3	2	2	3	2	2	1	2	3	2	3	3	3	2
5	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3

Assessment Pattern

Bloom's Category	Continuous Assessment Tests(Marks)		End Sem Examination(Marks)
	1	2	
Remember (Re)	10	10	20
Understand (Un)	20	20	20
Apply (Ap)	15	15	20
Ananlysis (An)	15	15	20
Create (Cr)	0	0	20

K. S. Rangasamy College of Technology – Autonomous R2022								
60 TT E 32 Smart Textiles								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Essentials of Smart Textile * An overview on smart textiles, electrically active polymers materials- application of non-ionic polymer gel and elastomers for artificial muscles; heat storage and thermo regulated textiles and clothing, thermally sensitive materials, cross – linked polymers of fibre substrates as multifunctional and multi-use intelligent material; mechanical properties of fibre Bragg gratings, optical responses of FBG (Fibre Bragg grating) sensors under deformation; smart textile composites integrated with optic sensors	[9]
Heat Storage and Thermo Regulated Textiles and Clothing * Introduction – Bascs of heat storage materials – Manufacture of heat storage and thermo regulated material: Phase change materials or impregnated fibres, coated fabric, fibre spinning - properties of heat storage and thermo regulated textiles & clothing: Thermal resistance, thermo regulating properties, antimicrobial properties – Applications of heat storage and thermo regulated textiles and clothing.	[9]
Thermally Sensitive Material * Introduction – Thermal storage and thermal insulating fibers: Use of ceramics as melt dope additives, Hollow fibres, Insulating structures with PCM – Thermal insulation through polymeric coating: Water proof breathable coatings, Water proof breathable membranes-Designing of fabric assemblies.	[9]
Wearable Technologies * Introduction – Basics of embroidery technology-Embroidery for technical applications: Tailored fibre placement, medical textiles. Introduction-ARTS- The symbiotic relationship between textiles and computing-Wearable motherboard: performance requirements, design and structure, Production system and its potential applications. Introduction: Wearable technology- performance requirements-prototype: user interface, survival features in the suit, Wearable technology for snow clothing.	[9]
Smart Interactive garments * Smart interactive garments for combat training, hospital and patient care; smart garments in sports and fitness activities; smart garments for children; smart home textiles	[9]
Total Hours	**45**

Text Book(s):

1.	Van Langenhove, L. (2014). Smart Textiles: Past, Present, and Future. In: Tao, X. (eds) Handbook of Smart Textiles. Springer, Singapore. https://doi.org/10.1007/978-981-4451-68-015-1.
2.	Stefan Schneegass, Oliver Amft, Smart Textiles Fundamentals, Design, and Interaction, Springer Cham, Springer International Publishing AG 2017, 978-3-319-50123-9Published: 10 February 2017, Edition 1, https://doi.org/10.1007/978-3-319-50124-6

Reference(s):

1.	Ornaghi, Heitor & Motta Neves, Roberta & Monticeli, Francisco & Dall Agnol, Lucas. (2022). Smart Fabric Textiles: Recent Advances and Challenges. Textiles. 2. 582-605. 10.3390/textiles2040034.
2.	Vladan Koncar, **Smart Textiles and Their Applications,**1st Edition - April 22, 2016,Hardback ISBN: 9780081005743, 9 7 8 - 0 - 0 8 - 1 0 0 5 7 4 – 3, ISBN: 9780081005835, wood head publisher
3.	Smart Textiles for protection,2013 Edited by R.A.Chapman, The Textile Institute & Woodhead Publishing, UK. ISBN 978-0-85709-056-0.
4.	Smart Clothes and Wearable Technologies, 2010 Edited by J.Mccann & D.Bryson, The Textile Institute & Woodhead Publishing, UK. ISBN 978-184569-357-2.
5.	Electronic Textiles, 2015 Edited by Tilak Dias, The Textile Institute & Woodhead Publishing, UK. ISBN 978-0-08-100201-8
6.	Xiaoming Tao, “Smart fibers, fabrics and clothing”, Wood head publication, Textile Institute, 2003 publication.

***SDG:09 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**

Course Contents and Lecture Schedule

Unit	Topic	No. of Hours
Overview Electrically Active Polymers		
1.1	Course Introduction	1
1.2	Smart Textiles: Definition and Scope	1
1.3	Evolution of Smart Textiles	1
1.4	Future Trends in Smart Textiles	1
1.5	Q&A and Discussion on Overview	1
1.6	Introduction to Electrically Active Polymers	1
1.7	Non-Ionic Polymer Gel	1
1.8	Elastomers in Smart Textiles	1
1.9	Applications in Artificial Muscles	1
1.10	Case Studies: Electrically Active Polymers	1
1.11	Discussion on Electrically Active Polymers	1
Heat Storage & Thermo Regulated Textiles		
2.1	Basics of Heat Storage Materials	1
2.2	Phase Change Materials in Textiles	1
2.3	Manufacturing Techniques: Impregnated Fibres	1
2.4	Coated Fabric for Heat Storage	1
2.5	Properties of Thermo Regulated Textiles	1
2.6	Applications of Heat Storage Textiles	1
Thermally Sensitive Materials		
3.1	Introduction to Thermally Sensitive Materials	1
3.2	Thermal Storage Fibers	1
3.3	Insulating Structures with PCM	1
3.4	Polymeric Coating for Thermal Insulation	1
3.5	Use of Ceramics as Additives	1
3.6	Designing Fabric Assemblies	1
Wearable Technologies		
4.1	Introduction to Wearable Technologies	1
4.2	Embroidery for Technical Applications	1
4.3	Advanced Responsive Textile Structures (ARTS)	1
4.4	Wearable Motherboard: Design	1
4.5	Wearable Motherboard: Structure and Applications	1
4.6	Prototype Development for Wearables	1
4.7	User Interface in Wearable Technology	1
4.8	Discussion on Wearable Technologies	1
Smart Interactive Garments		
5.1	Smart Garments in Combat Training	1
5.2	Smart Garments for Hospital and Patient Care	1
5.3	Smart Garments in Sports	1
5.4	Smart Garments for Children	1
5.5	Smart Home Textiles	1
5.6	Discussion on Smart Interactive Garments	1
5.7	Introduction to Fibre Bragg Gratings	1
5.8	Mechanical Properties of FBG	1
5.9	Optical Responses of FBG Sensors	1
5.10	Integration with Optic Sensors	1
5.11	Smart Textile Composites	1
5.12	Discussion on Smart Textile Composites and Sensors	1
5.13	Recap of Key Concepts	1
5.14	Final Examination or Project Presentation	1
	Total Hours	**45**

