

**SONA COLLEGE OF TECHNOLOGY, SALEM-5**

**(An Autonomous Institution)**

**B.Tech-Fashion Technology**

**CURRICULUM and SYLLABI**

**[For students admitted in 2020-2021]**

**B.E / B.Tech Regulation 2019**

**Approved by BOS and Academic Council meetings**

**Sona College of Technology, Salem**  
(An Autonomous Institution)

**Courses of Study for B.E./B.Tech. Semester I under Regulations 2019 (CBCS)**

**Branch: Fashion Technology**

S.No.	Course Code	Course Title	L	T	P	C	Category
<b>Theory</b>							
1.	U19ENG101D	English for Engineers - I	2	0	0	2	HS
2.	U19MAT102C	Calculus and Statistics	3	1	0	4	BS
3.	U19PHY103D	Engineering Physics - I	3	0	0	3	BS
4.	U19CHE104F	Chemistry for Textile Technologists - I	3	0	0	3	BS
5.	U19FTY107	Textile Science: Fibres and Yarns	3	0	0	3	PC
<b>Practical</b>							
6.	U19PCL108B	Physics and Chemistry Laboratory <sup>#</sup>	0	0	2	1	BS
7.	U19FTL116	Fibre and Yarn Analytical Laboratory	0	0	2	1	PC
8.	U19CFTL117	Computer basics for Fashion Technology Laboratory	0	0	2	1	PC
9.	U19GE101	Basic Aptitude - I	0	0	2	0	EEC
<b>Total Credits</b>						18	
<b>Optional Language Elective*</b>							
10.	U19OLE1101	French	0	0	2	1	HS
11.	U19OLE1102	German					
12.	U19OLE1103	Japanese					

\*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

<sup>#</sup> Laboratory classes on alternative weeks for Physics and Chemistry. The lab examination will be conducted separately for 50 marks each with 2 hours duration.



**Approved By**

Chairperson,  
Science and  
Humanities BoS  
**Dr.M.Renuga**

Chairperson,  
Fashion  
Technology  
BoS  
**Dr.D.Raja**

Member Secretary,  
Academic Council  
**Dr.R.Shivakumar**

Chairperson,  
Academic Council  
& Principal  
**Dr.S.R.R.Senthil  
Kumar**

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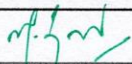
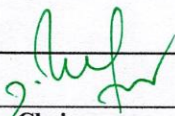
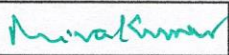
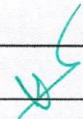
HOD/ Fashion Technology, First Semester BE FT Students and Staff, COE

**Sona College of Technology, Salem – 636 005**  
**(An Autonomous Institution)**  
**Courses of Study for BE/B Tech Semester II under Regulations 2019 (CBCS)**  
**Branch: Fashion Technology**

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
<b>Theory</b>								
1	U19MAT202E	Probability and Statistical Quality Control	3	1	0	4	BSC	60
2	U19PHY203E	Engineering Physics - II	3	0	0	3	BSC	45
3	U19CHE204C	Chemistry for Textile Technologists - II	3	0	0	3	BSC	45
4	U19BEE206A	Basics of Mechanical and Electrical Engineering	3	0	0	3	ESC	45
5	U19FT201	Woven Fabric Manufacture and Structure	3	0	0	3	PCC	45
6	U19EGR206B	Engineering Graphics for Fashion Designing	1	0	2	2	ESC	45 (15L+30P)
<b>Practical</b>								
7	U19ENL215	English for Engineers - II	0	0	2	1	HSC	30
8	U19FT202	Woven Fabric Structure and Textile CAD Laboratory	0	0	2	1	PCC	30
9	U19GE201	Basic Aptitude – II	0	0	2	0	EEC	30
<b>Total Credits</b>						<b>20</b>		
<b>Optional Language Elective*</b>								
10	U19OLE1201	French	0	0	2	1	HSMC	30
11	U19OLE1202	German						
12	U19OLE1203	Japanese						

\*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved by

			
<b>Chairperson, Science and Humanities BoS</b>	<b>Chairperson, Fashion Technology BoS</b>	<b>Member Secretary, Academic Council</b>	<b>Chairperson, Academic Council &amp; Principal</b>
<b>Dr. M. Renuga</b>	<b>Dr. D. Raja</b>	<b>Dr. R. Shivakumar</b>	<b>Dr. S. R. R. Senthil Kumar</b>

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**Sona College of Technology, Salem**  
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**Courses of Study for B.E/B.Tech. Semester III Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19MAT301E	Operations Research and Statistical Methods	3	1	0	4	60
2	U19FT301	Knitted Fabric Manufacture and Structure (lab integrated)	3	0	2	4	75
3	U19FT302	Chemical Processing of Textiles and Garments (Lab Integrated)	3	0	2	4	75
4	U19FT303	Fashion Art and Design	3	0	0	3	45
5	U19FT304	Pattern Making and Garment Construction - I	3	0	0	3	45
6	U19GE304	<b>Mandatory Course :</b> Constitution of India	2	0	0	0	30
<b>Practical</b>							
7	U19FT305	Pattern Making and Garment Construction Laboratory - I	0	0	2	1	30
8	U19FT306	Digital Fashion Design Laboratory	0	0	4	2	60
9	U19ENG301	Communication Skills Laboratory	0	0	2	1	30
10	U19GE301	Soft Skills and Aptitude – I	0	0	2	1	30
<b>Total Credits</b>						<b>23</b>	

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**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester IV Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19GE402	<b>Mandatory course:</b> Environment and Climate Science	2	0	0	0	30
2	U19FT401	Pattern Making and Garment Construction - II	3	0	0	3	45
3	U19FT402	Garment Production Machinery and Equipment (Lab Integrated)	3	0	2	4	75
4	U19FT403	Problem Solving using Python Programming (Lab Integrated)	3	0	2	4	75
5	U19FT404	Textile and Apparel Quality Evaluation	3	0	0	3	45
6	U19FT405	Textile Materials for Fashion Design	3	0	0	3	45
<b>Practical</b>							
7	U19FT406	Pattern Making and Garment Construction Laboratory – II	0	0	2	1	30
8	U19FT407	Textile and Apparel Quality Evaluation laboratory	0	0	2	1	30
9	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
10	U19FT408	Mini Project - I	0	0	2	1	30
11	U19FT409	In-Plant Training	2 Weeks			1	2 Weeks
<b>Total Credits</b>						<b>22</b>	

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**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester V under Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19FT501	Apparel Manufacturing	3	0	0	3	45
2	U19FT502	Apparel Production Planning and Control	3	0	0	3	45
3	U19FT503	Apparel Merchandising (Lab Integrated)	3	0	2	4	75
4	U19FT504	Functional Garments	3	0	0	3	45
5	noc22_mg104	NPTEL – Principles of Management	3	0	0	3	<b>12 weeks</b>
6	U19FT906	<b>Professional Elective - Intimate Apparel</b>	3	0	0	3	45
	U19FT910	<b>Professional Elective - Home Textiles</b>					
<b>Practical</b>							
7	U19FT505	Apparel Manufacturing Laboratory	0	0	2	1	30
8	U19FT506	Digital Pattern Development and Marker Planning Laboratory	0	0	2	1	30
9	U19GE501	Soft Skills and Aptitude – III	0	0	2	1	30
10	U19FT507	Mini Project - II	0	0	2	1	30
11	U19FT508	In-Plant Training	<b>2 weeks</b>			1	<b>2 Weeks</b>
<b>Total Credits</b>						<b>24</b>	

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HOD/Fashion Technology, Fifth Semester B.Tech FT Students and Staff, COE

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester VI Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19FT601	Clothing Size, Fit and Comfort	3	0	0	3	45
2	U19FT602	Fashion Visual Merchandising	3	0	0	3	45
3	U19FT603	Industrial Engineering in Garment Production	3	0	0	3	45
4	U19FT911	<b>Professional Elective</b> – Fashion Forecasting	3	0	0	3	45
5	U19FT919	<b>Professional Elective</b> – Fashion Retail Store Operations	3	0	0	3	45
6	U19BM1001	<b>Open Elective</b> – Hospital Management	3	0	0	3	45
	U19BM1002	<b>Open Elective</b> – Basic Life Support					
	U19CE1002	<b>Open Elective</b> – Municipal Solid Waste Management					
	U19CE1003	<b>Open Elective</b> – Energy Efficiency and Green Building					
	U19CS1002	<b>Open Elective</b> – Cloud Computing					
	U19EE1002	<b>Open Elective</b> – Energy Conservation and Management					
	U19EE1003	<b>Open Elective</b> – Innovation, IPR and Entrepreneurship Development					
	U19EE1004	<b>Open Elective</b> – Renewable Energy Systems					
U19ME1004	<b>Open Elective</b> – Renewable Energy Sources						
<b>Practical</b>							
7	U19FT604	3D Virtual Fit analysis Laboratory	0	0	2	1	30
8	U19FT605	Industrial Engineering in Garment Production Laboratory	0	0	2	1	30
9	U19GE601	Soft Skills and Aptitude – IV	0	0	2	1	30
10	U19FT606	Mini Project – III	0	0	2	1	30
<b>Total Credits</b>						<b>22</b>	

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VII

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester VII under Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19GE701	Professional Ethics and Human Values	3	0	0	3	45
2	U19FT701	Retail Management	3	0	0	3	45
3	U19FT921	<b>Professional Elective - Fashion Photography</b>	3	0	0	3	45
	U19FT922	<b>Professional Elective – Lean Manufacturing in Apparel Industry</b>					
4	U19FT926	<b>Professional Elective - Fashion Styling</b>	3	0	0	3	45
	U19FT927	<b>Professional Elective - Entrepreneurship Development and Management of Apparel Industry</b>					
5	U19BM1001	<b>Open Elective - Hospital Management</b>	3	0	0	3	45
	U19BM1002	<b>Open Elective - Basic Life Support</b>					
	U19CE1001	<b>Open Elective - Building Services and Safety Regulations</b>					
	U19CE1004	<b>Open Elective - Disaster Management</b>					
	U19CS1001	<b>Open Elective - Big Data Analytics</b>					
	U19CS1002	<b>Open Elective - Cloud Computing</b>					
	U19CS1003	<b>Open Elective - Internet of Things</b>					
	U19EC1006	<b>Open Elective - Mobile Technology and Its Applications</b>					
	U19EE1002	<b>Open Elective - Energy Conservation and Management</b>					
	U19EE1003	<b>Open Elective - Innovation, IPR and Entrepreneurship Development</b>					
	U19EE1004	<b>Open Elective - Renewable Energy Systems</b>					
U19MC1004	<b>Open Elective - Fundamentals of Robotics</b>						
U19ME1002	<b>Open Elective - Industrial Safety</b>						

2/17

Practical							
6	U19FT702	Fashion Portfolio and Product Development Laboratory	0	0	4	2	60
7	U19FT703	Accessory Design and Embellishment Laboratory	0	0	2	1	30
8	U19FT704	Draping Technique	0	0	2	1	30
9	U19FT705	Internship	0	0	4	2	4 weeks
10	U19FT706	Mini Project - IV	0	0	2	1	30
<b>Total Credits</b>						<b>22</b>	

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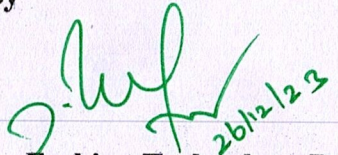
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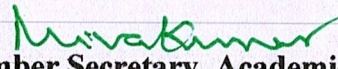
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**Courses of Study for B.E/B.Tech. Semester VIII Regulations 2019**  
**Branch: Fashion Technology**

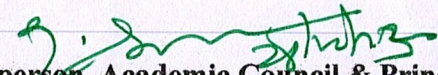
S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Practical</b>							
1	U19FT801	Project Work	0	0	24	12	360
<b>Total Credits</b>						<b>12</b>	

26/12/23

Approved By

  
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HOD/Fashion Technology, Eighth Semester B.Tech FT Students and Staff, COE



**Sona College of Technology, Salem**  
(An Autonomous Institution)

**Courses of Study for B.E./B.Tech. Semester I under Regulations 2019 (CBCS)**

**Branch: Fashion Technology**

S.No.	Course Code	Course Title	L	T	P	C	Category
<b>Theory</b>							
1.	U19ENG101D	English for Engineers - I	2	0	0	2	HS
2.	U19MAT102C	Calculus and Statistics	3	1	0	4	BS
3.	U19PHY103D	Engineering Physics - I	3	0	0	3	BS
4.	U19CHE104F	Chemistry for Textile Technologists - I	3	0	0	3	BS
5.	U19FTY107	Textile Science: Fibres and Yarns	3	0	0	3	PC
<b>Practical</b>							
6.	U19PCL108B	Physics and Chemistry Laboratory <sup>#</sup>	0	0	2	1	BS
7.	U19FTL116	Fibre and Yarn Analytical Laboratory	0	0	2	1	PC
8.	U19CFTL117	Computer basics for Fashion Technology Laboratory	0	0	2	1	PC
9.	U19GE101	Basic Aptitude - I	0	0	2	0	EEC
<b>Total Credits</b>						18	
<b>Optional Language Elective*</b>							
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11.	U19OLE1102	German					
12.	U19OLE1103	Japanese					

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<sup>#</sup> Laboratory classes on alternative weeks for Physics and Chemistry. The lab examination will be conducted separately for 50 marks each with 2 hours duration.

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# U19ENG101D - ENGLISH FOR ENGINEERS – I

## Common to FT

L T P C

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

1. Frame sentences correctly with accuracy.
2. Write emails and formal letters
3. Prepare reports and proposals
4. Draft memos for professional purposes
5. Recommend suggestions / solutions to problems, give instruction, make notes, prepare checklists

### UNIT – I

- General Vocabulary- Parts of speech, Prefixes and Suffixes, Active and Passive voices
- Email - fixing an appointment, Cancelling appointments, conference details, hotel accommodation, order for equipment, training programme details, paper submission for seminars and conferences

### UNIT – II

- Adjectives, comparative adjectives, Prepositions and dependent prepositions
- Letter Writing - Business communication, quotations, placing orders, complaints, replies to queries from business customers, inviting dignitaries, accepting and declining invitations
- Resume / CV

### UNIT – III

- Tenses, Modal verbs and probability
- Proposal: establishing a lab, introducing a subject in the curriculum, training programme for students

### UNIT – IV

- Concord, If conditionals, Collocations
- Technical report writing - feasibility reports, accident reports, survey reports

## **UNIT - V**

- Cause and effect expressions, Pronouns, Adverbs
- Technical Writing: recommendations, checklists, instructions, note making and memo

**TOTAL: 30 hours**

## **TEXT BOOK**

- Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

## U19MAT102C - CALCULUS AND STATISTICS

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

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

- apply the various differentiation techniques to the algebraic and transcendental functions
- apply the various integration techniques to the algebraic and transcendental functions
- represent the data in the form of diagram and graph and analyze them
- apply the concepts of measure of central tendency, dispersion and skewness to the given data and analyze the results
- apply the concepts of correlation and regression to the data and analyze the result.

### UNIT I - DIFFERENTIAL CALCULUS

12

**Ordinary Differentiation:** Rules of differentiation – Derivatives of elementary functions – Differentiation of inverse functions – Logarithmic differentiation – Differentiation of implicit functions – Successive differentiation of simple functions.

**Partial Differentiation:** Total derivative – Euler’s theorem – Differentiation of implicit functions.

### UNIT II - INTEGRAL CALCULUS

12

Definite and indefinite integrals – Substitution rule – Integration by parts – Bernoulli’s formula – Integration of rational functions by partial fraction – Double integral in Cartesian coordinates – Change of order of integration.

### UNIT III - COLLECTION AND REPRESENTATION OF DATA

12

Collection of data – Primary and secondary data – Diagrammatic representation – Simple, subdivided, multiple and bar diagram – Pie diagram – Pictograph – Graphs of frequency distribution – Histogram – Frequency polygon – Frequency curve – Cumulative frequency curve.

## **UNIT IV - MEASURES OF CENTRAL TENDENCY, DISPERSION AND SKEWNESS** **12**

Measure of central tendency (Simple arithmetic mean, median, mode) – Quartile’s – Measure of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation) – Skewness – Karl Pearson’s coefficient of skewness.

## **UNIT V - CORRELATION AND REGRESSION** **12**

Simple and rank correlations – Multiple and partial correlations – Linear regression – Multiple and partial regressions – Curve fitting (straight line and parabola).

**Total: 60 Hours**

### **TEXT BOOKS**

1. S. Narayanan and T. K. Manicavachagom Pillay, “Calculus – volume I and II”, S.Viswanathan Publishers, 2016.
2. S. P. Gupta, “Statistical Methods”, Sultan Chand and Sons Publishers, 15<sup>th</sup> Edition, 2012.

### **REFERENCE BOOKS**

1. J. Stewart, “Calculus”, Cengage Publishers, 8<sup>th</sup> Edition, 2016.
2. G. B. Thomas, “Calculus”, Pearson Publishers, 14<sup>th</sup> Edition, 2018.
3. S. C. Gupta and V. K. Kapoor, “Fundamentals of Mathematical Statistics”, Sultan Chand and Sons Publishers, 11<sup>th</sup> Edition, Reprint, 2019.
4. R. A. Johnson and C. B. Gupta, “Miller and Freund’s, Probability and Statistics for Engineers”, Pearson Publishers, 9<sup>th</sup> Edition, 2018.
5. P. G. Hoel, S. C. Port and C. J. Stone, “Introduction to Probability Theory”, Universal Book Stall Publishers, Reprint, 2003.

**U19PHY103D - ENGINEERING PHYSICS - I**  
**(For B.Tech. Fashion Technology)**

**L T P C**  
**3 0 0 3**

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

- Discuss the dual nature of matter and radiation and the application of wave nature of particles.
- Describe the basic components of lasers.
- Analyse the relation between arrangement of atoms and material properties.
- Deduce Maxwell's equations using the fundamentals of electromagnetism.
- Elucidate the different modes of heat transfer.

**UNIT I - QUANTUM PHYSICS**

**9**

Origin of quantum mechanics – Limitations of classical theory - Dual nature of matter and radiation.

**Particle nature of radiation** - Compton effect - Explanation based on quantum theory - Expression for Compton shift (no derivation).

**Wave nature of matter** - de Broglie waves - Schrödinger's time independent and time dependent wave equations - Physical significance of wave function - Energy and wave function of an electron trapped in one dimensional box.

**Application of wave nature of particles** - Electron microscope - Comparison of optical and electron microscope - Scanning electron microscope - Limitations of electron microscope.

**UNIT II - LASERS**

**9**

**Basic terms** - Energy level - normal population - Stimulated absorption - population inversion - meta stable state - spontaneous emission - stimulated emission.

**Basic components of a laser** - Active medium - pumping technique - optical resonator  
**Einstein's theory** - stimulated absorption - spontaneous emission and stimulated emission.

**Types of lasers** - Solid lasers ( Nd:YAG) - Gas lasers (CO<sub>2</sub> laser) - semiconductor laser (homojunction and hetero junction laser).

**Holography** - Construction and reconstruction of hologram.



### UNIT III - CRYSTAL PHYSICS

9

Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice –space lattice - unit cell - lattice parameters – basis - crystallographic formula) - Seven crystal systems and fourteen Bravais lattices – Lattice planes and Miller indices – Interplanar distance - d spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number and Atomic Packing factor for SC, BCC, FCC and HCP Structures - Polymorphism and allotropy.

**Crystal imperfections** - Point, line and surface defects - Burger vector.

### UNIT IV - ELECTROMAGNETISM

9

**Electrostatics** - Electric field - Electric field intensity – Field due to discrete and continuous

charges – Electric lines of forces – Electric flux – Gauss’s law – Divergence of E – Applications of Gauss’s law – Curl of E.

**Magnetostatics** – Magnetic fields – Magnetic Lorentz force – Force experienced by current carrying conductor in magnetic field – Steady currents – Magnetic field due to steady current - Biot - Savart Law - Straight line currents – Ampere’s circuital law – Divergence and curl of B – Applications of Ampere’s circuital law - Comparison of Magnetostatics and Electrostatics.

### UNIT V - THERMAL PHYSICS

9

**Heat and temperature** - Modes of heat transfer (Conduction, convection and radiation) - Specific heat capacity - thermal capacity and coefficient of linear thermal expansion.

**Thermal conductivity** - Measurement of thermal conductivity of good conductor - Forbe’s method - Measurement of thermal conductivity of bad conductor - Lee’s disc method - Radial flow of heat - Cylindrical flow of heat - Practical applications of conduction of heat.

**Thermal radiations** - Properties of thermal radiations - Applications of thermal radiations.

**Total: 45 Hours**

### TEXT BOOKS

1. M.N.Avadhanulu, ‘Engineering Physics’ S.Chand & Company Ltd, New Delhi (2015)
2. D. K. Bhattacharya, Poonam Tandon “Engineering Physics” Oxford University Press 2017.

## **REFERENCES**

1. Engineering Physics, Sonaversity, Sona College of Technology, Salem (Revised Edition 2018 ).
2. B. K. Pandey and S. Chaturvedi, Engineering Physics , Cengage Learning India Pvt. Ltd., Delhi, 2019
3. Rajendran, V, and Marikani A, ‘Materials science’ TMH Publications, (2004) New Delhi.
4. Palanisamy P.K, ‘Materials science’, SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)

## U19CHE104F - CHEMISTRY FOR TEXTILE TECHNOLOGISTS – I

L	T	P	C
3	0	0	3

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

- Analyze the types of impurities of water, their removal methods and explain the conditioning methods for domestic and industrial uses.
- Analyze the various types of chemical bonding and impacts on materials.
- Recognize the role applications of surface chemistry and catalysis in engineering and technology.
- Understand the basics of nano chemistry and nano material fabrication on fibers and its role.
- Apply the various instrumental methods of analysis on numerous engineering materials and their significances.

### UNIT I - WATER TECHNOLOGY

**09**

Introduction - Characteristics – hardness – estimation of hardness by EDTA method, alkalinity and its estimation - Boiler feed water – requirements – disadvantages of using hard water in boilers – internal conditioning (colloidal, phosphate, calgon and carbonate conditioning methods) – external conditioning – zeolite process, demineralization process, desalination of brackish water by reverse osmosis.

### UNIT II - CHEMICAL BONDING

**09**

Types of bond – van der Waals (or) intermolecular forces – types – hydrogen bond – types, Valence Bond Theory (VBT) – VSEPR Theory - Molecular Orbital Theory – Linear Combination of Atomic Orbitals (LCAO method)- energy level diagram of molecular orbitals (nitrogen and oxygen only) – coordinate bond – metallic bond.

### UNIT III - SURFACE CHEMISTRY AND CATALYSIS

**09**

Adsorption-types-physical and chemical adsorption – adsorption of gases on solids-adsorption isotherms-Freundlich and Langmuir isotherms-adsorption of solutes from solution – applications of adsorption - role of adsorption in catalytic reactions – basic principles in adsorption chromatography – adsorption in pollution abatement (granular activated carbon and powdered activated carbon) – catalysis - types - characteristics of catalysis - autocatalysis - definition and examples.

### UNIT IV - APPLICATIONS OF NANO CHEMISTRY IN TEXTILES

**09**

Basics - distinction between molecules, nanoparticles and bulk materials – size dependent properties – Synthesis: precipitation – thermolysis – hydrothermolysis – solvothermolysis –sol-gel technique – Potential applications of Nanoparticles in textiles

- Fabrication Process – Electrospinning- Self Cleaning Fabrics - Water Repellency Property- UV-Protection Property - Anti-Bacterial Property - Anti-Static Property - Wrinkle Resistance Property - Flame Retardant Finish- Nanotextiles – Properties, Types, Functionalities and Processes.

## **UNIT V - INSTRUMENTAL METHODS OF ANALYSIS 09**

Beer-Lambert's law – UV-Visible spectroscopy, Colourimetry – principles and instrumentation - Estimation of Iron - IR and FT-IR spectroscopy – principles and instrumentation (block diagram only) - Thermoanalytical methods – principles and applications of Thermogravimetry (TGA), Differential thermal analysis (DTA) and Differential Scanning Calorimetry (DSC).

**Total: 45 Hours**

### **TEXT BOOKS**

- P.C.Jain and Monica Jain, “Engineering Chemistry” Dhanpat Rai Pub, Co., New Delhi, 2018 (17th Edition).
- N. Panneer Selvam et al., “Chemistry For Textile Technologists - I”, Sonaversity, Sona College of Technology, Salem, 2019.

### **REFERENCE BOOKS**

- O.G. Palanna “Engineering Chemistry” Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2017.
- Kannan P., Ravikrishnan A., “Engineering Chemistry”, Sri Krishna Hi-tech Publishing Company Pvt. Ltd., Chennai, 2016.
- H.K. Chopra, A. Parmer, “Chemistry for Engineers”, Narosa Publishing House, New Delhi, 110 002, 2016.

## U19FTY107 - TEXTILE SCIENCE: FIBRES AND YARNS

L T P C  
3 0 0 3

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

- Classify textile fibres, define the basic terms used, outline fundamental concepts of fibre structure, describe the properties of an ideal fibre and state the properties and uses of major natural fibres.
- Describe the common man-made fibre spinning techniques and explain the properties and uses of major natural-polymer, synthetic and special fibres.
- Describe the identification methods of common fibres and define the common linear density terms used for man-made fibres.
- Outline the objectives and working principles of the different processes in spun yarn production.
- Describe sewing thread types, fibres used, quality requirements, outline of production and state the characteristics and uses of fancy yarns and certain special yarns.

### UNIT I - GENERAL INTRODUCTION AND NATURAL FIBRES 10

**Definitions:** Textile fibre, staple fibre, filament; yarn: spun, continuous filament, monofilament and multifilament, flat and textured yarn; single, ply and cabled yarns; thread; fabric: woven, knitted and non-woven

**Classification of textile fibres:** Main classes and sub-classes with examples for each class / sub-class

**Basic concepts of fibre structure:** Definition of orientation, types, schematic representations and examples; definition of crystallinity, schematic representation of fibre with crystalline and amorphous contents, outline of influence of crystallinity on fibre properties; crystallinity values of some common natural and man-made fibres

**Properties expected of a Textile Fibre:** Definitions of fibre length, fineness, strength, flexibility, elongation, elasticity, moisture content, moisture regain, crimp, fibre uniformity, lustre, fibre modulus, Tm and Tg.; Essential and desirable properties of a textile fibre

**Natural Fibres:** Definition and source, properties and uses of cotton, flax, silk and wool

### UNIT II - MAN MADE FIBRES 09

**Introduction to man-made fibre spinning:** Principles of wet-spinning, dry-spinning and melt-spinning of man-made fibres, principle of drawing and its importance.

**Raw materials, properties and uses of natural-polymer and synthetic fibres:** Viscose rayon, modal, bamboo, polyester, nylon 6, acrylic and elastomeric fibre. **High performance fibres:** Definition, characteristics, types, properties and uses of Nomex and Kevlar. Climate yarn; latest developments in fibres to attain comfort properties.

### **UNIT III - LINEAR DENSITY AND IDENTIFICATION OF FIBRES** **08**

**Linear density:** Definition, denier and tex systems, decitex, millitex, kilotex and English cotton count; Conversion formulae and simple calculations of linear density

**Definition, properties and uses:** Micro, nano fibres and bio polymers

**Identification of common textile fibres:** Microscopic test, burning test, solubility test and density test

### **UNIT IV - OUTLINE OF YARN PRODUCTION** **10**

**Preparatory processes:** Objects of ginning, names of machines used; Objects of mixing and blending; Objects of blow room, common sequence of machines used for processing of cotton, manmade fibre and blends; Objects of carding, outline of working principle of high production card; Objects of combing, difference between carded and combed yarns; Objects of draw frame, outline of working principle of draw frame; Objects of speed frame, outline of working principle of simplex

**Yarn production:** Objects of ring spinning outline of working principle of ring frame; yarn count and TPI; Objects of doubling, difference between single and double yarn; Outline of principles of compact spinning. **New spinning system:** Types and its needs, principle of rotor and air jet spinning system.

### **UNIT V - SEWING THREADS, FANCY YARNS AND SPECIAL YARNS** **08**

**Sewing thread:** Definition, quality requirements, fibres used, types, properties, production process, selection of sewing thread, ticket number, leading brands of sewing threads

**Fancy yarns:** Definition, brief study of slub yarn, snarl yarn, melange yarn, and spotted yarn. End uses of fancy yarn

**Other special yarns:** Brief study of core spun yarn, metallic yarn, hollow yarn and applications of these yarns

**TOTAL: 45 Hours**

#### **TEXT BOOKS**

1. Mishra S.P., "Fibre Science and Technology", New Age International Publishers, New Delhi, 2000
2. Lord P. R., "Yarn Production: Science Technology and Economics", The Textile Institute, Manchester, U.K., 2003

## REFERENCES

1. Bernard P. Corbman, “Textiles: Fibre to Fabric”, McGraw Hill International Edition, New Delhi, 1983
2. Srinivasamoorthy H. V., “Introduction to Textile Fibres”, The Textile Association India, Mumbai, 1993
3. Cook, J. Gordon, “Hand Book of Textile Fibres: Man-Made Fibres”, Vol. 1 and 2, Merrow Publishing Co. Ltd., England, 2005
4. Moncrief R.W., “Manmade Fibres”, John Willey & Sons, New York, 2004
5. Klein W. “ A practical guide to opening and carding”, Vol 2, The Textile Institute, Manchester, 1987
6. Klein W. “ A practical guide to combing and drawing ”,Vol 3, The Textile Institute, Manchester, 1987
7. Klein W. “ A practical guide to ring spinning”,Vol 4, The Textile Institute, Manchester, 1987

**U19PCL108B - PHYSICS AND CHEMISTRY LABORATORY**  
**PHYSICS PART**  
**(For B.Tech. Fashion Technology)**

**L T P C**  
**0 0 2 1**

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

1. Demonstrate by means of an appropriate experiment the poor thermal conductivity of a given bad conductor
2. Apply the principle of spectrometry to determine the properties of a given prism.
3. Demonstrate the experimental set up to execute torsional oscillations and determine the rigidity modulus of the given wire
4. Demonstrate the experimental setup for stream line flow of low viscus liquid and determine the coefficient of viscosity of the given liquid by Poiseuille's method.
5. Investigate the non – uniform bending behavior of a given material.
6. Determine the band gap of a semiconductor diode.

**LIST OF EXPERIMENTS (PHYSICS PART)**

1. Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
2. Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
3. Determination of rigidity modulus of the material of wire using torsion pendulum
4. Determination of coefficient of viscosity of liquid by Poiseuille's method.
5. Determination of the Young's modulus of the given material by non - uniform bending method.
6. Determination of band gap of the given semiconductor diode.

(Any five experiments may be conducted from the above list)

**Total: 30 Hours**



**U19PCL108B - PHYSICS AND CHEMISTRY LABORATORY**  
**CHEMISTRY PART**  
(For Fashion Technology)

**L T P C**  
**0 0 2 1**

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

- Estimate the amount of total, temporary and permanent hardness in the given water sample
- Analyse the different types of alkalinity and determine their amount in the given water sample
- Estimate the amount of hydrochloric acid present in the given solution using conductivity meter.
- Estimate the amount of hydrochloric acid present in the given solution using pH metry.
- Describe the estimation of ferrous iron present in the given solution using potentiometer.
- Evaluate the iron content of the water by spectrophotometry.

**List of Experiments (Chemistry part)**

1. Estimation of hardness of water sample by EDTA method.
2. Estimation of alkalinity of water sample by indicator method.
3. Estimation of HCl by conductometry. (HCl vs NaOH)
4. Estimation of HCl acid by pH metry.
5. Estimation of ferrous ion by potentiometric titration.
6. Determination of iron content in water by spectrophotometric method

(Any five experiments may be conducted from the above list)

**Total: 30 Hours**

## U19FTL116 - FIBRE AND YARN ANALYTICAL LABORATORY

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

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

1. Identify the common textile fibres and determine the blend proportion of binary blends
2. Determine the physical properties like moisture regain, linear density, swelling behaviour of fibre and yarn / sewing thread characteristics like yarn type, yarn count and ticket number
3. Solve real time problems in fibre identification, fibre and yarn properties

### **LIST OF EXPERIMENTS**

1. Identification of fibres by microscopy: longitudinal views of fibres
2. Identification of fibres by microscopy: cross-sectional views of fibres
3. Confirmation of fibres by means of the burning test
4. Confirmation of fibres by means of the solubility test
5. Identification of a textile fibre of unknown identity using microscopic, burning and solubility tests
6. Determination of blend proportion in fibre mixture / blended yarn / fabric.
7. Determination of the atmospheric conditions in the lab and the amount of moisture in given samples of conditioned and unconditioned fibre
8. Estimation of the crimp of man-made staple fibre and the denier by length and mass measurements
9.
  - (a) Identification of yarn type and twist direction and determination of yarn count of given spun yarn
  - (b) Identification of fibre type and determination of number of filaments and yarn linear density of given continuous filament yarn
  - (c) Identification of filament yarn and spun yarn
10. Identification of type of given sewing thread and determination of its ticket number and linear density

### **DEMONSTRATION**

11. Identification of fibre by density test using density gradient column
12. Examination of the diametric swelling behaviour of cotton and viscose rayon fibres in water and alkali solution

### **SAMPLE COLLECTION**

13. Collection of various fibre and yarn samples

**TOTAL: 30 hours**

## **U19CFTL117 - COMPUTER BASICS FOR FASHION TECHNOLOGY LABORATORY**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>1</b>

**Course Outcomes: At the end of a study of this course the students will be able to,**

1. Apply MS Excel tools in the analysis of apparel-production data.
2. Develop basic fashion sketches using fashion-CAD software and compile information on ancient fashion and latest fashion trends
3. Generate fashion ideas for garments using stated requirements and information related to ancient and current trends in the fashion industry

### **BASICS OF MS EXCEL**

1. Datasheet – Manipulating tools
2. Built-in functions
3. Basic analysis options for apparel-production data

### **BASICS OF CAD - FASHION ILLUSTRATOR SOFTWARE**

4. CAD Tools I
5. CAD Tools II
6. Development of basic fashion sketches and simple designs

### **COLLECTION OF VARIOUS FASHION-DESIGN RELATED DATA**

7. Collection of details about the origin and evaluation of costumes
8. Analysis of motifs, design, colour and materials used in Indian, Egyptian, Roman, French and English costumes
9. Collection of profiles of at least three popular Indian/International designers and their design collections (for two seasons)

**TOTAL: 30 hours**

**U19GE101 - BASIC APTITUDE – I**  
**(Common to All Departments)**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>

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

1. Solve fundamental problems in specific areas of quantitative aptitude
2. Solve basic problems in stated areas of logical reasoning
3. Demonstrate rudimentary verbal aptitude skills in English with regard to specific topics

**1. Quantitative Aptitude and Logical Reasoning**

**Solving simple problems with reference to the following topics:**

- a. Numbers – HCF & LCM
- b. Decimal fractions
- c. Square roots & cube roots
- d. Surds & Indices
- e. Logarithms
- f. Percentage
- g. Averages
- h. Coding and Decoding & Visual language

**2. Verbal Aptitude**

**Demonstrating plain English language skills with reference to the following topics:**

- a. Synonyms
- b. Antonyms
- c. Verbal analogy
- d. Editing passages
- e. Sentence filler words

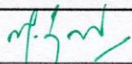
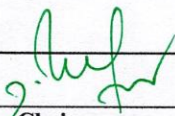
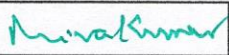
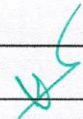
**TOTAL: 30 hours**

**Sona College of Technology, Salem – 636 005**  
**(An Autonomous Institution)**  
**Courses of Study for BE/B Tech Semester II under Regulations 2019 (CBCS)**  
**Branch: Fashion Technology**

S.No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
<b>Theory</b>								
1	U19MAT202E	Probability and Statistical Quality Control	3	1	0	4	BSC	60
2	U19PHY203E	Engineering Physics - II	3	0	0	3	BSC	45
3	U19CHE204C	Chemistry for Textile Technologists - II	3	0	0	3	BSC	45
4	U19BEE206A	Basics of Mechanical and Electrical Engineering	3	0	0	3	ESC	45
5	U19FT201	Woven Fabric Manufacture and Structure	3	0	0	3	PCC	45
6	U19EGR206B	Engineering Graphics for Fashion Designing	1	0	2	2	ESC	45 (15L+30P)
<b>Practical</b>								
7	U19ENL215	English for Engineers - II	0	0	2	1	HSC	30
8	U19FT202	Woven Fabric Structure and Textile CAD Laboratory	0	0	2	1	PCC	30
9	U19GE201	Basic Aptitude – II	0	0	2	0	EEC	30
<b>Total Credits</b>						<b>20</b>		
<b>Optional Language Elective*</b>								
10	U19OLE1201	French	0	0	2	1	HSMC	30
11	U19OLE1202	German						
12	U19OLE1203	Japanese						

\*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved by

			
<b>Chairperson, Science and Humanities BoS</b>	<b>Chairperson, Fashion Technology BoS</b>	<b>Member Secretary, Academic Council</b>	<b>Chairperson, Academic Council &amp; Principal</b>
<b>Dr. M. Renuga</b>	<b>Dr. D. Raja</b>	<b>Dr. R. Shivakumar</b>	<b>Dr. S. R. R. Senthil Kumar</b>

Copy to:-HOD/ Fashion Technology, Second Semester BE FT Students and Staff, COE



**B. TECH. / FASHION TECHNOLOGY**

SEMESTER – II	<b>PROBABILITY AND STATISTICAL QUALITY CONTROL</b>	L	T	P	C
U19MAT202E		3	1	0	4

**COURSE OUTCOMES**

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

1. apply the concepts of probability, random variable and their properties to generate the moments.
2. fit the suitable distribution and its properties to the real world problems and interpret the results.
3. apply the concepts of joint probability distribution and its properties to find the covariance and transformation of random variables.
4. apply the various designs of experiments to find cause-and-effect relationships.
5. apply the process control techniques to control and maintain the quality of the product.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)												PSO1	PSO2	PSO3
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12			
CO1	3	3		3								2			3
CO2	3	3		3								2			3
CO3	3	3		3								2			3
CO4	3	3		3								2			3
CO5	3	3		3								2			3

**UNIT – I      RANDOM VARIABLES****12**

Discrete and continuous random variables – Moments – Expectation – Moment generating function and its properties.

