

**SEMESTER I****20FD11 APPLIED GEOMETRY****3 2 0 4**

**GEOMETRICAL CONSTRUCTION:** Polygons, circumscription and inscription of polygons. Circle- segment, sector, chord. Conic sections - ellipse, parabola, hyperbola-eccentricity, locus, oblong, thread, tangent, offset methods. (10)

**CURVES:** Special curves, cycloidal curves- cycloid, epicycloids, hypocycloid-tangent, normal- involutes. (6)

**PROJECTION OF OBJECTS:** Projection of lines, projection of planes, projection of solids - prism, pyramid, truncated solids – solids of revolution. Principles of isometric projection – isometric scale –isometric projections of simple solids and truncated solids – prisms, pyramids, cylinders, cones. (10)

**INTERACTIVE GRAPHICS:** Parametric modeling and geometry - transformations – display – points, lines using software. (9)

**COMMERCIAL ARITHMETIC:** Percentage – ratio and proportion – simple interest – compound interest – annuities – discount– banker's discount – true discount. Supply and demand curves – elasticities – relation between average and marginal costs – relationship between average and marginal revenues. (10)

**TUTORIAL PRACTICE:**

1. Geometrical construction.
2. Scaling (proportion and ratio).
3. Conic sections (methods-concentric circle, oblong, pin and string, tangent and offset).
4. Special curves (cycloidal, epicycloidal, hypocycloidal and involutes).
5. Projection of lines and objects (2D and 3D)
6. Projection of solids(polyhedra, prism, pyramid )
7. Transformation(isometric projection)
8. Development of surfaces (parallel line method, radial line method, triangulation method and approximate method)

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. George B. Thomas, Ross L. Finney, "Calculus and Analytic Geometry", Pearson Education, 2010.
2. Venugopal K and Prabhu Raja V, "Engineering Graphics", New Age International Publishers, New Delhi, 2016.

**REFERENCES:**

1. John K C, "Engineering Graphics for Degree", PHI Learning Private Limited, New Delhi, 2009.
2. Wade Hands D, "Introductory Mathematical Economics", Oxford University Press, 2004.
3. David Solomon, "Computer Graphics and Geometric Modeling", Springer, 2013.
4. Michael E. Mortensen, "Geometric Modeling (Digitized)", Industrial Press, 2011.

**20FD12 APPLIED SCIENCES****4 0 0 4**

**POLYMERIC ASPECTS OF NATURAL TEXTILES:** Cellulose – cotton, jute, linen, ramie; Protein – wool, silk; Polymerization – types. Requirements of the polymer - polymer suitability - reactive sites. Influence of these in the fiber formation and fiber properties. Fiber behaviour - viscoelastic deformation - Maxwell model Voigt-Kelvin method to increase creep resistance. Fracture -fatigue - method to increase fatigue resistance. (12)

**POLYMERIC ASPECTS OF SYNTHETIC TEXTILES:** Selection of monomers – functionality, polymerization, types – polymers – synthetic - polyester, nylon, acrylic, polypropylene and lycra. Regenerated cellulosic fibers - viscose, modal, lyocell. Polymers development into fiber – reactive sites, linkages. Properties - elastic deformation, tensile properties, plastic deformation, plasticity. Ductility, dislocation and strengthening mechanisms. (12)

**CHEMICALS REQUIREMENTS FOR BASIC TREATMENTS:** Acids, alkalies, salts, oxidizing agents, reducing agents, surfactants, soaps/detergents, resins and enzymes. Fiber behaviour with solution – viscosity, coefficient of viscosity. Poiseuille's equation for quantity of liquid flowing. Determination of coefficient of viscosity by Poiseuille's method and Ostwald viscometer method. Variation of viscosity with temperature. Surface energy and surface tension, angle of contact. (12)

**CHEMICALS REQUIREMENTS FOR MAIN TREATMENTS:** Reduction and oxidation type of bleaching agents. Calcium/sodium hypochlorites and hydrogen peroxide – principle and mechanism. Theory of colour and constitution– chromophore and auxochrome – relevant for the different dyes. Heat process during treatments - conduction of heat - coefficient of thermal conductivity, flow of heat through a compound media, flow of heat through a cylindrical tube, experimental determination of thermal conductivity of a material in the form of a cylinder. Determination of thermal conductivity by Lee's disc method. (12)

**WATER AND EFFLUENTS IN TEXTILE PROCESSING INDUSTRIES:** Water - types of water, hardness, determination of hardness, softening of water required for textile wet processing units – boiler feed water. Behaviour of water - capillarity - expression for surface tension by capillary rise, experimental determination of surface tension by capillary rise method, variation of surface tension with temperature. Pollution - types of pollution and sources - classification of water pollutants - COD, BOD and dissolved salts. Waste water (effluent) treatment in textile processing industries. (12)

**Total L: 60**

**TEXT BOOKS:**

1. Robert R Mather and Roger H Wardman, "The Chemistry of Textile Fibers", Royal Society of Chemistry, Cambridge, UK, 2015.
2. Gaur R K and Gupta S L, "Engineering Physics", Dhanpat Rai and Sons, New Delhi, 2002.

**REFERENCES:**

1. Gowariker V R, Viswanathan N V and Jayadev Sreedhar, "Polymer Science", New Age International Publishers, New Delhi, 2015.
2. Jayakumar S, "Materials science", R K Publishers, Coimbatore, 2007.
3. Jain and Jain, "Engineering Chemistry", Dhanpat Rai and Sons, 1995.
4. Shenai V A, "Technology of Textile Processing- Vol.II – Chemistry of Dyes & Principles of Dyeing", Sevak Publications, 1995.

## 20FD13 TEXTILE SCIENCE

**3 0 0 3**

**TEXTILE FIBERS:** Introduction to fiber, classification. Fiber identification – microscopic, solubility, burning test, appearance and handle. Natural fibers - vegetable fibers- origin, production, properties and uses. (10)

**ANIMAL FIBERS:** Silk- origin, types, production, properties and uses; Wool- production, properties and uses. (10)

**MAN MADE FIBERS:** Regenerated and synthetic fibers - fiber spinning - types, manufacturing, properties and uses of viscose rayon, polyester, polypropylene, acrylic and nylon. Fiber blending - reasons, process, requirements, functions and application. (10)

**NEW GENERATION AND HIGH PERFORMANCE FIBERS:** New generation fibers - origin, production, properties and uses of bamboo, banana, pineapple, corn, milk, modal and spider silk, poly lactic acid, chitosan and collagen fiber. (7)

**HIGH PERFORMANCE AND FUNCTIONAL FIBERS:** Properties and uses - micro, hollow, elastomeric, nano, kevlar, nomex, melamine, ceramic, milk weed and lotus fiber. (8)

**Total L: 45**

**TEXT BOOKS:**

1. Corbmann B P, "Textiles: Fiber to fabric", McGraw Hill Inc., Singapore, 2002.
2. Mishra S P, "Text book of Fiber Science and Technology", Newnes HV Butterworths & Co Publishers Ltd., 2000.