Course Designers

Dr Bharani Murugesan: bharanim@ksrct.ac.in

60 TT E 33	Sustainable Textiles

Category	L	T	P	Credit
BS	3	0	0	3

Objective(s)

- To get knowledge on Sustainable process
- To aware the supply chain of textiles
- To analyze the ecological parameters in textile industry
- To understand the reasons of carbon footprint and its causes
- To identify the sustainable fashion trends

Prerequisite
Nil

Course Outcomes
On the successful completion of the course, students will be able to

CO1	Apply the concepts of sustainability in the textile sector	Understand &Analyze
CO2	Describe the life cycle assessment of textiles	Understand & Analyze
CO3	Analyze the carbon foot print and its impact on environment	Understand & Apply
CO4	Evaluate the life cycle impacts, modeling of life cycle impacts	Understand & Analyze
CO5	Apply the standards of environmental footprints of various packaging systems	Understand & Analyze

Mapping with Programme Outcomes

60 TT E 33 - Sustainable Textiles															
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	3	1	2	2	3	2	2	2	2	2	3	2	2
CO2	3	2	1		2				3	2	3	3	3	2	2
CO3	2	1		2	2	1		2	3	2	2	3	2	3	2
CO4	2	3	2	1	2	2	3	2	2	2	2	2	2	2	2
CO5	3	2		2	2	3	2	2	2	2	2	3	2	2	2

Assessment Pattern

Bloom's Category	Continuous Assessment Tests			Terminal Examination
	1	2	3	
Remember	20	20	20	20
Understand	40	40	40	40
Apply	20	20	20	20
Analyze	20	20	20	20
Evaluate	-	-	-	-
Create	-	-	-	-

K.S. Rangasamy College of Technology–Autonomous								R 2022
60 TT E 33 – Sustainable Textiles								
B.Tech. Textile Technology								
Elective	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

Sustainable Development (SD) as a Goal in Production, Marketing and Trade * Concept, Theory behind, Sustainability in public sector and in industry, Environmental management systems, Environmental labeling, Recycling of material.	9
Supply Chain of Textiles * Fibres, Yarn and Fabric production, Garment manufacturing, Chemical treatment, Consumption, use and care, Disposal of circular economic-Funds utilization wastes	**9**
Life Cycle Assessment (LCA) and Ecological Key Figures (EKF) ** Life cycle assessment (LCA) methodology, Eight case studies, Life cycle inventory (LCI), Life cycle assessment (LCA), Costs, Ecological key figures (EKF), Applied ecological key figures (EKF) in spinning and weaving, Discussion on ecological key figures (EKF) of textile products, Relevant industrial case studies.	**9**
Carbon Footprint of Textile and Clothing Products *** Environmental Impacts of Apparel Production, Distribution, and Consumption, Eco-Parameters and Testing of Sustainable Textiles and Apparels, Sustainable Measures Taken by Industry Affiliates, Nonprofit Organizations and Governmental and Educational Institutions, Standards: Oeko-Tex Standard 100, ISO 22000, and ISO 31000, E3096 – 18, E2986 – 18, E2987 / E2987M – 20.	**9**
Sustainable Fashion *** The fashion industry, sustainability and business models. . Decode the past, present and future of sustainable fashion. Broad theoretical framework for traditional sustainable business models and the differences between these Models, Innovative –Sustainable models.	**9**
	Total Hours: 45

Text Book(s):

1. Subramanian Senthilkannan Muthu., “Sustainability in the Textile Industry”, Springer, Singapore, 2017, ISBN:978- 981-10-2638-6.
2. Subramanian Senthilkannan., “Roadmap to Sustainable Textiles and Clothing”, Springer, Singapore. 2014, ISBN:978-981-287-065-0.

Reference(s):

1. Subramanian Senthilkannan., “Sustainable Innovations in Textile Fibre”, Springer, Singapore, 2018, ISBN:978- 981-10-8578-9.
2. Subramanian Senthilkannan., “Sustainable Innovations in Textile Chemical Processing”, Springer, Singapore, 2018, ISBN: 978-981-10-8491-1.
3. Subramanian Senthilkannan Muthu., and Yi Li., “Assessment of Environmental Impact by Grocery Shopping Bags,Springer Science & Business Media, 2013, ISBN: 978-981-4560-20-7.
4. Subramanian Senthilkannan Muthu., “Environmental Footprints of Packaging”, Springer, Singapore, 2015, ISBN: 978-981-287-913-4.