**UNIT – II      PROBABILITY AND DISTRIBUTIONS****12**

Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.

**UNIT – III      TWO DIMENSIONAL RANDOM VARIABLES****12**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation – Central limit theorem.

**UNIT – IV      DESIGN OF EXPERIMENTS****12**

Analysis of variance – One way classification – Completely randomised design – Two way classification – Randomised block design – Latin square.

**UNIT – V STATISTICAL QUALITY CONTROL**

12

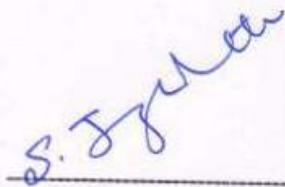
Control charts for measurements ( $\bar{X}$  and R charts) - Control charts for attributes,  $p$ ,  $c$  and  $np$   
Charts – Examples of application of statistical control charts in garment industry.

Theory: **45 Hours**Tutorial: **15 Hours**Total: **60 Hours****TEXT BOOK:**

1. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4<sup>th</sup> Edition, 7<sup>th</sup> reprint, 2018.

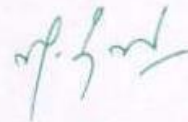
**REFERENCE BOOKS:**

1. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11<sup>th</sup> Edition, Reprint, 2019.
2. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15<sup>th</sup> Edition, 2012.
3. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9<sup>th</sup> Edition, 2018.
4. S. Ross, "A first course in probability", Pearson Publishers, 9<sup>th</sup> Edition, 2019.
5. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
6. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, 3<sup>rd</sup> Edition, Wiley Publishers, 2008.



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**Prof. S. JAYABHARATHI**  
Head / Department of Mathematics  
Sona College of Technology  
Salem – 636 005



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**Dr. M. RENUKA**  
BoS - Chairperson  
Science and Humanities  
Sona College of Technology  
Salem – 636 005

**Course Code:**  
**Course Name:**

**U19PHY203E**  
**Engineering Physics II**

**L T P C**  
**3 0 0 3 100**

**(for Fashion Technology)**

**COURSE OUTCOMES:**

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

- CO1** Differentiate the electrical and thermal conductivity of metals.
- CO2** Discuss the three moduli of elasticity in detail.
- CO3** Apply hydrodynamic principles for the flow of liquids.
- CO4** Elucidate the elastic, anelastic and visco-elastic behaviour of materials.
- CO5** Evaluate the novel properties of phase change materials, shape memory polymers and nanomaterials.

<b>CO / PO, PSO Mapping</b>														
<b>(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak</b>														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
<b>COs, POs, PSOs Mapping</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
<b>CO – 1</b>	3	2	-	-	-	-	-	-	-	-	2	2	-	3
<b>CO – 2</b>	3	2	-	-	-	-	-	-	-	-	2	2	-	3
<b>CO – 3</b>	3	2	-	-	-	-	-	-	-	-	2	2	-	3
<b>CO – 4</b>	3	2	-	-	-	-	-	-	-	-	2	2	-	3
<b>CO - 5</b>	3	2	-	-	-	-	-	-	-	-	2	2	-	3

**Unit 1 Conducting materials**

**9**

Usage of conducting materials– basic definitions (electrical resistance-conductance-resistivity-conductivity).

**Classical free electron theory of metals** - postulates of classical free electron theory - microscopic form of Ohm’s law - Electrical conductivity - definition and expression for electrical conductivity - thermal conductivity - definition and expression for thermal conductivity



– Wiedemann - Franz law and Lorentz number - Success and failure of classical free electron theory.

**Quantum free electron theory** - Drawbacks of quantum free electron theory - origin of energy bands - band theory of solids ( qualitative treatment only) - Fermi energy and Fermi distribution function – Effect of temperature on Fermi function - Density of energy states - carrier concentration in metals - Electrically conductive textiles.

## **Unit 2 Elastic properties of materials**

**9**

Stress-Strain - Hooke's law - Modulus of elasticity - Young's modulus - Rigidity modulus - Bulk modulus - Poisson's ratio – stress - strain diagram - applications of stress - strain diagram - factors affecting elasticity.

**Bending of beams** –expression for bending moment – elevation produced at the midpoint of the beam-Measurement of Young's modulus by uniform bending- Cantilever depression produced at the loaded end of the beam-depression produced at the midpoint of the beam- Measurement of Young's modulus by non uniform bending- I shaped girders.

**Torsion pendulum** - Work done in twisting a wire - Expression for couple per unit twist - Determination of rigidity modulus of thin wire by torsion pendulum.

## **Unit 3 Hydrodynamics**

**9**

**Viscosity** - Stream line motion - Turbulent motion - Reynold's number - Determination of viscosity of fluids - Poiseuille's method.

**Surface Tension** - Molecular forces - Surface energy and surface tension - Rise of liquids in a capillary tube - Determination of surface tension by capillary rise method - Applications: Detergents and surface tension.

**Moisture absorption in fibres** - Humidity and its importance in Textiles - definition of humidity, Absolute humidity, Relative humidity, Recommended allowance, Regain and moisture content.

#### **Unit 4 Elastic, Inelastic and Viscoelastic behavior**

**9**

**Elastic behavior:** Atomic model of elastic behavior - Modulus as a parameter in design, stiffness - Rubber like elasticity: Elastomers - coiling and uncoiling of an elastomer chain - Stress strain curve for elastomer molecule.

**Anelastic behavior** - Relaxation processes-damping capacity - Visco-elastic behavior - Spring dashpot models - Maxwell element - Voigt-Kelvin element - Four parameter model, Retarded elasticity, Entropy elasticity.

#### **Unit 5 New engineering materials**

**9**

**Phase change materials** - Basic information of phase change materials - Phase change technology-PCM in textiles - Shape memory polymers (SMPs) - Introduction ,Features, properties, classifications and applications.

**Nanoscience and Nanotechnology** - significance of the nanoscale - different types of nanostructures (Confinement Dimensions 0-D, 1-D, 2-D and 3-D) - Categories of nanomaterials - Fabrication of nonomaterials - Ball milling method and Chemical vapour deposition technique - Applications.

**Lecture: 45, Tutorial: 00, Total: 45 Hours**

#### **Text Book:**

1. M.N.Avadhanulu, 'Engineering Physics' S.Chand &Company Ltd, New Delhi (2015)
- 2.Subramaniam. N, Brijlal, ' Properties of Matter', S. Chand Group, New Delhi (2007)  
( Unit II)

#### **References:**

1. 'Applied Physics', Sonaversity, Sona College of Technology, Salem (Revised edition, 2015).
2. Physics for Mechanical Engineering, Sonaversity, Sona College of Technology, Salem (Revised Edition 2016).
3. Rajendran, V, and Marikani A, 'Materials science' TMH Publications, (2004) New Delhi.
4. Palanisamy P.K, 'Materials science', SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)

<b>COURSE CODE</b>	<b>U19CHE204C</b>	<b>L T P C</b>
<b>COURSE NAME</b>	<b>CHEMISTRY FOR TEXTILE TECHNOLOGISTS –II</b>	<b>3 0 0 3</b>

**Course outcome:**

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

- CO1** Compare the various types of organic material used in textile industry and their structure activity relationship and also can replace alternative environmental organic substituents.
- CO2** Analyze various types of inorganic materials used in textile industry and their mechanistic way in those application and preparation, uses in textile industry.
- CO3** Analyze the types of fibre forming polymers, polymerization and characteristics of Polymers.
- CO4** Discuss topics related to various types of modern washing machines and highlight the importance of using industrial cleaning agents and label care.
- CO5** Give an account of the principles and practices of stain removal in textiles / garments and describe the applications of stiffening agents to textiles.

**CO / PO, PSO Mapping**

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

**Programme Outcomes (POs) and Programme Specific Outcome (PSOs)**

<b>COs, POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>
<b>PSOs Mappin</b>														
<b>CO – 1</b>	3	2												3
<b>CO – 2</b>	3	2												3
<b>CO – 3</b>	3	2												3
<b>CO – 4</b>	3	2												3
<b>CO - 5</b>	3	2												3

**UNIT I: ORGANIC COMPOUNDS FOR TEXTILE INDUSTRY**

**9**

Cellulose – structure of cellulose – derivatives of cellulose – carboxymethyl cellulose and Gun cotton – structural aspects of cellulose –waxes - classification of waxes - Organic dyes – introduction – colour and chemical constitution – classification of dyes by structure – examples only– classification of dyes by methods of application – direct dyes – vat dyes – mordant dyes - azo dyes – disperse dyes – reactive dyes – examples only - chemistry of reactive dyes – Textile

auxiliaries – dying auxiliaries – optical brighteners – printing auxiliaries – synthetic softeners – wetting agents, etc.

## **UNIT II: INORGANIC COMPOUNDS FOR TEXTILE INDUSTRY**

**9**

Zeolites – types – applications – ion exchange properties of pigments – white pigments- titanium dioxide – lithophone – zinc oxide – coloured pigments - iron oxide – ultramarine – bleaching agents – Oxidizing bleaching agents, calcium hypochlorite, hydrogen peroxide, Reducing bleaching agents- sulphur dioxide and sodium hyposulphite, Applications of Chemistry in textile technology.

## **UNIT III: POLYMERS**

**9**

Polymers: Terminology related to fibre molecules-classification of polymers; polymer-monomer-copolymer-types of fibre forming polymers; homo polymer-copolymer-alternating copolymer-random copolymer-block copolymer-graft copolymer-types of polymerization: addition-condensation and copolymerization-properties of polymers.

## **UNIT IV: LAUNDRY EQUIPMENT WITH CARE LABELS AND LAUNDRY REAGENTS**

**9**

Washing Machines: Methods of washing, manual and machine washing. Study of modern/industrial washing machines: Rotary, swirling, pressure, tumble type washing machines laundering specialty fabrics and Care Labels: Importance of care label, various systems of care labelling, placement of labels on garments.

Laundry reagents: Soaps, detergents, cleaning action of soaps, indigenous cleaning agents, industrial cleaning agents, application of perchloroethylene, acetone and petrol. Study on modern cleaning agents.

## **UNIT V: STAIN REMOVAL AND STIFFENING**

**9**

Stain Removal: Principles of stain removal, classification of stains and stain removers, various solvents for removing stains like blood, tea, rust, oil/grease, ink, candle wax, fruit juice, gum and other handling stains, stain removal procedure in garment industries.

Stiffening: Stiffening agents, purpose of stiffening and classification of stiffening agents, preparation and uses of stiffeners, steps in stiffening process.

**Total: 45 Hours**

## **TEXT BOOKS**

1. P.C.Jain and Monica Jain, “Engineering Chemistry” Dhanpat Rai Pub, Co., New Delhi, 2018 (17th Edition).
2. N. Panneer Selvam et al., “Chemistry For Textile Technologists – II” by Sonaversity, Sona College of Technology, Salem, 2019.

## **REFERENCE BOOKS**

1. O.G. Palanna “Engineering Chemistry” Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2017.
2. Kannan P., Ravikrishnan A., “Engineering Chemistry”, Sri Krishna Hi-tech Publishing Company Pvt. Ltd., Chennai, 2016.
3. H.K. Chopra, A. Parmer, “Chemistry for Engineers”, Narosa Publishing House, New Delhi, 110 002, 2016.
4. Gowariker V.R. , Viswanathan N.V. and Jayadev Sreedhar, “Polymer Science”, New Age International P (Ltd.), Chennai, 2006
5. Gurdeep R. Chatwal, “Synthetic Organic Chemistry”, Himalaya Publishing House, Mumbai, 1994.
6. Dr. C.V. Koushik and Antao Irwin Josico, “Chemical Processing of Textiles Preparatory Processes and Dyeing”, NCUTE Publication, New Delhi – 110 016.
7. Dantiyagi S., “Fundamentals of Textile and Their Care”, Oriental Longmans Ltd, New Delhi, 1996.
8. Noemia D’Souza, “Fabric Care”, New Age International (P) Ltd. Publishers, Chennai, 1998.
9. Shenai V. A., “Technology of Textile Finishing”, Sevak Publications, Bombay, 1995.
10. Davis, “Laundry and Clothing Care”, Drama Book Publishers, 1995.

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

1. Summarise the principle of operation of various conventional power plants and explain the components
2. Discuss the working principles of Refrigerators and Air conditioner used in domestic purposes
3. State the fundamental laws of electrical circuits and explain the basic principles related to DC and AC electrical circuits
4. Explain the constructional features and principles of operation of DC and AC motors
5. Explain the different types of electrical drives and its heating and cooling curves.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	-	2	1	-	1	2	-	2	1	1
CO2	2	1	1	1	-	2	1	-	1	2	-	2	1	1
CO3	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO4	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO5	2	2	1	1	2	1	1	1	2	2	2	2	1	1

### **UNIT I - POWER PLANT ENGINEERING**

**9**

Introduction, Classification of power plants-working of steam, gas, diesel, hydro- electric, nuclear power plants; Pumps-working principle of reciprocating and centrifugal pumps. Boilers: types, applications of Cochran, Lamont, Benson, Babcock- Wilcox boilers; Properties of steam; Dryness fraction, latent heat, Total heat of wet steam, Superheated steam; Use of steam tables; Volume of wet steam; Volume of superheated steam.

### **UNIT II - REFRIGERATION AND AIR CONDITIONING**

**9**

Terminology of refrigeration and air conditioning; Principle of vapour compression and absorption system-window and split type air conditioner

Compressor – Classification, Working of reciprocating and rotary air compressors, Applications.

### **UNIT III - DC AND AC CIRCUITS**

**10**

**DC Circuits:** Ohm's law, Kirchoff's laws, Series and Parallel circuits, Star – Delta transformation – Simple Problems.

**AC Circuits:** AC waveform standard terminologies, Single phase RL, RC, RLC series circuits – Simple Problems. Introduction to three phase circuits.

#### **UNIT IV - DC AND AC MOTORS**

**10**

**DC motors:** Construction - Principle of operation - Torque equation - Types -Characteristics - Applications.

**Three Phase Induction Motor:** Construction- Principle of operation- Torque Equation

- Slip - Torque vs Slip characteristics - Applications.

#### **UNIT V - ELECTRICAL DRIVES**

**7**

Basic Electrical Drives – Types of Electric Drive – Types of Load – Classes of Duty –Factors Affecting Selection of Electric Drives – Heating and Cooling Curve.

**TOTAL: 45 Hours**

#### **TEXT BOOKS**

1. Shunmagam G, Ravindran S, “**Basic Mechanical Engineering**”, TataMcGraw Hill, 2011.
2. V.K. Mehta and Rohit Mehta, “**Principles of Electrical Engineering and Electronics**”, S. Chand publishers, 2015.

#### **REFERENCES**

1. Venugopal K, Prabhuraja V, “ **Basic Mechanical Engineering**”, Anuradha Agencies, 2014
2. S.R.J. Shantha Kumar, “**Basic Mechanical Engineering**”, 2nd Edition, Hi-Tech Publications, 2000.
3. S.K. Bhattacharya, “**Basic Electrical and Electronics Engineering**”, Pearson publishers, 2016
4. D.P. Kothari and I.J. Nagrath, ‘**Electric Machines**’, Tata McGraw Hill, 2010.
5. B.L. Theraja, “Fundamentals of Electrical Engineering and Electronics”, S.Chand publishers, 2008.
6. SudhakarA and Shyam Mohan SP, Circuits and Network Analysis andSynthesis”, Tata McGraw Hill, 2015.

**Course Outcome:**

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

1. Explain the winding, warping, sizing, drawing-in, denting and knotting process.
2. Describe the working principles of various loom mechanisms.
3. Explain the various principles of weft insertion in shuttle less looms and modern weaving.
4. Explain the elementary features of woven design and explain the construction of different elementary weaves with appropriate diagrams
5. Illustrate the design of dobby, jacquard, mock leno and pile fabrics.

		CO/PO, PSO Mapping														
		(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	2	2	3	2	2							2	2	2	2	
CO2	3	3	3	3	3	2	2			2	3	2	3	3	2	
CO3	2	3	3	3	3	2					2	2	3	2	2	
CO4	2	3	3	3	3					2	2	2	3	3	2	
CO5	2	3	3	3	3	2					2	2	3	3	2	

**UNIT I Weaving Preparatory Processes****9**

**Winding:** Objectives and yarn passage in cone winding machines, Objectives and yarn passage in pirn winding machine. **Warping machine:** Objectives, types and material passage. **Sizing:** Objects of sizing and list of sizing ingredients; drawing-in, denting and knotting.

**UNIT II Basics of Loom Mechanisms****10**

**Looms:** Types of looms. **Basic motions:** Primary, secondary and auxiliary motions.



**Primary mechanisms:** Principles of Shedding: Dobby and Jacquard. Principle of Picking and beat up.

**Secondary mechanisms:** Principle of take-up and let-off motions.

**Objectives of Auxiliary mechanisms:** Warp protector mechanism, Warp stop motion, weft stop motion, temples and brakes.

**UNIT III Shuttleless Looms 8**

**Shuttleless weaving machines:** Principles of weft insertion by projectile, rapier, air jet and water jet. Types of selvages, Multi-phase weaving and 3D fabrics.

**UNIT IV Elementary Weaves 9**

**Elements of woven design:** Design, Draft and its types, Peg plan and Repeat

**Construction of elementary weaves:** Plain weave and its derivatives: warp rib, weft rib and matt rib, Twill weave and its derivatives: ordinary twill, herringbone twill and zigzag twill, Satin, Sateen and their derivatives; Honeycomb, Ordinary and Brighton honeycomb, huck a back, Crepe weave and its modifications.

**UNIT V Dobby and Jacquard Design 9**

**Spot figuring:** Basic doobby, Jacquard designs, Arrangement of motifs in doobby and Jacquard designs; Extra-warp and extra-weft figuring.

**Mock leno:** Perforated mock leno design; Pile fabrics: plain velveteen and corduroys; Colour and weave effects; Principle of Double cloth construction; Fabric structures and its commercial name.

**TOTAL: 45 Hours**

**TEXT BOOKS**

1. Talukdar M. K., Sriramulu P. K. and Ajgaonkar D. B., "Weaving: Machines, Mechanisms, Management", Mahajan Publishers Pvt Ltd, 2004
2. Gokarneshan N., "Fabric Structure and Design", New Age International (P) Limited, 2009

**REFERENCE:**

1. W.S. Murphy, "Textile weaving and Design", Abhishek Publications, 2007.
2. H. Nisbet, "Grammar of Textile Design", Taraporewala and Sons Co. Pvt. Ltd., 1994

3. Grosicki, Watson's Textile design and colour, Elementary weaves and figured fabrics, Butterworth & Co publishers ltd.

## U19EGR206B – ENGINEERING GRAPHICS FOR FASHION DESIGNING

L T P C  
1 0 2 2

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

1. predict the construction of various curves in civil elevation plan and machine components.
2. draw the projection of three dimensional objects representation of machine structure and explain standards of orthographic views by different methods.
3. analyze the principles of projection of various planes by different angle to project points, lines and planes and simple solids.
4. study the development of simple solids and surfaces
5. create fabric print design, garment designs and illustrate the human figures.

### **CONCEPTS AND CONVENTIONS (Not for Examination) 9**

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

### **COMPUTER AIDED DRAFTING (Not for Examination) 9**

Importance 2d Drafting, sketching, modifying, transforming and dimensioning.

### **UNIT I – PLANE CURVES (Free hand sketching) 9**

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

### **UNIT II – ISOMETRIC TO ORTHOGRAPHIC VIEWS (Free Hand Sketching)**

**9**

Representation of three dimensional objects – General Principles of Orthographic projection – Need for importance of multiple views and their placement – First angle projection – layout of views – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

**UNIT III – PROJECTION OF POINTS, LINES PLANE SURFACES (Free hand sketching and 2D Software) 9**

Projection of points- All 4 quadrants, lines- Perpendicular to H.P and parallel to V.P, Perpendicular to V.P and parallel to H.P ,Inclined to H.P parallel to V.P, inclined to V.P and parallel to H.P, Planes – inclined to any one of the reference plane, Solids – prism, pyramid, cylinder and cone – resting on H.P and resting on V.P-simple positions.

**UNIT IV – SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES (Free hand sketching and 2D Software) 9**

Sectioning of simple solids like prisms – pyramids, cylinder and cone in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other, Development of lateral surfaces of simple and truncated solids – Prisms – pyramids – cylinders and cones.

**UNIT V - FASHION DESIGNING 9**

(2D CAD software) Creation of fabric print design - garment design - Illustration of three different poses of fashion figure.

**(Not for Examination)**-Paper craft models preparation of simple and truncated solids – Prisms – pyramids – cylinders and cones.

**TEXT BOOK**

1. P. Suresh, “Engineering Graphics and Drawing”, Sonaversity, Sona College of Technology, Salem, Revised edition, 2012.

**REFERENCES**

1. Manmeet sodhia, “Fashion Illustration”, Kalyani publishers, Ludhiana, Newdelhi, 2008.
2. Caroline Tatham and Julian Seaman, “Fashion Designing and Drawingcourse” Thames and Hudson Publishers, 2003.

**TOTAL: 45 Hours**

U19ENL215-English for Engineers – II

First year II semester

FT

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

1. Demonstrate effective listening skills for academic and professional purposes.
2. Draw conclusions on explicit and implicit oral information.
3. Develop effective reading skills and reinforce skills required for grammar and building vocabulary.
4. Read for gathering and understanding information, following directions and giving responses
5. Introduce themselves, initiate and participate in conversations, deliver speeches and technical presentations

	COURSE OUTCOMES	PROGRAMME OUTCOMES												Pso 1	Pso 2
		1	2	3	4	5	6	7	8	9	10	11	12		
1	Demonstrate effective listening skills for academic and professional purposes	2	2	2	2	1	2	3	3	3	3	2	3	3	3
2	Draw conclusions on explicit and implicit oral information	3	3	2	3	3	2	3	3	3	3	3	3	3	3
3	Develop effective reading skills and reinforce skills required for grammar and building vocabulary	3	3	2	3	2	3	3	3	3	3	3	3	3	3
4	Read for gathering and understanding information, following directions and giving responses	2	3	2	3	2	3	3	3	3	3	3	3	3	3
5	Introduce themselves, initiate and participate in conversations, deliver speeches and technical presentations	1	2	2	3	2	2	3	2	3	3	2	3	3	3

## **LISTENING**

- Listening to conversations, welcome speeches, lectures and description of equipment. • Listening to different kinds of interviews (face-to-face, radio, TV and telephone interviews). Understanding short conversations or monologues. • Taking down phone messages, orders, notes etc. • Listening for gist, identifying topic, context or function.
- Listening comprehension, entering information in tabular form. • Intensive listening exercises and completing the steps of a process.
- Listening exercises to categorise data in tables.
- Listening to extended speech for detail and inference.

## **READING**

- Understanding notices, messages, timetables, advertisements, graphs, etc.
- Reading passages for specific information transfer.
- Reading documents for business and general contexts and interpreting graphical representations.
- Error correction, editing mistakes in grammar, vocabulary, spelling, etc.
- Reading passage with multiple choice questions, reading for gist and reading for specific information, skimming for comprehending the general idea, meaning and contents of the whole text.

## **SPEAKING**

- Self-introduction, personal information, name, home background, study details, area of interest, hobbies, strengths and weaknesses, projects and paper presentations, likes and dislikes in food, travel, clothes, special features of home town.
- Welcome address, vote of thanks, special address on specific topics.
- Mini presentation in small groups of two or three regarding, office arrangements, facilities, office functions, sales, purchases, training recruitment, advertising, applying for financial assistance, applying for a job, team work, discussion, presentation
- Situational role play between examiner and candidate, teacher and student, customer and sales manager, hotel manager and organiser, team leader and team member, bank manager and candidate, interviewer and applicant, car driver and client, industrialist and candidate, receptionist and appointment seeker, new employee and manager, employee and employee, P.A. and manager, schedule for training, asking for directions, seeking help with office equipment, clarifying an error in the bill, job details, buying a product, selling a product, designing a website, cancelling and fixing appointments, hotel accommodation, training facilities, dress code, conference facilities.

## **Extensive Reading**

1. You Can Win by Shiv Khera - Macmillan *Publishers* India
2. Who Moved my Cheese? – Spencer Johnson-G. P. Putnam's Sons
3. Discover the Diamond in You – Arindham Chaudhari – Vikas publishing House Pvt.
4. The Story of Amazon-com – Sara Gilbert, published by Jaico
5. The Story of Google – Sara Gilbert, published by Jaico

**TOTAL: 30 hours**

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

1. Analyse the common woven fabrics and develop the related design, draft and peg plan
2. Determine the cloth particulars for given fabrics
3. Utilise effectively the different tools in textile CAD software and create/develop different textile design and prepare their 2D simulations

		CO/PO, PSO Mapping														
		(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
		Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CO1		2	2	2	2	2	2							2	2
CO2		2	2	2	2	2	2					2		2	2	2
CO3		2	2	2	2		3							2	2	2

**List of Experiments**

Analyse the structures of woven fabric Designs

1. Plain, Twill, Satin.(2 session)
2. Huck a back and Honey comb.(1 session)
3. Dobby cloth analysis. (1 session)
4. Jacquard cloth (1 session)
5. Extra warp and extra weft figuring. (1 sessions)
6. Pile fabrics – corduroy fabrics. (1 session)

Study and practice of

1. Different tools used in textile CAD software. (1 session)
2. Development of striped, checked and print design and preparation of its 2D simulation. (1 session)
3. Development of dobby design and preparation of its 2D simulation. (1 session)
4. Development of jacquard design and preparation of its 2D simulation. (1 session)

**TOTAL: 30 Hours**



## U19GE201 - BASIC APTITUDE - II

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0 0 2 0

**Course Outcomes: At the end of the course, the students will be able to CO1**  
solve more elaborate problems than those in BA-I in specific areas of

quantitative aptitude.

**CO2** solve problems of greater intricacy than those in BA-I in stated areas of logical reasoning.

**CO3** demonstrate higher than BA-I level verbal aptitude skills in English with regard to specific topics.

### List of Experiments

#### 1. QUANTITATIVE APTITUDE AND LOGICAL REASONING

Solving quantitative aptitude and logical reasoning problems with reference to the following topics:

- a. Ratio and proportion
- b. Partnership
- c. Chain rule
- d. Ages
- e. Profit, loss and discount
- f. Geometry
- g. Area and volume
- h. Data arrangement

#### 2. VERBAL APTITUDE

Demonstrating verbal aptitude skills in English with reference to the following topics:

- a. Jumbled sentences
- b. Reconstructions of sentences (PQRS)
- c. Sentence fillers two words
- d. Idioms and phrases
- e. Spotting errors
- f. Writing captions for given pictures

**TOTAL : 24 Hours**

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester III Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19MAT301E	Operations Research and Statistical Methods	3	1	0	4	60
2	U19FT301	Knitted Fabric Manufacture and Structure (lab integrated)	3	0	2	4	75
3	U19FT302	Chemical Processing of Textiles and Garments (Lab Integrated)	3	0	2	4	75
4	U19FT303	Fashion Art and Design	3	0	0	3	45
5	U19FT304	Pattern Making and Garment Construction - I	3	0	0	3	45
6	U19GE304	<b>Mandatory Course</b> : Constitution of India	2	0	0	0	30
<b>Practical</b>							
7	U19FT305	Pattern Making and Garment Construction Laboratory - I	0	0	2	1	30
8	U19FT306	Digital Fashion Design Laboratory	0	0	4	2	60
9	U19ENG301	Communication Skills Laboratory	0	0	2	1	30
10	U19GE301	Soft Skills and Aptitude – I	0	0	2	1	30
<b>Total Credits</b>						<b>23</b>	

**Approved By**

**Chairperson, Fashion Technology BoS**  
**Dr.D.Raja**

**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

**Chairperson, Academic Council & Principal**  
**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Fashion Technology, Third Semester B.Tech FT Students and Staff, COE

## B. TECH / FASHION TECHNOLOGY

<b>SEMESTER – III</b>	<b>OPERATIONS RESEARCH AND STATISTICAL METHODS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>U19MAT301E</b>		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**COURSE OUTCOMES**

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

1. solve the linear programming problem using suitable methods.
2. apply the optimization technique to the transportation and assignment problems.
3. analyze project management problems using critical path method and project evaluation and review technique.
4. test the hypothesis for proportions, mean and standard deviation using  $Z$  – test.
5. test the significance of the hypothesis using  $t$ ,  $\chi^2$  and  $F$  distributions.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	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								2			3
CO4	3	3		3								2			3
CO5	3	3		3								2			3

**UNIT – I LINEAR PROGRAMMING PROBLEM****12**

Linear programming problem - Mathematical formulation – Graphical solution method – Canonical and standard forms of Linear Programming Problem – Simplex method (using slack variables only) – Use of artificial variables – Big-M method.

**UNIT – II TRANSPORTATION AND ASSIGNMENT PROBLEMS****12**

Transportation problem – Initial basic feasible solution – North west corner rule – Least cost method – Vogel's approximation method – Modified distribution method – Assignment problem – Hungarian method.

**UNIT – III CPM AND PERT****12**

Network construction – Critical Path Method (CPM) – Computations of total, free and independent floats – Project Evaluation and Review Technique (PERT) Analysis – Computation of expected time and standard deviation.

**UNIT – IV TESTING OF SIGNIFICANCE FOR LARGE SAMPLES****12**

Parameter and statistic – Null and alternative hypothesis – Errors in sampling, critical region and level of significance – One tailed and two tailed tests – Testing of hypothesis for proportions, mean, and standard deviation using  $Z$  – test.

**UNIT – V EXACT SAMPLING DISTRIBUTIONS****12**

$t$ -test for single mean, difference between means and paired  $t$ -test -  $\chi^2$ -tests for independence of attributes, goodness of fit –  $\chi^2$ -test for population variance –  $F$ -test for variance.

Theory: **45 Hours**Tutorial: **15 Hours**Total: **60 Hours**

20. 05. 2020

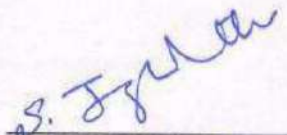
B. E. / B. Tech. Regulations 2019

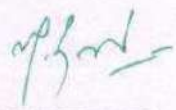
**TEXT BOOKS:**

1. P. K. Gupta and D. S. Hira, "Problems in Operations Research", Sultan Chand and Sons Publishers, 4<sup>th</sup> Edition, 2015.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4<sup>th</sup> Edition, 7<sup>th</sup> reprint, 2018.

**REFERENCE BOOKS:**

1. H. A. Taha, "Operation Research: An Introduction", Pearson Publishers, 10<sup>th</sup> Edition, 2019.
2. P. K. Gupta and Manmohan, "Problems in Operations Research", Sultan Chand and Sons Publishers, 8<sup>th</sup> Edition, 2003.
3. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15<sup>th</sup> Edition, 2012.
4. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11<sup>th</sup> Edition, Reprint, 2019.
5. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9<sup>th</sup> Edition, 2018.

  
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20. 05. 2020

B. E. / B. Tech. Regulations 2019

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Describe the basic terms, specifications and functions of weft and warp knitting machines.
2. Develop a clear understanding of different stitches and pattern mechanisms used for the production of weft knitted fabrics
3. Identify the different structures of the basic weft knitted structures and its derivatives
4. Identify and explain the representation of weft and warp knitted fabrics
5. Analyse the methods of production and the applications of common types of nonwoven fabrics
  
6. Analyse the knitted fabrics and develop the design
7. Analyse the geometrical properties for given fabrics
8. Experiment on Settings of machine parameters

<b>CO/PO, PSO Mapping</b>															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	1	2	2						1	1	3	2	2
CO2	1	2	3	2	3	2				1		2	2	2	1
CO3	2	3	3	3	3	2	2			1		3	3	3	1
CO4	1	2	3	3	2	1	2			1		3	3	3	1
CO5	2	3	2	1	3		2					2	3	2	2
CO6	2	3	3	3	3		2					3	3	3	1
CO7	2	3	3	3	3		2					1	3	3	1
CO8	2	3	3									1	3	3	1

## UNIT I Weft Knitting

10

**Introduction: Introduction and basic concepts of Knitting, Principles of weft and warp knitting – comparison of weft and warp knitting**

**Weft Knitting:** Functional Elements: Needles, Loop forming sequence, Sinkers, Cylinder, Dial, Cams, Creel, Feeder, Fabric Spreader, Take down and winding Mechanism. Machine description - Single Jersey, Rib, Purl and Interlock machine –Fully fashioned garments: socks, gloves, sweaters

## UNIT II Knit Stitches, Basic weft Knit Structures and Pattern Mechanism 14

**Knit stitch, float stitch, tucks stitch:** Properties, Symbolic and diagrammatic representation of stitches.

**Basic Weft Knitted Structures:** Single Jersey, Rib, Purl and Interlock. Line, Symbolic and diagrammatic notations of basic weft knitted structures, Characteristics and application areas of basic weft knit structures.