**REFERENCES:**

1. Houck M M, "Identification of Textile Fibers", CRC press publishers Ltd., 2000, Boca Raton, 2009.
2. Eberle H, "Clothing Technology from Fiber to Fashion", Beuth-Verlag GmbH & Co., Berlin, 2007.
3. Morton W E and Hearle J W S, "Physical properties of textile fibers", Wood Head Publishing Limited, Cambridge, 2008.

## 20FD14 ELEMENTS AND PRINCIPLES OF DESIGN

**3 2 0 4**

**DESIGN:** Definition, concepts - design as process and product. (5)

**ELEMENTS:** Space, line, shape, form, texture and colour. (10)

**PRINCIPLES:** Balance, harmony, rhythm, emphasis and proportion. (10)

**COLOUR:** Dimensions – hue, value and intensity, colour theory – light theory - Newton's theory and pigment theory - Prang and Munsell, psychological theory – Ostwald theory; Pantone, colour schemes. (10)

**FABRIC AND GARMENT DESIGN:** Fabric design - natural, conventional, geometric, abstract, historic; Garment design - structural, decorative and functional. (10)

**TUTORIAL PRACTICE:**

1. Collect ten images and observe the following elements, analyze and describe the physical and psychological effects created by the elements:
  - a. Space
  - b. Line
  - c. Shape and form
  - d. Texture
2. Prepare colour scheme - Prang colour chart.
3. Prepare colour cards and explain the colour properties - hue, value, intensity.
4. Prepare the following colour scheme:
  - a. Monochromatic
  - b. Analogous
  - c. Direct complementary
  - d. Double complementary
  - e. Split complementary
  - f. Triad
5. Collect ten images and observe the following principles, analyze and describe the physical and psychological effects created by the principles:
  - a. Balance
  - b. Harmony
  - c. Emphasis
  - d. Proportion
  - e. Rhythm
6. Select a source of inspiration, sketch it, and make a stylized, abstract and geometric version of the same.

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Suzanne Marshall, Hazd Jackson and Sue Stanley M, "Individuality in dress design", Pearson Publications, UK, 2011.
2. Caroline Tatham and Julian Seaman, "Fashion designing and drawing course", Thames and Hudson Publishers, UK, 2003.

**REFERENCES:**

1. Gerald F Brommer, "Illustrated Elements of Art and Principles of Design", Crystal Production, England, 2011.
2. Poppy Evans, "Exploring the Elements of Design", Cengage learning, USA, 2013.
3. Marian L Davis, "Visual Design and Dress", Prentice Hall, New Jersey, 1996.

**20FD15 ENGLISH FOR PROFESSIONAL SKILLS****3 0 0 3**

**COMMUNICATION SKILLS USING SCIENTIFIC TEXTS:** Comprehension and critical evaluation of scientific essays – focus on language style, word formation, use of prefixes and suffixes, synonyms, antonyms, abbreviations and acronyms and technical vocabulary. (6)

**FOCUS ON GRAMMAR:** Identifying common errors in articles and prepositions, common errors- misplaced modifiers - tenses- redundancies and clichés - practice exercises in common errors. (6)

**READING:** Reading and importance - techniques of effective reading - improving comprehension skills- techniques for good comprehension- skimming and scanning - comprehension- intensive and extensive reading- practice in reading comprehension. (4)

**WRITING:** Formal letters- letter of complaint, requisition letter- job application and resume- report writing- types of reports- business and technical reports. (6)

**FOCUS ON SOFT SKILLS:** Intra and interpersonal communication- interview techniques – etiquette - body language - telephone conversation. (8)

**PRACTICALS:** Presentations- group discussions- listening exercises- mock interviews. (15)

**Total L: 45****TEXT BOOK:**

1. N.P.Sudharshana, C. Savitha "English for Engineers", Cambridge University Press, 2018.

**REFERENCES:**

1. Dhanavel S P, "English and Soft Skills", Orient BlackSwan, Hyderabad, 2010.
2. Lina Muhkopadhyay, et al., "English for Jobseekers", Cambridge University Press, New Delhi, 2013.

**20FD16 SURFACE EMBELLISHMENT LABORATORY I****0 0 4 2**

Preparation of samples and end products by applying the following embellishment techniques:

1. Basic hand stitches – Temporary and Permanent.
2. Hand embroidery – Linear, Filling, Pattern, Textural, Threaded stitches.
3. Traditional embroidery – Kantha, Kasuti, Chikankari, Phulkari, Kutch.
4. Metal embroidery – Bead work, Sequins work, Zardosi work, Shisha embroidery.
5. Ribbon Embroidery.
6. Aari embroidery – Basic stitches.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by Department of Apparel and Fashion Design.

**20FD17 FASHION ILLUSTRATION LABORATORY I****0 0 4 2**

1. Study on various illustrations techniques.
2. Illustrating the object's shape and form using shading technique by understanding the light source, its direction and fall on the object.
3. Illustrating lines, shapes, space, form and colour applying the concept of illusion.
4. Illustrating basic apparel silhouettes.
5. Illustrating various garment components.
6. Illustrating fashion accessories.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD18 MATERIAL EXPLORATION LABORATORY****0 0 4 2**

1. Exploring visual, structural, aesthetic properties and preparing swatch cards for the following:
  - a. Paper
  - b. Natural Materials
  - c. Soft Materials
  - d. Hard Materials
  - e. Fabrics
  - f. Colouring mediums and brushes
2. Designing products based on a theme using materials from the above categories.
3. Developing products based on the designs developed.
4. Analyzing the effectiveness and feasibility of the material used for product development.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**SEMESTER II****20FD21 TEXTILE MANUFACTURING****3 0 0 3**

**YARN MANUFACTURING:** Objectives, process sequence and machinery - ginning, blow room, carding, combing, drawing, roving and ring spinning. (11)

**SPINNING:** Spinning- types, process, applications and comparison of yarn properties; Specialty yarns- types, process, applications and comparison of yarn properties; Yarn numbering systems - direct and indirect. Post spinning process. Yarn quality requirements in weaving and knitting. (11)

**WEAVING:** Preparatory process; Weaving – types, process and application; Loom- types, process and applications. (11)

**KNITTING AND NONWOVENS:** Needle types, stitches and loop formation; Weft knitting machines – types, process and applications; Jacquard knitting - process and applications; Warp knitting machines - types, process and applications, comparison of woven and knitted fabric properties. Nonwoven- raw material, types, process and applications. (12)

**Total L: 45****TEXT BOOKS:**

1. Anbumani N, "Knitting: Fundamentals, Machines, Structures and Developments", New Age International Publishers, New Delhi, 2007.
2. Eberle H, "Clothing Technology from Fiber to Fashion", Beuth-Verlag GmbH, Publishers., Berlin 2007.