SDG: 15 Life on Land

****SDG: 3 Good Health and Well Being***

*****SDG: 9 Industry, Innovation and Infrastructure***

Course Contents and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Sustainable Development (SD) as a Goal in Production, Marketing and Trade**	
1.1	Concept, Theory behind in Sustainability	2
1.2	Environmental management systems	2
1.3	Environmental labeling	2
1.4	Recycling of material	2
1.5	Marketing and Trade	1
2.0	**Supply Chain of Textiles**	
2.1	Fibres Yarn, and Fabric production,	1
2.2	Garment manufacturing	2
2.3	, Chemical treatment	2
2.4	Consumption, use and care	2
2.5	Disposal of circular economic	1
2.6	Funds utilization wastes.	1
3.0	**Life Cycle Assessment (LCA) and Ecological Key Figures (EKF)**	
3.1	Life cycle assessment (LCA) methodology,	2
3.2	Eight case studies,Introduction	1
3.3	Life cycle inventory (LCI),	1
3.4	Life cycle assessment (LCA)	1
3.5	Costs, Ecological key figures (EKF)	1
3.6	Applied ecological key figures (EKF) in spinning and weaving,	1
3.7	Discussion on ecological key figures (EKF) of textile products	2
3.8	Relavent industrial case studies.	
4.0	**Carbon Footprint of Textile and Clothing Products**	
4.1	Environmental Impacts of Apparel Production, Distribution, and Consumption,	1
4.2	Eco-Parameters and Testing of Sustainable Textiles and Apparels	1
4.3	Sustainable Measures Taken by Industry Affiliates, Nonprofit Organizations	2
4.4	Governmental and Educational Institutions	1
4.5	Standards: Oeko-Tex Standard 100	2
4.6	ISO 22000, and ISO 31000, E3096 – 18, E2986 – 18, E2987 / E2987M – 20.	2
5.0	**Sustainable Fashion**	
5.1	The fashion industry. .	1
5.2	sustainability and business models	2
5.3	Decode the past, present and future of sustainable fashion	2
5.4	Broad theoretical framework for traditional sustainable business models	2
5.5	The differences between these Models,Innovative –Sustainable models.	2
	Total Hours	45

Course Designers Mr.G.Devanand - devanandg@ksrct.ac.in

60 TT E34	Production and Operation Management	Category	L	T	P	Credit
		OE	3	0	0	3

Objectives

- To know the basic concepts and functions of production and operation management.
- To enable the students to learn about the production and operation systems.
- To understand the basic concepts of production process and planning.
- To impart the basic concepts of production and operation management process.
- To understand the production and operation management control processes.

Prerequisite

Course Outcomes

On the successful completion of the course, students will be able to

CO1	To understand the basics and functions of Production and Operation Management	Understand
CO2	To learn about the Production and Operation Systems	Understand
CO3	To understand the Production and Operations Planning Techniques followed in Industries.	Understand
CO4	To know about the Production and Operations Management Processes in organizations.	Understand
CO5	To comprehend the techniques of controlling Production and Operations in industries	Understand

Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	3	2		3	2	2	2	3	2	1
CO2	2	2	2	2	2				2	3	2		3	2	1
CO3	2	3				2		2	3	3	2		3	3	2
CO4	3	2		2	2	2		2	3	2	2	2	3	3	2
CO5	2	3	3	2	3	2			2	2	3	2	3	3	2
			3- Strong; 2-Medium; 1-Some												

K.S. Rangasamy College of Technology – Autonomous							R 2022
60 TT E34 – Production and Operations Management							
Semester	Hours / Week			Total hrs	Credit	Maximum Marks	
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	40	60	100

Introduction to Production and Operation Management. Functions of production management, Relationship between production and other functions, Production management and operation management, characteristics of modern production and operation management, organization of production function, recent trends in operation and production management, production as an organizational function, decision making in production operation research.	9
Production and Operation Systems* Production systems, principles, models, CAD and CAM, Automation in production, functions and significance, Capacity and facility planning, importance of capacity planning, capacity measurement, Capacity Requirement Planning (CRP) process for manufacturing and service industry.	9
Production and Operation Planning Facility planning, Location of facilities, location flexibility, Facility design process and techniques, Location break even analysis, Production process planning, characteristics of production process systems, steps for production process, Production planning control – functions, planning phases, action phase, control phase, Aggregate production planning.	9
Production and Operation Management Process Process selection with PLC phases, process simulation tools, Work study – significance, methods, evolution of normal/standard time, Job design and rating, Value analysis, Plant layout – meaning, characters, plant location techniques, types, MRP and layout design, Optimization and Theory of Constraints (TOC), Critical Chain Project Management (CCPM), Relationship (REL) chart, Assembly line balancing, Plant design optimization, Forecasting methods.	9
Controlling Production and Operation Management Material Requirement Planning (MRP), concept, process and control, Inventory control systems and techniques, JIT and Lean manufacturing, network techniques, Quality management – Preventive Vs Breakdown maintenance for quality, Techniques for measuring quality, Control chart (X, R, p, np and C charts), Cost of quality, Continuous improvement (Kaizen), Quality awards, supply chain management, total quality management, six sigma approach and Zero Defective Manufacturing.	9
Total hours	**45**

Textbook(s):

1.	Panneerselvam R., “Production and Operation Management”, Prentice Hall of India, 2002
2.	Chary S.N, Production and Operations Management, TMH Publications, 2010

Reference(s):

1.	Adam Jr. Ebert, Production and Operations Management, PHI Publication, 1992
2.	Mikell P. Groover, Automation, Production Systems, and Computer-Integrated Manufacturing, Pearson, 2007
3.	Terry Hill, Operation Management. Pal Grave McMillan (Case Study).2005.
4.	Amitabh Raturi, Production and Inventory Management, , 2008.