**Patterning mechanism:** Pattern wheel, Pattern drum, Peg drum machine, pattern jack, computerized jacquard knitting machines, Electronic devices for needle selection

## UNIT III Derivatives of Plain Jersey, Rib and Interlock Structures 14

**Derivatives of plain knit:** Pique, honeycomb, Lacoste, cross tuck, satin, Knitted twill, Jersey blister, Plaiting, seer sucker effect, accordion fabrics.

**Derivatives of Rib knit:** 2x2 Rib, 3x2 Rib, 5x1 Derby rib, Regular and irregular rib fabrics, half cardigan, Full cardigan Milano rib, Waffle, Flat back rib.

**Derivatives of Purl knit:** 2x2 Purl, 4x2 Purl, and Basket Purl

**Derivatives of Interlock Structure:** Eight lock, Ponte-di-roma, Texi-pique, Milano rib, plated structure

**Striped patterns:** Horizontal stripe patterns, Vertical stripe patterns, Square patterns. Fabric structure and its commercial name.

## UNIT IV Warp knitting and Structures 14

**Warp knitting:** Classification, Functional Elements: Overlap and Underlap, Machine elements: Needle bar, Sinker bar, Guide bar, Presser bar, Warp beam, Pattern wheel, Chain links, Latch wire, Trick plate, Knitting Cycle of Tricot and Raschel machine.

**Principle stitches of warp knitting:** 1 and 1 lapping – pillar or chain stitch – in lay stitch – blind stitch – 2 and 1 lapping – longer lapping – atlas stitch.

**Study and representation:** Full Tricot, Locknit, Reverse Locknit, Satin, Shark Skin, Queen's cord. Fabric structure and its commercial name. Application areas of warp knit structure

## **UNIT V Interlining Fabrics (Non-Woven Fabric)**

**9**

Interlining: Types (Woven, knit and non-woven) , Properties, and end uses. Non-woven Interlining: Method of non-woven fabric manufacture: Mechanical bonded, Chemical bonded, Thermal bonded, Spun bonded and Melt blown. Applications of non-woven fabrics.

**TOTAL: 75 HOURS (45 L + 30 P)**

### **LIST OF EXERCISES**

**Analysis of KNIT FABRIC PARAMETERS: CPI, WPI, LOOP LENGTH, GSM,**

**YARN COUNT, FABRIC THICKNESS for the following knit samples.**

Analyse the given single jersey structure and its derivatives (2 session)

1. Analyse the given rib structure and its derivatives (2 session)
2. Analyse the given interlock structure and its derivatives (2 session)
3. Analyse the given jacquard knitted structure (1 session)
4. Analyse the basic geometrical properties of knitted fabrics (1 session)
5. Experiment on Settings of machine parameters to attain different GSM of knitted fabric

### **TEXT BOOK**

1. Anbumani N., Knitting-Fundamentals, Machines, Structures and Developments, New Age International Publishers, 2007.

### **REFERENCES**

1. Ajaonkar D.B., Knitted Technology, Universal Publishing Corporation, Mumbai, 1998.
2. Spencer D.J., Knitting Technology: A Comprehensive Handbook, Woodhead Publishing Limited, England, 3<sup>rd</sup> Edition, 2001.

## COURSE OUTCOMES

At the end of the study of this course the students should be able to,

1. Explain the various grey preparatory processes for woven and knitted fabrics.
2. Describe the process of dyeing of cotton with direct, reactive and vat dyes.
3. Analyse the process of dyeing of Polyester and PC Blends with disperse dyes.
4. compare methods and styles of printing.
5. Evaluate the procedure of dyed and printed materials
  
6. Prepare the grey fabric for dyeing and printing
7. Dye and print the fabric with suitable dyes
8. Test the dyed and printed fabrics for its fastness

CO/PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2							1				1			
CO2	3							1				1	1		
CO3	2	1					3	1				1	1	1	
CO4	3	2	2				3	1				1	1	1	
CO5	2		2		1			1		2		1	3		1
CO6	3	2	2				3	1				1	1	1	
CO7	3	2	2				3	1				1	1	1	
CO8	3	2	2		2	2	3	1		2		1	2	1	





**Fabric Finishes:** Basic principles of calendaring, raising, sanforising, compacting of knitted fabric and softening finish.

### **LIST OF EXERCISES**

1. Bleaching of cotton using hydrogen peroxide. (1 session)
2. Dyeing of cotton with M brand reactive dyes. (1 session)
3. Dyeing of silk / wool with acid dyes (1 sessions)
4. Printing of fabric (Screen, block and resist) (1 session)
5. Printing of fabric (tie & dye, batik, transfer) (1 session)
6. Determination of colour fastness to washing, rubbing and light fastness. (2 sessions) fabric – To be added in testing laboratory.

**TOTAL: 75 HOURS (45 L + 30 P)**

### **TEXTBOOKS**

1. Koushik C. V., and Antao Irwin Josico, "Chemical Processing of Textiles – Grey Preparation and Dyeing" – NCUTE Publication, New Delhi, 2004 (Units 1, 2 and 5)
2. Shenai V. A., "Technology of Finishing", Sevak Publications, Mumbai, 1995, Nitra, "Pollution Control in Textile"
3. D G Dugg and S Sinclair, "Giles's Laboratory Course in Dyeing", Woodhead Publishing Limited (Fourth edition) December 1989

### **REFERENCES**

1. Shenai V. A., "Technology of Textile Processing – Vol. III, IV, V, VII and VIII", Sevak Publications, Mumbai, 1995
2. Palmer John W., "Textile Processing and Finishing Aids: Recent Advances", Mahajan Book Distributors, 1996
3. Ronald James W., "Printing and Dyeing of Fabrics and Plastics", Mahajan Book Distributors, 1996
4. Sivaramakrishnan C. N. " A compilation of 10 papers", Colorage
5. L. W. C Wiles, "Textile Printing", Mellow Monographs. Textile Technology.

**COURSE OUTCOMES:**

At the end of the study of this course the students will be able to,

1. Classify and define the fashion, art and design related terms.
2. Describe different types of fashion and life cycles of fashion.
3. Design the elements and principles of the design, with the effects in the apparel.
4. Stretch an account of the various concepts of colour theory and the applications of colours.
5. Develop a theme and prepare a portfolio.

CO/PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1		2						1	3	1	3	3	3	1
CO2	1	1	1					2				3	2	1	
CO3	1		3			2					2	1		3	
CO4	2		3			1	3	2			0	3	1	2	1
CO5	1	1	2		2			1		1	1	3	1	1	

**UNIT I INTRODUCTION TO FASHION ART DESIGN 9**

**Definition:** Fashion, Art, Design, Costume and Clothing

**Origin and history:** Fashion, Art, Design, Clothing and costumes; Importance of Clothing; Types of clothing, Factors to be considered in the selection of clothing.

**UNIT II CLASSIFICATION AND TYPES OF FASHION 9**

**Nature of Fashion:** Principles of Fashion, Classification of fashion

**Movements on Fashion:** Fashion cycle, Stages of fashion cycle, Length of fashion cycle business of fashion, theories of Fashion; Fashion trends, Boutique, Haute Couture

**Study of leading fashion designers:** French, Italian, American, Indian and English, Role of Fashion Designers, Types of designers

**UNIT III**                      **ELEMENTS OF DESIGN**                      **9**

**Introduction: Garment Design:** structural t design and decorative t design

**Elements of design:** Line, Size, Shape, Texture, Form, Colour and light - effects of elements in the apparel. Silhouettes, types and their application

**Principles of Design:** Introduction to principles of designs - Balance, Proportion, Emphasis, Rhythm, Harmony. Illusion effects, Principles on functionality and aesthetics

**UNIT IV**                      **COLOUR**                      **9**

**Colour Theories:** Primary, secondary, tertiary, intermediate colours

**Color Scheme:** colour contrast and colour harmony

**Dimensions of colours:** Hue, Value and intensity, Warm and cool colours, psychology of colours, application of colours to different components and seasons.

**UNIT V**                      **PORTFOLIO DEVELOPMENT**                      **9**

**Fashion Illustration:** Illustration techniques, strokes, hatching, shading.

**Colouring techniques:** Media for colouring, Rendering techniques for different fabrics (Plain, Chambrey, Satin, Denim, Velvete, Fur).

**Portfolio presentation:** Designer boards, Mood board, Fabric board, Colour board, Illustration board, accessory board practicalities and style of presentation,.

**TOTAL: 45 HOURS**

**TEXT BOOKS**

1. Marian L Davis, "**Visual Design and Dress**", Third edition, Prentice Hall, New Jersey, 1996.
2. Elaine Stone, "**Fashion Merchandising – An Introduction**", McGraw-Hill 5th Edition, 1990

**REFERENCES**

1. Anderson B and Anderson C, "**Costume Design**", Harcourt Brace Second Edition, 1990.
2. Caroline Tatham and Julian Seaman, "**Fashion Designing and Drawing course**" Thames and Hudson Publishers, 2003.
3. HarroldCarr,"**Fashion Design and Product Development**" John Wiley and Sons Inc. NewYork,1992.
4. Ralph Lauren, "**In His Own Fashion**", Alan Flusser 2019.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Describe the various pattern making tools in the workroom and the measuring techniques
2. Explain the method of drafting basic body slopers and types of fullness
3. Apply types of seams, seam finishes, stitches and sewing threads for suitable end uses
4. Draft the pattern and give construction procedure for different types sleeves and collars
5. Analyse the types and techniques involved in the construction of garment closures

CO/PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	1				1	1	1	2	3	1
CO2	3	3	3	3	3	1				1	2	1	3	3	1
CO3	1	3	3	3	3		1				2	1	3	3	1
CO4	3	3	3	3	3	1	1			1	2	1	3	3	
CO5	2	3	3	3	3						1	1	3	2	1

**Unit -I Measurements and Workroom Practices**

**8**

Flow process chart of garment manufacturing.

**Pattern:** Definition, Importance, Types: basic pattern, working pattern and production pattern

**Pattern making:** Definition, Techniques: drafting and draping, Merits and demerits. Pattern making tools and workroom terms and definitions. Types: Industrial and bespoke patterns.

**Figure analysis:** Head theory: Seven and Half and Eight.

**Measuring techniques:** Introduction; Standard Measurement charts for male, female and kids, Body measurements: circumference measurement, Vertical measurements and horizontal measurements.

**Unit -II Block preparation and Fullness**

**10**

Drafting of basic bodice, Skirt blocks and sleeve

**Fullness:** Definition types, Darts–single, Double, Pointed darts, Tucks- pin tucks, Cross tucks, Piped tucks, Shell tucks, Pleats,- knife pleats, Box pleats, Invertible box pleats, Kick pleats, Flare, Godets, Gathers, Shirrings, Single and Double frills.

**Dart manipulation:** Pivotal method, Slash and spread method, designing with fullness.

**Unit III**                                      **Seams and Stitches**                                      **9**

**Seams:** Definition, Federal classification of seams, Seam quality, Seam performance, Factors to be considered in the selection of Seam, Seam finishes.

**Stitches:** Definition, Federal classification of Stitches, Stitch parameters, Factors to be considered in the selection of stitches.

**Sewing thread:** Selection of sewing thread for woven and knitted garments.

**Unit -IV**                                      **Sleeves and Collars**                                      **10**

**Sleeves:** Drafting and construction of Set–in–sleeves: Plain, Puff, Bell, Circular and Leg-o-mutton; Sleeves combined with bodice: Kimono and Raglan.

**Collars:** Drafting and construction of Convertible, Shirt, Mandarin, Peter pan, Sailor, Shawl and Notch collar.

**Unit V**                                      **Fasteners**                                      **8**

**Introduction and construction techniques of garment closures:** Applications of zippers, Types of button and button holes and their applications, Types and applications of hooks and eye snaps; Velcro, Eyelets, Cords.

**TOTAL: 45 HOURS**

**TEXT BOOKS**

1. Halen Josep Armstrong “**Pattern Making for Fashion Design**” 5 th Edition, Pretence Hall, New Jercey , 2014.
2. Marie Clayton, “**Ultimate Sewing Bible – A Complete Reference with Step-by-Step Techniques**”, Collins & Brown, London, 2008.
3. Claire Schaeffer, “**The Complete Book of Sewing Shortcuts**”, Sterling Publishing (NY), 2009.

**REFERENCE BOOKS**

1. Winifred Aldrich, “**Pattern Cutting for Menswear**”, 4th edition, Blackwell Science Publisher, USA, 2006.
2. Winifred Aldrich, “**Metric Pattern Cutting**”, Blackwell Publishing, , 2008.
3. Claire Shaeffer, “**Sewing for Apparel Industry**”, Prentice Hall, 2000.
4. Cooklin Gerry, “**Garment Technology for Fashion Designers**”, Blackwell Science Ltd., 1997.
5. Laing, Webster J “**Stitches and Seams**” Woodhead Publishing Ltd., 1998.
6. Leila Aitken, “**Step by Step Dress Making Course**”, BBC Books, 1992.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Draft and construct samples for basic blocks, seam and seam finishes and fullness.
2. Draft and construct samples for sleeves and collars.
3. Solve real time problem related to pattern making and construction of blocks, seams, fullness, sleeves and collars.

<b>CO/PO, PSO Mapping</b>															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2		1	1	1			1	1	2	1	1	1
CO2	1	1	2		1	1	1			1	1	1	1	2	1
CO3	1	3	3	1	1	1				2	1	1	1	2	1

**List of Experiments****Drafting and construction of following components**

1. **Bodice blocks, Skirt blocks and sleeve block** (2 sessions)
2. **Seam and Seam Finishes** (1 session)
3. **Fullness:** Darts, Tucks and Pleats (1 session)
4. **Sleeves:** Plain, Puff and Raglan (1 session)
5. **Collars:** Shirt, Peter pan, Sailor and Shawl (1 session)

**TOTAL: 30 HOURS**

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Develop the basic creative and manipulative skills necessary for fashion design through various shading techniques and Sketching various elements and principles of designing and Draw fashion figures and visually communicate apparel design details, understanding of the color theory using various color schemes and Illustrate different styles of garment components and reproduce it to fit fashion figures
2. Illustrate basic fashion figure models and various fashion designs using software
3. Illustrate different fashion figures incorporating all the illustrating techniques and designing high end fashion garments

**CO/PO, PSO Mapping**

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	2	3	1		1	3	1	3	3	3	2
CO2	2	3	3	3	3	2	1	1	1	3	1	3	3	3	2
CO3	1	2	1	2	2	1			1	1	1	2	2	1	1

**LIST OF EXPERIMENTS****Manual Practice**

1. Illustration of lines and strokes using pencil shading techniques; lettering and numbering styles
2. Illustration of human body shapes (Indian and International standards)
3. Illustration of human face
4. Illustration of different postures of human head, hand, leg and feet
5. Illustration of different hair styles
6. Sketching of lay figure using head theory
7. Preparation of Prang's colour wheel
8. Preparation of different colour schemes
9. Rendering different fabric textures

**Digital Practice**

10. Illustration of sleeves, cuffs, necklines, skirts, pockets, trousers, and skirt tops
11. Illustration of elements and principles of design
12. Draping of garments for men, women and kids on fashion figure
13. Designing of accessories for men, women and kids.
14. Development of flat sketches for men, women and kids.
15. Development of technical pack.

**TOTAL: 60 HOURS**



# U19ENG301 COMMUNICATION SKILLS LABORATORY

## (LAB / PRACTICAL COURSE)

0 0 2 1

(Common to all branches of Third / Fourth Semester B.E / B.Tech programmes)

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

- Communicate confidently and effectively
- Demonstrate active listening skills
- Practice soft skills and interpersonal skills to excel in their jobs.
- Use language efficiently to face interviews, participate in group discussions and present speeches.

		CO/PO, PSO Mapping														
		(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
		Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	CO1		1	3	2	3	3		1	3	3	3	2	3	2	2
CO2		1	3	2	3	3	3	3	3	3	3	2	2	2	2	3
CO3		1	3	3	3	3	3	3	3	3	3	2	3	2	3	3
CO4		1	3	2	3	3	3	3	3	3	3	1	3	2	2	3

1. **Listening Comprehension:** Listening and typing – listening and sequencing of sentences – Filling in the blanks – Listening and answering questions.

2. **Reading Comprehension:** Filling in the blanks – Cloze exercises – Vocabulary building – Reading and answering questions.

3. **Speaking: Phonetics:** Intonation – Ear training – Correct Pronunciation – Sound recognition exercises – Common errors in English.

Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

4. Making presentations: introducing oneself – introducing a topic – answering questions – individual presentation practice

5. Creating effective PPTs – presenting the visuals effectively
6. Using appropriate body language in professional contexts – gestures, facial expressions, etc.
7. Preparing job applications - writing covering letter and résumé
8. Applying for jobs online - email etiquette
9. Participating in group discussions – understanding group dynamics - brainstorming the topic – mock GD
10. Training in soft skills - persuasive skills – people skills - questioning and clarifying skills
11. Writing Project proposals: collecting, analyzing and interpreting data / drafting the final report
12. Attending job interviews – answering questions confidently
13. Interview etiquette – dress code – body language – mock interview

**TOTAL: 30 PERIODS**

#### **REFERENCE BOOKS:**

1. English and Soft Skills, Dhanavel, S.P. Hyderabad: Orient BlackSwan Ltd. 2010.
2. How to Prepare for Group Discussion and Interview, Corneilssen, Joep. New Delhi: Tata-McGraw-Hill, 2009.
3. Group Discussion and Team Building D'Abreo, Desmond A. Mumbai: Better yourself books, 2004.
4. The ACE of Soft Skills, Ramesh, Gopalswamy, and Mahadevan Ramesh. New Delhi: Pearson, 2010.
5. Corporate Soft Skills, Gulati, Sarvesh. New Delhi: Rupa and Co. 2006.
6. Presentation Skills for Students, Van Emden, Joan, and Lucinda Becker. New York: Palgrave Macmillan, 2004.
7. Dictionary of Common Errors, Turton, N.D and Heaton, J.B. Addison Wesley Longman Ltd., Indian reprint 1998.

#### **EXTENSIVE READING**

1. The 7 Habits of Highly Effective People, Covey, Stephen R. New York: Free Press, 1989.
2. The Professional, Bagchi, Subroto. New Delhi: Penguin Books India, 2009.

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L	T	P	C	Marks
		0	0	2	1	100
<b>Course Outcomes</b>						
<b>At the end of the course the student will be able to:</b>						
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches						
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning						
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics						
<b>1.Soft Skills</b>	<b>Demonstrating soft-skill capabilities with reference to the following topics:</b>					
	<ul style="list-style-type: none"> <li>a. Attitude building</li> <li>b. Dealing with criticism</li> <li>c. Innovation and creativity</li> <li>d. Problem solving and decision making</li> <li>e. Public speaking</li> <li>f. Group discussions</li> </ul>					
<b>2. Quantitative Aptitude and Logical Reasoning</b>	<b>Solving problems with reference to the following topics:</b>					
	<ul style="list-style-type: none"> <li>a. <b>Vedic Maths:</b> Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification.</li> <li>b. <b>Numbers:</b> Types, Power cycle, Divisibility, Prime factors &amp; multiples, HCF &amp; LCM, Remainder theorem, Unit digit, highest power.</li> <li>c. <b>Averages:</b> Basics of averages and weighted average.</li> <li>d. <b>Percentages:</b> Basics of percentage and Successive percentages.</li> <li>e. <b>Ratio and proportion:</b> Basics of R &amp; P, Alligations, Mixture and Partnership.</li> <li>f. <b>Profit ,Loss and Discount:</b> Basic &amp; Advanced PLD</li> <li>g. <b>Data Interpretation:</b> Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation.</li> <li>h. <b>Syllogism:</b> Six set syllogism using Venn diagram and tick and cross method</li> </ul>					
<b>3. Verbal Aptitude</b>	<b>Demonstrating English language skills with reference to the following topics:</b>					
	<ul style="list-style-type: none"> <li>a. Verbal analogy</li> <li>b. Tenses</li> <li>c. Prepositions</li> <li>d. Reading comprehension</li> <li>e. Choosing correct / incorrect sentences</li> <li>f. Describing pictures</li> <li>g. Error spotting</li> </ul>					

*S. Aust*

Department of Placement Training  
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## SEMESTER – III

## MANDATORY COURSE

## U19GE304- CONSTITUTION OF INDIA

(Common for MCT and FT)

L	T	P	C
2	0	0	0

## Course Outcomes

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

1. demonstrate a capacity to work efficiently and with critical engagement with complex and sophisticated primary constitutional law texts
2. exhibit the capacity to craft coherent and persuasive constitutional law arguments in an adversarial context ,also recognizing the limitations of such argumentation
3. apply a contextual understanding of (i) the function of the High Court as the final arbiter of constitutionality and (ii) the techniques of judicial review as applied
4. practice a thorough and contextual knowledge of constitutional law doctrine particularly in its application to real or hypothetical constitutional law problems
5. demonstrate a high level of skill on academic and professional legal writing

<b>UNIT – I Introduction to Constitution of India</b>	<b>6</b>
Constitutional law – meaning – importance	
Constitutionalism – features – elements	
Constitution of India – concept – importance – historical perspective – characteristics	
<b>UNIT – II Fundamental Rights and Equality</b>	<b>6</b>
Fundamental rights – scheme – benefits	
Fundamentals duties – importance – and its legal status	
<b>UNIT – III Structure, Policies, Principles</b>	<b>6</b>
State policy – the directive principles and its importance-The implementation of directive principles- Parliamentary form of government in India- Constitution power and status of the President- Federal structure and distribution of legislative	
<b>UNIT –IV Emergency rule</b>	<b>6</b>
Financial powers between the union and the states- Amendment of the constitutional powers – procedure- Emergency provisions : articles of Indian constitution that has provisions to proclaim emergency- Emergency powers of President – national emergency President rule, financial emergency	
<b>UNIT – V Types and Concepts of Local Self Government</b>	<b>6</b>
The concept of local self –government and its types	
Comparison of the Indian constitutional scheme	

20.05.2020

B.E. / B.Tech. Regulations 2019



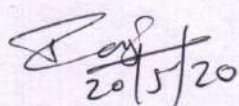
Directive principles of state policy and fundamental duties noted in the Indian constitution

Scheme of the fundamental rights to certain freedom under Article 19  
Scope of the right to life and personal liberty under Article 21

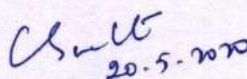
**References:**

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

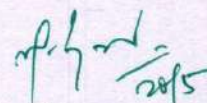
**Total: 30 HOURS**



**Dr. M. Raja**  
Course Coordinator / Sciences



**Dr. C. Shanthi**  
HOD / Sciences



**Dr. M. Renuga**  
Chairperson B.O.S,  
Science and Humanities.

20.05.2020

**B.E. / B.Tech. Regulations 2019**

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester IV Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19GE402	<b>Mandatory course:</b> Environment and Climate Science	2	0	0	0	30
2	U19FT401	Pattern Making and Garment Construction - II	3	0	0	3	45
3	U19FT402	Garment Production Machinery and Equipment (Lab Integrated)	3	0	2	4	75
4	U19FT403	Problem Solving using Python Programming (Lab Integrated)	3	0	2	4	75
5	U19FT404	Textile and Apparel Quality Evaluation	3	0	0	3	45
6	U19FT405	Textile Materials for Fashion Design	3	0	0	3	45
<b>Practical</b>							
7	U19FT406	Pattern Making and Garment Construction Laboratory – II	0	0	2	1	30
8	U19FT407	Textile and Apparel Quality Evaluation laboratory	0	0	2	1	30
9	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
10	U19FT408	Mini Project - I	0	0	2	1	30
11	U19FT409	In-Plant Training	2 Weeks			1	2 Weeks
<b>Total Credits</b>						<b>22</b>	

**Approved By**

**Chairperson, Fashion Technology BoS**  
**Dr.D.Raja**

**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

**Chairperson, Academic Council & Principal**  
**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Fashion Technology, Fourth Semester B.Tech. FT Students and Staff, COE

**COURSE OUTCOMES**

At the end of a study of the unit concerned, the student should be able to

1. State the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
2. Explain the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
3. Explain environmental based pollution their causes, effects and their remedial measures
4. Discuss their causes, effects and the control measures of Global Warming, Acid Rain, Ozone Layer Depletion
5. Describe the effect of climate change due to pollution

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	2				2	2						3	3
CO2	2	-											3	3
CO3	3	2				2	2						2	2
CO4	3	2				2	2						2	2
CO5	3	2				2	2						2	2

**UNIT I Introduction to Environmental Studies and Natural Resources 6**

Definition, Scope and Importance Forest Resources:- Use and over - exploitation, deforestation, Case Studies, Water Resources:- Use and Over-Utilization of Surface and ground water , Floods, Drought, Food Resources- Effects of Modern Agriculture, Fertilizer- Pesticide Problems–Role of an Individual in Conservation of Natural Resources.

**UNIT II Ecosystems and Biodiversity 6**

Structure and Function of an Ecosystem– Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids.

Introduction to Biodiversity –Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values –India as a Mega-Diversity Nation — Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.

**UNIT III Environmental Pollution 6**

Definition – Causes, Effects and Control Measures of:- (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution, Solid Waste Management- Effects and Control Measures of Acid Rain,– Role of an Individual in Prevention of Pollution..

#### **UNIT IV Climate Change on the Environment**

**6**

Sustainable Development- - Climate Change- Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy - Kyoto Protocol in reduction of greenhouse gases - Ozone Layer Depletion - mechanism, effects and control measures- Montreal Protocol to protect ozone layer depletion - Rain Water Harvesting - .Effect of climate change due to air pollution Case study - CNG vehicles in Delhi

#### **UNIT V Effect of Climate Change on Pollution**

**6**

Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings, consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.

**Total: 30 hours**

#### **TEXT BOOKS:**

1. Miller, T.G. Jr., “**Environmental Science**”, Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik, “**Environmental Science and Engineering**” New Age International Publication, 4<sup>th</sup> Multicolour Edition, New Delhi, 2014.

#### **REFERENCE:**

1. S. Radjarejesri et al., “**Environmental Science**” Sonaversity, Sona College of Technology, Salem, 2018.
2. Masters, G.M., “**Introduction to Environmental Engineering and Science**”, Pearson Education Pvt., Ltd., 2<sup>nd</sup> Edition, 2004.
3. Erach, B., “**The Biodiversity of India**”, Mapin Publishing P.Ltd.,Ahmedabad, India.
4. Erach Bharucha, “**Textbook of Environmental Studies for Undergraduate Courses**”, 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad – 500029.



## COURSE OUTCOMES

U19FT401

## PATTERN MAKING AND GARMENT CONSTRUCTION II

3 0 0 3

At the end of the study of this course the students will be able to,

1. Explain the steps in the construction of yokes, necklines and hems
2. Describe stitching methods used for pockets, plackets, waist bands and cuffs
3. Draft block patterns for basic children's, men's and women's garments
4. Explain the basic principles of grading
5. Explain the basic principles of draping

CO/PO, PSO Mapping														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	3	2	2					3	3	2
CO2	2	3	3	2	3	2	2					3	3	2
CO3	3	2	3	2	3	2	2				2	3	3	2
CO4	3	3	2	2	3	2	2				2	3	2	2
CO5	3	3	3	2	2	2					2	2	2	2

### UNIT I Yokes, Hemming and Necklines

9

**Yokes:** Definition – Selection of yoke design, Different styles of yoke. Simple yoke – yokes with or without fullness – Midriff yokes, Methods of attaching yokes.

**Hemming Techniques:** Definition, Factors to be considered in the selection of hems, Types of machine stitched hem, Hand stitched hem.

**Neckline Finishes:** Preparation and uses of True Bias, Facings, and Binding.

### UNIT II Pockets and Plackets

10

**Plackets:** Types, two piece plackets, continuous plackets, Kurtha plackets, Shirt cuff placket

**Pockets: Types** – patch pocket, patch with lining, Patch with flap, Front hip, Set-in seam, Slash pocket - Single lip, Double lip, with flap.

**Waistband:** One-piece, Two-piece and Tailor waistband, Elastic applied

**Cuffs:** Types, square shape, Round shape.

### UNIT -III Drafting for Garments

10

**Drafting:** Basic principles and methodologies used to draft block patterns for the following garments: Children's Body Suit, Romper, Frock, Shirt, Trouser, Skirt and Blouse.

**Pattern alterations:** Importance, Principles and pattern alterations for blouse and trouser.

**UNIT -IV Grading****8**

**Grading:** Principles of pattern grading, Types: Draft grading: Two dimensional and Three dimensional grading, Track grading; Grading of basic bodice, Basic sleeve and Basic collar.

**UNIT -V Draping****8**

**Draping:** Introduction, Importance, Preparation of dress forms, Preparation of muslin for draping; draping for bodice, sleeve, collar and skirt.

**Total: 45 hours****TEXT BOOKS:**

1. Marie Clayton, “**Ultimate Sewing Bible – A Complete Reference with Step-by-Step Techniques**”, Collins & Brown, London, 2008.
2. Clair B. Shaeffer “**The Complete Book of Sewing Shortcuts**” Sterling Publishing Company, 1981.

**REFERENCE:**

1. Claire Shaeffer, “**Sewing for Apparel Industry**”, Prentice Hall, 2000.
2. Cooklin Gerry, “**Garment Technology for Fashion Designers**”, Kindle edition, 2011.
3. Leila Aitken, “**Step by Step Dress Making Course**”, BBC Books, 1992.
4. Peg couch “**Illustrated Guide to Sewing: Garment Construction**”, fox chapel publishing, 2011
5. Anette Fischer “**Construction for Fashion Design (Basics Fashion Design)**”, Bloomsbury, 2017

### COURSE OUTCOMES

At the end of the study of this course the students will be able to,

1. Explain different methods of spreading of fabrics with respect to type of fabric.
2. Describe the types and functions of various fabric cutting machines.
3. Explain the functions of primary and auxiliary parts of sewing machine.
4. Elucidate the working principles of over lock and flat lock sewing machine.
5. Explain the functions and working principles of special purpose sewing machines.
6. Identify the major parts and various setting points in garment manufacturing machines.
7. Perform threading sequence of various stitching machines.
8. Determine the causes and remedies for stitch defects

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	2			2	2	3	2	2
CO2	2	3	2	2	2	2		2				3	2	2
CO3	3	3	2	3	2	3					2	3	2	2
CO4	3	1	2	2		2					2	2	3	2
CO5	3	3	2	2	2	3					2	3	3	2
CO6	3	3	3	2	2	2	2				2	2	2	2
CO7	3	3	3	2	2	2	2				2	2	2	2
CO8	3	3	2	3	2	2	2				2	2	3	2

### UNIT I Spreading

8

**Spreading:** Types of fabrics: One way, two way fabrics, their effect on spreading. Methods of fabric spreading, spreading equipment, computerized spreaders, marker planning, marker efficiency, factors affecting marker efficiency, marker duplicating methods and computer aided marker planning, types of fabric packages.

### UNIT II Cutting Machines

8

**Introduction to cutting machines:** Types and functions of cutting machines, straight knife, round knife, band knife cutting machines, notches, drills, die cutting machines, computerized cutting machines. Maintenance of cutting machines, common defects in cutting and their remedies.

### UNIT III Sewing Machine - SNLS

10

**Basic parts of sewing machine:** Primary and auxiliary part and their functions, bobbin case / bobbin hook, throat plate, take up devices, tensioners, feed dog, pressure foot. Types of needle, parts of needle and their function, needle finishes. Adjustments of stand height, pedal, needle bar, stitch length selection, feed timing, needle and bobbin thread tension, stitch cycle timing diagram. Common defects and remedies. Special attachments in sewing machines: guides, folders, stackers, trimmers, ziggers. Different machine brands.

### UNIT IV Multi Thread Sewing Machines

10

**Over lock machines:** Types of over lock machines, parts and their functions. Threading diagram of over lock machines. Adjustment of needle height, feed dog height, angle, differential feed ratio, position of upper and lower knives, loopers. Defects and remedies.

**Flat lock machines:** Types, parts and their functions. Threading diagram of flat lock machines. Adjustment of parts: Needle height, feed dog height, differential feed ratio, loopers. Maintenance of flat lock machines. Defects and Remedies.

### UNIT V Special Purpose Sewing Machines

9

**Introduction to different special purpose sewing machines:** Basic working of feed of arm, button hole sewing, button sewing, bar tack, blind stitch machines. Embroidery sewing machines. **Seam sealing machine.** Latest developments in sewing machines. Sewing machine maintenance, maintenance schedule for various machines.

**Total: 75 hours**

### LIST OF EXERCISES

1. Identify the single needle lock stitch machine parts, study various setting points, perform threading, prepare samples by using various folders and calculate the SPI for specified/chosen stitch length. (1 sessions)
2. Identify an over lock machine parts, study various setting points, adjustments for needle-thread, looper thread tension, feed-ratio, needle and looper setting and knife setting. perform threading, prepare stitch sample and calculate the SPI for given stitch length. (2 sessions )
3. Identify the flat lock machine parts, study various setting points, making adjustments of the needle-thread and looper-thread tension, feed-ratio, needle-and-looper setting and spreader setting. Perform threading, prepare stitch sample and calculate the SPI for given stitch length. (2 sessions )
4. Identify the button sewing and buttonhole machine parts, study various setting points, perform threading and prepare stitch sample. (2 sessions)
5. Identify the Feed-off arm and Bar tack machine parts, study various setting points, perform threading and prepare stitch sample. (2 sessions)

## TEXTBOOKS

1. Carr and Latham's "**Technology of Clothing Manufacture**" Revised by David J.Tyler, Blackwell Publishing, 2008.
2. Laing R.M., Webster J, "**Stitches and Seams**", TheTextile Institute, Manchester, UK, 2009.
3. Rathnamoorthy.,R,Surjith, "Apparel Machinery And Equipments", WoodHead Publishing Indian in Textiles,2015

## REFERENCES

1. Shaeffer Claire, "**Sewing for the Apparel Industry**", Prentice Hall, New Jersey, 2001.
2. Singer Sewing Reference Library, "**Sewing Lingerie**", CyDeCosse Incorporated, Minnesota, 1991.
3. Jacob Solinger, "**Apparel Manufacturing Handbook**", Reinhold Publications, 1998.

**Garment Production Machinery and Equipment (Lab Integrated)**  
**List of equipment required for a batch of 30 students**

<b>S. No.</b>	<b>Name of the equipment / software</b>	<b>Quantity Required</b>
1	Single Needle Lock Stitch Machine	30
2	Over lock machine	3
3	Flat lock machine	2
4	Button sewing machine	1
5	Button Hole machine	1
6	Feed - off the arm machine	1
7	Bar tack sewing machine	1
	<b>Total</b>	<b>39</b>

**COURSE OUTCOME:**

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

1. Develop algorithmic solutions to simple computational problems
2. Write simple Python programs
3. Write programs with the various control statements and handling strings in Python
4. Develop Python programs using functions and files
5. Analyze a problem and use appropriate data structures to solve it.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3									3	3
CO2	2	3	3	3	3								3	3
CO3	2	3	3	3	3								3	3
CO4	2	3	3	3	3								3	3
CO5	2	3	3	3	3								3	3

**UNIT I      Algorithmic Problem Solving      9**

Need for computer languages, Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

**UNIT II      Basics of Python Programming      9**

Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, input function, print function, Formatting numbers and strings, implicit/explicit type conversion.

**UNIT III      Control Statements and Strings      9**

Conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration-while, for, infinite loop, break, continue, pass, else. Strings-String slices, immutability, string methods and operations.