**REFERENCES:**

1. Klien W G, "The Technology of Short Staple Spinning", The Textile Institute, Manchester, 1998.
2. Spencer D J, "Knitting Technology", Pergamon press, Oxford, 2001.

**20FD22 FABRIC STRUCTURE****3 2 0 4**

**WOVEN STRUCTURES:** Classification, elements of woven design, types of drafts. Elementary weaves - construct and represent the elementary weaves – plain and its derivatives, twill and its derivatives, satin and sateen, honey comb, huck-a-back. (14)

**STRIPE AND CHECK WEAVE COMBINATION:** Elements of colour, simple colour and weave effects, construction of line effects, hound's tooth pattern, bird's eye and spot effects, hairline effects, step pattern, idea of compound colour and weave effects. (7)

**SPECIAL WOVEN FABRIC:** Crepe, leno, pile fabric, bed ford cord, welt and pique, double cloth, extra thread - warp figuring, weft figuring. 3D woven structure. (12)

**WARP AND WEFT KNITTED STRUCTURES:** Weft knitted structures- types of stitches. Single jersey - types, properties and its applications. Double jersey - types, properties and its applications. Interlock - types, properties and its applications. Purl and jacquard – properties and applications. Warp knitted structures - basic stitches; Tricot structures- types, properties and applications; Raschel structures - properties and applications. (12)

**TUTORIAL PRACTICE:**

1. To analyze the following particulars of woven fabrics:
  - Woven structural analysis : Design, draft and peg plan
  - Warp particulars : Warp thread density, yarn count, crimp percentage, cover factor
  - Weft particulars : Weft thread density, yarn count, crimp percentage, cover factor
  - Fabric Particulars : Total cover factor, weight of the fabric and thickness
    - a. Plain weave
    - b. Twill weave
    - c. Satin/ Sateen weave
    - d. Honey comb fabric
    - e. Extra thread figuring fabric
2. To analyze the following particulars of knitted fabrics:
  - Knitted structural analysis : Symbolic representations, thread diagram
  - Fabric Particulars : Course per unit length, wales per unit length, stitch density, yarn count, loop length, tightness factor, GSM
    - a. Single jersey

- b. Rib
- c. Interlock

**Total L: 45 + T: 30 = 75**

**TEXT BOOKS:**

1. Gokerneshan N, "Fabric Structure and Design", New age international publication, New Delhi, 2004.
2. Ajoankar D B, "Principles of Knitting", Universal Publishing Corporation, Mumbai, 2006.

**REFERENCES:**

1. Grosicki Z J, "Watson's Textile Design and Colour", Newness-Butterworth and Co., London, 2005.
2. Hu J, "Structure and Mechanics of Woven Fabric", Woodhead Publishing, Cambridge, 2004.

## 20FD23 INDIAN ART AND CRAFT

**3 0 0 3**

**EARLY INDIAN ART:** Art in the prehistoric period; Indus valley civilization; Vedic period; Mauryan period and Gupta period. (12)

**MEDIEVAL INDIAN ART:** Art in the medieval era; Indo-Islamic art; Rajasthani and Pahari art; Colonial art and art in the modern era. (11)

**CRAFT CATEGORIES:** Wood and stone craft; Paint and metal work; Pottery and miscellany of crafts. (10)

**TEXTILE CRAFTS:** Textile related crafts – embroidered textiles, resist-dyed textiles, printed textiles and hand woven textiles of India. (12)

**Total L: 45**

**TEXT BOOKS:**

1. Nicholas Barnard, "Arts and Crafts of India", Conran Octopus Ltd., London, 1993.
2. Partha Mitter, "Indian Art", Oxford University Press, Oxford, 1<sup>st</sup> edition, 2001.

**REFERENCES:**

1. Jaya Jaitly, "Crafts Atlas of India", Niyogi Books, New Delhi, 2012.
2. Sandhya Ketkar, "The History of Indian Art", Jyotsna Prakasan, Pune, 1<sup>st</sup> edition, 2016.
3. Ilay Cooper and John Gillow, "Arts and Crafts of India", Thames and Hudson, London, 1996.
4. Aditi Ranjan and M.P.Ranjan, "Handmade in India", Abbeville Press Publishers, New York, 2009.

## 20FD24 FASHION BUSINESS

**3 0 0 3**

**NATURE OF FASHION BUSINESS:** Fashion industry – evolution, scope, importance and principle of fashion, fashion terminologies, fashion capitals and streets. (10)

**BUSINESS OF FASHION:** Movement of fashion, nature and organization in fashion industry, levels of fashion industry, business growth and expansion, careers in retail, auxiliary enterprise, fashion designers – types, role, national and international designers, manufacturer's role-type of manufacturers, the retailer's role- types of retailers. Digital marketing- E-commerce, social media, E-mail marketing. (12)

**WOMEN'S CLOTHING:** History of women's apparel industry- growth and acceptance of ready to wear, growth of fashion district, unionization, categories in women's apparel-active wear, formal wear, bridal wear, maternity wear, knitwear market.(10)

**MEN'S CLOTHING:** History of men's apparel industry- birth of ready to wear, role of industrial revolution, acceptance of ready to wear, growth of fashion district, categories in men's apparel- tailored clothing, furnishing, outer wear, active wear and sportswear. Knitwear market. (8)

**CHILDREN'S CLOTHING:** History of children's apparel industry, style categories, knitwear market. Accessories market- foot wear, handbags, belts, gloves, hats, neck, eyewear and pet accessories. (5)

**Total L: 45**

**TEXT BOOKS:**

1. Elaine stone, "The Dynamics of Fashion", Fair Child Publication Inc, 2004.
2. Jay diamond, Ellen Diamond, "Fashion Apparel, Accessories and Home furnishings", Pearson Prentice Hall, 2007.