- SDG – 9 - Industry, Innovations and Infrastructure

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction to Production and Operation Management.**	
1.1	Functions of production management, Relationship between production and other functions	1
1.2	Production management and operation management	2
1.3	Characteristics of modern production and operation management	1
1.4	Organization of production function	1
1.5	Recent trends in operation and production management,	2
1.6	Production as an organizational function	1
1.7	Decision making in production operation research.	1
2.0	**Production and Operation Systems**	
2.1	Production systems - principles and models	1
2.2	CAD and CAM	1
2.3	Automation in production, functions and significance,	2
2.4	Capacity and facility planning, Importance of capacity planning	2
2.5	Capacity measurement	1
2.6	Capacity Requirement Planning (CRP) process for manufacturing and service industry.	2
3.0	**Production and Operation Planning**	
3.1	Facility planning, Location of facilities, location flexibility	1
3.2	Facility design process and techniques,	1
3.3	Location break even analysis	1
3.4	Production process planning, steps for production process	2
3.5	Characteristics of production process systems,	1
3.6	Production planning control – functions	1
3.7	Planning phases, Action phase and Control phase	1
3.8	Aggregate production planning.	1
4.0	**Production and Operation Management Process**	
4.1	Process selection with PLC phases, process simulation tools	1
4.2	Work study – significance, methods, evolution of normal/standard time,	2
4.3	Job design and rating, Value analysis	1
4.4	Plant layout – meaning, characters, plant location techniques, types	1
4.5	MRP and layout design	1
4.6	Optimization and Theory of Constraints (TOC), Critical Chain Project Management (CCPM), Relationship (REL) chart,	2
4.7	Assembly line balancing, Plant design optimization, Forecasting methods.	1
5.0	**Controlling Production and Operation Management**	
5.1	Material Requirement Planning (MRP), concept, process and control,	1
5.2	Inventory control systems and techniques, JIT and Lean manufacturing,	2
5.3	Quality management – Preventive Vs Breakdown maintenance for quality	1
5.4	Techniques for measuring quality - Control chart (X, R, p, np and C charts)	2
5.5	Continuous improvement (Kaizen), Quality awards, supply chain management, total quality management	2
5.6	Six sigma approach and Zero Defective Manufacturing.	1
	Total Hours	**45**

Course Designers

A.S. Subburaayasaran -subburaayasaran@ksrct.ac.in

60 TT E 35	Export Policies and Documentation

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- *Conveying insights into diverse facets of export trade, export finance, and the foreign exchange market.*
- *Providing understanding of product planning, development, product cycle, and market dynamics.*
- *Offering knowledge on EXIM policies, export documents, and export procedures. • Evaluating government-led export promotion initiatives.*
- *Analyzing pricing policies and terms prevalent in export trade.*

Prerequisite

Financial Management and Costing for Textile and Apparel Industry

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Differentiate domestic and international trade, merits and demerits & functions of Regional Trade Blocsand summarize the international business environment, regulatory framework and export barriers.	Remember
CO2	Analyze the different types of export credit facilities available for exporters and describe the export riskcoverage facilities	Analyze
CO3	Summarize the concept of balance of payment and its functions and factors affecting counter trade andforeign exchange functions	Understand
CO4	Outline the export promotion activities undertaken by the government, summaries the foreign traderegulation act for regulating export trade	Understand
CO5	Discuss the steps involved in export activity from raw material to shipping and the documents to be produced in bank for payment clearance and documents to be produced in central excise departmentfor claiming incentives.	Remember

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1			2					2		3	2	2
CO2	2	2	1			2					2		3	3	1
CO3	3	2	2			2					2		2	2	1
CO4	3	2	2			2					2		2	1	2
CO5	2	2	2			2					2		2	1	1
			3- Strong; 2-Medium; 2-Low												

K.S. Rangasamy College of Technology– Autonomous								
60 TT E 35 - Export Policies and Documentation								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction to International Business * Domestic trade Vs international trade - comparison; regional trade blocks – ASEAN, EU, SAARC, NAFTA; International business environment – social, cultural, political and regulatory; Tariff and Non-Tariff barriers – features.	9
International Trade Financing ** Export credit - L/C, export packing credit, post shipment credit, Buyers credit, Line of credit, short term, medium term, long term finance; Telegraphic Transfer, EXIM bank – objectives and functions; ECGC – objectives and functions; Forfaiting –functions and benefits; Product planning and development, product cycle, new product development ; Payment and Pricing Terms in export trade.	9
Balance of Payment ** BOP – Introduction, components, functions, disequilibrium, financing BOP deficit; foreign exchange market – functions, dealings, exchange rate systems; Devaluation – introduction, limitations; Counter trade – meaning, factors responsible for growth of counter trade.	9
Exim Policies *** Foreign Trade Policy- objectives, EXIM policy related to textile; Export promotional measures – ASIDE, MAI, MDA, TEE, BPQ, TPS, DBK, EPCG, EOU, EHTP, STP, BTP, SEZ; Regulation and promotion of foreign trade – Introduction.	9
Export Documents ** Documents for export — primary and secondary, documents for claiming export assistance; international codes for products and services; export procedure – from packing to shipment.	9
Total hours	**45**

Text Books

1.	T.A.S Balagopal, " Export Management ", New age Publishers,2008
2.	Francis Cherunilam, "International Buisness Text and Cases", Prentice Hall India, 2009
1.	Philip Kortler and Kevin Lane keller , "Marketing Management", PH ,2012.
2.	Ramaswamy V S and Namakumari S., "Marketing Management", Global Perspective Indian Context,Macmillian Publishers India Ltd ,2009
3.	Richard M.Hill, Ralph S.Alexander, James S.Cross, "Industrial Marketing", Aitbs Publishers & Distributors, 1998

**SDG 8: Decent Work and Economic Growth*

***SDG 9: Industry, Innovation, and Infrastructure*

***SDG 17: Partnerships for the Goals*

****SDG 12: Responsible Consumption and Production*

Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction to International Business**	
1.1	Introduction of business	1
1.2	Concept of domestic trade and international trade	1
1.3	Regional trade blocks	1
1.4	ASEAN and EU	2
1.5	SAARC and NAFTA	1
1.6	International business environment	2
1.7	Features of Tariff and Non-Tariff barriers	1
2.0	**International Trade Financing**	
2.1	Introduction of International Trade Financing	1
2.2	Export credit and export packing credit	1
2.3	Post shipment credit, Buyers credit and Line of credit	1
2.4	Short term, medium term and long term finance	1
2.5	Telegraphic Transfer	1
2.6	Objectives and functions of ECGC	1
2.7	Product planning and development	1
2.8	Product cycle and new product development	1
2.9	Payment and PricingTerms in export trade	1
3.0	**Balance of Payment**	
3.1	Introduction to balance of payment	1
3.2	Components, functions and disequilibrium	1
3.3	Financing BOP deficit	1
3.4	Functions foreign exchange market	1
3.5	Dealings and exchange rate systems	1
3.6	Objects of devaluation	1
3.7	Counter trade	1
3.8	Factors responsible for growth of counter trade	2
4.0	**Exim Policies**	
4.1	Object of foreign Trade Policy	1
4.2	EXIM policy	1
4.3	Export promotional measures of ASIDE and MAI	1
4.4	MDA, TEE and BPQ	1
4.5	TPS, DBK, EPCG, BTP and SEZ	2
4.6	EOU, EHTP and STP	1
4.7	Foreign trade regulation and promotion	2
5.0	**Export Documents**	
5.1	Introduction to export documents	1
5.2	Primary and secondary	1
5.3	Documents for claiming export assistance	2
5.4	International codes for products and services	1
5.5	Export procedure	2
5.6	Packing	1
5.7	Shipment	1
	Total hours	**45**