**UNIT IV      Functions and Files      9**

Functions - Introduction, inbuilt functions, user defined functions, passing parameters - positional arguments, default arguments, keyword arguments, return values, local scope, global scope and recursion. Files -Text files, reading and writing files.

**UNIT V      Data Structures: Lists, Sets, Tuples, Dictionaries      9**

Lists-creating lists, list operations, list methods, mutability list functions, searching and sorting, Sets-creating sets, set operations. Tuples-Tuple assignment, Operations on Tuples, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Nested Dictionaries.

**Theory: 45 Hours      Tutorial: -      Practical: -      TOTAL: 45 Hours**

**TEXT BOOKS:**

1. Reema Thareja, "**Problem Solving and Programming with Python**", Oxford University Press, 2018.
2. Allen B. Downey, "**Think Python: How to Think Like a Computer Scientist**", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (<http://greenteapress.com/wp/think-python/>)

**REFERENCES:**

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, "**Programming and Problem Solving with Python**", Mc-Graw Hill Education, 2018.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "**Introduction to Programming in Python: An Inter-disciplinary Approach**", Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, "**Exploring Python**", Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, "**Fundamentals of Python: First Programs**", CENGAGE Learning, 2012.
5. Charles Dierbach, "**Introduction to Computer Science using Python: A Computational Problem Solving Focus**", Wiley India Edition, 2013.

**LIST OF EXPERIMENTS**

1. Draw flowchart using any open source software.
2. Implement programs with simple language features.
3. Implement various branching statements in python.
4. Implement various looping statements in python.
5. Develop python programs to perform various string operations like concatenation, slicing, indexing.
6. Implement user defined functions using python.
7. Implement recursion using python.
8. Develop python programs to perform operations on list and tuples
9. Implement dictionary and set in python
10. Implement python program to perform file operations.

**Theory: -****Tutorial: -****Practical: 30 Hours****TOTAL: 30 Hours****Problem Solving using Python Programming (Lab Integrated)****List of equipment required for a batch of 30 students**

<b>S. No.</b>	<b>Name of the equipment / software</b>	<b>Quantity Required</b>
1	Computers (Pentium i5)	30
<b>Total</b>		<b>30</b>

**COURSE OUTCOMES**

At the end of the study of the course the student should be able to,

1. Elucidate the various principles and methods are used for yarn properties testing.
2. Describe the different methods and procedure is used for fabric testing properties.
3. Discuss the basic terms and definition of apparel testing and methods of evaluation.
4. Discuss the basic terms and definition and procedures of Quality, Inspection Quality Assurance and Control forms.
5. Elaborate on the quality control for Fabrics, QC in Garment Manufacturing Processes, Quality Standards and Tolerances.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	3		2		2	2	3	2	2
CO2	3	2	2	2	2	3		2		2	2	3	2	2
CO3	3	2	2	2	2	3		2		2	2	3	2	2
CO4	3	2	2	3	3	3		3		2	2	3	2	2
CO5	3	2	2	3	3	3		3		2	2	3	2	2

**UNIT I Fibre and Yarn Testing****9**

**Fibre Testing:** Testing of cotton using the rapid fibre testing methods, high Volume Instrument (HVI) and AFIS.

**Yarn count and Strength:** Definitions of count, yarn numbering system, determination of yarn count using wrap reel. **Count Strength Product and single yarn strength.**

**Yarn Twist:** Definitions of twist, determination of twist of single and ply yarn.

**Yarn Evenness and Hairiness:** Yarn appearance board winder. Classification of variations in yarn, methods of measuring yarn evenness and hairiness, Uster evenness tester.

**UNIT II Fabric Testing****9**

**Fabric Strength Testing:** Fabric tensile strength tester, tearing strength tester, hydraulic bursting strength tester.

**Fabric Performance Testing:** Martindale abrasion resistance tester. **Fabric pilling:** ICI pillbox tester.

**Fabric Drape and Stiffness:** Definition of drape and stiffness, drape meter, Shirley stiffness tester, fabric crease resistance and crease recovery tester.

**Fabric Permeability:** Terms in air permeability and water permeability tester. MVTR, MMT, thermal conductivity and resistance, liquid penetration.



### UNIT III Apparel Testing

8

**Seam Strength:** Definition of seam strength, seam puckering, seam slippage and evaluation of interlining quality. Standards for above testing methods.

**Apparel testing:** Dimensional stability, durable press evaluation, Snap / button pull strength testing. Testing procedures for various functional finishes like anti-microbial, flame retardant.

### UNIT IV Quality, Inspection, Quality Assurance and Control forms

9

**Quality:** Introduction, definition, control of quality and its necessity.

**Inspection:** Importance of inspection, types of inspection: raw material inspection, in-process inspection, final inspection, 100% inspection, sampling inspection, comparison of 100% and sampling inspections. AQL Standards, basic calculations, self-inspection method. definition of minor, major and critical faults.

### UNIT V Quality Control and Quality Standards

10

**QC for fabrics:** Quality control for knitted and woven fabrics, types of defects in fabrics, major, minor and critical faults, fabric inspection system, 4 point and 10 point system.

**Quality assurance:** Definition, differences between quality assurance and inspection, inspection agencies. Control forms.

**Quality Standards and Tolerances:** Quality standards and tolerances and for fabrics, spreading, cutting, stitching in garment industry, tolerances and quality standards for finished garments. Quality assurance system and standards for packing and packed goods.

**TOTAL: 45 hours**

#### TEXT BOOKS:

1. Angappan P and R.Gopalakrishnan , “**Textile Testing**”-S.S.M.I.T.T Co-op stores Ltd.,2007.
2. Koushik C.V. and R. Chandrasekaran, “**Textile Testing**”-NCUTE publication, New Delhi, 2004.
3. Jacob Solinger, “**Apparel Manufacturing Handbook**”, Prentice Hall, New Jersey, 1993.

#### REFERENCES:

1. J. E. Booth, “**Principles of Textile Testing**”, CBS Publishers and Distributors, New Delhi, 1996.
2. B. P. Saville, “**Physical Testing of Textiles**”, CRC Woodhead Publishing, New Delhi 1999.
3. V.K. Kothari, “**Quality Control and Testing Management**”, IAFL Publications, New Delhi, 1999.
4. Samuel Eilon, “**Production Planning and Control**”, Macmillan, New York, 1962.
5. Grover E. G. and Hamby D. S., “**Hand Book of Textile Testing and Quality Control**”, Wiley Eastern Pvt. Ltd., New Delhi, 1969.
6. Pradip V. Mehta, “**An Introduction to Quality Control for the Apparel Industry**”, Dekker, 1992.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain about role of textiles in fashion
2. Describe about design features, properties and applications of woven fabrics.
3. Describe about design features, properties and applications of knitted and nonwoven fabrics.
4. Describe about design features, properties and applications of embellished fabrics in fashion
5. Describe about design features, properties and applications of speciality fabrics in fashion

**CO/PO, PSO Mapping**

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PSO 1	PSO2	PSO3
CO1	2	3	3	2	3		2				2	2	2	3
CO2	3	3	3	3	3	2	2			2	3	2	3	3
CO3	2	2	3	2	3	2						2	2	2
CO4	3	3	3	3	3	2	2			2	2	2	2	2
CO5	3	3	3	3	3	2	2			2	2	2	2	2

**UNIT I Role of Textiles in Fashion****9**

Role of textiles in fashion designing, different types of textile materials used in fashion designing: raw material, construction, structure and quality, its properties and application, sources of fabric, choice of fabrics for regular and functional garments, factors influencing the selection of fabric for specific end use.

**UNIT II Woven Fabrics in Fashion****9**

Design, properties, applications and commercial names of plain, twill, stain, sateen, crepe, gauze, Bedford cord, leno, pile, gauze, dobby, jacquard, brocade, extra warp, extra weft fabrics and double cloth.

**UNIT III Knitted and Nonwoven Fabrics in Fashion****9**

Design, properties, applications and commercial name of jersey, rib, interlock, purl, pique, lacoste weft knitted fabrics.

Design, properties, applications and commercial name full tricot, lock knit, reverse lock knit, satin, shark skin, queen's cord warp knitted fabrics.

Design, properties, applications and commercial name needle punched, melt blown, spun bond nonwoven fabrics.

**UNIT IV Embellished Fabrics in Fashion****9**

Design, properties, applications and commercial name of ikkat, bhandhini, batik dyed textiles,

Design, properties, applications and commercial name of batik, stencil, block, screen and transfer printed textiles,

Design, properties, applications and commercial name of kalamkari and spray painted textiles,  
Design, properties, applications and commercial name of hand and machine embroidered textiles

**UNIT V Speciality fabrics in Fashion**

**9**

Design, properties, applications and commercial name of full grain, bonded, tanned, Suede, embossed leather.

Design, properties, applications and commercial name of coated fabrics for mobility, outdoor & lifestyle, interior design, industrial & protective and exterior application

Design, properties, applications and commercial name of composites, laminated, brushed, lace, stretch, and fur fabrics

**TOTAL: 45 hours**

**TEXTBOOKS:**

1. Clive Hallett, Fabric for Fashion: The Complete Guide: Natural and Man-made Fibers Paperback, Laurence King Publishing, 2014
2. Clive Hallett and Amanda Johnston, Fabric for Fashion: A Comprehensive Guide to Natural Fibres, Laurence King Publishing, 2010

**REFERENCES:**

1. Gail Baugh , The Fashion Designer's Textile Directory: The Creative Use of Fabrics in Design, Thames and Hudson Ltd, 2011
2. Stefanella Sposito , Fabrics in Fashion Design: The Way Successful Fashion Designers Use Fabrics, Promopress, 2017

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to

1. Draft and construct samples for Placket, Necklines and Pockets.
2. Draft and construct for children's garments like body suit, Romper, Frock and Drape for basic bodice and skirt.
3. Solve real time problem related to pattern making and construction of components, garments and draping

**CO/PO, PSO Mapping**

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	2	2				2	3	3	3
CO2	3	2	3	2	3	2	2				2	3	3	3
CO3	3	3	2	3	2	2	2				2	3	2	3

**LIST OF EXPERIMENTS****I. Drafting and construction of following components**

1. Plackets – Continuous bound placket, 2 piece placket and Tailored Placket (1session)
2. Necklines – Bias facing, Shaped facing and Bias binding (1session)
3. Pockets –Patch pocket, set in seam pocket and Bound pocket (1 sessions)

**II. Drafting and construction of following garments**

4. Children's body/sleep suit(1session)
5. Children's rompers(1session)
6. Children's frock(1session)

**III. Drape bodice and skirt (1session)**

**Total: 30 hours**

## PATTERN MAKING AND GARMENT CONSTRUCTION LABORATORY II

### List of equipment required for a batch of 30 students for U.G

S. No.	Name of the equipment / software	Quantity Required	Additional tools issued to individual students
1.	Cork Top Tables	15	L - scale
2.	<b>Dress forms</b>		Hip curve
3.	Male : 40" chest full	1	Meter Scale
4.	Male : 42" chest full	1	French Curve
5.	Male : adjustable half	1	Tracing wheel
6.	Male : 40" chest half	1	Measuring tape
7.	Female : 32.5" bust half	1	Tailor's Chalk
8.	Female : 32.5" bust full	1	Paper cutting scissors
9.	Female : 34.5" bust full	1	Fabric cutting scissors
10.	Female : 36.5" bust full with hand	1	1/4 <sup>th</sup> Paper Scale
11.	Female : adjustable half	1	
	<b>Mannequins</b>		
12.	i. Baby		
	Boy – 80.5 cm	1	
	Girl – 88.8 cm	1	
	ii. Teenage Girls & Boys		
	Boy – 139 cm	1	
	Girl – 139cm	1	
	iii. Adults		
	Male -186 cm	1	
	Male -182.5 cm	1	
	Female -157.6 cm	1	
	Female -186 cm	1	
	Jewellery bust half head	1	
	Jewellery bust Indian face	1	
	Jewellery hand	2	
13.	Single-needle lock-stitch machine	30	
14.	Steam Iron	3	
15.	Fusing Machine	1	
16.	Ironing Table	1	
	<b>Total</b>	<b>71</b>	

**Total: 30 hours**

**COURSE OUTCOMES**

At the end of study of this course the students will be able to,

1. Determine the count, strength and the appearance of the yarn.
2. Determine the physical and dimensional properties of the fabric.
3. Evaluate the garment qualities like dimensional stability, seam properties of the garment.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	2			2	2	3	3	2
CO2	3	3	2	3	3	2	2			2	2	3	3	2
CO3	2	3	2	3	3	2	2			2	2	3	3	2

**LIST OF EXPERIMENTS**

1. Determination of yarn count, lea strength and CSP. (1 session)
2. Determination of fabric tensile strength and seam strength properties. (1 session)
3. Determination of fabric abrasion resistance and pilling tendency of the fabric. (1 session).
4. Determination of colour fastness to light, washing and rubbing. (1 session)
5. Determination of fabric bursting and tearing strength of the fabric. (1 session)
6. Determination of drape coefficient of fabric by using drape meter. (1 session)
7. Determination of air permeability and wickability of fabric testing. (1 session)
8. Analyses of Seam puckers and thread consumption for a given garment. (1 Session)
9. Analyse the given fabric and garment defects using standards and suggest causes and remedies. (1 session)
10. Determination of Button Pull Strength and dimensional stability of the garment. (1 session)

**Total: 30 hours**

## TEXTILE AND APPAREL QUALITY EVALUATION LABORATORY

### List of equipment required for a batch of 30 students

S. No.	Name of the equipment / software	Quantity Required
1.	Electronic Balance	1
2.	Automatic Wrap Reel	1
3.	Lea Strength tester	1
4.	Yarn appearance tester	1
5.	Single yarn twist tester	1
6.	Fabric tensile strength tester	1
7.	Double yarn twist tester	1
8.	Martindale abrasion tester	1
9.	Fabric bursting strength tester	1
10.	Fabric stiffness tester	1
11.	Fabric crease recovery tester	1
12.	Drape meter	1
13.	Beesley's Balance	4
14.	Air-permeability tester	1
15.	Course length tester	1
16.	Crimp tester	2
17.	Single yarn strength tester	1
18.	Wash fastness tester	1
19.	Rubbing fastness tester	1
20.	Light fastness tester	1
<b>Total</b>		<b>24</b>

**Total: 30 hours**

## COURSE OUTCOMES

At the end of the study of this course the students will be able to,

1. Identify case study and innovative ideas related to the subjects learnt in the current semester.
2. Execute a mini project related to the case study and innovative ideas identified by the students.
3. Function effectively on teams and to communicate effectively and develop report with results and conclusion of the mini project work.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3

The students should complete the following tasks:

- Identify and finalise the mini project members.
- Identify a guide for their mini project and select an area to solve a research or industry problems.
- Developing a scope for their mini project that will include objectives, budget, timeline and any other variables.
- Survey of literature  
Once the plan is ready for the mini project, the next step is to refer journals, past work related to their mini projects and other sources to compile information about the work already done in the specified area.
- Preparing work plan for the mini project.
- Execution of mini project as per the work plan.
- Report Preparation for the work executed by them.

## REVIEWS TO MONITOR THEIR WORK PROGRESS

- An appointed committee of faculty will review the progress of the mini project three times in the semester at periodic interval before final viva.
- The final viva will be conducted by the appointed committee of an external and an internal faculty.

**Total: 30 hours**



**2 weeks during vacation leave****COURSE OUTCOMES**

At the end of the study of this training, the students will be able to

1. Get training in real world of production and process in the apparel and related industries.
2. Understand the entire process in detail.
3. Identify the problems in the industry by observation and prepare an in-plant training report

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO 1	PSO2	PSO3
CO1	2	3	2	2		2	2		2	2	2	2	2	2
CO2	2	3	2	3		3	3		2	2	2	2	2	2
CO3	2	3	2	3		3	2		2	2	2	2	2	2

- The students have to undergo a 2-week in-plant training related to the subject learnt in the immediately preceding semesters.
- Industry mentor and institute mentor will be allotted to the students in the inplant training.
- Students have to submit weekly progress report regularly which will be compiled by the institute mentor and submitted to HOD.
- The students have to submit a report of their in-plant training with photos.
- Students have to submit a certificate provided by the industry for two weeks.
- A committee of three staff members as internal examiner and an external examiner will conduct a Viva voce and evaluate student performance.
- Students successfully completing the 2-week in-plant training will be awarded one credit.

Semester – IV	U19GE401-SOFT SKILLS AND APTITUDE – II	L	T	P	C	Marks
		0	0	2	1	100
<b>Course Outcomes</b>						
<b>At the end of the course the student will be able to:</b>						
1. Demonstrate capabilities in additional soft-skill areas using hands-on and/or case-study approaches						
2. Solve problems of increasing difficulty than those in SSA-I in given areas of quantitative aptitude and logical reasoning and score 65-70% marks in company-specific internal tests						
3. Demonstrate greater than SSA-I level of verbal aptitude skills in English with regard to given topics and score 65-70% marks in company-specific internal tests						
<b>1.Soft Skills</b>	<b>Demonstrating soft-skill capabilities with reference to the following topics:</b> <ol style="list-style-type: none"> <li>SWOT</li> <li>Goal setting</li> <li>Time management</li> <li>Stress management</li> <li>Interpersonal skills and Intrapersonal skills</li> <li>Presentation skills</li> <li>Group discussions</li> </ol>					
<b>2. Quantitative Aptitude and Logical Reasoning</b>	<b>Solving problems with reference to the following topics:</b> <ol style="list-style-type: none"> <li>Equations: Basics of equations , Linear, Quadratic Equations of Higher Degree and Problem on ages.</li> <li>Logarithms, Inequalities and Modulus</li> <li>Sequence and Series: Arithmetic Progression, Geometric Progression, Harmonic Progression, and Special Series.</li> <li>Time and Work: Pipes &amp; Cistern and Work Equivalence.</li> <li>Time, Speed and Distance: Average Speed, Relative Speed, Boats &amp; Streams, Races and Circular tracks and Escalators.</li> <li>Arithmetic and Critical Reasoning: Arrangement, Sequencing, Scheduling, Network Diagram, Binary Logic, and Logical Connection.</li> <li>Binary Number System.- Binary to decimal, Octal, Hexadecimal</li> </ol>					
<b>3. Verbal Aptitude</b>	<b>Demonstrating English language skills with reference to the following topics:</b> <ol style="list-style-type: none"> <li>Critical reasoning</li> <li>Theme detection</li> <li>Verbal analogy</li> <li>Prepositions</li> <li>Articles</li> <li>Cloze test</li> <li>Company specific aptitude questions</li> </ol>					



**Dr.S.Anita**

**Head/Training**

## MANDATORY COURSES

Sona College of Technology, Salem

Department of Sciences (Chemistry)

### SEMESTER – IV

#### MANDATORY COURSE

#### U19GE402 - ENVIRONMENT AND CLIMATE SCIENCE

(Common for MCT, IT, FT, ECE and BME)

**L T P C**  
**2 0 0 0**

**Course Outcomes:**

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

1. state the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
2. explain the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
3. explain environmental based pollution their causes, effects and their remedial measures
4. discuss their causes, effects and the control measures of Global Warming, Acid Rain, Ozone Layer Depletion
5. describe the effect of climate change due to pollution

**UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES** **6**

Definition, Scope and Importance Forest Resources:- Use and over - exploitation, deforestation, Case Studies, Water Resources:- Use and Over-Utilization of Surface and ground water , Floods, Drought, Food Resources- Effects of Modern Agriculture, Fertilizer- Pesticide Problems–Role of an Individual in Conservation of Natural Resources.

**UNIT II ECOSYSTEMS AND BIODIVERSITY** **6**

Structure and Function of an Ecosystem– Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids.

Introduction to Biodiversity –Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values –India as a Mega-Diversity Nation — Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.

**UNIT III ENVIRONMENTAL POLLUTION** **6**

Definition – Causes, Effects and Control Measures of:- (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution, Solid Waste Management- Effects and Control Measures of Acid Rain,– Role of an Individual in Prevention of Pollution..

23.01.2021

B.E. / B.Tech. Regulations 2019

**UNIT IV CLIMATE CHANGE ON THE ENVIRONMENT**

6

Sustainable Development- - Climate Change- Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy - Kyoto Protocol in reduction of greenhouse gases - Ozone Layer Depletion - mechanism, effects and control measures- Montreal Protocol to protect ozone layer depletion - Rain Water Harvesting - .Effect of climate change due to air pollution Case study - CNG vehicles in Delhi

**UNIT V EFFECT OF CLIMATE CHANGE ON POLLUTION**

6

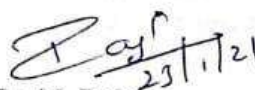
Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings. consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.

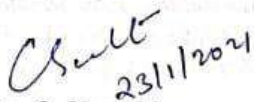
**TOTAL: 30 HOURS****Text Books:**

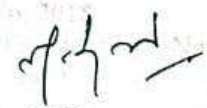
1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik, "Environmental Science and Engineering" New Age International Publication, 4<sup>th</sup> Multicolour Edition, New Delhi, 2014.

**References:**

1. S. Radjarejesri et al., "Environmental Science" Sonaversity, Sona College of Technology, Salem, 2018.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., 2<sup>nd</sup> Edition, 2004.
3. Erach, B., "The Biodiversity of India", Mapin Publishing P.Ltd., Ahmedabad, India.
4. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad - 500029.

  
23/1/21  
**Dr. M. Raja**  
Course Coordinator / Sciences

  
23/1/2021  
**Dr. C. Shanthi**  
HOD / Sciences

  
**Dr. M. Renuga**  
Chairperson BOS,  
Science and Humanities

23.01.2021

**B.E. / B.Tech. Regulations 2019**



**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester V under Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19FT501	Apparel Manufacturing	3	0	0	3	45
2	U19FT502	Apparel Production Planning and Control	3	0	0	3	45
3	U19FT503	Apparel Merchandising (Lab Integrated)	3	0	2	4	75
4	U19FT504	Functional Garments	3	0	0	3	45
5	noc22_mg104	NPTEL – Principles of Management	3	0	0	3	<b>12 weeks</b>
6	U19FT906	<b>Professional Elective - Intimate Apparel</b>	3	0	0	3	45
	U19FT910	<b>Professional Elective - Home Textiles</b>					
<b>Practical</b>							
7	U19FT505	Apparel Manufacturing Laboratory	0	0	2	1	30
8	U19FT506	Digital Pattern Development and Marker Planning Laboratory	0	0	2	1	30
9	U19GE501	Soft Skills and Aptitude – III	0	0	2	1	30
10	U19FT507	Mini Project - II	0	0	2	1	30
11	U19FT508	In-Plant Training	<b>2 weeks</b>			1	<b>2 Weeks</b>
<b>Total Credits</b>						<b>24</b>	

**Approved By**

**Chairperson, Fashion Technology BoS**

**Dr.D.Raja**

**Member Secretary, Academic Council**

**Dr.R.Shivakumar**

**Chairperson, Academic Council & Principal**

**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Fashion Technology, Fifth Semester B.Tech FT Students and Staff, COE

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain the fundamental concepts of measurement for children's garment draft the pattern and construct the garment and enumerate the factors affecting the selection of fabrics, trimmings, seams used in children's wear, explain the method of fabric consumption and check the fit of the garment.
2. Explain the procedure involved in drafting and construction of men's wear, state the method followed in minimizing the fabric used and check the fit of the garment.
3. Draft and construct men's suit and analyse the principles of fit, explain the method to judge the fit of the men's suit'.
4. Analyse the importance and method of taking measurement for women's garment, Design and explain pattern drafting and construction of women's wear and explain the process involved in minimizing fabric consumption for women's wear.
5. Design intimate apparels and check its fitting, explain the procedure involved in drafting and construction of lingerie and state the importance of elastomeric yarns and its application in the manufacture of lingerie.

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	3	1		1				2	3	3	3
CO2	2	3	3	2	3	1		1				3	3	3	3
CO3	2	3	3	3	2	1		1				2	3	3	3
CO4	1	3	3	2	3	1		1				3	3	3	3
CO5	2	3	3	3	2	1		1				2	3	3	3

**UNIT I Measurement for Children's Garments****9**

Measurement for Children's Garments: Measurement required for construction of children's garments. Step by step procedure for pattern drafting, construction, minimizing fabric consumption and checking the fit for children's wear- body suit, baby frock, shorts, rompers, pedal pushers. Factors affecting selection of fabrics, trimmings, seams used in children's wear.

**UNIT II Men's Wear****9**

Step by step procedure for pattern drafting, construction and minimizing fabric consumption for men's casual wear, formal wear, work wear and under clothing. Check the fit of the garments.

**Casual wear** : T-Shirts, Bermudas, Pyjamas, Boxer shorts, Cargos

**Formal wear** : Formal shirts, Formal trousers

**Work wear** : Dungarees and overalls

**Inner Wear** : Vests and briefs

**UNIT III Men's Formal Wear****9**

Men's Formal Wear: Step by step procedure for pattern drafting: construction and minimizing fabric consumption, principles of fit for men's suits: 2 piece and 3 piece suits, single and double breasted suits.

**UNIT IV Women's Wear****9**

Women's Wear: Measurement required for construction of women's garments. Step by step procedure for pattern drafting, construction and minimizing fabric consumption for women's wear.

**Casual wear** : Night wear

**Traditional wear** : Salwar kameez, Chudidhar

**Western wear** : Ladies tops, Formal trousers, Skirts: 'A' line, Umbrella, six gore, Circular skirt.

**UNIT V Lingerie****9**

Lingerie: Intimate apparels, different types of fitting for ladies inner wear, step by step procedure of drafting and construction of stretch fabrics, step by step procedure of construction of brassiers, size and fit, ladies panties, other lingerie's, use of elastomeric yarns in lingerie.

**TOTAL: 45 hours****TEXT BOOKS:**

1. Patrick John Ireland, "**Fashion Design Illustration: Men**", B.T Batsford Ltd., London, 1996.
2. Gerry Cooklin, "**Pattern Grading for Children's Clothes**", Om Book Service, New Delhi, 1991.
3. Harold Carr and Barbara Latham, "**The Technology of Clothing Manufacture**", Blackwell Science Inc., Oxford, 1994.
4. Singer Sewing Staff, "**Sewing Lingerie**", CyDeCosse Incorporated, Minnetonka, 1991.

**REFERENCE:**

1. Singer Sewing Staff, "**Sewing Active Wear**", Creative Publishing International Editors, 1986.
2. Singer Sewing Staff, "**Sewing Pants That Fit**", Cowles Creative Publishing Inc., 1989.
3. Gerry Cooklin, "**Garment Technology for Fashion Designers**", Blackwell Science, Oxford, 1997.

**COURSE OUTCOMES**

At the end of the study of the course, the student will be able to,

1. Explain the functions and techniques involved in production and pre-production activities.
2. Describe the lay planning and bundle ticket process in apparel production.
3. Analyse types of production system and operation break down for various garments.
4. Compare the types of capacity, capacity planning and line balancing in cutting, sewing and finishing.
5. Analyse the production planning tools and its implementation in garment industry.

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	1	1	1	1	1	1	1	1	1	3	1	1
CO2	1	3	2	2	1	2	1	1	1		1	1	2	1	1
CO3	1	2	3	2	2	2			1		2		3	2	2
CO4	3	3	1	3	3	2			1		1		2	2	1
CO5	2	2	2	2	1	1			1		3		2	2	2

**UNIT I Introduction****9**

**Production:** Definition, Terminology, Functions of production department, Duties and responsibilities of a production manager / supervisor.

**Pre-production activities:** Lead time, Product development steps from a prototype to the production model, Product data management and detailed interpretation of specification sheets.

**UNIT II Lay Planning and Bundle tickets****8**

**Lay planning:** Lay lot planning, numerical exercises on lay lot planning, shrinkage allowance.

**Bundle Tickets:** Importance and guidelines, sorting and bundling, move ticket, barcode and RFID Technology.

**UNIT III Production Systems and Operation Sequence****10**

**Production systems:** Whole garment production system, batch production system, straight line production system, unit production system, quick response production system, modular production system.

**Operation breakdown:** T- shirt, men's full sleeve shirt, trousers, jeans, ladies night dress, shorts, machines and attachment details.

**UNIT IV Capacity Calculation and Line Balancing****9**

**Types of Capacity:** Committed capacity, Available capacity, Potential capacity, Required capacity, Excess capacity.

**Capacity calculation:** Cutting, sewing and finishing, analysis of man - machine requirements for a given target. Case Study.

**Line balancing:** Importance, techniques and line balancing matrix, TAKT time analysis. Case Study.

**UNIT V Production Planning Tools****9**

**Principles of scheduling:** Scheduling charts, GANTT chart, backlog graph, CPM and PERT analysis.

**Line Planning:** Multi-style planning, evaluation of plant layout, pitch time analysis, production grid.

**Production Monitoring Tools:** Daily and monthly production report, Daily and monthly production analysis, Daily and monthly production charts.



**TOTAL: 45 hours**

**TEXT BOOKS:**

1. Cooklin Gerry, “**Introduction to Clothing Manufacture**”, Blackwell Science Ltd., Oxford, 2006.
2. Ruth E. Glock and Grace I. Kunz, “**Apparel Manufacturing: Sewn Product Analysis**”, Fourth Edition, Pearson Education, New Delhi, 2005.

**REFERENCE:**

1. Chuter A. J., “**Introduction to Clothing Production Management**”, Blackwell Science Publishing, 1995.
2. Harold Carr and Barbara Latham, “**The Technology of Clothing Manufacture**”, Om Book Service, New Delhi, 1995.
3. Jacob Solinger, “**Apparel Production Handbook**”, Van Nostrand Reinhold Publications, New York, 1998.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Describe the apparel merchandising and various types of merchandising
2. Discuss the roles of merchandiser and time management in merchandising
3. Calculate the apparel pricing and sourcing
4. Analyse types of costs and elements of cost
5. Choose appropriate the apparel raw material for end uses and calculate CMT cost
6. Determination of costing for the given garments
7. Perform the merchandising plan for the given work order
8. Development of proto sample for the given specifications

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	2	2	2	2	3	2	2	3	3	2
CO2	3	3	3	3	3	1	1		2	3	3	2	3	3	2
CO3	2	3	2	3	2	1	2	1	1	2	2	1	3	2	2
CO4	1	3	3	3	3		2	1	1	2	2	1	3	1	1
CO5	1	3	3	3	3		1			1	3	1	3	3	1
CO6	1	3	3	3	3	1	1	1	3	3	3	3	3	3	3
CO7	1	3	3	3	3	1	1	1	3	3	3	3	3	3	3
CO8	1	3	3	3	3	1	1	1	3	3	3	3	3	3	3

**UNIT I Merchandising****9**

**Apparel Merchandising:** Definition, functions of merchandising department, responsibilities of merchandiser. Steps involved in receiving an order, purchase order and specification sheet analysis, sampling procedure, interfacing merchandising with other departments in an apparel organization, terminologies used in merchandising

**Types of Merchandising:** Principles and techniques of apparel merchandising, retail merchandising, visual merchandising, fashion Merchandising

**UNIT II Roles of Merchandiser****9**

**Roles of Merchandiser:** Line planning-Introduction, fashion forecasting, apparel line and seasons. Steps and techniques in fashion forecasting, Market research, consumer research, product research, Fashion research, trend research, colour research, line Development- Fabric and trims selection, prototyping, pre-costing, final product development. Line presentation, Line Adoption, market/customer profiling. Specific roles of buying house, production and retail house merchandisers.

**UNIT III Pricing and Sourcing****9**

**Pricing:** Pricing theory, factors affecting price structure in apparel.

**Sourcing:** Definition, role of merchandiser in sourcing, sourcing process. Need and important factors in sourcing, methods of sourcing raw materials, international and domestic sourcing centers, sourcing of accessories, manufacturing resource planning, sourcing lead time, supplier types, vendor management, JIT technology.

#### **UNIT IV Introduction to Cost accounting**

**9**

**Cost:** Principles of cost. Types of cost: Fixed cost, Variable cost, Semi variable cost, Conversion cost, Differential cost **Elements of cost**, Direct material cost, Direct expenses, Direct wages - Indirect materials - Indirect expenses, Indirect labour , Overheads, Production overhead , Administrative overhead , Selling and distribution overhead , Components of cost sheet, Break even analysis.

#### **UNIT V Material and CMT Cost**

**9**

**Factors that Determine the Price of Garments:** Material cost, Cost of yarn, Cost of fabric production, Cost of processing. Factors that affect cost of garment, width, design and lot size. Cutting, Making and Trim cost (CMT cost) for different types of woven and knitted garments - Waste minimisation in garment production.

**Total: 75 hours**

#### **LIST OF EXERCISES**

1. Prepare the Merchandising plan for the given work order.
2. Development of proto sample by using buyer's measurement (specification sheet) and calculate the costing.
3. Determination of CMT costing for the given baby frock
4. Determination of CMT costing for the given men's shirt and trouser
5. Determination of CMT costing for the given T shirt.
6. Determination of CMT costing for the given ladies top and skirt.
7. Prepare the cost sheet and BOM for the given style of garment.

#### **TEXT BOOKS:**

1. Moore Evelyn C., "**Path for Merchandising- A Step by Step Approach**", Thames and Hudson Ltd., London, 2001.
2. Vijay Barotia, "**Marketing Management**", Mangal Deep Publication, New Delhi, 2001.
3. **R.Rathinamoorthy, R.Surjit**, "**Apparel Merchandising**", Woodhead Publishing Limited, 2019
4. M.Krishnakumar, "**Apparel Merchandising : An Integrated Approach**", Abhishek Publications, 2010

#### **REFERENCE:**

1. Jarnow J. and Dickerson K. G., "**Inside the Fashion Business**", Prentice Hall, New Delhi, 1997.
2. Laine Stone and Jean Samples, "**Fashion Merchandising**", McGraw Hill Books, Singapore, 1985.

**APPAREL MERCHANDISING**  
**(Lab integrated course)**

**List of equipment required for a batch of 30 students**

<b>S. No.</b>	<b>Name of the equipment / software</b>	<b>Quantity Required</b>
1	Single needle Lock Stitch Machine	30
2	Beesley balance	4
3	GSM cutter	2
	<b>Total</b>	<b>36</b>

**COURSE OUTCOMES**

At the end of study of this course the students will be able to,

1. Explain the characteristics, classification of functional garments, market size, and functional garments for medical and chemical field.
2. Explain requirements, selection and development of sportswear, and development of camouflage garments.
3. Apply the concept and develop wearable electronics and space suit garments.
4. Analyse the techniques involved in the manufacture of high altitude garments, high visibility garments and chromic textiles.
5. Evaluate the applications, manufacture and its performance of bullet proof vests, cut resistant, vehicle armour clothing and flame resistant textiles.

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	3	2					1	3	2	1
CO2	3	3	3	2	2	3						1	3	3	1
CO3	2	2	2	2	3	2	1					2	2	2	1
CO4	1	3	2	3	1		2					1	2	3	1
CO5	2	3	2	3	1	3	1					3	3	3	2

**UNIT I Introduction and Functional Garments for Medical and Chemical field 9**

**Functional Garments:** Introduction, characteristics and classification of functional garments. Size and future growth prospects of world and Indian market of functional garments.

**Surgical, intelligent functional and therapeutic clothing:** Fibre requirements, characteristics, design and development process of functional garments used for medical application.

**Biological and chemical protection clothing:** Fibre requirements, design and development process of functional garments used in biological and chemical protection.

**UNIT II Sportswear and Camouflage Garments 9**

**Sportswear:** Functional requirements, fibre selection, fabric properties and finishing requirements, ease and comfort, dry-fit garments, importance of moisture management behaviour and applications in sportswear.