**REFERENCES:**

1. Marshall, Jackson, Stanley, Kefgen, Touchie-specht, "Individuality in Clothing Selection and Personal Appearance", Pearson Prentice Hall, 2004.
2. Jeannette A Jarnow, Miriam Guerreiro, Beatrice Judelle, "Inside the Fashion Business" Macmillan Publishing Company, 1987.

## 20FD25 PATTERN MAKING I

**3 2 0 4**

**PATTERN MAKING TERMS:** Body Measurements – importance and sequence of taking body measurements. Definition - Grading, trueing, blending and marker planning; Types of pattern, pattern making tools, techniques, drafting basic blocks and pattern details. (9)

**FLAT PATTERN TECHNIQUES:** Dart manipulation methods–pivot, slash and spread and measurement method. (9)

**STYLE OF GARMENT COMPONENTS:** Sleeves, collar, yoke, plackets, cuff, neck line and its finishes. (10)

**STYLE OF GARMENTS:** Bodice – princess line, empire line, surplice, off -shoulder, halter and tent; Bifurcated garments - pleated pant, culottes, trousers, slack, jean, high waist, shorts, capri, jumpsuit; Skirt – pleated, gathered, flared, gored, pegged, tiered, circular, wrap. (17)

### TUTORIAL PRACTICE:

1. Taking and recording of body measurements from dress form.
2. Draft the paper pattern for the following:
  - a. Basic Bodice, trousers, skirt, and sleeve.
  - b. Collars –flat, roll, standing, shirt and shawl.
  - c. Yokes – simple, with fullness, releasing fullness, partial and midriff.
  - d. Sleeves – set in, with bodice and sleeveless.
  - e. Flat pattern technique – bodice styles.
  - f. Flat pattern technique – skirt styles.

**Total L: 45 + T: 30 = 75**

### TEXT BOOKS:

1. Helen Joseph and Armstrong, "Pattern Making for Fashion Designing", Prentice Hall, New York, 2009.
2. Winifred Aldrich, "Metric Pattern Cutting for Women's Wear", Wiley Blackwell Publishers, UK, 2015.

### REFERENCES:

1. Nora M Mac Donald, "Principles of Flat Pattern Design", Fairchild Publications, New York, 2009.
2. Ernestine K, Lee G, Beatrice Z, Vittorina R, "How to draft Basic Patterns", Fairchild Publications, UK, 1991.

## 20FD26 SURFACE EMBELLISHMENT LABORATORY II

**0 0 4 2**

Preparation of samples and end products applying the following embellishment techniques:

1. Aari embroidery – Motifs and application.
2. Machine embroidery.
3. Appliqué work.
4. Patchwork.
5. Quilting.
6. Smocking.
7. Crochet.
8. Macramé.
9. Fabric painting - Madhubani, Kalamkari, Warli, Gond, Madhu warli, Beenth Chitra.

**Total P: 60**

### REFERENCE:

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

## 20FD27 FASHION ILLUSTRATION LABORATORY II

**0 0 4 2**

1. Drawing normal figure using 7 ½ head theory for men.
2. Drawing normal figure using 7 ½ head theory for women.

3. Drawing croquis using 10 ½ head theory for men.
4. Drawing croquis using 10 ½ head theory for women.
5. Drawing croquis for kids.
6. Drawing face and facial features for men, women and kids.
7. Drawing hairstyles for men and women.
8. Stylizing the croquis - various poses for men, women and kids.
9. Illustrating type of folds and creases and its application in various garments.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD28 APPAREL PRODUCTION LABORATORY I****0 0 4 2**

Preparation of samples for the following garment components:

- |                         |   |   |
|-------------------------|---|---|
| 1. Seams                | – | plain, top stitch, welt, french, flat fell, lapped, slot and piped.               |
| 2. Seam finishes        | – | overlock , pinked, double stitch, turn and stitch, bound seam.                    |
| 3. Hem finishes         | – | single turn, double turn, rolled, faced hem, decorative faced, fused, bias-bound, |
|                         |   | banding and attaching trims.  |
| 4. Fullness             | – | darts, tucks, pleats, gathers, shirring, ruffles and godets.                      |
| 5. Yokes                | – | simple, with fullness, releasing fullness, partial and midriff yoke.              |
| 6. Neckline finishing   | – | shaped facing, bias facing, bias binding and piped neck edge.                     |
| 7. Plackets             | – | one piece, two piece, tailored, zipper , fly and opening.                         |
| 8. Fastener attachments | – | zips, buttons, buttonholes, button loops, hooks, eyes, snaps, tape and eyelets.   |
|                         |   | button loops, hooks, eyes, snaps, tape and eyelets.                               |

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD29 INDUSTRIAL VISIT AND LECTURE I****0 0 2 1**

1. Students will visit a minimum of two industries and attend a minimum of two lectures by industrial experts.
2. Students will submit a report on the knowledge gained during the industrial visits and expert lectures.
3. Students will make a final presentation on a specific area identified from the industrial visits and expert lectures. The same will be assessed by a committee appointed by the department.



**SEMESTER III****20FD31 DYEING AND PRINTING OF TEXTILE MATERIALS****3 2 0 4**

**PREPARATORY FOR DYEING:** Importance of dyeing, type of impurities, type of pre-treatment, formulation of dyeing and liquor ratio in dyeing. (11)

**COLOURING MATERIALS:** Types and definition, classification of colours, theory of dyeing, synthetic colours - cellulosic and protein materials -direct, reactive, vat, sulphur dyes, acid and basic; Synthetic materials - disperse and cationic dyes, thermo chromic dyes and polychromatic dyes, machineries. Natural colours - origin, extraction, mordanting, techniques, dye fastness and grading properties. (12)

**STYLES OF PRINTING:** Historical development of printing, ingredients, styles of printing - direct, resist and discharge style. Special printing styles - flock, pigment, foam, carpet, khadi, metallic, rubber, plastic and pearl. Finishing and after treatment.(11)

**PRINTING METHODS:** Screen, roller, rotary, transfer, digital printing, 3D printing; Printing defects, causes and remedies. (11)

**TUTORIAL PRACTICE:**

1. Develop samples using the following techniques:
  - a. Block
  - b. Screen
  - c. Stencils
  - d. Tie and Dye
  - e. Batik
  - f. Flock

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Chakraborty J N, "Fundamentals and Practices in Coloration of Textiles", Woodhead publications India Pvt Ltd, New Delhi, 2014.
2. Mahadevappa D, "Colours from Nature", Oxford and IBH Publications Co. Pvt Ltd, New Delhi, 2002.