Course Designers Mr. M.Arunkumar – arunkumar@ksrct.ac.in

60 TT E36	Functional Finishes

Category	L	T	P	Credit
PE	3	0	0	3

Objectives

- To impart knowledge on chemical finishing.
- To impart knowledge on hand building effect and finishes.
- To impart knowledge on ultraviolet production and elastomeric finish.
- To impart knowledge on antimicrobial and blood repellent finish.
- To impart knowledge on Novel finishes on textile fabrics.

Pre requisite

Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the methods of chemical finishing, Softening finishes mechanisms, types Softeners, evaluation methods, standards and troubleshooting.	Understand
CO2	Describe the hand building effect and finishes, non-slip finish Mechanisms, application methods and combinability, evaluation methods, standards and troubleshooting.	Analyze
CO3	Explain the mechanism of UV protection, EMI Shielding, elastomeric effect, evaluation methods, standards and troubleshooting.	Understand
CO4	Describe the mechanism and properties of an antimicrobial and blood repellent finish. Chemicals/agents uses and interaction evaluation methods, standards and troubleshooting.	Apply
CO5	Summarize the various novel finishes and Smart textiles by chemical finishing.	Apply

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3			2										
CO2	3	3			2										
CO3	3	3	3	3	2	2									
CO4	3	3	3	3	2	2									
CO5	3	3				3	3								
3- Strong;2-Medium;2-Low															

Mapping with Program outcomes

K.S.Rangasamy College of Technology–Autonomous								R 2022
60 TT E 36 – Functional Finishes								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	3	0	0	45	3	40	60	100

Chemical Finishing Importance, methods of chemical finishing. Softening finishes: Mechanisms of the softening effect. Types Softeners. Evaluation methods. Standards; Troubleshooting.	9
Hand Building Finishes The hand building effect. Textiles with hand building finishes. Evaluation methods. Non-Slip Finishes: Mechanisms, Application methods and combinability. Evaluation, standards; Trouble shooting.	9
Ultraviolet Protection and Elastomeric Finishes Mechanism of UV protection. EMI Shielding. Mechanism of elastomeric effect. Evaluation. standards Troubleshooting.	9
Antimicrobial and Blood Repellent Finishes Mechanism. Properties of an effective antimicrobial and blood repellent finish. Chemicals/agents used and their interaction. Evaluation. standards; Trouble shooting.	9
Novel Finishes Anti-odour and fragrance finishes. Mosquito repellent finish. Conductive finish. Finishes using plasma, radiation technologies. Application of nano and biotechnology in finishing. Micro encapsulation technique and finishing. Smart textiles by chemical finishing.	9
Total Hours	**45**

TextBooks

1.	Mohammad Shahid, Ravindra Adivarekar “Advances in Functional Finishing of Textiles” Springer Singapore, Hardcover, ISBN978-981-15-3668-7, June 2020.
2.	K.L.Mittal and Thomas Bhaners,“Textile Finishing: Recent development and Future Trends” ISBN 9781119426769,2017.

References

1.	Asim Kumar Roy Choudhury” Principles of Textile Finishing (The Textile Institute Book Series) Hardcover, April 2017**.**
2.	Vijay Kumar Jain**, “** Nanofinishing Science and Technology” Hardcover, January 2017.
3.	W.D.Schindler, “Chemical Finishing of Textiles”, Wood Head Publishing Ltd, 2004.
4.	Prof. Dr. rer. nat. Hans-Karl Rouette, “Encyclopedia of Textile Finishing”, Springer Verlag, 2002.

Course Content and Lecture Schedule

S.No.	Topic	No. of hours
1.0	**Chemical Finishing**	
1.1	Importance of chemical finishing	1
1.2	Methods of chemical finishing	1
1.3	Softening finish mechanism	1
1.4	Effect of softening	1
1.5	Types Softeners	2
1.6	Evaluation methods	1
1.7	Standards	1
1.8	Troubleshooting	1
2.0	**Hand building finishes**	
2.1	Introduction to hand building effect	1
2.2	Textiles with hand building finishes	1
2.3	Evaluation methods of hand building finishes	1
2.4	Non-Slip Finishes	1
2.5	Mechanism - Non-slip finishes	1
2.6	Application methods and combinability	1
2.7	Evaluation methods of Non-slip finishes	1
2.8	Standards of evaluation	1
2.9	Troubleshootingthe issues in Non-slip finishes	1
3.0	**Ultraviolet Protection and Elastomeric Finishes**	
3.1	Mechanism of UV protection	1
3.2	EMI Shielding	1
3.3	Mechanism of elastomeric effect	1
3.4	Evaluation methods of UV protection	1
3.5	Standards of UV protection	1
3.6	Troubleshooting the issues in UV protection	1
3.7	Evaluation methods of EMI Shielding	1
3.8	Standards of EMI Shieldingevaluation	1
3.9	Troubleshooting the issues in EMI Shielding	1
4.0	**Antimicrobial and Blood Repellent Finishes**	
4.1	Mechanism of an antimicrobial finish	1
4.2	Properties of an effective antimicrobial finish	1
4.3	Mechanism of blood repellent finish	1
4.4	Properties of an effective blood repellent finish	1
4.5	Chemicals/agents used and their interaction	2
4.6	Evaluation of antimicrobial and blood repellent finish	1
4.7	Evaluation standards for antimicrobial and blood repellent finish	1
4.8	Troubleshooting the issues in antimicrobial and blood repellent finish	1
5.0	**Novel Finishes**	
5.1	Anti-odour and fragrance finishes	1
5.2	Mosquito repellent finish	1
5.3	Conductive finish	1
5.4	Finishes using plasma, radiation technologies	1
5.5	Application of nanotechnology in finishing	1
5.6	Application of biotechnology in finishing	1
5.7	Micro encapsulation technique	1
5.8	Micro encapsulation finishing	1
5.9	Smart textiles by chemical finishing	1
	Total hours	**45**