**Camouflage Textiles:** Requirements- fibre and fabric, applications, materials and development process of camouflage clothing for military applications.

**UNIT III Wearable Electronics and Garment 9**

**Wearable Clothing:** Principle and design of wearable garments, Requirements of fibre and fabrics, characteristics, flexible wearable electronics in fabrics, wearable sensors, bio monitoring devices. Interfacing circuits and garments. Application of wearable electronics. Design features, comfortness, challenges and limitations of electronics wearable garments. Principle and design of space suit garments.

**UNIT IV Garments for Chromic Textiles, High Altitudes and Visibility Garments 9 Textiles:**

Principles of thermo chromic and photo chromic textiles and outline of manufacturing process. Application of chromic textiles in fashion.

**High altitudes garments:** Requirements, characteristics, fibres, yarn and fabrics, component materials and development of garments for protection against extreme weather conditions.

**High Visibility Clothing:** Requirements of fibres, characteristics, applications, materials and manufacturing process of high visibility garments.

**UNIT V      Defense Clothing**

**9**

**Ballistic protection and bullet proof vest:** Introduction, concept of ballistic protection, fibres, yarns and fabrics for ballistic protection, manufacture, testing and evaluation of bullet proof vests.

**Cut resistant and vehicle armour clothing:** Need and requirements, materials, influencing factors, development process, testing and evaluation of cut resistant and vehicle armour clothing,

**Flame resistant garments:** Requirements, materials, design and development, testing and evaluation of flame resistant garments.

**Total: 45 hours**

**TEXT BOOKS:**

1. Horrocks A.R. and Anand S.C., “**Handbook of Technical Textiles**”, Wood head Publishing Limited, Cambridge, UK, 2012.
2. Anand S.C., Kennedy J.F., Mirafatab M. and Rajendran S., “**Medical Textiles and Biomaterials for Health Care**”, Wood head Publishing Limited, Cambridge, UK, 2006.

**REFERENCE:**

1. Adanur S., “**Wellington Sears Handbook of Industrial Textiles**”, Technomic Publishing Co. Inc., 2017
2. Pushpa Bajaj and Sengupta A.K., “**Protective Clothing**”, the Textile Institute, 1992.
3. N.Pan and G.Sun., “**Functional Textiles for improved performance, protection and health Part-1 and Part-2**”, Wood head Publishing series in textiles, 2011.
4. Mc Cann J. and Bryson D., “**Smart Clothes and Wearable Technology**”, Wood Head Publishing Series in Textiles, UK, 2010, ISBN-10: 1845693574
5. Xiaoming Tao, “**Wearable Electronics and Photonics**”, The Textile Institute, CRC press, Manchester, 2005
6. Roshan Shishoo, “**Textiles for Sportswear**”, Wood head Publishing series in textiles, 2015
7. L.Ashok kumar & C.Vigneswaran, “**Electronics in Textiles and Clothing – Design, Products and Applications**”, CRC Press, Coimbatore, 2015

Instructor bio



**Prof. Susmita Mukhopadhyay**

IIT Kharagpur

**Susmita Mukhopadhyay, Associate Professor, VGSOM (Ph.D., Calcutta University, Fellow ISI, Kolkata)**

Susmita Mukhopadhyay's areas of specialization include Human Resource Management and Industrial Psychology, Business Values and Ethics, and Organizational Behaviour. A gold medalist in M.Sc., she is the recipient of the Young Scientist Award and Search of Excellence Award. She was selected for the Microfinance Researchers Alliance Fellow Program Centre for microfinance, Institute of Financial Management and Research, Chennai, in 2009.



**Prof. S. Srinivasan, Assistant Professor at Vinod Gupta School of Management, IIT Kharagpur.**

Srinivasan is an Assistant Professor at Vinod Gupta School of Management, IIT Kharagpur. He teaches Organization Behavior and Human Resource Management. He received his Ph.D. in OB & HR from IIT Madras in 2018. He was a recipient of the DAAD Fellowship. He is a certified Labor and ESH compliance auditor. He has audited several factories for established European and American Brands. Prior to joining Ph.D. program, he was a research associate in a collaborative research project between IIT Madras and the University of Guelph, Canada. He was engaged in socio-economic impact assessment with NTPC.

## **COURSE LAYOUT**

Week 1:Management: Definition, nature, purpose and scope of management, Skills and roles of a Manager, functions, principles; Evolution of Management Thought, Scientific Management.

Week 2:Planning: Types of plans, planning process, Characteristics of planning, Traditional objective setting, Strategic Management, premising and forecasting

Week 3:Decision-Making: Process, Simon's model of decision making, creative problem solving, group decision making.

Week 4:Management by Objectives: Management by exception; Styles of management: (American, Japanese and Indian), McKinsey's 7-S Approach, Self-Management

Week 5:Organizing: Organizational design and structure, Coordination, differentiation and integration.

Week 6:Span of management, centralization and de-centralization Delegation, Authority & power - concept & distinction, Line and staff organizations

Week 7:Staffing: Human Resource Management and Selection, Performance appraisal and Career strategy, Coordination- Concepts, issues and techniques

Week 8:Organizational Change: Introduction, Resistance to Change, Behavioural Reactions to Change, Approaches Or Models to Managing Organisational Change.

Week 9:Organizational Change: Introduction, Resistance to Change, Behavioural Reactions to Change, Approaches Or Models to Managing Organisational Change.

Week 10:Leading: Human Factors and Motivation, Leadership, Communication, Teams and Team Work

Week 11:Leading: Human Factors and Motivation, Leadership, Communication, Teams and Team Work

Week 12:Controlling: Concept, planning-control relationship, process of control, Types of Control, Control Techniques Characteristics of team

### Books and references

1. Principles of management : Stoner
2. Principles of management: Koontz O'donell

<b>Course Type :</b>	<b>Core</b>
<b>Duration :</b>	<b>12 weeks</b>
<b>Credit Points :</b>	<b>3</b>



## PROFESSIONAL ELECTIVE

U19FT906

INTIMATE APPAREL

3 0 0 3

### COURSE OUTCOMES

At the end of the study of this course the students will be able to,

1. Categorize intimate apparel and choose suitable fabrics and designs
2. Appraise on basic principles in designing and construction of various types of Men's intimate wear
3. Appraise on basic principles in designing and construction of various types of Women's intimate wear
4. Develop Intimate Night wear and classify the types of girdles and analyze fabric properties role in girdle design
5. Analyse and relate different accessories and production technique of Intimate apparel

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3		3	2					1	2	3	3
CO2	3	3	3	3	3	3	1			2	3	2	3	3	3
CO3	3	3	3	3	3	3	1			2	3	2	3	3	3
CO4	3	3	3	3	3	3	1			2	3	2	3	3	3
CO5	1	3	3	3	3	3	1			1		1	3	3	3

#### UNIT I Introduction to Intimate Apparel

9

**Intimate Apparel:** Types: whole body, upper body and lower body, Classification of kids, women's and men's intimates, Quality requirements: fibers, fabrics, designs. Physical and physiological health effects of intimate apparel, comfort in intimate apparel.

#### UNIT II Men's Intimate Wear

9

**Men's Wear:** Design and development, measurements, drafting procedure and construction sequence: long johns, tank top, tanga, boy shorts, knickers, bikini underwear, thong, boxer briefs, boxer shorts and jockstrap.

#### UNIT III Women's Intimate Wear

9

**Women's Lingerie:** Design and development, measurements, drafting procedure and construction sequence: petticoats, panties, camisoles, spaghetti top, tube top, bikini.

Brassiere: technology, innovations, bio-mechanical engineering of bra, basic block of bra pattern.

Intimate apparel with special functions: sports bra, panty hose, swimwear, mastectomy bra and maternity underwear.

#### UNIT IV Night Wear and Girdles

9

**Night Wear:** Design and development, measurements, drafting procedure and construction sequence: nightgown, pajamas.

**Innovations Of Girdles:** Introduction, historical development of girdles, classification of modern girdles, innovations of shape-up girdles, Inventions of health promoting girdles, materials for girdles, fabric properties in girdle design.

## **UNIT V Intimate Apparel Production Technology**

**9**

**Production Technology:** Accessories: Bra wire, hook & eye tape, ring & slider, buckle, plastic bone, elastics and threads Principles, methods, technical aspects and controls of lamination, molding and welding for production of intimate apparels. Shrinkage chart for different stretch fabrics.

**TOTAL: 45 hours**

### **TEXT BOOKS:**

1. C. Harlock, S.P. Ng, **“Innovation and Technology of Women's Intimate Apparel”**, Woodhead Publishing Limited, England, 2006.
2. Ann Hagggar, **“Pattern Cutting For Lingerie, Beach Wear And Leisure Wear”**, Black Well Science Limited, France, 2001.

### **REFERENCES:**

1. W YuandJ Fan, **“Innovation and Technology of Women's Intimate Apparel”**, Woodhead Publishing Limited, England,2014.
2. Lynn Nottage, **“Intimate Apparel”**, Nick Hern Books,USA,2014
3. Lynn Nottage, **“Intimate Apparel / Fabulation”**, Theatre Communications Group, USA, 2006.
4. Stokes Terry, **“Intimate Apparel”**, Brooklyn: Release Press, USA, 1980.
5. Singer, **“Sewing Lingerie”**, Cy Decosse Incorporated, Mexico, 1991.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Define and classify home textiles, explain the type of fabric used for home textiles and eco-friendly textiles, describe the special finishes and surface ornamentation on home textile products and explain Indian home textiles industry and its future prospects and latest development in home textile products.
2. List and explain the types of furnishings used for different interiors- and enumerate the factors influencing the selection of home furnishings for different interiors, describe the usage of furnishing for different workplaces.
3. Analyse the types, features and end use of different types of floor coverings and list the factors influencing the selection of different floor covering and its maintenance.
4. Analyse the types, choice of fabrics, material required for construction of curtains and draperies for different types of windows and doors.
5. Analyse the types and end uses of furnishings used for home decorations, upholsteries, explain bed linens, table linens, kitchen linen, bath linens, and hotel and hospital linens.

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3		3	2					1	2	3	3
CO2	3	3	3	3	3	3	1			2	3	2	3	3	3
CO3	3	3	3	3	3	3	1			2	3	2	3	3	3
CO4	3	3	3	3	3	3	1			2	3	2	3	3	3
CO5	1	3	3	3	3	3	1			1		1	3	3	3

**UNIT I Introduction****9**

**Definition and classification:** Definition and classification of home textiles: woven, nonwoven and knitted fabrics, eco-friendly home textiles, special finishes and surface ornamentation on home textile products, Indian home textiles industry and its future prospects, latest development in home textile products, requirements of fabric particulars for home textiles.

**UNIT II Drawing Room, Dining Room and Kitchen Furnishings****9**

**Types of Drawing Room, Dining Room and Kitchen Furnishings:** Materials, designs and styles: Selection of various decorative and appealing products, table cloths, table mats, table skirting, table runners, napkins, curtains, sofa covers, cushion covers, chair covers, chair mats, chair pads, tea mats, tea cozy, aprons, kitchen towels, mittens, napkins, place mats, dish cloths, pot holders. Sample development procedure and preparation of samples.

**UNIT III Floor Coverings****9**

**Types of Floor Coverings:** Hard floor covering: types, features and end uses. Soft floor covering: types, features and end uses. Resilient floor covering: types, features and end uses. Factors influencing the selection of different floor covering and its maintenance. Sample development procedure and preparation of samples.

**UNIT IV Bedroom and Bathroom Furnishings****9 Types of**

**Bedroom and Bathroom Furnishings:** Materials, designs and styles: Selection of various decorative and appealing products, throws, bed covers, cushion covers, pillow covers, quilt covers, duvet covers, blankets

covers, bed sheets, bed spreads, bed skirts, bed coverlets, bed comforts, mattress covers, bath towels, bathroom mats. Sample development procedure and preparation of samples.

#### **UNIT V Living Room and In-House Linen**

**9**

**Types of Living Room and In-House Linen:** Different styles, and use of colours, design and texture in home furnishing. Developments in living room furnishing including upholstery, wall hanging, bolster and bolster covers, throws, classification and types, table linens, kitchen linen, bath linens, hotel and hospital linens. Sample development procedure and preparation of samples.

**TOTAL: 45 hours**

#### **TEXT BOOKS:**

1. Gopalakrishnan, D and T Karthik, :**Home Textiles**", Daya Publishing House, 2016.
2. Subrata Kumar Das, "**Performance of Home Textiles**" ((2nd Edition),Woodhead Publishing India Pvt. Ltd, 2017.

#### **REFERENCE:**

1. Alexander N. G., "**Designing Interior Environment, Mas Court Brace Covanorich**", New York, 1972.
2. V. Ramesh Babu and S. Sundaresan, "**Home Furnishing**", Woodhead Publishing India Pvt. Ltd, 2017.
3. Donserkery K. G., "**Interior Decoration in India**", D. B. Taraporevala Sons and Co. Pvt Ltd., Mumbai, 1973.
4. Das, Subrata. **Performance of home textiles**. WPI Publishing, 2010.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain the method of taking measurements for men's wear and describe the process involved in pattern making and the construction.
2. Design women's wear and method of taking measurements for women's wear and describe the process involved in pattern making and the construction.
3. Analyse the construction sequence of men's wear and women's wear for any given measurement.

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	1				2		2	3	2	1
CO2	2	3	3	3	3	1				2		2	3	2	1
CO3	1	3	3	3	2	1				1		1	3	3	3

**LIST OF EXPERIMENTS****Construction of****Men's casual wear:**

1. Men's Bermudas (1 session)
2. Men's T-Shirt (1 session)

**Men's inner garments:**

3. Briefs and vests (1 session)

**Men's formal wear**

4. Men's formal shirt (1 sessions)
5. Men's formal trousers (1 sessions)

**Women's casual wear**

6. Ladies Salwar and Kameez (1 session)
7. Ladies Chudidhar (1 session)
8. Ladies Night Dress (1 sessions)

**Women's traditional wear**

9. Ladies Sari Blouse (1 sessions)

**Women's western wear**

10. Ladies Top and Skirt (1 session)

**Women's lingerie**

11. Ladies Brassiere and Panties (1 session)

**TOTAL: 30 hours**

## APPAREL MANUFACTURING LABORATORY

### List of equipment required for a batch of 30 students for U.G

S. No.	Name of the equipment / software	Quantity Required	Additional tools issued to individual students
1.	Cork Top Tables	15	L - scale
2.	<b>Dress forms</b>		Hip curve
3.	Male : 40" chest full	1	Meter Scale
4.	Male : 42" chest full	1	French Curve
5.	Male : adjustable half	1	Tracing wheel
6.	Male : 40" chest half	1	Measuring tape
7.	Female : 32.5" bust half	1	Tailor's Chalk
8.	Female : 32.5" bust full	1	Paper cutting scissors
9.	Female : 34.5" bust full	1	Fabric cutting scissors
10.	Female : 36.5" bust full with hand	1	1/4 <sup>th</sup> Paper Scale
11.	Female : adjustable half	1	
	<b>Mannequins</b>		
12.	i. Baby		
	Boy – 80.5 cm	1	
	Girl – 88.8 cm	1	
	ii. Teenage Girls & Boys		
	Boy – 139 cm	1	
	Girl – 139cm	1	
	iii. Adults		
	Male -186 cm	1	
	Male -182.5 cm	1	
	Female -157.6 cm	1	
	Female -186 cm	1	
	Jewellery bust half head	1	
	Jewellery bust Indian face	1	
	Jewellery hand	2	
13.	Single-needle lock-stitch machine	30	
14.	Steam Iron	3	
15.	Fusing Machine	1	
	<b>Total</b>	<b>70</b>	

**COURSE OUTCOMES**

At the end of the study of this course, the students will be able to,

1. Create fashion drawings for children's, ladies and men's garments using a computer and related software
2. Draft the patterns, grade and generate marker plan
3. Develop fashion drawings for patterns, grade and generate marker plan for the given wear

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	1	3							3	3	3	2
CO2	2	1	1	1	3							3	3	3	2
CO3	2	1	1	1	3							3	3	3	2

1. Practice of pattern making and grading software features. (2 sessions)
2. (i) Development of design, pattern and pattern grade for children's frock.  
(ii) Preparation of marker plan.  
(iii) Calculation of marker efficiency for one-way fabric of varying fabric width. (1session)
3. (i) Development of design, pattern and pattern grade for children's body suit.  
(ii) Preparation of marker plan.  
(iii) Calculation of marker efficiency for one-way fabric of varying fabric width. (1session)
4. (i) Development of design, pattern and pattern grade for baby romper.  
(ii) Preparation of marker plan.  
(iii) Calculation of marker efficiency for two-way fabric of 38" and 42" width. (1session)
5. (i) Development of design, pattern and pattern grade for ladies top.  
(ii) Preparation of marker plan.  
(iii) Calculation of marker efficiency for plaid fabric of 44" and 52" width. (1session)
6. (i) Development of design, pattern and pattern grade for ladies party wear.  
(ii) Preparation of marker plan.  
(iii) Calculation of marker efficiency for plaid fabric of 44" and 52" width. (1session)
7. (i) Development of design, pattern and pattern grade for ladies skirt.  
(ii) Preparation of marker plan.  
(iii) Calculation of marker efficiency for corduroy fabric of 38" and 60" width and develop a lay lot plan. (1session)
8. (i) Development of design, pattern and pattern grade for men's full-sleeve shirt.  
(ii) Preparation of marker plan for checked fabric of 52" and 60" width.  
(iii) Calculation of marker efficiency and development of lay lot plan. (1session)

9. (i) Development of design, pattern and pattern grade for men's formal trousers.  
(ii) Preparation of marker plan for pencil stripe fabric of 60" and 72" width.  
(iii) Calculation of marker efficiency and development of lay lot plan. (1session)
  
10. (i) Development of design, pattern and pattern grade for men's formal shorts.  
(ii) Preparation of marker plan for pencil stripe fabric of 60" and 72" width.  
(iii) Calculation of marker efficiency and development of lay lot plan. (1session)

**TOTAL: 30 hours**



## DIGITAL PATTERN DEVELOPMENT AND MARKER PLANNING LABORATORY

### List of equipment required for a batch of 30- students

S. No.	Name of the equipment / software	Quantity Required
1.	Computers-Pentium IV	30
2.	Scanner	1
3.	Printer	1
4.	Pattern Drafting, Grading and Marker Planning Software -Tuka CAD	1
5.	Pattern Drafting, Grading, Marker Planning and 3D Designing Software -Lectra software	30
<b>Total</b>		<b>63</b>

## COURSE OUTCOMES

At the end of the study of this course the students will be able to,

1. Identify case study and innovative ideas related to the subjects learnt in the current semester.
2. Execute a mini project related to the case study and innovative ideas identified by the students.
3. Function effectively on teams and to communicate effectively and Develop report with results and conclusion of the mini project work.

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3

The evaluation of mini project shall be conducted in the form of creative methodology as **Hackathon**.

### Methodology:

- The students' group shall present their chosen problem statement and justify their selection.
- During review 2, they shall present their solution methodology to the chosen problem statement and also present the requirement.
- During review 3, the group shall present the progress made on the prototype development.
- The office of COE shall give 3 days to conduct the hackathon. During first two days, the students' group shall complete developing their prototype and showcase the same on the third day as video presentation/demonstration of the working model to the team of evaluators.

The evaluation is carried out in the following way:

- The team consist of industry personnel, faculty and peer students. Evaluation metrics and rubrics are provided to each of the evaluators. For computing the final marks, 50% weightage from industry evaluators, 40% weightage from faculty evaluators and 10% weightage from student evaluators, is considered. The numbers of industry evaluators and faculty evaluators for each programme will be decided by the HOD and COE as per the number of teams.
- Industry evaluators are appointed by the office of COE for which the list of such evaluators is provided by the respective departments. The faculty evaluators are also appointed by the office of COE as recommended by the respective HOD. The peer evaluators are chosen by the coordinators as one student from each team.
- Within 5 days after the completion of Hackathoan, the students shall submit the miniproject report as per the approved guidelines given by the Controller of Examinations.

**TOTAL: 30 hours**

## COURSE OUTCOMES

At the end of the study of this training, the students will be able to

1. Get training in real world of production and process in the apparel and related industries.
2. analyse the entire process in detail.
3. Identify the problems in the industry by observation and attempt to give solution and prepare an in-plant training report

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2	2		2	2		2	2	1	1	2	2	2
CO2	1	3	1	3		3	3		2	1	1	1	2	2	2
CO3	1	3	1	3		3	1		1	1	1	1	2	2	2

- The students have to undergo a 2-week in-plant training related to the subject learnt in the immediately preceding semesters.
- 3 internal reviews shall be done by a committee duly appointed by the HOD.
- Students shall submit a report on the work done during the course duration which consists of the following:
  - Description of the work
  - feedback from the respective industry mentor
  - Photographs of the students in the industry if the work is undertaken there.
  - Completion certificate from the Industry
- The final viva voce shall be conducted by a committee duly appointed by the office of COE which consists of a person from the related industry, two faculty members –
  1. From the same department
  2. From another related department.
- The evaluation is 100% internal.

Semester –V	U19GE501 : SOFT SKILLS AND APTITUDE - III	L	T	P	C	Marks
		0	0	2	1	100
<b>Course Outcomes</b>						
<b>At the end of the course the student will be able to:</b>						
1. Demonstrate capabilities in supplementary areas of soft-skills and job-related selection processes using hands-on and/or case-study approaches						
2. Solve problems of advanced levels than those in SSA-II in specified areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests						
3. Display effective language knowledge to construct sentences with subject verb agreement and select the best alternative for the underlined parts of the sentences, and fill in the blanks in the given passages with suitable forms of words and their synonyms.						
<b>1.SOFT SKILLS</b>	<b>Demonstrating soft-skill capabilities with reference to the following topics:</b> <ol style="list-style-type: none"> <li>Career planning</li> <li>Resume writing</li> <li>Group discussion</li> <li>Teamwork</li> <li>Leadership skills</li> <li>Interview skills</li> <li>Mock interviews</li> <li>Mock GDs</li> </ol>					
<b>2.QUANTITATIVE APTITUDE AND LOGICAL REASONING</b>	<b>Solving problems with reference to the following topics :</b> <ol style="list-style-type: none"> <li><b>Geometry:</b> 2D, 3D, Coordinate Geometry, and Height &amp; Distance.</li> <li><b>Permutation&amp;Combinations:</b>Principles of counting, Circular Arrangements and Derangements.</li> <li><b>Probability:</b> Addition &amp; Multiplication Theorems, Conditional Probability and Bayes Theorem.</li> <li><b>Statistics :</b> Mean Median, Mode, Range and Standard Deviation.</li> <li><b>Interest Calculation :</b>Simple Interest and Compound Interest</li> <li><b>Crypto arithmetic:</b> Addition and Multiplication based problem.</li> <li><b>Logical Reasoning :</b>Blood Relations, Directions Test, Series, Odd man out, Analogy, Coding &amp; Decoding, Problems and Input – Output Reasoning.</li> <li>Statement &amp; Assumptions, Statements &amp; Arguments, Inference.</li> <li><b>Company Specific Pattern :</b>Infosys and TCS company specific problems</li> </ol>					
<b>3. VERBAL APTITUDE</b>	<b>Demonstrating English language skills with reference to the following topics:</b> <ol style="list-style-type: none"> <li>Subject verb agreement</li> <li>Selecting the best alternative for the stated parts of given sentences</li> <li>Reading comprehension</li> <li>Contextual synonyms</li> <li>Sentence fillers</li> <li>Writing a story for a given picture</li> <li>Company specific aptitude questions</li> </ol>					



**Dr.S.Anita**

**Head/Training**

**Department of Placement Training  
Sona College of Technology,  
Salem-636 005.**

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester VI Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19FT601	Clothing Size, Fit and Comfort	3	0	0	3	45
2	U19FT602	Fashion Visual Merchandising	3	0	0	3	45
3	U19FT603	Industrial Engineering in Garment Production	3	0	0	3	45
4	U19FT911	<b>Professional Elective</b> – Fashion Forecasting	3	0	0	3	45
5	U19FT919	<b>Professional Elective</b> – Fashion Retail Store Operations	3	0	0	3	45
6	U19BM1001	<b>Open Elective</b> – Hospital Management	3	0	0	3	45
	U19BM1002	<b>Open Elective</b> – Basic Life Support					
	U19CE1002	<b>Open Elective</b> – Municipal Solid Waste Management					
	U19CE1003	<b>Open Elective</b> – Energy Efficiency and Green Building					
	U19CS1002	<b>Open Elective</b> – Cloud Computing					
	U19EE1002	<b>Open Elective</b> – Energy Conservation and Management					
	U19EE1003	<b>Open Elective</b> – Innovation, IPR and Entrepreneurship Development					
	U19EE1004	<b>Open Elective</b> – Renewable Energy Systems					
U19ME1004	<b>Open Elective</b> – Renewable Energy Sources						
<b>Practical</b>							
7	U19FT604	3D Virtual Fit analysis Laboratory	0	0	2	1	30
8	U19FT605	Industrial Engineering in Garment Production Laboratory	0	0	2	1	30
9	U19GE601	Soft Skills and Aptitude – IV	0	0	2	1	30
10	U19FT606	Mini Project – III	0	0	2	1	30
<b>Total Credits</b>						<b>22</b>	

**Approved By**

**Chairperson, Fashion Technology BoS**

**Dr.D.Raja**

**Member Secretary, Academic Council**

**Dr.R.Shivakumar**

**Chairperson, Academic Council & Principal**

**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Fashion Technology, Sixth Semester B.Tech FT Students and Staff, COE

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Define anthropometry and sizing system. Explain the principles of sizing systems and also categorise the sizes for men, women and children wear.
2. Discuss about the subjective evaluation and objective evaluation of clothing fit.
3. Discuss the importance of clothing comfort and properties related to tailoring performance.
4. Elaborate the points to be kept in mind while judging physiological comfort and fitting of textile products.
5. Explain the influence of thermal comfort on selection of fabrics.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	2	1	1	3	3	3	3	3	3	3	3	3	2	2
CO2	2	3	3	3	3	3	3	3	3	3	2	3	3	2
CO3	1	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	1	2	3	3	2	3	3	3	3	3	1	3	2	2
CO5	1	3	1	2	3	3	3	3	3	3	1	3	3	2

**UNIT I Anthropometrics and Sizing Systems 9**

**Basics of sizing systems:** Definition, anthropometric analysis, tools used, body shape analysis, classification of body shapes, characteristic differences among figures, posture – types, figure types- vertical, horizontal, key measurements, Overcoming unrealistic body image. *Basic Statistics for size standardization.*

**UNIT II Sizing Systems and Size Standardisation 9**

Sizing systems- strength and weakness, *Need of sizing survey* Process of sizing system- importance, *Direct and Indirect ways of human body measurement, brief on advance technology such as 3-D Body scanning, undertaking the national sizing, size and shape surveys, anthropometric analysis, size analysis, key or control measurements, Sizing survey methodology, statistics used in sizing system - Measures of Central Tendency, Measures of Dispersion, Percentiles, and Normal Distribution Curve.*

Apparel size designation and labelling. *survey* Study of International sizing system: UK, US and Europe. Size categories in men's, women's and children's wear. Study of *protocols such as ISO 8559, ISO 7250, ISO 15535, and ISO 20685*

**UNIT III Evaluation of Clothing Fit 9**

Fit -Definition, Importance, standards, influences of clothing fit, Methods of testing fit- fit models, fitting futures, measured methods, pinned pattern / tissue methods, trial garment, guide to fitting problems. Alternative methods for evaluating fit-using structural line, grain line, wrinkles, pinch test, inside measurement. Evaluating fit: subjective, objective, rating scales, subjective fitting guide, Objective method-moiré optics, algebraic evaluation of clothing fit, clothing waveform, pressure evaluation of clothing fit , 3D modeling of pressure fit, *3D visualization, 3 D fitting evaluation and pattern alteration using cloth and garment simulation tools - virtual try.*

**UNIT- IV Clothing Comfort 9**

**Comfort:** Introduction to clothing comfort, types and definition, human clothing system, comfort perception and preferences, Need and selection of clothing, Components of clothing comfort, Clothing Comfort and wearer's attitude, clothing performance characteristics: comfort, durability, hand and tailor ability, Fabric properties related to tailoring performance.

## **UNIT V Physiological and Thermal Comfort**

**9**

**Physiological Comfort:** Concept related to physiological aspects of clothing comfort, factors affecting garment fit and comfort – air gap thickness, garment ventilation, fluctuating microclimate in loose-fit garment, garment fit and pressure sensation. Fabric properties related to fit, perspiration, tactile, fabric expansion and relaxation.

**Thermal Comfort:** Physical phenomena affecting thermal comfort, Effect of fabric properties on heat transfer, Moisture vapour permeability, Liquid moisture permeability and air permeability.

**Total: 45 hours**

### **TEXT BOOKS**

1. Fan J., Yu .W and Hunter L., “**Clothing Appearance and Fit**”, Textile Institute, Woodhead Publishing Limited, England, 2004.
2. Das .A and Alagiruamy .E, “**Science in clothing comfort**”– Wood head Publishing Ltd., 2010.
3. “**The Perfect Fit: Classic Guide to Alter Patterns**”, Creative Publishing International, USA, 2005.
4. Das A and Alagirusamy , “**Science in clothing comfort**”, Wood head publishing limited, England 2010.

### **REFERENCE**

1. Sandra Betzina, “**Fast Fit-Easy Pattern Alterations for Every Figure**”, The Taunton Press Inc., Singapore, 2003.
2. Zakaria, Norsaadah, and Deepti Gupta, eds. “**Anthropometry, apparel sizing and design**”. Woodhead Publishing, 2019.
3. Faust, Marie-Eve, and Serge Carrier, eds. “**Designing apparel for consumers: The impact of body shape and size**”. Woodhead Publishing, 2014.
4. Gill, Simeon. “**Sizing in Clothing: Developing Effective Sizing Systems for Ready-to-wear Clothing.**” *Journal of Fashion Marketing and Management: An International Journal* (2008).
5. ISO 20685 – 1: 2018 - International standard for 3D scanning methodologies for international compatible anthropometric data bases for protocol for 3-D.
6. ISO 20685-2:2015(E) - Evaluation protocol of surface shape and repeatability of relative landmark position.
7. ISO 8559-1:2017 Size designation of clothes- Anthropometric definitions for body measurement.
8. ISO 7250-1:2017 Basic human body measurements for technological design -Part 1: Body measurement definitions and landmarks.
9. ISO 15535:2012(E) General requirements for establishing anthropometric databases.

### **RELATED JOURNALS:**

1. **Journal of Textile & Apparel Technology and Management**, North Carolina, USA **International Journal**.
2. **Stitch World** - Industry magazine. (stitchworld.net).
3. **Apparel Views** magazine. (www.apparelviews.com)

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Define the significance and role of visual merchandising in a retail environment, in order to effectively present the merchandise to the consumers.
2. Classify the various elements of visual presentation and understand their significance in visually presenting a display.
3. Analyze and identify the best suitable environment for merchandise including interior and point of displays.
4. Determine the type of fixtures and mannequins for different display arrangements
5. Develop planogram and merchandise assortment planning and acquire knowledge on the various computer applications in visual merchandising.

**CO/PO, PSO Mapping**

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	2	3				2	0	0	2	3	2
CO2	2	2	2	3	2							2	2	2
CO3	1	1	2		3							2	2	2
CO4	2	2			2							2	2	2
CO5	2	2	2		2				1	3	2	2	2	2

**UNIT I Fundamentals of Visual Merchandising****9**

Definition, objectives and scope, types of display and display settings, retail stores and approaches of visual merchandising, types of retail stores, store atmospherics, approaches in visual merchandising in various stores, department store approach and small store approach. Role of Visual Merchandising in the changing face of retailing.

**UNIT II Elements of Visual Presentation****9**

Introduction - Overview of the various elements, importance of store exteriors and interiors arrangements, Store front – Façade, Signs, Marquees, Outdoor lighting, Banners, Planters, Awnings, Windows and its types. Masking and proscenia, Store layout-Objectives, allocation of space, types of layouts, Utilization of store space – staircase, lifts, elevators, point of purchase display. Store line composition, Signage and graphics – need, types of signage, sign sizes, sign colors. Signage changes and updations.

**PRACTICE:** Development of miniature fashion retail store front using various types of visual merchandising elements.

**UNIT III Store interiors, Points of Display and Display Techniques****10**

Store interior-display types and settings. Interior components – Store atmosphere, lighting, sound track and its selection, scent, ceiling, focal points, island displays, risers and platforms, the runway, counters and display cases, museum cases, demonstration cubes, ledges, shadow boxes, enclosed displays, fascia, t-walls. Point of purchase display, industrial display, fashion shows, attention getting devices, familiar symbols. Application and selection of colour, colour schemes and colour psychology to create mood in garment display.

**PRACTICE:** Development of miniature fashion store interior atmosphere using various types of visual merchandising elements.



**UNIT IV Mannequins and Fixtures****8**

Mannequins – purpose and applications, types of mannequins, alternatives of mannequins and other human forms, Fixtures-Role of fixtures, types of fixtures, criteria for selection of fixtures, dressing fixtures, modular fixtures. Sourcing of Properties-buy, rent or build.

**PRACTICE:** Development of miniature merchandise displays using mannequins and fixtures.

**UNIT V Merchandise Planning and computer aids in visual merchandising****9**

Planogram-Definition, design and direction of flow. Floor plans and reading of floor plans, purpose of planning. Merchandise assortment planning – Price, Styles, Sizes and Colors, optimize apparel assortments, display calendar and planning a display, scheduling the promotion, budgeting and safety factors in visual merchandising.

Introduction-Softwares used for store design and merchandise arrangement planning, inventory management. Recent computer technologies used in visual merchandising

**PRACTICE:** Development of sample planogram and merchandise assortment planning for given store particulars.

**TOTAL: 45 Hours****TEXT BOOKS**

1. Pegler M.M., “**Visual Merchandising and Display**”, IV Edition, Fair child Publications, NewYork, 2001.
2. Diamond. J. Diamond. E., “**Contemporary Visual Merchandising**”, Prentice Hall Inc. New Jersey 2003.
3. Diamond.E, “**Fashion Retailing - A Multi-channel Approach**”, II Edition, Prentice Hall Inc., New Jersey 2006.

**REFERENCE**

1. Rath P.M., Peterson J., Greensley. P, Gill. P, “**Introduction to Fashion Merchandising**”, Delmar Publishers Inc., New York 1994.
2. Phillips P.M., “**Fashion Sales Promotion**”, II Edition, Prentice Hall Inc, New Jersey, 1996.
3. Curtis E, “**Fashion Retail**”, John Wiley and Sons Ltd, England, 2004.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain the importance of productivity and discuss the role of industrial engineer in the garment industry.
2. Discuss the various procedure and techniques involved in method study.
3. Explain the objectives and procedure to measure work content in the garment industry and also discuss its importance.
4. Explain the importance of plant layout, standardisation techniques and analyse the lean manufacturing technology in the garment industry.
5. Discuss the various planning, control tools and material handling systems used in garment industries.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	3	3	2				2	3	2
CO2	3	3	3	3	3	2	3	2			1	3	2	2
CO3	3	2	2	2	3	2	2	2				2	2	2
CO4	3	2	3	1	3	2	2				1	2	3	2
CO5	3	2	3	2	3	3	3					3	2	2

**UNIT I Industrial Engineering Basics****9**

**Productivity:** Production, Productivity, types of productivity, productivity measures, factors affecting productivity in garment industry, measurement of line efficiency.