**REFERENCES:**

1. Karmakar S R, "Textile Science and Technology-Chemical Technology in the Pre-treatment Process of Textiles", Elsevier, New York, April 1999.
2. Clark M, "Handbook of Textile and Industrial Dyeing: Principles, Processes and Types of Dyes", Woodhead publications, England, 2011.
3. Miles L W C, "Textile Printing", SDC, England, 2003.
4. Chettan Bhatt, "Digital Textile Designing", Random Publications, New Delhi, 2014.

**20FD32 HISTORY OF COSTUMES****3 0 0 3**

**EVOLUTION OF FASHION:** Origin of clothing; Need for clothing; Fashion in the Roman era (500 BC-323AD); Fashion in the middle ages (400-1200 AD); Renaissance Period (1350-1520); Fashion during 1600-1900, fashion in 1900-2000. Fashion during 20<sup>th</sup> and 21<sup>st</sup> centuries. (15)

**TRADITIONAL COSTUMES OF THE WORLD:** Kimono, Kebaya, Hanbok, Shuka, Kilt, Agbada, Huipil, Longyi, Aingyi, Chong kraben, Suesa pat, Salvar, Gho, Poncho and Dirndl - designs, styles and textiles. (10)

**TRADITIONAL INDIAN COSTUMES (NORTH, WEST AND CENTRAL STATES):** North - Jammu and Kashmir, Himachal Pradesh, Punjab, Haryana and Uttar Pradesh. West and Central states - Rajasthan, Gujarat, Madhya Pradesh and Maharashtra. Study on the costumes, textiles, accessories and ornaments used in different states of India. (10)

**TRADITIONAL INDIAN COSTUMES (SOUTH, EAST AND NORTHEAST):** East and Northeast India - Bihar, West Bengal, Orissa, Sikkim, Arunachal Pradesh, Assam, Meghalaya and Manipur. South India - Karnataka, Andhra Pradesh, Tamil Nadu and Kerala. Study on the costumes, textiles, accessories and ornaments used in different states of India. (10)

**Total L: 45****TEXT BOOKS:**

1. Katherine Morris Lester, "Historic Costumes: A resume of the Characteristic Types of Costume from the Most Remote Times to the Present Day", Prentice Hall, Inc., New York, 2000.
2. Ramanjit Kaur Bajwa, "Traditional Costumes of India", Abhishek Publication, 1<sup>st</sup> Edition, 2013.

**REFERENCES:**

1. James Laver, "World of Art Costume and Fashion 4e: A Concise History", Thames and Hudson, Fourth edition, 2002.
2. Vandana Bhenderi, "Costume, Textiles and Jewellery of India – Traditions in Rajasthan", Prakash Books, New Delhi, 2004.
3. Hart A North S V and A Museum, "Historical Fashion in Detail the 17<sup>th</sup> and 18<sup>th</sup> Centuries", McMillan, India, 1998.

**20FD33 PROCESS FLOW IN APPAREL MANUFACTURING****4 0 0 4**

**APPAREL INDUSTRY:** Nature, structure, functional organization of apparel firm, process flow of garment manufacturing. Merchandising - role of merchandiser, activities of buying house and buying agencies. Sampling - types, specification sheet-style description, positioning strategy, style presentation. Apparel Association - AEPC, CMAI and GEA. (12)

**SPREADING:** Objectives, types, requirements and quality. Spreading machinery - manual, semi and fully automatic. (10)

**CUTTING:** Cutting machinery-straight knife, round knife, band knife, die cutting, laser cutting, plasma cutting and water jet cutting. Notches, drills and thread markers. Computerized cutting, computer controlled cloth spreaders and cutting heads. Cutting defects- causes and remedies. Fabric packages. Ticketing and bundling. (12)

**STITCHES AND SEAMS:** Stitch classification and designation, seam classification and its notation. Sewing needles - parts, types, size and designation, selection and their application. Machineries for different stitches and seams - types, parts, functions, bed types and special attachments. Selection of stitches and seams for different fabrics. Sewing defects - causes and remedies. (14)

**TRIMS AND ACCESSORIES:** Sewing threads- types, selection, thread consumption and quality specifications, Trims and Accessories - types, sizes and quality specifications. Selection of suitable trims and accessories for different garments. Pressing and packing – material and machinery. (12)

**Total L: 60****TEXT BOOKS:**

1. Ruth E Glock and Grace I Kunz, "Apparel Manufacturing – Sewn Product Analysis", Prentice Hall, New York, 2000.
2. Carr S. Latham's, Revised by David J. Tyler, "Technology of Clothing Manufacture", 4<sup>th</sup> edition, Wiley Blackwell Publishers, UK, 2008.

**REFERENCES:**

1. Laing R M and Webster J, "Stitches and seams", The Textile Institute, 1998.
2. Eberle H, "Clothing Technology from Fiber to Fashion", Beuth-Verlag GmbH, Publishers, Berlin, 2007.

**20FD34 FASHION FORECASTING****4 0 0 4**

**BASICS OF FASHION FORECASTING:** Fashion trend terminology, steps in developing a forecast, fashion trends in context and framework for fashion change and consumer segmentation. (15)

**FASHION ADOPTION:** The innovation adoption process, factors influencing the rate of adoption - attributes of the innovation and consumer adopter categories. (12)

**FASHION FORECASTING PROCESS:** The process and methods of fashion trend analysis and forecasting, role of fashion industry professionals in creating and supporting trends; consumer and industry fashion innovation. (15)

**TREND FORECAST:** Colour, prints, textile and style forecast; social responsibility related to forecasting, formats for trend forecast and future of fashion forecasting. (18)

**Total L: 60****TEXT BOOKS:**

1. Eundeok Kim, Ann Marie Fiore and Hyejeong Kim, "Fashion Trends Analysis and Forecasting", 3<sup>rd</sup> edition, Berg publishers, London, 2011.
2. Evelyn L Brannon, "Fashion Forecasting", 3<sup>rd</sup> edition, Fairchild publications, 2010.