Course Designer: Mr.P.Maheswaran – pmaheswaran@ksrct.ac.in

60 TT 6P1	Garment Construction Laboratory I

Category	L	T	P	Credit
PC	0	0	4	2

Objective(s)

- To give hands on training in constructing stitches and seams
- To give hands on training in darts, tucks and pleats
- To give hands on training in sleeves, collars and pockets
- To give hands on training in pattern making for children's wear
- To give hands on training in constructing basic children's and ladies garments.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Construct types of seams and stitches	Undersand
CO2	Construct types of pleats, gathers, darts and tucks	Understand
CO3	Demonstrate the pattern drafting and constructions of baby and children wear	Remember
CO4	Demonstrate the pattern drafting and constructions of men's wear	Remember
CO5	Demonstrate the pattern drafting of women's wear	Remember

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2		1	3	1		2	1	2		3	2	2
CO2	3	3	2		2	3	1		3	2	3	2	3	2	2
CO3	3	3	2	2	2	3	1		3	1	3	2	3	2	2
CO4	3	3	2	2	2	3	1	1	3	2	3	2	3	2	2
CO5	3	3	2	1	1	3	1	1	1	1	3	1	3	2	2
			3- Strong; 2-Medium; 2-Low												

List of Experiments

1. Construction of different types of stitches and seams.
2. Construction of different types of embroidery stitches.
3. Construction of different types of Pleats and gathers.
4. Construction of different types of darts, tucks and yokes.
5. Construction of different types of sleeves, collars and pockets.
6. Drafting pattern and construction of baby's romper.
7. Drafting pattern and construction of children's summer frock.
8. Drafting pattern and construction of men's T-Shirt.
9. Drafting pattern and construction men's pyjama.
10. Drafting pattern for ladies skirt and blouse.

Total Hours: 60

Course Designer

Dr. M.B.Sampath -sampath@ksrct.ac.in

60 TT 6P2	Textile and Apparel Quality Evaluation Laboratory I

Category	L	T	P	Credit
PC	0	0	4	2

Objective(s)

- To study the different sampling techniques
- To study the evaluation procedure for determining various fibre properties
- To study the evaluation procedure for determining various yarn properties
- To study the evaluation procedure for determining various fabric properties
- To study the evaluation procedure for determining various apparel properties.

Prerequisite

NIL

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyse the fibre length, fibre fineness and bundle fibre strength	Analyse
CO2	Evaluate the linear density of sliver, roving and yarn. Determine single yarn and ply yarn twist	Evaluate
CO3	Evaluate the single yarn strength and lea strength	Evaluate
CO4	Analyse the fabric abrasion and pilling	Analyse
CO5	Evaluate the fabric tensile, bursting strength and tearing strength	Evaluate

Mapping with Programme Outcomes

60 TT 6P2 - Textile and Apparel Quality Evaluation Laboratory														
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	2	3	2			2	1	2		2		2	2
CO2	3	3	2	3	2			2	1	2		2		2	2
CO3	3	3	2	3	2			2	1	2		2		2	2
CO4	3	3	2	3	2			2	1	2		2		2	2
CO5	3	2	2	3	2			2	1	2		2		2	2

List of Experiments

1. Determination of fibre length using Baer sorter / fibrograph*
2. Determination of fibre fineness using Sheffield micronaire and Determination of bundle fibre strength and elongation using Stelometer*
3. Determination of fibre trash content using trash analyzer *
4. Determination of linear density of sliver, roving and yarn using wrap block and automatic wrap reel*
5. Determination of single yarn and ply yarn twist using manual / electronic twist tester*
6. Determination of single yarn strength and elongation using single thread strength tester*, Determination of lea strength using mechanical lea tester*
7. Determination of fabric GSM and fabric stiffness using stiffness tester *
8. Determination of crease recovery angle using crease recovery tester*
9. Determination of fabric pilling using ICI pill box tester and Determination of fabric abrasion using Martindale abrasion tester*
10. Determination of fabric tensile strength using fabric strength tester, bursting strength using bursting strength tester and tearing strength using Elmendorf tear tester*
11. Determination of fabric seam slippage using seam slippage tester*
12. Determination of button and snap pull strength using button snap pull tester.*

*SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Total Hours: 60

Course Designer

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60 CG 0P5	Comprehension Test*	Category	L	T	P	C	CA	ES	Total
Semester VI		CG	0	0	2	1*	100	-	100

Objectives

- To evaluate the knowledge gained in core courses relevant to the programme of study.
- To assess the technical skill in solving complex engineering problems.

Prerequisite

Fundamental knowledge in all core subjects.

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Infer knowledge in their respective programme domain.	Apply
CO2	Attend interviews for career progression	Apply
CO3	Exhibit professional standards to solve engineering problems	Apply
CO3	Promote holistic approach to problem solving	Apply
CO5	Examine the competency of graduates in specific programme domain	Apply

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2					1	2	2	3	3	2	1
CO2	3	3	2	2					1	2	2	3	2	1	1
CO3	3	3	2	2					1	2	2	3	3	3	2
CO4	3	3	2	2					1	2	2	3	3	3	2
CO5	3	3	2	2					1	2	2	3	3	2	1
3- Strong;2-Medium;1-Some															

Assessment Pattern

The overall knowledge of the candidate in various courses he/she studied shall be evaluated with multiple choice questions.