**Industrial engineering:** Definition, Need of Industrial Engineering, Benefits, Roles and responsibilities of industrial engineer in apparel industry

IE in Ergonomics and Safe working environment: right and wrong postures, Manufacturing environment in RMG sector: Light, Noise, Vibration, Colour, Temperature and Ventilation and its Standards

**UNIT II Method Study****9**

**Method study:** Definition, Objectives, Basic procedure, Value Added and Non Value Added activity analysis, Method improvement techniques

**Process Chart:** Flow process chart, multiple activity chart, Case studies and application of process chart in garment industries.

**Motion Economy:** Principles of motion economy, classification of movements, micro-motion study, factors of ergonomics in motion study

**UNIT III Work Measurement****9**

**Work Measurement:** Definition, Objective, Techniques

**Time study:** Operation Breakdown and its importance, definition of time study, steps in making time study, breaking the job into elements, stop-watch procedure, different pre-determined motion time study (PMTS) techniques, Work sampling Technique

**Standard Time:** Types of rating factor, Types of allowances: Personal, Fatigue, Machine, Delay and Policy allowances, mechanism of arriving SAM, SMV and SAM examples for regular garments. Latest work measurement techniques – RFID and IoT.

#### **UNIT IV Plant Layout**

**9**

**Layout:** Objectives, Steps in planning layout, Types of layout, importance of Plant location, Work area planning, quick changeover, application of robotics in automated sewing production systems.

**Standardisation:** Standard operating procedure, Risk analysis during proto-type development, ROI on standardisation techniques.

**Lean Manufacturing:** Definition, objective, concepts and principles, SMED technique.

#### **UNIT V Planning and Control**

**9**

**Planning:** Cost per minute, learning curve, preparation of operation bulletin, development of skill matrix, thread consumption, estimation of on-standard and off-standard time.

**Line Balancing:** WIP, factors influence on line balancing techniques, pitch diagram analysis.

**Material Handling:** Definition, objective, classification of material handling equipment in apparel industries.

**TOTAL: 45 hours**

#### **TEXTBOOKS**

1. Jana, P., & Tiwari, M. (2018). “**Industrial Engineering in Apparel Manufacturing**”. New Delhi, India: Apparel Resources Pvt. Ltd. (ISBN: 9788193247204)
2. Khan M.I “**Industrial Engineering**”, New Age International, 2007.

#### **REFERENCE**

1. Cooklin Gerry, “**Introduction to Clothing Manufacture**”, Blackwell Science Ltd., 2006.
2. Johnson Maurice “**Introduction of Work Study**”, International labour Organization, Geneva, 2010.
3. Ralph M Barnes, “**Motion and Time study design and measurement of work**”, John Willey sons Inc. 2002., New York
4. Bridger, “**Introduction to Ergonomics**”, Tata McGraw Hill, 1995

## PROFESSIONAL ELECTIVE

U19FT911

FASHION FORECASTING

3 0 0 3

### COURSE OUTCOMES

At the end of the study of this course, the students will be able to,

1. Define and discuss the fashion forecasting, types of forecasting and compilation of forecasting information.
2. Explain the forecasting packages, role of forecasters in aiding designers and the various processes involved in it.
3. Explain the forecasting procedure, the role and method of forecasting.
4. Explain the Colour Forecasting process and the tool kits used to predict the direction
5. Explain the colour cycles and colour relationship in the forecasting process

#### CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	2		2	2	2		3	2	3
CO2	2	3	3	3	3	2	2	2	2	3	1	3	3	3
CO3	2	3	3	2	3	2	2		2	3	2	3	3	3
CO4	2	3	3	3	2	2				3	2	3	3	3
CO5	2	2	2	1	1					2	2	2	2	2

#### UNIT I Fashion Forecasting 9

**Fashion Forecasting:** Definition of forecasting, types of forecasting, source of Fashion forecasting information, forecasting agencies and their role in forecasting. Seasons and their impact on fashion. Compiling fashion forecasting information, forecasting agencies, forecasting magazines, websites and information in the forecasting publications.

#### UNITII Role of Forecasting Agencies 9

**Role of Forecasting Agencies:** Fashion forecasting packages and magazines. Specialist fashion forecasting companies: WGSN, promostyl. Role of forecaster in aiding fashion designers, developers and retailers, process of forecasting, decision making process, when to start forecasting for the selling season.

#### UNIT III Colour, Style and Fabric Forecasting 9

**Colour, Style and Fabric Forecasting:** driving forces of fashion, The views of the forecasters and trend information users, knowledge of colour, style and fabric, forecasting process, forecaster's toolkit, development of story Predicting the direction for colour, style and fabric forecast, Market study-review of market performance, Fashion Triangle of Balance.

#### UNIT IV Forecasting Procedure 9

**Forecasting Procedure:** Endogenous and Exogenous variables in forecasting, Source of forecasting data, collection of data, categorising under different theme for different styles, fabric, colour and accessories for different seasons. Method of adopting forecasted data in domestic, International and Regional markets. Method of forecasting for industries.

#### UNIT V Trend Analysis on accessories 9

development of story predicting the direction for accessories forecast, design jewelry, bags, belts, scarves, hats, footwear, eyewear based on forecasted trend analysis

**TOTAL: 45 hours**

## **TEXT BOOKS**

1. Kathryn McKelvey and Janine Munslow, “**Fashion Forecasting**”, Wiley , Blackwell, USA, 2008
2. Seivewright Simon, “**Basics Fashion Design -Research and Design**”, Bloomsbury Publication India, 2012.

## **REFERENCE**

1. Susan Dillon, “**The Fundamentals of Fashion Management**”, AVA Publishing (UK) LTd., 2012.
2. Lorynn Divita, **Fashion Forecasting**, Fairchild, 2019.
3. Chelsea Rousso and Nancy Kaplan Ostroff, **Fashion Forward**, Fairchild, 2018
4. Evelyn L. Brannon & Lorynn R. Divita, **Fashion forecasting**, Fairchild books, 2015
5. Eundeok kim & Ann marie fiore, **Fashion Trends: Analysis and Forecasting**, Berg publications, 2011
6. Tracy Diane and Tom Cassidy, **Color forecasting**, John wiley and sons, 2009
7. Chelsea Rousso, “**Fashion Forward - A Guide to Fashion Forecasting**”, Bloomsbury Academic, 2012.

**PROFESSIONAL ELECTIVE**

**U19FT919**

**FASHION RETAIL STORE OPERATIONS**

**3 0 0 3**

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Elaborate the objective and concept of fashion retail store administration, various terminologies used in fashion retail stores
2. Explain the various functions, various steps involved in opening, running and closing a fashion retail store
3. State the importance of Staff and Space Management in fashion retail store
4. Explain about the retail mix, marketing mix and inventory control in fashion retail store
5. State the importance of MIS, Reporting Systems and Store audits in fashion retail store

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
<b>COs</b>	<b>Programme Outcomes (POs) and Programme Specific Outcome (PSOs)</b>													
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO12</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>
CO1	2	2	3	2	2	2	2	2	2	2	2	2	2	3
CO2	2	2	3	3	3	3	3	3	3	2	3	2	3	2
CO3	2	2	1	2	3	2	2	2	2	1	2	2	2	2
CO4	2	2	2	2	2	2	2	2	2	2	2	2	2	2
CO5	2	2	2	2	2	2	2	1	2	2	2	2	2	2

**UNIT I Fashion Retail Store Administration and Environment 9**

Introduction and Objective-Fashion Retail, Organization structure of a fashion retail store. Store Administration: Introduction, Objectives, Responsibilities of Store Administrator, Role of Housekeeping Staff in a Store, Guidelines for Housekeeping, Checklist for Maintenance, Licence Renewal. Various terms used in Fashion Retail Store Operations - CKU, RFID, Footfall, Conversion, Average Ticket Value & their importance.

**UNIT II Functions of Retail Store 9**

Introduction, Objectives, Everyday Operations of a Retail Store. Opening and Closing a Store, Store opening process, Store closing process, Store Key Management, Checklist for Store Opening and Closing. Importance of security, Security Process in Different Situations, Pilferage and Shoplifting, Handling Legal Aspects, Handling Counterfeit Currencies, Handling Tag Beep.

**UNIT III Staff and Space Management 9**

Introduction, Objectives, Employees and Shift Timings, Employee Entry and Attendance Recording System, Scheduling Breaks, Entry Recording System for Outsiders, Grooming Standards for Store Employees, Store Disciplinary Policy for Employees, Morning Briefing for Sales. Contribution made by each sales staff. Importance of SPF, CPF for a fashion retail store. Calculations of these and their analysis

**UNIT IV Retail Mix, Marketing Mix, Inventory Control 10**

Retail mix and its importance, Marketing mix and its importance, Inventory Management in Retail: Introduction, Objectives, Inventory Management, Important terminologies in inventory management, Importance of inventory management in retail, Stock check, Negative inventory, Movement of inventory from warehouse to store, Un-loading of inventory, Product Repair System-Customer Interface, Vendor Interface, Returning Merchandise to Vendor,.

## **UNIT V MIS, Reporting Systems and Store audit**

**8**

Introduction, Importance of MIS in Fashion Retail Store Operations. Types of reports required in managing a fashion retail store Concept of Store Audit, Importance of Store Audit, Parameters for Store Audit, Storefront appearance, In-store presentation, Customer service, Storage, Housekeeping

**TOTAL: 45 Hours**

### **TEXT BOOKS**

1. R Evans, Barry Berman Joel. "**Retailing Management-A Strategic Approach.**" (2009).
2. Newman, Andrew, and Peter Cullen. **Retailing: environment & operations.** Cengage Learning EMEA, 2002.
3. Diamond, Jay, Ellen Diamond, and Sheri Litt. **Fashion retailing: a multi-channel approach.** Bloomsbury Publishing USA, 2015.
4. Chetan Bajaj, RajnishTuli, Nidhi V Srivastava, "**Retail Management**", Oxford University Press, 2005.
5. Levy, Michael, Barton A. Weitz, and Dhruv Grewal. **Retailing management.** New York, NY: Irwin/McGraw-Hill, 1998.

### **REFERENCE**

1. Quan, Vincent, Bang Nguyen, Meng-Shan Sharon Wu, Cheng-Hao Steve Chen, Francesca Bonetti, Patsy Perry, John Fernie, Ian Phau, and Min Teah. **Luxury fashion retail management.** Edited by Tsan-Ming Choi, and Bin Shen. Springer Singapore, 2017
2. Clodfelter, Richard. **Retail buying: From basics to fashion.** Bloomsbury Publishing USA, 2015.

**COURSE OUTCOMES**

At the end of the study of this course, the students will be able to,

1. Develop pattern, prepare draping model for the given measurement.
2. Drape and sew the finished pattern, 3D Simulation of garment with fabric design, fabric texture, seams trims, other surface ornamentation.
3. Check the virtual fitting with required pattern alterations.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	2	3	2	3							3	3	3
CO2	3	3	3	3	3							3	3	3
CO3	3	3	3	3	3							3	3	3

**LIST OF EXPERIMENTS**

- I. Practice of 3D fit analysis software features. (2 sessions)
- II. Develop pattern, prepare 3D draping model for the given measurement and development of 3D garment by virtual stitching. 3D Simulation of garment with fabric design, fabric texture, seams, trims, and other surface ornamentation. Analysis of virtual fitting with required pattern alterations for the following styles:
  1. Baby's frock
  2. Men's T-shirt
  3. Men's trouser
  4. Women's tops and skirt
  5. Women's long frock

**TOTAL: 30 hours**

**3D VIRTUAL FIT ANALYSIS LABORATORY****List of equipment required for a batch of 30- students**

S. No.	Name of the equipment / software	Quantity Required
1.	Computers-Pentium IV	30
2.	Scanner	1
3.	Printer	1
4.	Pattern Drafting, Grading and Marker Planning Software – Lectra Software	30 user licenses
5.	3D fit Software – Lectra Software	30 user licenses
<b>Total</b>		<b>92</b>



**U19FT605 INDUSTRIAL ENGINEERING IN GARMENT PRODUCTION 0021  
LABORATORY**

**COURSE OUTCOMES**

At the end of study of this course the students will be able to,

1. Practice the work measurement technique for cutting, sewing and packing operation.
2. Estimation of SAM of the garments through PMTS software.
3. Develop the sewing line layout for the garment production in the apparel industry.

<b>CO/PO, PSO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO 1	PSO2	PSO3
CO1	3	3	3	2	3	3	2	2			2	3	3	2
CO2	3	2	2	2	2	3	2					3	2	2
CO3	3	3	3	2	3	2	3	2			2	3	3	2

**LIST OF EXPERIMENTS**

1. Analysis of a cutting operation elements and determine the VA-NVA elements, SAM, suggestions for method improvement and capacity study through time study technique. (1 session)
2. Analysis of a sewing operation elements and determine the VA-NVA elements, SAM, suggestions for method improvement and capacity study through time study technique. (1 session)
3. Analysis of inspection and packing operation elements and determine the VA-NVA elements, SAM, suggestions for method improvement and capacity study through time study technique. (1 session)
4. Engineering operation sequence for a basic T shirt and calculation of standard allowed minute (SAM) value using predetermined time standards. (1 session)
5. Engineering operation sequence for a men's wear and calculation of standard allowed minute (SAM) value using predetermined time standards. (1 session)
6. Engineering operation sequence for a women's wear and calculation of standard allowed minute (SAM) value using predetermined time standards. (1 session)
7. Engineering operation sequence for a kid's wear and calculation of standard allowed minute (SAM) value using predetermined time standards (1 session)
8. Preparation of operation bulletin, line balancing, cost per minute and the development of sewing line layout for the given garment. (1 session)
9. Determination of sewing threads consumption for the given garment. (1 session)
10. Identify suitable folders and attachments for the production of given garment samples. Analyse the given operation and design a new folder/attachment.

**TOTAL: 30 hours**

**INDUSTRIAL ENGINEERING IN GARMENT PRODUCTION LABORATORY**

**List of equipment required for a batch of 30 students**

S. No.	Name of the equipment / software	Quantity Required
1.	Computer (Pentium i5)	30
2.	Stop watch	15
<b>Total</b>		<b>45</b>

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Identify case study and innovative ideas related to the subjects learnt in the current semester.
2. Execute a mini project related to the case study and innovative ideas identified by the students.
3. Function effectively on teams and to communicate effectively and develop report with results and conclusion of the mini project work.

<b>CO/PO, PSO Mapping</b>														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3	3	3

The evaluation of mini project shall be conducted in the form of creative methodology as **Hackathon**.

**Methodology:**

- The students' group shall present their chosen problem statement and justify their selection.
- During review 2, they shall present their solution methodology to the chosen problem statement and also present the requirement.
- During review 3, the group shall present the progress made on the prototype development.
- The office of COE shall give 3 days to conduct the hackathon. During first two days, the students' group shall complete developing their prototype and showcase the same on the third day as video presentation/demonstration of the working model to the team of evaluators.

The evaluation is carried out in the following way:

- The team consist of industry personnel, faculty and peer students. Evaluation metrics and rubrics are provided to each of the evaluators. For computing the final marks, 50% weightage from industry evaluators, 40% weightage from faculty evaluators and 10% weightage from student evaluators, is considered. The numbers of industry evaluators and faculty evaluators for each programme will be decided by the HOD and COE as per the number of teams.
- Industry evaluators are appointed by the office of COE for which the list of such evaluators is provided by the respective departments. The faculty evaluators are also appointed by the office of COE as recommended by the respective HOD. The peer evaluators are chosen by the coordinators as one student from each team.
- Within 5 days after the completion of Hackathaoon, the students shall submit the mini project report as per the approved guidelines given by the Controller of Examinations.

**Total: 30 hours**

Semester –VI	U19GE601-SOFT SKILLS AND APTITUDE – IV (Common to All except Civil)	L	T	P	C	Marks
		0	0	2	1	100
<b>Course Outcomes</b>						
<b>At the end of the course the student will be able to:</b>						
1. Demonstrate capabilities in job-oriented company selection processes using the hands-on approach						
2. Solve problems of any given level of complexity in all areas of quantitative aptitude and logical reasoning and score 70-75% marks in company-specific internal tests						
3. Demonstrate advanced-level verbal aptitude skills in English and score 70-75% marks in company-specific internal tests						
<b>1. Soft Skills</b>	<b>Demonstrating Soft -Skills capabilities with reference to the following topics:</b>					
	a. Mock group discussions					
	b. Mock interviews					
	c. Mock stress interviews					
<b>2. Quantitative Aptitude and Logical Reasoning</b>	<b>Solving problems with reference to the following topics:</b>					
	a. Functions and Polynomials					
	b. Clocks and Calendars					
	c. Data Sufficiency: Introductions, 3 Options Data Sufficiency, 4 Options Data Sufficiency and 5 Options Data Sufficiency.					
	d. Logical reasoning: Cubes, Non Verbal reasoning and Symbol based Reasoning.					
	e. Decision making table and Flowchart					
	Campus recruitment papers: Solving of previous year questions paper of all major recruiters					
	f. Miscellaneous: Cognitive gaming Puzzles-(Picture, Word and Number based), IQ Puzzles, Calculation Techniques and Time Management Strategies.					
	g. Trigonometry.- Concepts					
<b>3. Verbal Aptitude</b>	<b>Demonstrating English language skills with reference to the following topics:</b>					
	a. Writing captions for given pictures					
	b. Reading comprehension					
	c. Critical reasoning					
	d. Theme detection					
	e. Jumbled sentences					
	f. Writing a story on given pictures					
	g. Company specific verbal questions					

*S. Anita*  
06/01/2023

Dr.S.Anita

Head/Training

Department of Placement Training  
Sona College of Technology,  
Salem-636 005.

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Define and discuss the fashion and related terms and reason for change in fashion and the classification
2. Describe clothing and its purpose, Role of clothing and its status.
3. Describe the selection of clothing for various age groups, Fashion apparel and wardrobe planning.
4. Explain the elements and principles of the design, with the effects in the apparel
5. Bounce out the theme and development of portfolio.

**CO/PO, PSO Mapping**  
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO12	PSO1	PSO2	PSO3
CO1	3	3	3							3	3	3	3	3
CO2	3	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	3	3

**UNIT I Introduction to Fashion 9**

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.

**UNIT II Introduction to Clothing 9**

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

**UNIT III Selection of clothes 9**

Clothes for children, middle-aged and adults. Types of clothes according to different types of human figure, Different materials for different clothes, Fabrics and colours suitable for different garments.

**Planning for clothing needs:** Formal clothing, Clothes for parties, Clothes for sports,

Casual Clothes for casualwear. Wardrobe Planning: Wardrobe for men and women

**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

**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.

**TOTAL: 45 hours**

**TEXT BOOKS**

1. Munslow, Janine, McKelvey, Kathryn “**Fashion Design Process Innovation and Practice**”, 2<sup>nd</sup> Edition , wiley , 2012.
2. Nicola White, Ian Griffiths, “**The Fashion Business Theory, Practice, Image**”, Berg, 2000.

**REFERENCE**

1. Sumathi, G. J. **Elements of fashion and apparel design**. New Age International, 2007.
2. Kathryn McKelvey “**Fashion Source Book**” Balckwell Publishing New Delhi.
3. Mills, Jane, and Janet K. Smith. **Design concepts**. Fairchild Books, 1985.
4. Rasband J. **Wardrobe strategies for women**. Fairchild Publications; 2002.
5. Jarnow JA, Judelle B, Guerreiro M. **Inside the fashion business**. Wiley; 1981.



FT  
VII

**Sona College of Technology, Salem**  
**(An Autonomous Institution)**  
**Courses of Study for B.E/B.Tech. Semester VII under Regulations 2019**  
**Branch: Fashion Technology**

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Theory</b>							
1	U19GE701	Professional Ethics and Human Values	3	0	0	3	45
2	U19FT701	Retail Management	3	0	0	3	45
3	U19FT921	<b>Professional Elective - Fashion Photography</b>	3	0	0	3	45
	U19FT922	<b>Professional Elective – Lean Manufacturing in Apparel Industry</b>					
4	U19FT926	<b>Professional Elective - Fashion Styling</b>	3	0	0	3	45
	U19FT927	<b>Professional Elective - Entrepreneurship Development and Management of Apparel Industry</b>					
5	U19BM1001	<b>Open Elective - Hospital Management</b>	3	0	0	3	45
	U19BM1002	<b>Open Elective - Basic Life Support</b>					
	U19CE1001	<b>Open Elective - Building Services and Safety Regulations</b>					
	U19CE1004	<b>Open Elective - Disaster Management</b>					
	U19CS1001	<b>Open Elective - Big Data Analytics</b>					
	U19CS1002	<b>Open Elective - Cloud Computing</b>					
	U19CS1003	<b>Open Elective - Internet of Things</b>					
	U19EC1006	<b>Open Elective - Mobile Technology and Its Applications</b>					
	U19EE1002	<b>Open Elective - Energy Conservation and Management</b>					
	U19EE1003	<b>Open Elective - Innovation, IPR and Entrepreneurship Development</b>					
	U19EE1004	<b>Open Elective - Renewable Energy Systems</b>					
U19MC1004	<b>Open Elective - Fundamentals of Robotics</b>						
U19ME1002	<b>Open Elective - Industrial Safety</b>						

2/17

Practical							
6	U19FT702	Fashion Portfolio and Product Development Laboratory	0	0	4	2	60
7	U19FT703	Accessory Design and Embellishment Laboratory	0	0	2	1	30
8	U19FT704	Draping Technique	0	0	2	1	30
9	U19FT705	Internship	0	0	4	2	4 weeks
10	U19FT706	Mini Project - IV	0	0	2	1	30
<b>Total Credits</b>						<b>22</b>	

Approved By

**Chairperson, Fashion Technology BoS**  
**Dr.D.Raja**

**Member Secretary, Academic Council**  
**Dr.R.Shivakumar**

**Chairperson, Academic Council & Principal**  
**Dr.S.R.R.Senthil Kumar**

Copy to: -

HOD/Fashion Technology, Seventh Semester B.Tech FT Students and Staff, COE



**U19GE701 PROFESSIONAL ETHICS AND HUMAN VALUES 3 0 0 3**

**COURSE OUTCOMES:**

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

- Identify the core values that shape the ethical behavior of an engineer.
- Analyze and practice engineering ethics in their profession.
- Apply codes of ethics in the context of social experimentation.
- Explore various safety issues and ethical responsibilities of an engineer.
- Adopt ethical practices pertaining to global issues.

CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	1	2	3	3	3	2	2	3
CO2	2	1	1	1	2	2	3	3	3	3	3	3
CO3	2	1	3	1	2	3	3	3	3	3	3	3
CO4	2	1	3	1	1	3	3	3	3	2	3	3
CO5	2	1	3	1	1	3	3	3	3	3	3	3

**UNIT-I HUMAN VALUES**

9

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Introduction to Yoga and meditation for professional excellence and stress management.

**UNIT-II ENGINEERING ETHICS**

9

Senses of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Profession and Professionalism – Professional Ideals and Virtues –Theories of Right action- Self Interest- Customs and Religion-Uses of Ethical Theories.

**UNIT-III ENGINEERING AS SOCIAL EXPERIMENTATION**

9

Engineering as Experimentation – Contrasts with standard experiments- Engineers as Responsible Experimenters – Importance and limitations of Codes of Ethics - Industrial Standards - A Balanced Outlook on Law – Industrial Standards- Case Study: Space shuttle challenger disaster.

**UNIT-IV SAFETY, RESPONSIBILITIES AND RIGHTS**

9

Safety and Risk – Types of risk - Assessment of Safety and Risk – Risk Benefit analysis-Reducing Risk – Case Studies - Chernobyl and Bhopal plant disaster.

Collegiality and Loyalty –Respect for Authority- Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Importance and consequences of whistle blowing - Professional Rights – Employee Rights – Intellectual Property Rights (IPR) and its components– Discrimination.

**UNIT-V GLOBAL ISSUES**

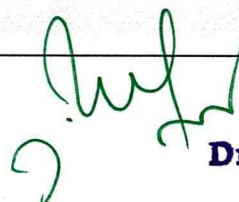
9

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

**Lecture: 45, Tutorial: 0, TOTAL: 45 Hours**

17.07.2023

Regulations-2019



**Dr. D. RAJA, M.Tech., Ph.D.,**  
 Professor & Head  
 Department of Fashion Technology  
 Sona College of Technology  
 Salem - 636 005. Tamil Nadu



### TEXT BOOKS

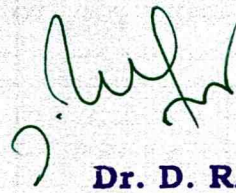
1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, Indian Edition, Tenth reprint, 2017.
2. Professional Ethics and Human values- Sonaversity, Edition 2018.

### REFERENCES

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 2012.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2016.
3. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
4. R.Subramanian, "Professional Ethics", Oxford University Press, Second Edition, 2017.

*Member Secretary*  
5/7/2022

Member Secretary-Academic Cell  
SONA COLLEGE OF TECHNOLOGY  
SALEM - 636 005.



**Dr. D. RAJA**, M.Tech., Ph.D.,  
Professor & Head  
Department of Fashion Technology  
Sona College of Technology  
Salem - 636 005. Tamil Nadu

**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain the concept of retailing as a channel of communication and the elements of retail formats, elucidate the types of ownership structures in retailing
2. Explain the concept of buying and the factors affecting the buying behavior of the customers, explain the concept and their significance of retail location strategy
3. Analyse the importance and the factors deciding retail pricing, explain the need, objectives, elements and promotional strategies in retailing
4. Analyse the importance of store atmospherics and visual merchandising and discuss the various store's atmospherics both interior and exterior, types of store layout designs and visual merchandising concepts
5. Apply the various methods and techniques involved in merchandise management and e-tailing

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		1	2	2	2	3		2	3	3	2	2	2	2	2
CO2		3	1	3	2	3		2		3	2	2	2	2	2
CO3	1	3	2	3	2	3		3	3	3	2	2	2	2	2
CO4		2	2	3	3			2	2	3	2	2	2	2	2
CO5		3	2	2	2			2	2	3	2	2	2	2	2

**UNIT I Basic Concepts of Retailing****9**

**Introduction:** Concept and importance of retailing, characteristics of retailing, functions and activities of retailing.

**Types of Retailers:** Structure and nature of retail channels, trends in retail formats, relationship between retailers and suppliers. Dealers and Subdealers.

**Multichannel Retailing and Ownership Structures in Retail:** Multi-channel retailing, classification of retail units on the basis of ownership, operational structures and retail location

**UNIT II Consumer Buying Behavior and Retail Location Strategy****9**

**Retail Consumer Behavior:** Features and need for studying consumer behaviour, basic model of consumer decision making, factors affecting consumer decision making, stages and types of the consumer decision-making.

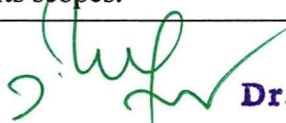
**Retail Location Strategy:** important factors in location decision, types of retail locations, site selection analysis, retail location theories and assessment procedures.

**UNIT III Retail Pricing and Promotion Strategy****9**

**Retail Pricing:** Objectives, approaches and strategies adopted in pricing of products, external factors influences on retail pricing strategy and methods for setting retail prices. Factors affecting retail pricing. Retail analytics and its scopes.

17.07.2023

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Professor & Head  
Department of Fashion Technology  
Sona College of Technology  
Salem - 636 005. Tamil Nadu



**Promotion Strategy:** Sales promotion, objectives of sales promotion, steps in designing retail sales promotion, advertising, objectives and types of advertising and steps involved in retail advertising.

**UNIT IV Store Atmospherics and Visual Merchandising 9**

**Store Atmospherics:** Importance of atmospherics, role of atmospherics in retail strategy, effects of retail unit environment and components of retail atmospherics. Exterior atmospherics: Store entrance, display windows, marquee, facade, parking facilities. Interior atmospherics: Lighting, music, Store layout, layout planning, grid, freeform, race track and storeyed.

**Visual Merchandising:** Organising the display, planogram, components of display, category planning, wall displays, floor fixtures, display products, promotional items, lighting fixtures, signage and factors to consider in organizing an effective display.

**UNIT V Merchandise Management and E-tailing 9**

**Merchandise Management:** Components of merchandise management - Merchandise planning - Planning of assortment - Inventory tum over. Sales forecasting - Collaborative planning forecasting replenishment (CPFR). Merchandise mix, Merchandise budget plan for fashion merchandise - monthly sales, beginning of month (BOM), end of month (EOM), open to buy (OTB). Allocating merchandise to stores.

**E-tailing:** Store and non-store retailing, concept of virtual retail store, category planning, role of internet and mobiles in virtual retailing, customer benefits and modes of payment and emerging retail technologies. Eye focusing in virtual retailing.

**TOTAL: 45 hours**

**TEXT BOOKS:**

1. Chetan Bajaj, RajnishTuli, Nidhi V Srivastava, "**Retail Management**", Oxford University Press, 2016.
2. K.V.S. Madaan, "**Fundamentals of Retailing**", Tata McGraw-Hill, New Delhi, 2009.

**REFERENCE:**

1. Jarnow.J.AGuerreiro and Judello B, "**Inside the Fashion Business**", Pearson Education, New Delhi, 2004.
2. Marian L. Davis, "**Visual Design in Dress**", Prentice Hall Inc., Third Edition, 1996.
3. Berman and Evans (2002), "**Retail Management: A Strategic Approach**", 8<sup>th</sup> edition, Pearson Education, New Delhi.

**Dr. D. RAJA**, M.Tech., Ph.D.,  
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**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain the fashion photography concepts and its significance.
2. Understand the equipment handling concepts followed in achieving quality images.
3. Differentiate the lighting techniques used to capture images in varied perspectives.
4. Compare and contrast the methods of photography techniques followed in shooting images.
5. Summarize knowledge on the editing parameters to produce a conceptual presentation of images.

**CO/PO, PSO Mapping**

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2	2	2	3		2	3	3	2	2	2	2	2
CO2		3	1	3	2	3		3	3	3	2	2	2	2	2
CO3	3	3	2	3	3	3		3	3	3	2	2	2	2	2
CO4		2	2	3	3			3	2	3	2	2	2	2	2
CO5		3	2	2	3			3	2	3	2	2	2	2	2

**UNIT I Introduction to Photography**

12

Photography: Areas of photography, benefits and its applications in fashion industry. History of fashion: The origins of fashion, The role of photography in shaping fashion trends Major historical movements in fashion photography, Society photographs of aristocrats, actresses and society models wearing their clothes 1910, Fashion arrives in advertisement 1930s, Dynamic location Photography 1940's, Types of fashion photography, scope and opportunities, Types of cameras – TLR, SLR, DSLR, Polaroid, under water and digital camera. Working principle of camera. Lens specifications and types of films. Care instruction and maintenance for camera.

**UNIT-II Tools and Dark room Techniques**

7

Camera techniques: Aperture, shutter speed, ISO, Focal no and focal length. Equipment techniques: Exposure, measurement of light, tripod, monopod, filters and its types, Lens hood, rings and its types. Lighting techniques: Night photography, indoor and outdoor shoots equipments. Story board for a genre: Photographs describing the story (Indoor /outdoor).

**UNIT-III Lighting types and its Effects**

9

Lighting: Introduction, importance and its types. Composition through pose, propping, and scene elements: Makeup, hair, pose and expression. Creative and glamour lighting, Studio lights, Outdoor lights Controlling lights, Flash lights and Revealing lights effects and shooting techniques, Exploring the light, angle light, shadow and angle of view. Film types: Black, white and colour. Film formats and its specifications.

17.07.2023

Regulations-2019

  
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Department of Fashion Technology  
Sona College of Technology  
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#### **UNIT-IV Aesthetics of Photography**

9

Fashion photography sources in different media: styling, modelling, news papers, magazine, catalogues, fine arts, websites and look book, bespoke showcases, Make up and looks, Understanding human body and fashion figures, body shape perception of beauty and silhouette, Design aesthetics, clothing and accessories, choosing of backgrounds, Posing ordinary and bizarre, colour corrections for proper skin tone , colour corrections for accurate garment or object reproduction Retouch methods for skin, eyes, and clothing and advanced retouching techniques.

#### **UNIT - V Editing and printing methods**

8

Introduction about developing and printing: Post processing significance, blend transitions, colour balancing, shaping of lighting and darkening, Layer changing. Labelling of images, descriptive writing, and content enhancement. Computer applications in photography – Picture editing software's and printing techniques.

#### **Activity:**

Students need to do photo shoot and prepare an album.

**Total: 45 hours**

#### **TEXT BOOKS:**

1. The incomplete highsnobiety guide to street fashion and culture, 2018, Gestalten.
2. Henry Carroll, Read this if you want to take great photographs, 2014.
3. Tom Ang, Photography the definitive visual history. 2014.
4. Nirmal Pasricha, "A Professional's Basic Photography", Black Rose Publications, Delhi, 2002.
5. Simon Joinson, "Get the most from your Digital Camera", A David and Charles Book., United Kingdom, 2004.
6. Peter Cattrell, "Photography", Octopus Publishing Group Ltd, London 2005.

#### **REFERENCE:**

1. Bruce smith, Fashion Photography: A Complete Guide to the Tools and Techniques of the Trade. 2008.
2. <https://www.nytimes.com/1981/11/29/arts/camera-darkroom-techniques-for-more-interesting-prints.html>, Steve Mccurry, The iconic photographs, 2012, Phaidon publishers.

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**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Explain the basics of lean manufacturing. (LOTs)
2. Describe the steps involved in lean implementation in garment industry and evaluation of its effectiveness in the process.(HOTs)
3. Discuss about the various lean tools and its appropriateness for various textile industries.(LOTs)
4. Discuss the transparent flow of process and apply the lean tools in inventory control.(LOTs)
5. Analyze cases and develop strategic solutions for continuous improvement in garment industry. (HOTs)

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	1	3	3	2	2		3	3	3	3
CO2	3	3	3	3	3	1	3	1	2	2		2	3	3	3
CO3	3	3	3	3	3	1	2			1		2	3	3	2
CO4	3	3	3	3	3	1	1			1		2	3	2	2
CO5	3	3	3	3	3	1	2			1		2	3	3	3

**UNIT I Introduction**

9

**Introduction:** History and principles of Lean manufacturing, toyota production system (TPS), Lean practices Vs traditional business practices, three types of wasteful practices, 8 wastages, profit leakages due to wastages, over production, higher inventory, waiting time, unnecessary conveyance and motion of materials, over processing, rework, repairs, rejections, wastage of people talents, 5S audit.

**Concept of 7s:** Seiri, seiton, seisō, seiketsu, shitsuke, Safety, Sprit Housekeeping practices garment industries for cleaner production.

**UNIT II Critical to Quality and Value Stream Mapping**

9

**Critical to Quality and Value Stream Mapping:** Takt Time, calculation of time for producing exact quantity required, pull and push system of manufacturing, concepts of JIT, identifying non-value activities, eliminating non-value activities through value stream mapping (VSM) in garment industry. Real case studies on value stream mapping in apparel industries.

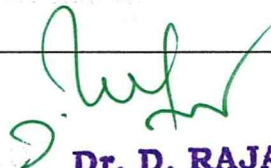
**UNIT III Statistical Tools**

9

**Statistical Tools:** Defect / defective distribution measurement using normal distribution. DMAIC (Define-Measure-Analyze-Improve-Control) model in world class zero defect programme (ZED model) and case studies. Sampling: Sampling plan for attributes and continuous variables. AQL levels and case studies.

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**Lean and Quality management:** Cause and effect diagram, Failure mode effect analysis, Bench marking and POKA YOKE. Quality Function Deployment.