**REFERENCES:**

1. Martin Raymond, "The Trend Forecaster's Handbook", Laurence King Publishing, London, 2010.
2. McKelvey, K and Munslow, J, "Fashion Forecasting", Wiley-Blackwell, 2008.
3. Henrik Vejlgaard, "Anatomy of a Trend", Confetti Publishing Inc., Denmark, 2008.

**20FD35 PATTERN MAKING II****3 2 0 4**

**SPECIFICATION SHEET:** Creative and technical design, interpretation of style, measurement chart and drafting methods of men's apparel – T-shirt, formal shirt, formal trousers, jackets and coats; Women's apparel – salwar, kameez, skirt, top, night wear, jackets; Kids apparel – dungaree, shorts, girls frock. (12)

**PATTERN GRADING:** Pattern grading – types, principles and method of grading bodice, sleeve, trousers and skirt blocks. Industrial grading methods using specification sheets for men's, women's and kid's wear. (11)

**PATTERN FIT AND ALTERATIONS:** Choosing right pattern size, comparing body and pattern measurements, fitting standards in apparel; Fitting problems and remedies in sleeve, bodice, skirts and trousers. Pattern alteration -importance of altering patterns, principles, alteration of patterns for irregular figures. (11)

**MARKER PLANNING:** Pattern layout - types of fabric fold and types of industrial fabric spreading, principles, laying various patterns on different types of fabrics. Marker planning -planning, drawing and reproduction of marker – requirements, efficiency, methods of marker planning. (11)

**TUTORIAL PRACTICE:**

1. Drafting and grading using industrial specification sheets:
  - a. T-Shirt
  - b. Shirt
  - c. Trousers
  - d. Skirt
  - e. Top
2. Exploring the different types of layout and analyzing the best optimum layout for a single style of garment.
3. Developing specification sheet for various garments.

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Helen Joseph, Armstrong, "Pattern Making for Fashion Designing", Prentice Hall, New York, 2004.
2. Nancy Zieman, "Pattern Fitting with Confidence", Krause Publications, Ohio, 2009.

**REFERENCES:**

1. Elizabeth Liechty, Judith Rasband, Della Pottberg-Steineckert, "Fitting and Pattern Alteration- A Multi-Method Approach to the Art of Style Selection, Fitting and Alteration", Fairchild Books, UK, 2016.
2. Patrick Taylor T, Marti Shoben M, "Grading for the Fashion Industry", Stanley Thomas (Publishers) Ltd., 2004.
3. Paula J. Myers-Mc Deritt, "Apparel Production Management and the Technical Package", Fairchild Books, UK, 2010.

**20FD36 COMPUTER AIDED TEXTILE DESIGN LABORATORY****0 0 4 2**

1. Demonstration of software related to CATD laboratory.
2. Developing of motifs.
3. Designing of floral motifs.
4. Designing of geometric and conversational motifs.
5. Designing of calligraphic and ethnic motifs.
6. Development of design for block, stencil & screen.
7. Designing of elementary weaves.
8. Designing of plaids, checks and stripes.
9. Developing the fabric pattern using the designed motifs.
10. Colour rendering and texture mapping.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by Department of Apparel and Fashion Design.

**20FD37 FASHION ILLUSTRATION LABORATORY III****0 0 4 2**

1. Exploring various colouring mediums and techniques: Mediums – charcoal, graphite pencils, water soluble colour pencils, dry and oil pastels, Indian ink, felt-tip pens, acrylics and photo transparent colours.
2. Understanding the rendering techniques for different fabric textures:
  - a. Textured fabrics – wool, fur, corduroy, denim, leather.
  - b. Shiny fabrics – satin, silk, velvets.
  - c. Sheer fabrics - chiffons, georgette.
  - d. Knitted fabrics – jersey, rib.
  - e. Patterns and prints – motifs, embroidery fabrics and lace.
  - f. Sourcing different textured fabrics and rendering the same.
3. Design and develop the following dress styles on croquis with appropriate texture and colour rendering:
  - a. Woolen jacket with fur stole.
  - b. Corduroy shirt and denim trousers.
  - c. Satin wedding gowns with lace work.
  - d. Silk saree with motifs (woven/printed).
  - e. Formal velvet dress.
  - f. Casual chiffon tea length dress.
  - g. Embroidered georgette Anarkali suit.
  - h. Knitted turtleneck cardigan.
  - i. Rib knitted bodycon dress with leather jacket.
  - j. Formal trousers and checked/tartan shirt.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD38 APPAREL PRODUCTION LABORATORY II****0 0 4 2**

1. Preparation of samples for the following garment components:
 

a. Collars	–	flat, stand, shawl and shirt collar
b. Sleeves	–	set in, sleeveless and sleeve with bodice
c. Cuffs	–	single cuff with placket opening
d. Pockets	–	patch, paper bag, front hip, in-seam and welt pocket
e. Belt with loop		
2. Drafting and construction of:
  - a. A-line Frock
  - b. Bermuda
  - c. T-shirt

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD39 INDUSTRIAL VISIT AND LECTURE II****0 0 2 1**

1. Students will visit a minimum of two industries and attend a minimum of two lectures by industrial experts.
2. Students will submit a report on the knowledge gained during the industrial visits and expert lectures.
3. Students will make a final presentation on a specific area identified from the industrial visits and expert lectures. The same will be assessed by a committee appointed by the department.

**SEMESTER IV****20FD41 TEXTILE AND APPAREL QUALITY EVALUATION****4 0 0 4**

**TEXTILE TESTING AND PRODUCT EVALUATION:** Fabric-strength, stretch, sewability, drapeability, bow and skewness, pilling, abrasion and durability. Apparel- seam strength, elongation, slippage and puckering. (8)

**MATERIALS AND SEWN PRODUCT TESTING:** Cleaning methods-laundering, dry and wet cleaning. Dimensional changes in apparel- laundering, dry cleaning, steaming and pressing. (7)

**HANDLE AND COMFORT TESTING:** Aspects of clothing physiological comfort, thermal comfort properties- thermal conductivity, air permeability and liquid water transport properties of fabrics and clothing. Factors affecting comfort properties of fabric and clothing. Fabric Handle - KES and FAST, effect of fiber, yarn and fabric properties on handle. (15)