***SDG:4- Quality Education**

60 TT L 03	Introduction to Fashion Design

Category	L	T	P	Credit
PC	3	0	0	3

Objectives

- Study the history and theories of fashion movement and fashion cycle
- Learn the significance of clothing in different cultural and social contexts
- Apply knowledge of fashion and clothing in personal wardrobe planning
- Utilize elements and principles of design in creating aesthetically pleasing outfits
- Develop skills in portfolio presentation and organizing fashion shows

Prerequisite

Basic knowledge about woven and knitted fabrics

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Analyse reasons for changes in fashion, classifying styles, trends, and fads	Analyze
CO2	Understand the cultural aspects and societal roles of clothing	Understand
CO3	Develop skills in selecting appropriate clothing for different age groups and occasions	Understand
CO4	Mastery of Design Elements and Principles	Understand
CO5	Create designer boards: Develop fashion illustration skills and portfolio presentation	Application

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1			2			1	2	2	1	2	2	
CO2	2	2	1			2			2	1	2	3	2	2	
CO3	3	2	2			2			2	2	2	2	2	2	
CO4	3	2	2			2			2	1	2	1	2	2	
CO5	2	2	2			2			3	3	2	2	2	2	
3- Strong; 2-Medium; 2-Low															

K.S. Rangasamy College of Technology– Autonomous								
60 TT L 03 - Introduction to Fashion Design								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VII	3	0	0	45	3	40	60	100

Introduction to Fashion Origin of fashion - terms and definitions - reasons for change in fashion - classification of fashion – Style, Classic, FAD, Trend – theories of fashion – movement of fashion - fashion cycle.	9
Introduction to Clothing Understanding clothing - Purpose of clothing: protection, modesty, attraction etc - Importance of clothing - Clothing Culture, Men and Women clothing and ornamentation - Role and status of clothing - Clothing according to climatic conditions – factors to be considered in the selection of clothing.	9
Wardrobe planning Selection of clothes - Clothes for children, middle-aged and adults. Types of clothes according to different types of human figure, Different materials for different clothes, Fabrics and colors suitable for different garments. Planning for clothing needs: Formal clothing, Clothes for parties, Clothes for sports, Casual Clothes for casual wear. Wardrobe Planning: Wardrobe for men and women	9
Elements and Principle of Design Elements of Design: Introduction on basics Elements of design - Silhouette, Details, Texture, Color, Lines, Principle of design: Introduction to principles of Elements of design - Proportion, Balance, Rhythm, Center of Interest, Harmony	9
Design and Development Designer boards - Mood board, fabric board, colour board, accessory board. Fashion illustration – head theories, Illustration techniques – strokes, hatching, shading; Colouring techniques – Medias for colouring. Portfolio presentation – styles of presentation - Fashion shows.	9
Total hours	**45**

1.	Munslow, Janine, McKelvey, Kathryn “Fashion Design Process Innovation and Practice”, 2nd Edition, wiley, 2012.
2.	Amaden-Crawford, C. “A Guide to Fashion Sewing - With Studio” . Bloomsbury Academic, USA, 2016

1.	Jelka Gersak, “Design of Clothing Manufacturing Processes”, Elsevier Science & Technology, 2016
2.	Kathryn McKelvey “Fashion Source Book” Balckwell Publishing, New Delhi. 2012
3.	Jane Mills and Janet K.Smith “Design Concepts” Fairchild Publications, New York.2013

SDG 8- Decent work and Economic Growth

SDG 12- Responsible Consumption and Production

S. No.	Topic	No. of hours
1.0	**Introduction to Fashion**	
1.1	Origin of fashion - terms and definitions	1
1.2	classification of fashion	1
1.3	Reasons for change in fashion	1
1.4	classification of fashion	2
1.5	Style, Classic, FAD, Trend – theories of fashion	1
1.6	movement of fashion - fashion cycle.	2
2.0	**Introduction to Clothing**	
2.1	Understanding clothing Importance	2
2.2	Purpose of clothing: protection, modesty, attraction etc -	2
2.3	Clothing Culture, Men and Women clothing and ornamentation	2
2.4	Role and status of clothing	1
2.5	Clothing according to climatic conditions	1
2.6	clothing factors to be considered in the selection of clothing.	1
3.0	**Wardrobe planning**	
3.1	Selection of clothes - Clothes for children, middle-aged and adults., Fabrics and colours suitable for different garments	3
3.2	Types of clothes according to different types of human figure	1
3.3	Different materials for different clothes,	2
3.4	Planning for clothing needs: Formal clothing, Clothes for parties, Clothes for sports, Casual Clothes for casualwear. Wardrobe Planning	2
3.5	Wardrobe for men and women	1
4.0	**Elements and Principle of Design**	
4.1	Elements of Design Introduction	2
4.2	Introduction on basics Elements of design	2
4.3	Silhouette, Details, Texture, Color, Lines, Principle of design:	2
4.4	principles of Elements of design - Proportion, Balance, Rhythm, Center of Interest, Harmony	3
5.0	**Design and Development**	
5.1	Designer boards - Mood board, fabric board, colour board, accessory board	1
5.2	Fashion illustration	1
5.3	head theories	2
5.4	Illustration techniques – strokes, hatching, shading	1
5.5	Colouring techniques – Medias for colouring	2
5.6	Portfolio presentation – styles of presentation	1
5.7	Fashion shows	1
	Total hours	**45**

Course Designer: Dr. MB Sampath - sampath@ksrct.ac.in

60 TT L 04	Industrial Textiles

Category	L	T	P	Credit
BS	3	0	0	3

Objectives

- To impart the knowledge on various fibers used in Industrial textile
- To impart the knowledge on medical textiles
- Understand the basic knowledge on geo and agro textiles
- To impart the knowledge on protective and smart textiles
- Understand the industrial application of textiles