**UNIT IV Lean Concepts in Inventory Control 9**

**Lean Concepts in Inventory Control:** Lean concepts applied in transparent flow of information and production between processes and customers, reduction of inventory using simple Economic Order Quantity (EOQ) and batch production models, influence of WIP, Line balancing on productivity. **Continuous Improvement:** Application of KAIZEN in garment industry for continuous improvement.

**UNIT V Lean Tools for Garment Industry 9**

**Lean Tools for Garment Industry:** Concepts and applications of single piece flow, quick change-over (SMED), total productive maintenance (TPM), heijunka, cellular production system, visual controls (Andon), poka-yoke, super market concept, kanban, overall Equipment Efficiency (OEE) etc. Lean implementation strategy in textile and apparel industry, case studies of lean manufacturing in spinning, weaving, knitting, processing and garment industries. Implementation: Road map, Senior management involvement, barriers, challenges, creation of lean culture, best practices in apparel industries, case studies.

**Total: 45 hours**

**TEXTBOOKS**

1. Hobbs Dennis P, "**Lean Manufacturing Implementation: A Complete Execution Manual for Any Size Manufacturer**", Cengage Learning India Private Ltd, NewDelhi, 2009.
2. Rajmanohar T P, "**Lean Product Development: Concept and Models**", ICFAI Press, 2009.
3. Desai, Aruna, "**Lean manufacturing: Perspectives and Applications**", ICFAI Press, 2008.

**REFERENCES**

1. Jana P & Tiwari M "**Lean management in apparel manufacturing. In Lean Tools in Apparel Manufacturing**" (pp. 1-16). Woodhead Publishing, 2021
2. Gopalakrishnan N, "**Simplified Lean Manufacture: Elements, Rules, Tools and Implementation**", Prentice Hall of India Learning Pvt. Ltd., 2010.
3. Askin Ronald G; "**Goldberg Jeffrey B, —Design and Analysis of Lean Production Systems**", John Wiley & Sons Inc, 2003.
4. Chowdhury, Subir, "**Design for Six Sigma**", Dearborn Trade, 2002.
5. Chowdhury, Subir, "**The Power of Six Sigma**", Pearson Education (Singapore) Pvt. Ltd., 2001.
6. Creveling C M; Sluisky J L; Antis, Jr. D, "**Design for Six Sigma Technology and Product Development**", Pearson Education (Singapore) Pvt. Ltd., 2004.
7. Truscott William T, "**Six Sigma Continual Improvement for Business: A Practical Guide**", Elsevier, 2009.

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8. Rajmanohar T P, 'Cost of Poor Quality: Concept and Applications', ICFAI Press, 2008.
9. Colenso Michael, "Kaizen Strategies for Successful Organizational Change", Pearson Education (Singapore) Pvt. Ltd., 2002.
10. Imai, Masaaki, "Kaizen: The Key to Japan's Competitive Success", McGraw-Hill, 1986.
11. Jana, P., & Tiwari, M. (Eds.). (2021). **Lean tools in apparel manufacturing**. Woodhead Publishing.



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**COURSE OUTCOMES**

At the end of study of the course the students should be able to,

1. Explain about fashion styling, factors involved and sources of styling.
2. Describe the importance of personal styling and its requirements.
3. Compare the role of editorial and catalogue styling and its process for product promotion.
4. Elaborate the show styling, its necessities, requirements and its process for company promotion.
5. Differentiate commercial styling, theatre styling and brand promotion, process in creating new brand identities.

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	2	2		3				2	3	3	2	2
CO2	2	3	3	3	1	3				2	2	2	3	3	2
CO3	2	3	3	3	3	3	3				2	2	3	3	3
CO4	2	3	3	3	3	3	3			2	2	3	3	3	3
CO5	3	3	3	3	3	3	3				2	2	3	3	3

**UNIT-I Fashion Styling**

9

Introduction to styling, fashion system and fashion marketing, , principles of art, design and trend forecasting for creative fashion styling, various sources of fashion styling, expectations of international luxury, fashion and publishing industries, photography and fashion magazine in styling, opportunities for stylist, studies on body challenges.

**UNIT -II Personal Styling**

9

Introduction and its importance, body shape and personality, garment style vocabularies, Elements of makeover, wardrobe edit, styling for personal, celebrities, stage performance and special occasions, types of makeover, hair styles and accessories, photo shoot for different occasions, types of garments that need to be avoided.

**UNIT -III Editorial and Catalogue styling**

9

Introduction, essentials of editorial and catalogues, Role of designer, freelance stylists, photographers and models, choice of theme, colour, dress and make up for styling, role of visual communication and graphic design in the fashion styling, process of producing photo shoots from initial idea stage to final image editing, Digital and online media – fashion websites, blogs, social media.

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**UNIT - IV Show styling**

9

Introduction, Necessities of events and fashion parades, types of shows, choice of models, garments, accessories, music, lighting and location, developing the event concept, Role of media, photographers, and promotional companies in show styling.

**UNIT -V Commercial styling**

9

Introduction, Choice of styling models or celebrities for commercials advertisement, selecting the wardrobe items, choice of location, models, makeup artists and photographer for the shoot, process involved in creating new brand identities, new markets and consumers. Brand photograph, Character styling, Sourcing and overview of theater styling.

**TOTAL: 45 Hours**

**TEXT BOOKS:**

1. Griffiths, D. (2012). **Fashion Stylist's Handbook**. Hachette UK.
2. Dingemans, J. (1999). **Mastering fashion styling**. Macmillan International Higher Education.

**REFERENCE:**

1. Devlin, P. **Vogue Book of fashion photography** (London: Thames and Hudson, 1979)
2. Simon, M. **Fashion in art. The Second Empire and Impressionism** (London: Zwemmer, 1995)
3. Williams, V. (ed) **Look at me. Fashion and photography in Britain 1960 to the present** (London: British Council, 1998)

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**COURSE OUTCOMES**

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

1. Explain the role, characteristics of entrepreneur and entrepreneurship management.
2. Discuss the various inputs required to setting up a new SSI.
3. Analyse the procedure for developing a new business plan.
4. Evaluate the procedure to manage a garment industry.
5. Analysis the importance of market analysis and advertisement.

COs	<b>CO/PO, PSO Mapping</b>														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	3	3	3	3	3	3	2	3	3	2	3
CO2	3	3	2	3	2	3	3	3	3	3	2	3	3	2	3
CO3	3	3	2	3	3	3	3	3	3	3	2	3	3	2	3
CO4	3	3	2	3	3	3	3	3	3	3	2	3	3	2	3
CO5	3	2	2	2	3	3	3	3	3	3	2	3	3	3	3

**UNIT I Entrepreneurship 9**

Definition of an entrepreneur, compare entrepreneurship with management, characteristics of an entrepreneur, role of an entrepreneur, opportunities for entrepreneur and women entrepreneur.

**UNIT II Establishing a New Venture 9**

**Small Scale Industry:** Definition, importance of small scale industry, government concessions and encouragement to SSI, procedure for registering SSI, advantages of SSI.

**Setting up New SSI:** Input requirement for setting up SSI, amount of investment, study of land, capital, labour, raw material, market demand, technical analysis, financial analysis; preparing a project for setting up garment industry, products identification in various fields, causes of industrial disputes, mechanisms for settlement of disputes, idea of risk management. Swot analysis of SSI.

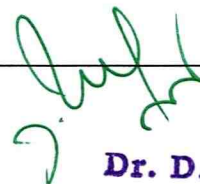
**Establishing a Startup:** Firm registration- DIPP registration- benefits for startup by Govt of India

**UNIT III Business Plan Development 9**

**Developing Business Plan:** Need for a business plan, structure of a business plan, critical elements of an effective business plan, preparing a business plan report, forecasting developments and charting an action plan, identifying the product/service evaluating the business venture, market research. Role of DIC

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**Financial Assistance:** Bank assistance by state and central govt, functions of commercial banks, TICC, SIDBI, NSIC, MUDRA.

**UNIT IV Enterprise Management**

9

**Enterprise Management:** Requirements for growth of a venture, effective organizational structures, operational challenges for entrepreneurships, alternative operations / strategies for adapting an organization to changes in the market place, entrepreneurial and traditional corporate career paths, organizational structure relevant to small garment industry.

**Managing 4Ms:** Procedures involved in the management of men, machine, material and methods of production and operation.

**UNIT V Market Analysis and Advertisement**

9

**Marketing:** Importance of national and international marketing, advantages and disadvantages of national and international marketing, buyer, seller meet.

**Market:** Study of markets for raw materials and markets for finishing products, local markets, international markets, feasibility study.

**Advertising:** Different media used for advertising, trade fair displays, exhibitions, fashion shows.

**Digital marketing:** facebook, linkedin, youtube ads, promotion, SEO techniques, paid and free promotion campaigns

**TOTAL: 45 hours**

**TEXTBOOKS:**

1. Peggy A. Lambing, "**Entrepreneurship**", Second Edition, Prentice Hall, 1999.
2. David Carson, Stanley Cromie and Pauric McGowan, "**Marketing and Entrepreneurship in SME's: An Innovative Approach**", First Edition, Prentice Hall, New Jersey, 1996.
3. William L. Megginson, "**Small Business Management: An Entrepreneur's Guidebook**", Fifth Edition, McGraw Hill, USA, 2005.

**REFERENCE:**

1. Philip Kotler, "**Marketing Management**", Prentice Hall Inc., New Jersey, 1996.
2. **How to Set up Readymade Garment Export Industry, Part I and II**, Industrial Estate Manufacturers Association, 1992.
3. Sally Jones, "**Service Management and Operations**", Prentice Hall, New Jersey, 1999.
4. Anantharaman V., "**Indian Industrial Relations: Law and Practice**", UPM Press, Serdang, 1997.

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**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Select a theme for a season or festival and interpret the forecasting of colours, fabrics, textures, accessories relating to the theme selected.
2. Prepare design collection boards representing the mood, colour, and fabric swatches for the theme selected.
3. Illustrate fashion figures and visually communicate apparel design details in a flat sketch and illustrate and construct different styles of accessories and construct garments suitable to the theme.

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3		2	3	2	3	2	2	3
CO2	3	3	3	1	3	3				3	2	2	3	3	3
CO3	2	2	2	2	3	3				2	2	1	3	3	1

**LIST OF EXPERIMENTS**

1. Selection of line, market segment, trend for a particular theme.
2. Analysis of target customer group and budget analysis
3. Forecast of colours, patterns and fabrics based on international forecast.
4. Preparation of story boards, mood boards, colour boards.
5. Collections of fabric swatches and colours based on collection.
6. Selection of surface ornamentation techniques
7. Selection of seams, necklines, collars, sleeves.
8. Preparation of various styles from selected fabrics.
9. Illustration fashion models both manually and using software.
10. Preparation of tech-pack for the developed style.
11. Construction of garment using required accessories and designs.
12. Selection of accessories.
13. Preparation of report, portfolio and costing sheet.

\*Minimum of 2 garments is to be developed.



**TOTAL: 60 hours**

**FASHIION PORTFOLIO AND PRODUCT DEVELOPMENT LABORATORY**  
**List of equipment required for a batch of 30 students for U.G**

S. No.	Name of the equipment / software	Quantity Required
1.	Cork Top Tables	15
2.	<b>Dress forms</b>	
3.	Male : 40"chest full	1
4.	Male : 42"chest full	1
5.	Male : adjustable half	1
6.	Male : 40"chest half	1
7.	Female : 32.5" bust half	1
8.	Female : 32.5" bust full	1
9.	Female : 34.5" bust full	1
10.	Female : 36.5" bust full with hand	1
11.	Female : adjustable half	1
	<b>Mannequins</b>	
12.	i. Baby	
	Boy - 80.5 cm	1
	Girl - 88.8 cm	1
	ii. Teenage Girls & Boys	
	Boy - 139 cm	1
	Girl - 139cm	1
	iii. Adults	
	Male -186 cm	1
	Male -182.5 cm	1
	Female -157.6 cm	1
	Female -186 cm	1
	Jewellery bust half head	1
	Jewellery bust Indian face	1
	Jewellery hand	2
13.	Single-needle lock-stitch machine	30
14.	Steam Iron	3
15.	Fusing Machine	1
16.	Single Needle Lock Stitch Machine	
17.	Over lock machine	1
18.	Flat lock machine	1
19.	Button sewing machine	1
20.	Button Hole machine	1
21.	Feed - off the arm machine	1
22.	Bar tack sewing machine	1
	<b>Total</b>	<b>106</b>

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**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Develop and prepare embroidery design using computerised embroidery machine and attach button, buttonholes and eyelets using industry grade machinery and hand press machinery and demonstrate the basic embroidery stitches.
2. Embellish the fabric surface using various special embroidery stitches and different decorative surface embellishment and Illustrate and construct different styles of various fashion accessories using different materials.
3. Implement computerised embroidery and hand embroidery basic and decorative stitches and other surface embellishments on fabric along with fashion accessories and show the development procedure in different garment and apparel products.

<b>CO/PO, PSO Mapping</b>															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3		2	3	2	3	2	2	3
CO2	3	3	3	3	3	3				3	2	2	3	3	3
CO3	2	2	2	2	3	3				2	2	3	3	3	1

**LIST OF EXERCISES**

1. Development of computerised designs for Machine embroidery (1 session)
2. Development of embroidery sample using computerised embroidery machine (1 session)
3. Attaching procedure of button, buttonholes, eyelets using industry grade machinery and hand press machinery (1 session)
4. Basic Embroidery stitches.(1 session)
  - Running, satin - long and short, chain, stem, herringbone, cross stitch, knotted stitch, fishbone, wheat, couching, buttonhole
5. Special embroidery stitches. (2 sessions)
  - Bead work, sequin work, zardosi, aari work, badla work
6. Decorative surface embellishment. (2 sessions)
  - Cutwork, drawn thread work, eyelet and mirror work, shadow work, ribbon work and Kundan work, Appliqué work and Patch work. (1 session)
7. Embellishment techniques Pompons, Fringes, Tassels. (1 session)
8. Designing and production of Earrings, bracelets, necklaces using materials like colored papers, fabric scraps, colour beads and stones. (2 sessions)
9. Designing and Construction of handbags and purses. (1 session)

 **TOTAL: 30 hours**

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**ACCESSORY DESIGN AND EMBELLISHMENT LABORATORY**

**List of equipment required for a batch of 30 students**

S. No.	Name of the equipment / software	Quantity Required
1.	Single needle lock stitch machine	30
2.	Computerised embroidery machine	1
3.	Eyelet Hole Punch Machine	1
4.	Button sewing machine	1
5.	Button Hole machine	1



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**COURSE OUTCOMES**

At the end of the study of the course, the student will be able to,

1. Explain about draping technique for industrial pattern, types of muslin fabrics, tools and human body measurements.
2. Apply the concept of dart manipulation and other techniques in draping of basic bodice blocks, basic skirts, sleeves and intimate apparels.
3. Develop the ready patterns from the draping styles for men's, women' and kids wear.

<b>CO/PO, PSO Mapping</b>															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	3	3		2	3	2	3	2	2	3
CO2	3	3	3	3	3	3				3	2	2	3	3	3
CO3	2	2	2	2	3	3				2	2	3	3	3	3

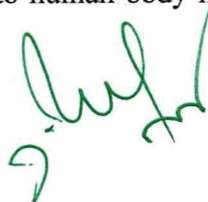
**LIST OF EXPERIMENTS**

1. Introduction to draping, tools and equipment, types of muslin fabrics for draping various garments. (1 session)
2. Collection of various types of fabrics and find the drape behaviour (1 session)
3. Draping of bodice front, back and sleeves. (1 session)
4. Draping of skirt front and back, Trousers front and back. (2 session)
5. Dart manipulation, contouring, ease and fullness details like collars and yokes etc., (2 session)
6. Draping of skirts with volume insertions and bias skirt dress. (2 session)
7. Draping of blouses and bustier. (2 session)
8. Draping of cowl, cascade, twisting and peplums effect in women's wear. (2 session)
9. Draping of kids wears. (1 session)
10. Draping of Men's formal shirt. (2 session)
11. Draping of intimate apparels using knitted fabric – Braziers' and Panties. (2 session)

**DEMONSTRATION**

1. Understanding the variation of dress form and human form, consideration of various measurements, adjusting the dress forms to human body measurements by padding and other techniques. (2 session)

**Total: 30 Hours**



## DRAPING TECHNIQUE

**List of equipment required for a batch of 30 students for U.G**

S. No.	Name of the equipment / software	Quantity Required	Additional tools issued to individual students
1.	Cork Top Tables	15	L - scale
2.	<b>Dress forms</b>		Hip curve
3.	Male : 40"chest full	1	Meter Scale
4.	Male : 42"chest full	1	French Curve
5.	Male : adjustable half	1	Tracing wheel
6.	Male : 40"chest half	1	Measuring tape
7.	Female : 32.5" bust half	1	Tailor's Chalk
8.	Female : 32.5" bust full	1	Paper cutting scissors
9.	Female : 34.5" bust full	1	Fabric cutting scissors
10.	Female : 36.5" bust full with hand	1	1/4 <sup>th</sup> Paper Scale
11.	Female : adjustable half	1	
	<b>Mannequins</b>		
12.	i. Baby		
	Boy - 80.5 cm	1	
	Girl - 88.8 cm	1	
	ii. Teenage Girls & Boys		
	Boy - 139 cm	1	
	Girl - 139cm	1	
	iii. Adults		
	Male -186 cm	1	
	Male -182.5 cm	1	
	Female -157.6 cm	1	
	Female -186 cm	1	
	Jewellery bust half head	1	
	Jewellery bust Indian face	1	
	Jewellery hand	2	
13.	Single-needle lock-stitch machine	30	
14.	Steam Iron	3	
15.	Fusing Machine	1	
<b>Total</b>		<b>70</b>	



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**COURSE OUTCOMES**

At the end of the study of this training, the students will be able to

1. Get training in real world of production and process in the apparel and related industries.
2. Analyse the entire process in detail.
3. Identify the problems in the industry by observation and attempt to give solution and prepare an in-plant training report

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	2	2		2	2		2	2	1	1	2	2	2
CO2	1	3	1	3		3	3		2	1	1	1	2	2	2
CO3	1	3	1	3		3	1		1	1	1	1	2	2	2

- The students have to undergo a 4 weeks internship.
- 3 internal reviews shall be done by a committee duly appointed by the HOD.
- Students shall submit a report on the work done during the course duration which consists of the following:
  - Description of the work
  - Feedback from the respective industry mentor
  - Photographs of the students in the industry if the work is undertaken there.
  - Completion certificate from the Industry
- The final viva voce shall be conducted by a committee duly appointed by the office of COE which consists of a person from the related industry, two faculty members –
  1. From the same department
  2. From another related department.
- The evaluation is 100% internal.

17.07.2023

  
**Dr. D. RAJA**, M.Tech., Ph.D.,  
 Professor & Head  
 Department of Fashion Technology  
 Sona College of Technology  
 Salem - 636 005. Tamil Nadu

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**COURSE OUTCOMES**

At the end of the study of this course the students will be able to,

1. Identify case study and innovative ideas related to the subjects learnt in the current semester.
2. Execute a mini project related to the case study and innovative ideas identified by the students.
3. Function effectively on teams and to communicate effectively and Develop report with results and conclusion of the mini project work.

COs	CO/PO, PSO Mapping														
	(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	2	3	3	3

The evaluation of mini project shall be conducted in the form of creative methodology as **Hackathon**.

**Methodology:**

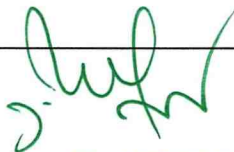
- The students' group shall present their chosen problem statement and justify their selection.
- During review 2, they shall present their solution methodology to the chosen problem statement and also present the requirement.
- During review 3, the group shall present the progress made on the prototype development.
- The office of COE shall give 3 days to conduct the hackathon. During first two days, the students' group shall complete developing their prototype and showcase the same on the third day as video presentation/demonstration of the working model to the team of evaluators.

The evaluation is carried out in the following way:

- The team consist of industry personnel, faculty and peer students. Evaluation metrics and rubrics are provided to each of the evaluators. For computing the final marks, 50% weightage from industry evaluators, 40% weightage from faculty evaluators and 10% weightage from student evaluators, is considered. The numbers of industry evaluators and faculty evaluators for each programme will be decided by the HOD and COE as per the number of teams.
- Industry evaluators are appointed by the office of COE for which the list of such evaluators is provided by the respective departments. The faculty evaluators are also appointed by the

17.07.2023

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 Professor & Head  
 Department of Fashion Technology  
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 Salem - 636 005, Tamil Nadu

office of COE as recommended by the respective HOD. The peer evaluators are chosen by the coordinators as one student from each team.

- Within 5 days after the completion of Hackathon, the students shall submit the miniproject report as per the approved guidelines given by the Controller of Examinations.

**Total: 30 hours**

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Department of Fashion Technology  
Sona College of Technology  
Salem - 636 005, Tamil Nadu



O.E

BME  
VI

U19BM1001

HOSPITAL MANAGEMENT

L T P C  
3 0 0 3

**COURSE OUTCOMES:**

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

- Describe the basics of Hospital Management.
- Illustrate the knowledge of Human resource management and marketing in hospitals.
- Apply various Quantitative methods in healthcare management.
- Amalgamate their knowledge in Hospital information system and supportive services.
- Explain the quality and safety aspects in Hospital.

CO/PO, PSO Mapping															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PSO1	PSO2	PSO3
CO1	-	-	3	-	2	3	3	-	-	-	-	1	-	-	3
CO2	-	-	3	-	2	3	3	-	-	-	-	1	-	-	3
CO3	-	-	3	-		3	3	-	-	-	-	1	-	-	3
CO4	-	-	3	-	3	2	-	-	-	-	-	1	-	-	3
CO5	-	-	3	-	-	3	3	3	-	-	-	1	-	-	3

**UNIT I INTRODUCTION TO HOSPITAL ADMINISTRATION 9**

Distinction between Hospital and Industry, Challenges in Hospital Administration, Hospital Planning, Equipment Planning, Functional Planning, Current Issues in Hospital Management, Role of Manager, Leadership, Motivation, Organizational behaviour, Strategic planning, Ethics and Law, Fraud and abuse.

**UNIT II HUMAN RESOURCE MANAGEMENT AND MARKETING 9**

Principles of HRM, Functions of HRM, Profile of HRD Manager, Tools of HRD, Human Resource Inventory, Manpower Planning. Different Departments of Hospital, Recruitment, Selection, Training Guidelines, Methods of Training, Leadership grooming and Training, Promotion, Transfer.

**UNIT III QUANTITATIVE METHODS IN HEALTHCARE MANAGEMENT 9**

Introduction to quantitative decision-making methods in healthcare management, Forecasting, Decision making in healthcare facilities, Facility location, Facility layout, Reengineering, Staffing, Scheduling, Productivity, Resource allocation, Supply chain and inventory management, Quality Control, Project Management, Queuing models and capacity planning.



#### **UNIT IV HOSPITAL INFORMATION SYSTEM AND SUPPORTIVE SERVICES 9**

Clinical Information Systems, Administrative Information Systems, Support Service Technical Information Systems, Medical Records Department, Central Sterilization and Supply Department – Pharmacy, Food Services, Laundry Services, Telemedicine.

#### **UNIT V QUALITY AND SAFETY ASPECTS IN HOSPITAL MANAGEMENT 9**

Quality system, Elements, implementation of quality system, Documentation, Quality auditing, International Standards ISO 9000 – 9004. Features of ISO 9001, ISO 14000, Environment Management Systems. NABA, JCI, NABL. Security, Loss Prevention, Fire Safety, Alarm System, Safety Rules.

**TOTAL: 45 PERIODS**

#### **TEXT BOOKS:**

1. R.C. Goyal, Hospital Administration and Human Resource Management, PHI, 4th Edition, 2006.
2. G.D. Kunders, Hospitals – Facilities Planning and Management, TMH, New Delhi, 5th Reprint, 2007.

#### **REFERENCE BOOKS:**

1. Sharon B. Buchbinder and Nancy H. Shanks, Introduction to Healthcare Management, Jones and Bartlett Learning, 2017
2. Blane, David, Brunner, Health and SOCIAL Organization: Towards a Health Policy for the 21st Century, Eric Calrendon Press, 2002.
3. Yasar A. Ozcan, Quantitative Methods in Healthcare management, Jossey Bass- John Wiley and Sons, 2009.

  
**Chairperson**

**BOS-BME**

**Dr. S. PRABAKAR, M.E., Ph.D.,**  
Professor and Head  
Department of Biomedical Engineering  
Sona College of Technology, Salem-5



**COURSE OUTCOMES:**

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

- Analyze Various BLS and First Aid Techniques
- Understand the Essentials of Anatomy and Physiology
- Analyze Various BLS techniques for adults.
- Analyze Various BLS techniques for children and infants
- Apply Respiratory techniques and AED in critical conditions

<b>CO/PO, PSO Mapping</b>															
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	<b>Programme Outcomes (POs) and Programme Specific Outcome (PSOs)</b>														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	3	1	1	1	-	-	1	-	-	-
CO2	3	-	-	-	-	1	2	1	-	-	-	1	1	-	-
CO3	3	-	-	-	-	1	1	1	1	-	-	1	-	-	-
CO4	3	-	-	-	-	3	2	1	-	-	-	1	-	-	1
CO5	3	-	-	-	-	2	1	1	1	-	-	1	1	-	1

**UNIT I INTRODUCTION TO BASIC LIFE SUPPORT**

9

General Concepts of Basic Life Support (BLS)-Chain of survival, BLS Algorithm, First Aid: Basic First Aid techniques- first aid kit, Law, Resuscitation, Top to Toe Assessment, Hygiene and Hand Washing.

**UNIT II ESSENTIALS OF ANATOMY AND PHYSIOLOGY OF HUMAN BODY**

9

Levels of Organization-Chemicals-Cells-Tissues-Organs-Organ Systems, Metabolism and Homeostasis, Terminology and General Plan of the Body-Case Studies.

**UNIT III ADULT BASIC LIFE SUPPORT**

9

BLS for adults: Adult BLS Algorithm, CPR, One Rescuer and Two Rescuer BLS for Adults- Adult Mouth-to-Mask Ventilation, Adult Bag-Mask Ventilation, Self-Assessment for Adult BLS

**UNIT IV PAEDIATRIC BASIC LIFE SUPPORT**

9

BLS for children: BLS Algorithm children, One Rescuer and Two Rescuer BLS for children, Child Ventilation. BLS for Infants: One Rescuer and Two Rescuer BLS for infants-Case Studies.

**UNIT V AUTOMATED EXTERNAL DEFIBRILLATOR AND FOREIGN BODY AIRWAY OBSTRUCTION**

9

AED for Adults, AED for Children and Infant, Self-Assessment for AED, FBAO- Respiration, Difficult Breathing, Drowning, Strangulation and Hanging, Chocking, Suffocation - Airway Management-Chest Discomforts-Case Studies.

**TOTAL PERIODS:45**

## REFERENCES:

1. Dr. Karl Disque, Basic Life Support Provider Handbook, Satori Continuum Publishing, USA, 2021.
2. INDIAN FIRST AID MANUAL – 7th Edition, St. John Ambulance Association (India) – Indian Red Cross Society National Headquarters, New Delhi, 2016.
3. Basic Life Support Training Manual, 1st Edition, Published by in Medical Development Division, Ministry of Health Malaysia, Malaysia in December 2017.
4. Valerie C. Scanlon, Tina Sanders, Essentials of Anatomy and Physiology, 5th Edition, F. A. Davis Company.

  
Chairperson  
BOS-BME

  
**Dr. S. PRABAKAR, M.E., Ph.D.,**  
Professor and Head  
Department of Biomedical Engineering  
Sona College of Technology, Salem-5



O.E

Civil  
VII

**PREAMBLE**  
**To**  
**Building Services and Safety Regulations**

- Building services engineers are responsible for the design, installation, operation and monitoring of the mechanical, electrical and public health systems required for the safe, comfortable and environmentally friendly operation of modern buildings.
- Building services engineers work closely with other construction professionals such as architects, structural engineers and quantity surveyors. They influence the architecture of a building and play a significant role on the sustainability and energy demand of a building.
- Within building services engineering, new roles are emerging, for example in the areas of renewable energy, sustainability, low carbon technologies and energy management.
- With buildings accounting for around 50% of all carbon emissions, building services engineers play a significant role in combating climate change.

COURSE CODE	COURSE NAME	L	T	P	C
U19CE1001	BUILDING SERVICES AND SAFETY REGULATIONS	3	0	0	3

**Course Objective (s): The Purpose of learning this course is to:**

1.	Provide knowledge on the building electrification systems.
2.	Impart the basic knowledge in the design of lighting systems in the buildings.
3.	Provide the basic knowledge of providing air conditioning systems in the various types of buildings.
4.	Aware the students about fire safety regulations and installation systems in the building.
5.	Provide basic knowledge in the water supply and sewerage systems for the buildings.

**Course Outcome (s) (COs): At the end of this course, the students will be able to:**

CO1	Acquire the basics knowledge in electrical and wiring systems for the buildings. (K1)
CO2	Design the lighting system for the various buildings and disabled peoples. (K3)
CO3	Know the basic provisions for air conditioning systems for various types of buildings. (K4)
CO4	Plan to install the fire safety equipment system in the buildings by obeying the regulations. (K3)
CO5	Explain the various plumbing fittings in the water supply and rainwater harvesting system for buildings. (K2)

**Knowledge Level:** K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:

**CO – PO Mapping**

Cos	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS
CO1	3	1	3	1	1	1	3	1	1	-	-	2	1	2
CO2	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO3	3	2	3	1	2	1	3	-	1	-	-	2	1	2
CO4	1	2	3	2	2	2	3	3	2	-	-	2	2	2
CO5	1	3	3	2	2	2	3	1	2	-	-	2	2	2
CO (Avg)	2.2	2	3	1.4	1.8	1.4	3	1	1.4	-	-	2	1.4	2

**Correlation Level:** 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)

**UNIT-I ELECTRICAL SYSTEMS IN BUILDINGS 9 Hours**

Basics of electricity- Single / Three-phase supply- Protective devices in electrical installations- Earthing for safety- Types of earthing- ISI specifications- Types of wires, wiring systems, and their choice- Planning electrical wiring for building- Main and distribution boards- Transformers and switch-gears- Layout of substations.

**UNIT-II PRINCIPLES OF ILLUMINATION & DESIGN 9 Hours**

Visual tasks- Factors affecting visual tasks- Modern theory of light and colour- Synthesis of light- Additive and subtractive synthesis of colour- Luminous flux- Candela- Solid angle illumination- Utilisation factor- Depreciation factor- MSCP- MHCP- Lams of illumination- Classification of lighting- Artificial light sources- Spectral energy distribution- Luminous efficiency- Colour temperature- Colour rendering. Design of modern lighting- Lighting for stores, offices, schools, hospitals, and house lighting. Elementary idea of special features required and minimum level of illumination required for



physically handicapped and elderly in building types.

UNIT-III	REFRIGERATION PRINCIPLES & APPLICATIONS	9 Hours
Thermodynamics- Heat- Temperature, measurement transfer- Change of state- Sensible heat- Latent heat of fusion, evaporation, sublimation- saturation temperature- Superheated vapour- Subcooled liquid- Pressure temperature relationship for liquids- Refrigerants- Vapour compression cycle- Compressors- Evaporators- Refrigerant control devices- Electric motors- Starters- Air handling units- Cooling towers- Window type and packaged air-conditioners- Chilled water plant- Fan coil systems- Water piping- Cooling load- Air conditioning systems for different types of buildings- Protection against fire to be caused by A.C. Systems		
UNIT-IV	FIRE SAFETY REGULATIONS AND INSTALLATION	9 Hours
Causes of fire in buildings- Safety regulations- NBC- Planning considerations in buildings like non-combustible materials, construction, staircases and lift lobbies, fire escapes, and A.C. systems. Special features required for physically handicapped and elderly in building types- Heat and smoke detectors- Fire alarm system, snorkel ladder- Fire lighting pump and water storage- Dry and wet risers- Automatic sprinklers		
UNIT-V	WATER SUPPLY AND SEWERAGE SYSTEM FOR BUILDINGS	9 Hours
Plumbing fixtures and fixture fittings- Water-conserving fittings- Overflows- Strainers and connectors- Prohibited fixtures- Special fixtures- Installation of water closet- Urinals - Flushing devices- Floor drains- Shower stall- Bathtub- Bidets- Minimum plumbing facilities- Rainwater harvesting systems- Necessity- Construction- Different types		
		<b>TOTAL: 45 Hours</b>
TEXT BOOKS:		
1.	R. Udaykumar, "A text book on Building Services", Eswar Press, Chennai, ISBN13, 9788178740638. ISBN-10, 817874063X	
2.	David V. Chadderton , Building Services Engineering Taylor & Francis, 2000.	
REFERENCES:		
1.	Handbook for Building Engineers in Metric systems, NBC, New Delhi, 2011.	
2.	Philips Lighting in Architectural Design, McGraw-Hill, New York, Latest edition.	
3.	R.G.Hopkinson and J.D.Kay, "The Lighting of buildings", Faber and Faber, London, 1972.	
4.	William H.Severns and Julian R.Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London, 1988.	
5.	A.F.C. Sherratt, "Air-conditioning and Energy Conservation", The Architectural Press, London, 2007.	

*P. J.*





**PREAMBLE**  
**To**  
**Disaster Management**

We observe that during the last three decades, disaster both natural and man-made occur frequently and their impact on life, live hoods, natural resources, property, infrastructure and facilities is very severe. Though hazards and disasters could not be prevents, by taking preparedness activities, we can minimize their harmful effects.

This course on disaster management emphasizes the need for disaster preparedness rather than emergency response. It throws light on risk assessments, risk resolution and risk sharing and transfer. The importance of community participation, building self-reliant resilient communities and awareness creation is highlights in this course. Application of modern communication tools, remote sensing and GIS technologies in search and resource operations and stream lining activities is elaborated. Way and means of financial arrangements to carry out disaster management activities are discussed.

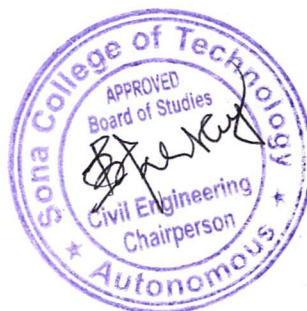
The physics of earthquake and tsunamis is explained. Safety measures against tsunamis are described. The functioning and tsunamis warning system is described.