**APPEARENCE AND PERFORMANCE TESTING:** Colour fastness – washing, light, rubbing, perspiration, saliva, bleaching and dry cleaning. Yellowing. Colour matching cabinets. Testing of accessories-interlinings, zippers, sewing threads, buttons and snap fasteners. Garment quality evaluation- measurement and visual. Product safety, safety requirements in apparel industry, guide lines for wearing apparel, drawstring for children's garments. Toxic regulations for wearing apparel. (15)

**INSPECTION:** Raw material, in-process and final inspection. Fabric inspection systems- 4 point and 10 point system. Quality parameters and control- shade sorting, pattern making, cutting and sewing, trims and accessories, packing, garment defects. Inspection standards for apparel products. Sampling and levels of inspection. Types of defects in materials and garments. Acceptable quality level standards- sampling plans, final inspection procedure, tolerances, quality specifications for finished garments-trouser, ladies top, full sleeve shirt, polo neck T-shirt and children's night wear. (15)

**Total L: 60****TEXT BOOKS:**

1. Pradip V Mehta, "Managing Quality in the Apparel Industry", New age International Publishers, India, 2008.
2. Bubonia, Janace E, "Apparel Quality: A Guide to Evaluating Sewn Products", Publisher: Fairchild Books, 2014.

**REFERENCES:**

1. Subrata Das, "Quality Characterization of Apparel", Woodhead Publisher, India, 2012.
2. Ruth E Glock and Grace I Kunz, "Apparel Manufacturing", Prentice Hall, New Jersey, 2005.
3. Saville, B P, "Physical Testing of Textiles", Woodhead Publishing Ltd., England, 2004.
4. Das A and Alagurusamy R, "Science in clothing comfort", Woodhead Publishing Ltd., England, 2010.

**20FD42 FINISHING AND CLOTHING CARE****3 0 0 3**

**FINISHING:** Objectives, types. Chemical finishing - principle, sourcing, selection of chemicals, application and assessment of water repellent, water proof finish, flame retardant, stain resistant, anti-static, soil release finish, UV protective finish, anti microbial finish, anti odour finish, fragrance finish, burn out finish and elastomeric finishes (without compaction). Resin finishing – durable press, wash-n-wear, wrinkle free and silicone finishing, softening. (10)

**MECHANICAL FINISHING:** Peach finish, raising, napping, calendaring, moiré effect. Plasma treatment, finishing using micro capsules and nano particles, electrochemical finishing. (10)

**DENIM FINISHING:** Process conditions, machinery, chemicals used for special washes - stone wash, acid wash, enzyme wash, bio polishing, tie 'n' wash, distress wash, tinted denim, stretch denim, sand blasting, ozone fading and laser fading. Crush effect/3D effect. (11)

**APPAREL CARE:** Identification and characteristics of stains, selection and application of stain removing agents. Laundering procedures; Washing- methods and machinery. Application of soaps, detergents, bleaches, optical brighteners, stiffeners, softeners, dry cleaning agents on different fabrics. Pressing – purpose, pressing equipment and methods. (11)

**Total L: 45****TEXT BOOKS:**

1. Wolfgang D Schindler and Peter J Hauser, "Chemical finishing of textiles", Woodhead Publishing, UK, 2013.
2. Whittall N S, "Laundering and Dry Cleaning", Vol.8, Textile progress, UK, 1996.

**REFERENCES:**

1. Goldman R F and Lyle D S, "Performance of Textiles", John Wiley and Sons, New York, 1987.
2. Noemia D Souza, "Fabric Care", New Age International (P) Ltd Publisher, Chennai, 1998.
3. Heywood D, "Textile Finishing", Woodhead Publishing, UK, 2003.

## 20FD43 FASHION DESIGN PROCESS

3 2 0 4

**CREATIVITY IN FASHION DESIGN:** Creativity – definition, myths, creative process – clarify the goals, search and explore, develop preliminary ideas, allow incubation, analyze and refine the design, reach a decision point, implement the decision point. (8)

**TARGET CONSUMER:** Fashion Categories – price, style, function, figure type, fabric type. Visualizing the customer – designing for one and consumer clusters, identifying characteristics, defining consumers with fashion variables, the consumer profile, trick the eye with optical illusions. Development of consumer board. (10)

**INSPIRATION, COLOUR AND FABRIC BOARDS:** Inspiration board – researching the future, fashion's inspiring past and present, looking beyond fashion, interpreting the inspiration and developing a concept board. Colour board – colour story, pantone, working with the colour forecast, communicating the colour specification, developing colour board. Fabric board – fabric story, communicating the fabric story and developing fabric board and trim boards. (15)

**DEVELOPING A COLLECTION:** Designing a line, coordinates and separates. Sketch book - design roughs, style of illustrations, range building, flats and specifications drawing. Presentation of illustration boards – planning a presentation, presentation techniques, resizing the figures, cut and paste preparations, design layouts, paste technique, computer generated presentations. Fashion Portfolio - choosing a portfolio, contents and layouts, target your portfolio, layout formats, croquis sketch book and backing up of portfolio. (12)

### TUTORIAL PRACTICE:

1. Choose any five inspiring products and describe the creative elements in it with photographs.
2. Create a mind-map for self-analysis and present it using a creative layout.
3. Prepare a client board - name, age group, gender, annual income, occupation, type of fashion personality, market (high class/upper middle/urban), category (men/women/kids), sub category (ethnic/casual/high fashion/ western).
4. Choose any three images and interpret your perception, derive the words that inspires from the images and prepare a story/poem.
5. Select a concept and create a visual board.
6. Create a mood / concept and story boards based on the above concept.
7. Create colour, texture/fabric and trim boards.
8. Develop design doodles, rough sketches and create illustration boards for five final designs.

**Total L: 45 + T: 30 = 75**

### TEXT BOOKS:

1. Naoki Watanabe, "Contemporary Fashion illustration Techniques", Rockport Publishers, USA, 2009.
2. Evelyn L Brannon, "Designer's Guide to Fashion Apparel", Bloomsbury Publishing, UK, 2011.

### REFERENCES:

1. Caroline Tatham and Julian Seaman, "Fashion Designing and Drawing Course", Thames and Hudson Publishers, UK, 2003.
2. Sandra Burke, "Fashion Artist - Drawing Techniques to Portfolio Presentation", Burke Publishing, UK, 2006.
3. Richard Sorger and Jenny Udale, "The Fundamentals of Fashion Design", Ava Publishing, Switzerland, 2006.
4. Linda Tain, "Portfolio Presentation for Fashion Designers", Fairchild Publications, UK, 2010.