Prerequisite
Nil

Course Outcomes

On the successful completion of the course, students will be able to

CO1	Explain the scope, classification & application of industrial textiles	Understand
CO2	Conclude the role of textile materials in the medical textile's product development.	Remember
CO3	Describe the properties required to use in Agro textiles & Geo textiles and the application of Geo & Agro textiles.	Understand
CO4	Summarize the functions & applications of protective & smart textiles.	Remember
CO5	Outline the miscellaneous & Industrial applications of textile products	Apply

Mapping with ProgrammeOutcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	2		1	3	2		3	3			3	3	1
CO2	2	3	2			3	3		3	1			3	3	1
CO3	2	1	3	2	1	3	3		3	1		1	3	3	1
CO4	3		3	3		3	3		3	1		1	3	3	1
CO5	2		3	3		3	3		3	1		1	3	3	1
3- Strong; 2-Medium; 2-Low															

K.S. Rangasamy College of Technology– Autonomous								
60 TT L04 - Industrial Textiles								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	4 5	3	50	50	100

Introduction of Industrial Textile Industrial Textiles: Introduction - Definition, Scope of Industrial textiles, Classification & Application of Industrial textiles. Fibres – Conventional Fibres, High-Performance fibres, Ultrafine and Novelty fibres.	9
Medical Textiles Medical Textiles: Introduction, Materials used & its requirements. Classification of Medical Textiles - Textiles for implantations, Non-implantation textiles, Extra-corporeal devices, Healthcare & Hygiene Products.	9
Geo & Agro Textiles Geo Textiles: Geotextile, Geosynthetics, Fibres and its selection for Geo textiles, Functions of Geotextiles, Engineering properties of Geotextiles, Geotextile structure, Applications for natural Geotextiles. Agro Textiles - Textiles in Agriculture - Fibres details & Properties, Applications of Agro textiles	9
Protective & Smart Textiles* Protective Textiles: Selection of protective clothing materials, fibres and fabrics for Protective Textiles, Textiles for environmental protection; Thermal insulation materials; Cold weather clothing, Nuclear protective fabrics. Smart Textiles: Role of smart materials in textiles, Shape Memory Fibres, Shape Memory Material, Concepts associated with shape memory materials	9
Industrial Applications of Textiles Textiles in Electronics, Textiles in Automotives, Textile reinforcement products, Textiles for Banners and Flags, Canvas Covers and Tarpaulins, Ropes and Nets, Home and Office Furnishings, and Textiles in Sportswear – Athleisure wear	9
Total hours	**45**

Text Books

1.	A.R.Horrocks & S.C. Anand (Edrs.), Handbook of Technical Textiles, The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
2.	T.Matsuo, “Fiber materials for Advanced Technical Textiles”, CRC publication, 2008.

References

1.	N.W.M. John, “Geotextiles”, Blackie, London, ISBN: 0-216-91995-9, 1987.
2.	S. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennylvania, ISBN: 1-56676-340-1, 1995.
3.	S. Anand, “Medical Textiles”, Text. Inst., 1996, ISBN: 185573317X.
4.	Richard. A.Scott, Textiles for Protection, CRC press, Woodhead Publication, USA, 2005.

*SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

BoS Chairman
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Course Content and Lecture Schedule

S. No.	Topic	No. of hours
1.0	**Introduction**	
1.1	Sequence of operation in warp and weft preparation.	1
1.2	Various types of woven fabrics - plain, stripes, checked, dyed, printed and denim	1
1.3	Different types of supply packages; Winding - angle of wind, angle of cone, traverse ratio	1
1.4	Classification of winding machines and yarn faults and its removal	1
1.5	Characteristics of parallel winding, cross winding and precision winding	2
2.0	**Warp Winding**	
2.1	Objects of winding	1
2.2	Principles of random and precision winders	1
2.3	Working of conventional and modern cone and cheese winding machines	1
2.4	Production of Bi-conical packages	1
2.5	Function of various parts – tension devices, slub catchers, stop motions	1
2.6	Types of drum - half accelerated and fully accelerated drums	1
2.7	Anti-patterning devices, anti-ballooning devices	1
2.8	Concepts in yarn clearing – mechanical, optical and electronic yarn clearers	1
2.9	Knotters and splicers, clearing efficiency	1
2.10	Calculations based on winding parameters	1
3.0	**Pirn Winding**	
3.1	Objects and principles of pirn winding	1
3.2	Types of pirn winding machine - modern automatic pirn winders	2
3.3	Production calculations in cone, cheese and pirn winding machines	1
3.4	Winding of synthetic and blended yarns	1
3.5	Yarn preparation for hosiery process	1
3.4	Package preparation for dyeing	1
3.5	Winding package faults and remedies - cone, cheese and pirn winding	2
4.0	**Warping**	
4.1	Warping - Objectives; classification of warping machines	1
4.2	working principle of beam warping machine	1
4.3	Creel types, stop motion, length measuring motion	1
4.4	working principle of sectional warping machine- creel, stop motion, length measuring motion	2
4.5	Ball warping and draw warping	1
4.6	Features of modern warping machines	1
4.7	Warping defects -causes and remedies	1
4.8	Production calculations in warping machine	2
5.0	**Sizing & Drawing – In**	
5.1	Sizing -Objectives of sizing	1
5.2	sizing ingredients and recipe for various fibres, size paste preparation	1
5.3	Types of sizing machines and its function marking and measuring motion	1
5.4	Concept of single end sizing	1
5.5	Sizing of blended and filament yarns & Modern developments in sizing	1
5.6	Cold and pre wet sizing	1
5.7	Sizing defects- causes and remedies	1
5.8	Production calculations in Sizing	1
5.9	Needs and methods of drawing-in process, leasing, knotting and pinning machines	1
5.10	Selection and care of reeds, healds and drop pins	1
	Total Hours	45

Course Designers

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Passed in BoS Meeting held on 11/05/2023
Approved in Academic Council Meeting held on 03/06/2023

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