COURSE CODE	COURSE NAME												L	T	P	C
U19CE1004	DISASTER MANAGEMENT												3	0	0	3
<b>Course Objective (s): The Purpose of learning this course is to:</b>																
1.	Provide knowledge on the types and effects of disasters.															
2.	Impart basic knowledge to reduce the impact of disasters.															
3.	Understand the relationship and impact of development projects on environment and society.															
4.	Disseminate the National policy and role played by our country during disasters.															
5.	Provide basic knowledge in assessment of disasters with case study.															
<b>Course Outcome (s) (COs): At the end of this course, the students will be able to:</b>																
CO1	Distinguish various types of disasters, their causes and impacts on environment and society (K2)															
CO2	Explain different phases of disaster management cycle (K3)															
CO3	Assess vulnerability and prepare disaster risk reduction measures (K4)															
CO4	Explain the vulnerability profile of India(K5)															
CO5	Prepare hazard zonation maps for all types of hazards (K4)															
<b>Knowledge Level: K1 – Remember: K2 – Understand: K3 – Apply: K4 – Analyze: K5 – Evaluate:</b>																
<b>CO – PO Mapping</b>																
Cos	Pos												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	POS		
CO1	3	2	3	3	1	2	3	3	3	3	2	3	2	2		
CO2	3	2	3	2	3	3	3	3	3	3	3	3	3	3		
CO3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
CO4	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
CO5	3	3	3	2	3	3	3	2	2	2	3	3	3	3		
CO (Avg)	3	2.6	3	2.6	2.6	2.8	3	2.8	2.8	2.8	2.8	3	2.8	2.8		
<b>Correlation Level:</b> 1:Slight (Low) 2:Moderate (Medium) 3:Substantial (High)																
<b>UNIT-I</b>	<b>INTRODUCTION TO DISASTERS</b>												<b>9 Hours</b>			
Definitions: Disaster, Hazard, Vulnerability, Resilience, Disaster Preparedness - Classification of Disasters - Causes for Disasters - Impacts of Disasters on Society, Environment, Economics, Politics, Health, etc. - Types of Vulnerability - The Sphere Project																
<b>UNIT-II</b>	<b>APPROACHES TO DISASTER RISK REDUCTION</b>												<b>9 Hours</b>			
Phases of Disaster Management Cycle - Culture of safety, prevention, mitigation, and preparedness - Community-based Disaster Risk Reduction - Structural and Non-structural mitigation measures																



UNIT-III	INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT	9 Hours
Linkage between Development and Disasters -Impact of Development Projects on Environment and Society - Climate Change Adaptation - IPCC - India's Participation - Relevance of Indigenous Knowledge, Appropriate Technology, and Local Resources		
UNIT-IV	DISASTER RISK MANAGEMENT IN INDIA	9 Hours
Hazards-Vulnerability Profile of India - Components of Disaster Relief: Water, Sanitation, Food, Shelter, Health, etc. - National Policy and Disaster Management - Institutional Framework for Disaster Management in India - Role of NGOs in Disaster Risk Reduction - Role of Armed Forces during Disasters		
UNIT-V	DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS	9 Hours
Application of Information Technology, Remote Sensing Technology, and Geographic Information System in Disaster Risk Reduction - Case Studies on Landslide Hazard Zonation, Seismic Assessment of Buildings and Infrastructures, Drought Assessment, Coastal Flooding Assessment, Storm Surge Assessment, Fluvial and Pluvial Floods Assessment, Forest Fires Assessment		
		<b>TOTAL: 45 Hours</b>
TEXT BOOKS:		
1.	Singhal J.P. "Disaster Management", Laxmi Publications, 2010.	
2.	Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012.	
3.	Pardeep Sahni and Madhavi Malalgoda Ariyabandu, "Disaster Risk Reduction in South Asia", PHI Learning Private Limited, Delhi- 110092, 2017	
4.	Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011	
5.	Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.	
REFERENCES:		
1.	Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005	
2.	Government of India, National Disaster Management Policy,2009.	

P. V. A.





**COURSE OUTCOMES:**

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

- Compare and analyze different types of digital data characteristics of Big Data
- Implement programs using Hadoop open source software framework
- Design and develop programs using NoSQL Databases like Mongo DB and Cassandra
- Apply MapReduce programming for various big data based problems
- Implement programs using Hive and Pig Databases

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	1	2	0	1	0	2	1	2	2	2
CO2	2	1	2	2	3	2	0	1	1	2	2	2	2	2
CO3	2	1	2	3	3	2	1	1	1	2	3	2	2	3
CO4	3	1	2	3	3	2	0	1	0	2	3	2	2	3
CO5	2	2	3	3	3	1	0	1	0	2	3	2	3	3

**UNIT I INTRODUCTION TO BIG DATA**

9

Types of Digital Data: Classification of Digital Data Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, Characteristics of Big Data, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment.

**UNIT II BIG DATA ANALYTICS**

9

Introduction -Big Data Analytics, Classification of Analytics, Challenges in Big Data, Technologies to handle Challenges Posed by Big Data- Data Science- Data Scientist, Terminologies Used in Big Data Environments, Basically Available Soft State Eventual Consistency (BASE), Few Top Analytics Tools.

**UNIT III HADOOP**

9

Introduction Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, Use Case of Hadoop, Hadoop Distributors, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator), Interacting with Hadoop Ecosystem, MapReduce Programming -Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression

05.07.2023

Regulation 2019

  
**B. SATHIYABALAN** M.E., Ph.D.,  
 PROFESSOR,  
 Dept. of Computer Science and Engineering  
 SONA COLLEGE OF TECHNOLOGY  
 SALEM - 636 005.



#### UNIT IV NO SQL DATABASES

9

Cassandra :Apache Cassandra - An Introduction , Features of Cassandra, CQL Data types, CQLSH, Keyspaces, CRUD (Create, Read, Update and Delete) Operations, Collections, Using a Counter, Time to Live (TTL), Alter Commands, Import and Export, Querying System Tables, Practice Examples- MongoDB, Terms Used in RDBMS and MongoDB, Data Types in MongoDB , MongoDB Query Language

#### UNIT V HIVE AND PIG

9

**Hive:** Introduction to Hive, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), RCFile Implementation, SerDe, User-defined Function(UDF).

**Pig:** Introduction to Pig, The Anatomy of Pig, Pig on Hadoop , Pig Philosophy, Use Case for Pig: ETL Processing, Pig Latin Overview , Data Types in Pig ,Running Pig , Execution Modes of Pig ,HDFS Commands ,Relational Operators ,Eval Function ,Complex Data Types ,Piggy Bank, User-Defined Functions (UDF) ,Parameter Substitution , Diagnostic Operator , Word Count Example using Pig,Pig versus Hive

**Total: 45 hours**

#### TEXT BOOKS:

1. **Big Data and Analytics**, Seema Acharya, Subhashini Chellappan, Infosys Limited, Publication: Wiley India Private Limited,1st Edition 2015(Chapters 1,2,3,4,5,6,7,8,9,10)

#### REFERENCE BOOKS:

1. **Hadoop in Practice**, Alex Holmes, Manning Publications Co., September 2014, Second Edition.
2. **Programming Pig**, Alan Gates, O'Reilly, Kindle Publication.
3. **Programming Hive**, Dean Wampler, O'Reilly, Kindle Publication.

  
**Dr. B. SATHIYABHAMA, B.E., M.Tech., Ph.D.**  
**PROFESSOR & HEAD,**  
**Dept. of Computer Science and Engineering**  
**SONA COLLEGE OF TECHNOLOGY**  
**SALEM - 636 005**

**PREAMBLE**

The "Internet of Things" (IoT) is the network of physical objects or "things" embedded with sensors, actuators, software, electronics and network connectivity to enable it to achieve greater value and service by exchanging data between the physical world and computer systems over existing network infrastructure. By connecting everyday real world objects such as transports, buildings and industrial equipments, IoT guarantees to revolutionize how we live and work. In the year 2020, it is estimated that approximately 30 billion devices will be connected in IoT. IoT will drive new consumer and business behavior that will demand increasingly intelligent industry solutions. It can also help various industries like agriculture, health services, energy, security, disaster management etc., which need to automate solutions to problems faced through remotely connected devices.

The Internet of Things involves three distinct stages:

1. The sensors which collect data (including identification and addressing the sensor/device)
2. An application which collects and analyzes this data for further consolidation
3. Decision making and the transmission of data to the decision-making server. Analytical engines, actuators and Big data may be used for the decision making process.

After completing the course the students will attain the following,

- Ability to build real time IoT applications by interfacing the sensors with minimal programming.
- Ability to associate sensor networks and communication modules for building IoT systems.

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

- Recall characteristics, physical and logical designs, domains.
- Differentiate IoT and M2M and explain IoT design methodology.
- Describe the various IoT components.
- Design a portable IoT system using Arduino/Raspberry Pi.
- Discuss the various applications of IoT.

**UNIT I FUNDAMENTALS OF IOT 9**

Introduction-Definition and Characteristics of IoT- Physical design- IoT Protocols-Logical design - IoT communication models, IoT Communication APIs- Enabling technologies - Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates - Domain specific IoTs.

**UNIT II M2M AND IOT DESIGN METHODOLOGY 9**

IoT and M2M- difference between IoT and M2M - Software defined networks, network function virtualization- Needs- IoT design methodology

**UNIT III IOT COMPONENTS 9**

Sensors and actuators - Communication modules - Zigbee- RFID-Wi-Fi-Power sources.

**UNIT IV BUILDING IOT WITH HARDWARE PLATFORMS 9**

Platform - Arduino/Raspberry Pi- Physical devices - Interfaces - Programming - APIs/Packages

**UNIT V CASE STUDY 9**

Various Real time applications of IoT- Home automation-Automatic lighting-Home intrusion detection- Cities-Smart parking-Environment-Weather monitoring system- Agriculture-Smart irrigation.

**TOTAL: 45 PERIODS****TEXT BOOK:**

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things-A hands-on approach", Universities Press, 2015.

**REFERENCES:**

1. Manoel Carlos Ramon, —Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers!, Apress, 2014.
2. Marco Schwartz, —Internet of Things with the Arduino Yun!, Packt Publishing, 2014.
3. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley Publications, 2012.
4. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things: Key applications and Protocols", Wiley Publications 2nd edition , 2013.

05.07.2023

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**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

1. Provide an overview of cloud computing
2. Explain the various tasks in developing cloud services
3. Analyze the provision of cloud computing services to different users
4. Configure the various cloud services according to the environment.
5. Analyze various ways to collaborate online

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	2	1	2	0	1	0	2	1	2	2	2
CO2	2	1	2	3	3	2	0	1	1	2	2	3	3	3
CO3	2	1	3	3	3	2	0	1	0	3	3	2	3	3
CO4	2	1	2	3	3	2	0	1	0	2	3	3	3	3
CO5	2	2	3	3	3	1	0	1	0	2	3	2	3	3

**UNIT I Understanding Cloud Computing****6**

Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services

**UNIT II Developing Cloud Services****10**

Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon – Google App Engine – IBM Clouds

**UNIT III Cloud Computing for Everyone****10**

Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation

**UNIT IV Using Cloud Services****10**

Collaborating on Calendars, Schedules and Task Management – Exploring Online Calendar Applications- Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Spread sheets- Collaborating on Databases – Storing and Sharing Files

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Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services –  
Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware –  
Collaborating via Blogs and Wikis

**Total:45 hours**

**TEXT BOOK:**

1. Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.

**REFERENCE BOOK:**

1. Haley Beard, Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008.

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**Course Outcomes**

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

- 1) Analyze the 1G and 2G Technologies.
- 2) Explain the 2.5G evolutions
- 3) Analyze the principles of 3G and UMTS
- 4) Analyze the evolutions of 4G.
- 5) Summarize the various wireless security applications and solve the mobile phone faults.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	3		1		1	1	3		
CO2	3	3	3	3	3	3		1		1	1	3		
CO3	3	3	3	3	3	3		1		1	1	3		
CO4	3	3	3	3	3	3		1		1	1	3		
CO5	3	3	3	3	3	3		1		1	1	3		

**Unit I 1G and 2G**

9

First Generation (1G): 1G Systems – General 1G System Architecture – Generic MTSSO Configuration – Generic Cell Site Configuration – Call Setup Scenarios – Handoff – Frequency Reuse – Spectrum Allocation – Channel Band Plan

Second generation (2G): Enhancements over 1G Systems – Integration with Existing 1G Systems – GSM - iDEN – CDPD

**Unit II 2.5G Generation**

9

Enhancements over 2G – Technology Platforms – General Packet Radio Service (GPRS) – Enhanced Data Rates for Global Evolution (EDGE) – High-Speed Circuit Switched Data (HSCSD) – CDMA2000 (1XRTT) – WAP-Migration Path from 2G to 2.5G to 3G..

05.07.2023

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**Unit III 3G Generation**

9

Introduction – Universal Mobile Telecommunications Service (UMTS), UMTS Basics, The UTRAN Architecture, Handover, UMTS Services – The UMTS Air Interface – Overview of the 3GPP Network Architecture – Overview CDMA2000 – Commonality Between WCDMA/CDMA2000/CDM

**Unit IV 4G and Beyond**

9

Introduction to LTE - Network architectures – EPC – E-UTRAN architecture – Mobility management – Resource management – Services – Channel – logical and transport channel mapping – downlink/uplink data transfer – MAC control element – PDU packet formats – scheduling services – random access procedure – Objectives of 5G-Architecture – Features and benefits.

**Unit V Wireless Security and Mobile Phone service**

9

Introduction – Fingerprint – Classification of major security attacks against RFID systems  
\* GSM Security – Barcode scanner technology features and applications – QR code – BAR code – OTP – AirDrop.  
Mobile phone Service: Parts in the mobile phones -Mobile phones assembling and disassembling –motherboard - Mobile Operating Systems - Fault finding - Advanced troubleshooting techniques.

**TOTAL : 45 HOURS**

**Text Book**

- 1) Clint Smith, P.E, Dannel Collins, “3G Wireless Networks” 2nd edition, Tata McGraw-Hill, 2008.
- 2) Vijay K.Garg, “Wireless Network Evolution- 2G & 3G” Pearson, 2013.

**References**

- 1) T.S Rapp port, “Wireless Communications” Principles and Practice, Second Edition, Pearson Education/ Prentice Hall of India, Third Indian Reprint, 2013.
- 2) JochenH.Schiller, “Mobile Communications”, 2/e, Pearson, 2014
- 3) SassanAhmadi, “LTE-Advanced – A practical systems approach to understanding the 3GPP LTE Releases 10 and 11 radio access technologies”, Elsevier, 2014

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**PREAMBLE  
TO  
RENEWABLE ENERGY SYSTEMS**

Energy is an important source of all technological developments as well as for all basic needs. The usage of renewable energy sources are the only way for sustainable development and future energy requirements. Renewable energy encourages the generation of electricity without any environmental impact and improves the economic growth of the country.

By choosing this elective the students will be able to know the importance of renewable energy sources for power generation. And also they could understand how the fossil fuels are made an impact on environmental issues. They will be familiar with the following

1. Concept of solar energy power production and solar photovoltaic cells and the application of solar PV system and Bio Mass power generation system.
2. Principle of conversion of wind energy in to electric energy
3. Working of geothermal and hydro power stations.
4. Principle of the conversion of tidal and wave energy in to electric energy.
5. The emerging technology of power generation.

After completion of this subject students will know how the energy can be produced locally. This knowledge would provide an opportunity to install small capacity power generation units independently for their needs.

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**COURSE OUTCOMES**

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

1. Describe the power demand scenario in world level and impact of various renewable energy sources in satisfying power demand.
2. Explain the principle of operation and the application of solar system.
3. Outline in the components and to find the suitability based on the performance of wind energy and Conversion system, biomass energy system
4. Describe the principle of operation and the application of geo thermal power tidal power generation scheme, wave energy and OTEC scheme.
5. Illustrate the emerging energy generation systems of MHD, Thermal and fuel cells applications.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2		2					2		2	3	3	3
CO2	3	3	3	2	1	3	3	1	2		3	3	3	3
CO3	3	3	3	2	2	3	3	1	2		3	3	3	3
CO4	3	3	3	2	2	3	3	1	2		3	3	3	3
CO5	3	3	3	2	2	3	3	1	2		3	3	3	3

**UNIT I INTRODUCTION**

9

World energy futures–Energy sources and their availability – Energy cycle of the earth – environmental aspects of energy utilization – Energy plantation- Renewable energy resources and their importance- Prospects of Renewable energy sources.

**UNIT II SOLAR ENERGY SYSTEMS**

9

Introduction –Solar radiation and measurements-Solar energy collectors-solar energy storage systems- Solar pond and applications- Applications of solar energy: solar pumping, solar cooking, solar distillation and solar greenhouse.

**UNIT III WIND AND BIOMASS ENERGY SYSTEMS**

9

Introduction – Wind Energy conversion- Wind speed and power relation – Power extracted from wind – wind distribution and wind speed predictions – types of Wind power systems.  
Bio mass conversion technologies-Biogas generation-Types of biogas plants-Bio gas from plant wastes- Utilization of Bio gas and applications.

**UNIT IV GEO THERMAL, TIDAL AND OCEAN ENERGY SYSTEMS**

9

Geothermal energy – Estimates of Geothermal power- site selection for geothermal power plant- Applications of Geothermal energy.  
Origin of tides – Basic principle of Tidal power- Operation of a Tidal power plant. Ocean Thermal Energy conversion system- Open and closed OTEC cycles- Prospects of ocean thermal energy conversion in India.

## UNIT V EMERGING ENERGY SYSTEMS

9

Magneto Hydro Dynamic (MHD) Power Generation- MHD systems and its operation. Thermo Electric power generation- Basic principle- Thermo electric power generator.

Thermonuclear fusion energy-Nuclear fusion and reactions- Advantages. Fuel cell- classification of fuel cells- Fuel cell based electrical power generation scheme- Applications.

**Lecture: 45; Tutorial: 0; Total: 45 Hours**

### TEXT BOOKS:

1. Rai, G.D., "Non-Conventional Energy Sources", Khanna Publishers, Sixth Edition 2017.
2. Khan, B.H, Non- Conventional Energy Resources", Mc. Graw Hill Education Ltd, third reprint 2017.

### REFERENCE BOOK

1. Rao S. Paruklekar,B.B, "Energy Technology – Non Conventional, Renewable and Conventional", KhannaPublishers,1994.
2. F.Kreith and J.F.Kreider, "Principles of Solar Engineering", McGraw Hill.
3. T.N.Veziroglu, "Alternative Energy Sources", Vol 5 and 6, McGraw Hill.
4. Mukund R.Patel, "Wind and Solar Power Systems", CRC Press LLC.

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**PREAMBLE**  
**TO**  
**Innovation, IPR and Entrepreneurship Development**

The open elective course syllabus has been framed by Entrepreneurship Development Cell of Sona College of Technology on above mentioned title for even semester. The course covers a wide range of topics from Innovation, Intellectual Property Right and entrepreneurial Competitiveness and competency, basic requirements of setting of an enterprise/startups, factors influencing entrepreneurship, Barriers to Entrepreneurship & Concepts, Issues of Entrepreneurship Failure, Idea selection, Innovation & creativity, design thinking.

The course also covers identifying and selecting a good business opportunity, market survey & research, techno-economic feasibility assessment and preparation of preliminary project reports, management of working capital, costing, break even analysis, taxation, income tax, GST, provision of incentives, subsidies & concessions, entrepreneurship finance and angels & ventures capital fund etc. Benefit out of Government policies to small scale industries and business incubators.

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**COURSE OUTCOMES**

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

- Acquire the knowledge for establishment of an enterprise and management,
- Derive the innovative ideas, right approach to the problem and arrive solution for problem with IPR and its legal aspects.
- Prepare the project report preparation and assessment of Business.
- Acquire the knowledge on costing, Techno-economic aspects, find out the sources of finance and opportunities in business.
- Identify the support system for Entrepreneurs by Government and venture capitals.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1			3			3	3		3	3	3	3		3
CO2			3			3	3	3	3	3	3	3		3
CO3			3			3	3	3	3	3	3	3		3
CO4			3			3	3	3	3	3	3	3		3
CO5			3			3	3	3	3	3	3	3		3

**UNIT I ENTREPRENEURSHIP & MOTIVATION 9**

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth. Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.

**UNIT II INNOVATION, CREATIVITY, DEVELOPMENT PROCESS AND LEGAL ASPECTS 9**

Innovation and Creativity- An Introduction, Innovation in Current Environment, Types of Innovation Sources of new Ideas, Methods of generating innovative ideas, creating problem solving, product planning and development process. Legal aspects of business (IPR, Labor law).

**UNIT III BUSINESS 9**

Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

**UNIT IV FINANCING AND ACCOUNTING 9**

Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, GST.

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Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures - Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

**Lecture: 45; Tutorial: 0; Total: 45 Hrs**

**TEXT BOOKS:**

1. Khanka. S.S., “Entrepreneurial Development” S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013. 99
2. Donald F Kuratko, “Entrepreneurship – Theory, Process and Practice”, 9 th Edition, Cengage Learning, 2014.

**REFERENCES:**

1. Hisrich R D, Peters M P, “Entrepreneurship” 8th Edition, Tata McGraw-Hill, 2013.
2. Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2 nd Edition Dream tech, 2005.
3. Rajeev Roy, "Entrepreneurship" 2 nd Edition, Oxford University Press, 2011.
4. EDII “Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development”, Institute of India, Ahmadabad, 1986.
5. Innovation and Entrepreneurship Book by Peter Drucker,
6. James Larminie and John Lowry, “Electric Vehicle Technology Explained “ John Wiley & Sons, 2003.

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**PREAMBLE  
TO  
ENERGY CONSERVATION AND MANAGEMENT**

Energy is one of the most important resources to sustain our lives. At present we still depend a lot on fossil fuels and other kinds of non-renewable energy. The extensive use of renewable energy including solar energy needs more time for technology development. In this situation Energy Conservation (EC) is the critical needs in any countries in the world.

Energy saving is important and effective at all levels of human organizations – in the whole world, as a nation, as companies or individuals. Energy Conservation reduces the energy costs and improves the profitability.

Energy costs are often treated as a fixed overhead by organisations. But, by taking the right approach to energy management it is possible to make considerable savings. Successful energy management must combine an effective strategy with the right practical interventions. Many organisations would like to save energy, but they need to make energy management an integral part of running the organisation to ensure success. Energy Management is very important for the management of factories/companies, and Energy Conservation is one of its major topics.

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**COURSE OUTCOMES**

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

1. Assess role of energy in global economic development.
2. Explain methodology of energy audit and concept of instruments used.
3. Discuss various lamps and design energy efficient illumination schemes.
4. Apply energy conservation concepts in buildings.
5. Identify the energy conserving opportunities in utilities.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	3		2			2	3	3	3	2
CO2	2	2	3	3	3				2			3	3	2
CO3	2	2	3	3	3	3			3		2	3	3	2
CO4	2	2	3	3	3	2		3				3	3	2
CO5	2	2	3	3	3		3			3		3	3	2

**UNIT- I ENERGY SCENARIO AND BASICS**

9

Classification of Energy – Purchasing Power Parity – Energy Security – Strategy to meet future energy requirements – Objectives and features for electricity act 2003 – Energy efficiency standards and labeling – Study of Global and Indian primary energy reserves – Study of energy scenario for India – Energy and environment – Global environmental issues – Types of Energy – Electrical and Thermal energy basics – Energy units and conversions.

**UNIT- II ENERGY MANAGEMENT AND AUDIT**

9

Definition and objectives of energy management and audit – Need for energy audit – Types of energy audit – Methodology for conducting detailed energy audit – ENCON opportunities and measures – Energy audit report. Energy costs – Benchmarking – Energy performance – Fuel and Energy substitution – Instruments and metering for energy audit – Basic principles, components of material and energy balance – Sankey diagram – Financial analysis terms – Payback period, ROI, NPV, IRR.

**UNIT- III LIGHTING SYSTEMS**

9

Introduction – Terms in Lighting and Illumination – Light sources - Lamp types – Arc Lamps, Vapour lamps – Incandescent lamp, Fluorescent lamp – Energy saving lamps – CFL, LED – Lighting design for interiors – Indoor and outdoor lighting schemes – Energy saving opportunities – Energy efficient lighting controls.

**UNIT- IV ENERGY CONSERVATION IN BUILDINGS**

9

Energy conservation building code (ECBC) – Compliance approaches – ECBC guidelines on Building envelope, HVAC system, Service hot water, Water pumps – Energy consumption in Escalators and Elevators – Building Energy Management Systems – Star ratings – Energy Efficiency Measures in AC and Lighting system.

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## UNIT- V ENERGY EFFICIENT OPPORTUNITIES IN UTILITIES

9

Introduction to Compressed air system components – Heat transfer loops in refrigeration systems – Standards and labelling of room air conditioners – Introduction to Fans, Blowers and Compressors – Types of pumps, Pump curves – Efficient operation of pumps – Components of cooling towers and its efficient operation - Introduction to DG set system.

Energy Efficiency and energy savings in Compressed Air System, HVAC system, Fans and Blowers, Pumping system, Cooling towers, and DG sets.

**Lecture: 45; Tutorial: 00; Total: 45**

### TEXT BOOKS:

1. "General Aspects of Energy Management and Energy Audit", Bureau of Energy Efficiency, Fourth Edition, 2015.
2. "Energy Efficiency in Electrical Utilities", Bureau of Energy Efficiency, Fourth Edition, 2015.

### REFERENCE BOOKS:

1. Chakrabarti A, "Energy Engineering and Management", PHI, 2011.
2. Murphy W R, McKay G, "Energy management", Elsevier, 2009.
3. Rajput R K, "Utilization of Electrical Power", Lakshmi Publications, 2006.

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O.E

M.E.T  
VII


## Department of Mechatronics Engineering

## Open Elective

U19MC1004		FUNDAMENTALS OF ROBOTICS										L	T	P	C
												3	0	0	3
<b>Course Outcomes</b>															
After successful completion of this course, the students should be able to															
CO1:	Understand the basic robotic concepts														
CO2:	Select the suitable drive system for robot application														
CO3:	Select the suitable sensors and grippers for the respective application														
CO4:	Develop VAL Programming for simple applications														
CO5:	Illustrate the robotic application in various sectors														
<b>Pre-requisite</b>															
NIL															
<b>CO/PO, PSO Mapping</b> (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	3		2			3	2		3		3	3	3	3	
CO2	2	2	2		3				3		2	3	2	3	
CO3	3	2	2		3				3		2	3	3	3	
CO4	3	3	3	3	3				3		2	3	3	2	
CO5	3	3	3	3	3	3	3		3			2	3	3	
<b>Course Assessment methods</b>															
<b>Direct</b>										<b>Indirect</b>					
Internal test I (8) Internal test II (8) Internal test III (8) Assignment/seminar/Quiz (5)					Online test (6) Attendance (5) End semester Examination (60)					Course end survey					
<b>Unit 01: INTRODUCTION TO ROBOTICS</b>													<b>9 Hours</b>		
Introduction to Robotics – History of Robotics – Laws of Robotics - Anatomy of a Robot – Classification of Robots – Robot Configurations - Robot subsystems: Motion subsystem, Recognition subsystem, Control subsystem – Robot Links – Joints in robot –Robot Specifications.															



<b>Unit 02: ROBOT MOTIONS AND DRIVE SYSTEMS</b>			<b>9 Hours</b>
Degrees of freedom – DOF associated with arm and body - DOF associated with wrist –Joint Notation scheme- Robot Kinematics – Robot Drive systems – Hydraulic Actuators – Pneumatic actuators – Electrical actuators: Stepper motors, DC motors, Servomotor.			
<b>Unit 03: ROBOT SENSORS AND END EFFECTORS</b>			<b>9 Hours</b>
Classification of Robotic sensors and their functions – Tactile sensors – Inductive Proximity sensor – Hall effect sensor – Range sensor –Force ant Torque sensors- Types of end effectors – Mechanical grippers – Vacuum cups – Magnetic grippers – Adhesive grippers – Tools as end effectors.			
<b>Unit 04: ROBOT PROGRAMMING</b>			<b>9 Hours</b>
Methods of Robot Programming: Lead through methods, Textual robot Languages – Robot language structure – First generation Languages – Second generation Languages – VAL Programming – Simple Programming examples.			
<b>Unit 05: ROBOT APPLICATIONS</b>			<b>9 Hours</b>
Robotics Applications in Manufacturing: Welding Robot, AGVs– Healthcare: Surgery Robot, Therapeutic Robot – Agriculture: Crop Harvesting & Fruit Picking Robot – Defence & Space: Exoskeleton Robot, Telerobotics.			
<b>Theory: 45 Hrs</b>	<b>Tutorial: --</b>	<b>Practical: --</b>	<b>Total Hours: 45 Hrs</b>
<b>TEXT BOOKS</b>			
1.	M.P.Groover, M.Weiss,R.N. Nagal,N.G.Odrey, "Industrial Robotics - Technology, programming and Applications" Tata McGraw-Hill Publication, 2012.		
<b>REFERENCES</b>			
1.	Richard D.Klafter, "Robotics Engineering" PHI Learning Private Limited, 2009.		
2.	Ganesh S.Hedge, "A text book in Industrial Robotics", Laxmi Publications, 2006.		
3.	S K Saha, "Introduction to Robotics", Tata McGraw-Hill Publication, 2012.		
4.	Sathya Ranjan Deb, "Robotics Technology & flexible Automation" Second edition, Tata McGraw-Hill Publication, 2009.		

  
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**COURSE CODE U19ME1002**

L T P C

**COURSE NAME INDUSTRIAL SAFETY**

3 - - 3

**Course Outcomes**

Upon completion of this course the students will be able to

- CO1** Summarize various legal provisions available in safety regulation.
- CO2** Analyze industrial environment hygiene and develop precautionary measure to avert occupational diseases.
- CO3** Demonstrate the uses of different grades of fire protection systems related with different classes of fire.
- CO4** Develop Agronomical study of different work environment in industries.
- CO5** Discuss the importance of safety training and its impact on shop floor of factories.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO - 1	3	-	-	-	1	3	3	3	2	2	3	3	2	2
CO - 2	3	2	2	1	3	3	3	3	2	2	-	2	2	3
CO - 3	2	3	2	3	3	3	3	3	3	3	3	2	2	3
CO - 4	2	1	3	3	3	3	2	3	1	2	-	2	3	3
CO - 5	1	3	3	3	-	3	-	3	3	3	2	3	2	2

**Unit I BASICS OF SAFETY ENGINEERING & ACTS**

L 9 T 0

Evolution of modern safety concept –safety performance monitoring. Acts – factories act – 1948 – Statutory authorities – inspecting staff – Tamilnadu Factories Rules 1950 under Safety and health – environment act – 1986 – Air act 1981, water act 1974 – other acts. Safety in industries – General safety concepts, machine guarding, hazards in metal removing process, welding process, cold and hot working process.

**Unit II OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE**

L 9 T 0

(Basic concepts, related hazards and exposure limits)

Physical Hazards – Noise, heat, radiation, vibration, recognition of chemical hazards-dust, fumes, mist, vapour, fog, gases. Biological and Ergonomical Hazards-Basic concepts. Occupational Health-Concept and spectrum of health – functional units and activities of occupational health services, pre-employment and post-employment medical examinations – occupational related diseases, levels of prevention of diseases, notifiable occupational diseases. Hazard assessment, procedure, methodology; safety audit, checklist analysis, what-if analysis, safety review, Preliminary Hazard Analysis (PHA), human error analysis, hazard operability studies (HAZOP), safety warning systems.



**Unit III FIRE ENGINEERING AND EXPLOSIVE CONTROL**

L 9 T 0

Fire properties of solid, liquid and gases – fire triangle – principles of fire extinguishing – active and passive fire protection systems – various classes of fires – A, B, C, D, E – types of fire extinguishers – Principles of explosion – Explosion Protection – Electrical Safety. Electrical Hazards – Primary and Secondary hazards – concept of earthing – protection systems – fuses, circuit breakers and over load relays – first aid cardiopulmonary resuscitation techniques.

**Unit IV ERGONOMICS**

L 9 T 0

Introduction to ergonomics: The focus of ergonomics, ergonomics and its areas of application in the work system, modern ergonomics, and future directions for ergonomics. Anatomy, Posture and Body Mechanics: anatomy of the spine and pelvis related to posture, posture stability and posture adaptation, low back pain, risk factors for musculoskeletal disorders in the workplace, effectiveness and cost effectiveness. Anthropometry and its uses in ergonomics, Applications of human factors engineering, man as a sensor, man as information processor, man as controller – Ergonomics in IT industries.

**Unit V SAFETY EDUCATION AND TRAINING**

L 9 T 0


Importance of training – identification of training needs – training methods – programs, seminars, conferences, competitions – motivation – communication – role of government agencies and private consulting agencies in safety training – creating awareness, awards, celebrations, safety posters, safety displays, safety pledge, safety incentive scheme, safety campaign – Domestic Safety Training.

**Total Number of hours: 45****Learning Resources****Text Books**

1. Krishnan N.V., "Safety Management in Industry", Jaico Publishing House, Bombay, 1997.
2. Hand book of "Occupational Safety and Health", National Safety Council, Chicago, 1982.

**Reference Books**

1. Derek, James, "Fire Prevention Hand Book", Butter Worths and Company, London, 1986.
2. Guidelines for Hazard Evaluation Procedures Centre for Chemical Process Safety, AICHE 1992.
3. The factories Act 1948, Madras Book Agency, Chennai, 2000.
4. Introduction to Ergonomics, R.S. Bridger, Taylor & Francis.



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**COURSE OUTCOMES:**

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

- Identify the core values that shape the ethical behavior of an engineer.
- Analyze and practice engineering ethics in their profession.
- Apply codes of ethics in the context of social experimentation.
- Explore various safety issues and ethical responsibilities of an engineer.
- Adopt ethical practices pertaining to global issues.

CO / PO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	1	1	2	3	3	3	2	2	3
CO2	2	1	1	1	2	2	3	3	3	3	3	3
CO3	2	1	3	1	2	3	3	3	3	3	3	3
CO4	2	1	3	1	1	3	3	3	3	2	3	3
CO5	2	1	3	1	1	3	3	3	3	3	3	3

**UNIT-I HUMAN VALUES**

9

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – Caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Introduction to Yoga and meditation for professional excellence and stress management.

**UNIT -II ENGINEERING ETHICS**

9

Senses of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Profession and Professionalism – Professional Ideals and Virtues –Theories of Right action- Self Interest- Customs and Religion-Uses of Ethical Theories.

**UNIT-III ENGINEERING AS SOCIAL EXPERIMENTATION**

9

Engineering as Experimentation – Contrasts with standard experiments- Engineers as Responsible Experimenters – Importance and limitations of Codes of Ethics - Industrial Standards - A Balanced Outlook on Law – Industrial Standards- Case Study: Space shuttle challenger disaster.

**UNIT-IV SAFETY, RESPONSIBILITIES AND RIGHTS**

9

Safety and Risk – Types of risk - Assessment of Safety and Risk – Risk Benefit analysis-Reducing Risk – Case Studies - Chernobyl and Bhopal plant disaster.

Collegiality and Loyalty –Respect for Authority- Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Importance and consequences of whistle blowing - Professional Rights – Employee Rights – Intellectual Property Rights (IPR) and its components– Discrimination.

**UNIT-V GLOBAL ISSUES**

9

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

**Lecture: 45, Tutorial: 0, TOTAL: 45 Hours**



## **TEXT BOOKS**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, Indian Edition, Tenth reprint, 2017.
2. Professional Ethics and Human values- Sonaversity, Edition 2018.

## **REFERENCES**

1. Charles D Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 2012.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2016.
3. Charles E Harris, Michael S Pritchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Cengage Learning, 2009.
4. R.Subramanian, "Professional Ethics ",Oxford University Press , Second Edition, 2017.

*Neeraj Kumar*  
5/7/2022

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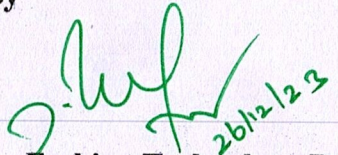
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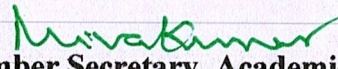
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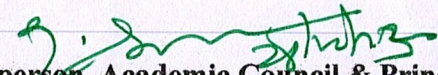
S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
<b>Practical</b>							
1	U19FT801	Project Work	0	0	24	12	360
<b>Total Credits</b>						<b>12</b>	

26/12/23

Approved By

  
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Dr.D.Raja

  
Member Secretary, Academic Council  
Dr.R.Shivakumar

  
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Dr.S.R.R.Senthil Kumar

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