## 20FD44 FASHION COMMUNICATION

3 2 0 4

**GRAPHIC DESIGN AND SEMIOTICS:** Elements of graphic design- space, unity, page layout, and typography. Graphics - vector graphics, raster graphics. Semiotics - icon, signs and symbols. Logo design. (10)

**CREATIVE THINKING:** Design as problem solving – empirical, chunking, clustering, opposition, top down and bottom up, substitution and lateral thinking; Creative thinking; Wit and Humor; Layers of meaning. Fashion promotion - campaign plan, visual promotional materials, press pack. Identity and branding – visual and non-visual identity, brand development, brand guidelines. SWOT analysis of the fashion brand. (15)

**COMMUNICATION AND JOURNALISM:** Communication - definition, elements, models and types. Journalism - print, broadcast and online. Fashion advertising - story boarding, photography and video shoot, look book building, packaging trends, in store display and visual merchandising. Case studies of fashion promotional ideas in history. (12)

**BLOGGING AND SOCIAL MEDIA:** Fashion bloggers and blogging; Brands and social media. Design and application -user interface, user experience and artificial intelligence; Mobile application; Websites and digital fashion shows; E- commerce sites. (8)

**TUTORIAL PRACTICE:**

1. Research on an upcoming fashion brand's creatives and critically analyze the logo and promotional materials.
2. Design and develop a logo for a new brand.
3. Design and digitize the in store promotional materials (letterhead, swing tag, label, strapline, mission statement and billboards).
4. Design and digitize the visual promotional materials (look book, catalogue, brochure and advertisement).
5. Design web page / mobile application pages for the brand.
6. Design a page in digital platform for a brand with creative storytelling and showcase the new collection.

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Kristin Cullen, "Layout Workbook: A real-World Guide to Building Pages in Graphic Design", Rockport publishers, 2007.
2. Gavin Ambrose and Paul Harris, "The Fundamentals of Graphic Design", AVA Publishing, 2009.

**REFERENCES:**

1. Harriet Posner, "Marketing Fashion", Laurence King Publishing Ltd., Second edition, 2015.
2. Gavin Ambrose and Paul Harris, "Fundamentals of Typography", AVA Publishing, 2006.
3. Malcolm Barnard, "Fashion as Communication" Routledge, Second edition, 2002.
4. Debora Halpern Wenger, Deborah Potter, "Advancing the Story: Quality Journalism in a Digital World", CQ Press, 4<sup>th</sup> edition, 2018.
5. Julie Bradford, "Fashion Journalism", Routledge Taylor and Francis group, 2015.

**20FD45 PRINCIPLES OF MANAGEMENT****3 0 0 3**

**PRELIMINARY ASPECTS OF MANAGEMENT:** Meaning, definition, importance and basic functions of management; Principles of management; Management concepts- MBO, Theory 2, Kaizen, Six sigma, quality circles and TQM; Development of management thoughts; Business administration and management. (9)

**PLANNING:** Meaning, nature, structure and steps in planning. Planning premises- concept, characteristics of a sound plan; MIS- criteria for evaluating information, making plan effective. Organizing- types of organization- formal and informal organization, delegation of authority departmentalization. (9)

**STAFFING:** Significance of human factors- meaning, nature and importance. Staffing process, functions, recruitment and selection of personnel, appraisal, career strategy, steps in formulating a career strategy. (9)

**DIRECTING:** Meaning, nature, elements, principles of directing and importance of directing, supervision- difference between directing and supervision- functions of supervisor. Motivation and leadership. Communication- barriers to communication. (9)

**CONTROLLING:** Concepts, steps in controlling, principles of controlling, objectives of controlling, importance of controlling, relationship between controlling and planning- features of a good controlling system, controlling techniques-social audit, HR. Accounting- PERT and CPM. Business ethics and social responsibility, socialization process. (9)

**Total L: 45****TEXT BOOKS:**

1. Harold Koontz, Heinz Wehrich and Ramachandra Aryasri, "Principles of Management", Tata McGraw Hill, New Delhi, 2004.
2. Chuck Williams and Manas Ranjan Tripathy, "Principles of Management", Cengage Learning India Pvt. Ltd., New Delhi, 2013.

**REFERENCES:**

1. C B Gupta, "Management Theory and Practice" Sultan Chand and Sons, New Delhi, 2009.
2. V S P Rao, "Management Text and Cases" Excel books, New Delhi, 2009.
3. R N Gupta "Principles of Management", S.Chand and Company Ltd, New Delhi, 2005.
4. Samuel C Certo and Tervis Certo, "Modern Management: Concepts and Skills", Pearson education, 12<sup>th</sup> Edition, 2012.

**20FD46 COMPUTER AIDED FASHION DESIGN LABORATORY I****0 0 4 2**

1. Demonstration of software related to CAFD Laboratory I.
2. Developing croquis based on head theories for men, women and children.
3. Extraction of fashion poses for men, women and children.
4. Developing logo, motif & pattern based on a theme.
5. Designing accessories for men, women and kids.
6. Designing trims for men, women and kids.
7. Designing basic garment components.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD47 TEXTILE AND APPAREL QUALITY EVALUATION LABORATORY****0 0 4 2**

1. Analyzing the fabric defects.
2. Determination of fabric strength (knitted and woven).
3. Determination of drapeability.
4. Determination of seam strength and seam slippage.
5. Determination of dimensional stability and appearance of apparel.
6. Determination of snap pull strength.
7. Determination of button impact strength.
8. Determination of zipper pull strength.
9. Analyzing the colour strength using spectrophotometer.
10. Determination of colour fastness- laundering, rubbing, perspiration and light.
11. Analyzing garment dimensions and tolerances.
12. Demonstration of thermal conductivity, air permeability and water vapour permeability test.
13. Demonstration of Kawabata evaluation systems.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by Department of Apparel and Fashion Design.
2. Bubonia, Janace E, "Apparel Quality: A Guide to Evaluating Sewn Products", Publisher: Fairchild Books, 2014.

**20FD48 APPAREL PRODUCTION LABORATORY III****0 0 4 2**

Developing the spec sheet, drafting and grading of pattern, constructing and analyzing the fit for the following garments:

1. Yoke Frock
2. Ladies' Top
3. Skirt
4. Salwar
5. Kameez

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD49 INDUSTRIAL VISIT AND LECTURE III****0 0 2 1**

1. Students will visit a minimum of two industries and attend a minimum of two lectures by industrial experts.
2. Students will submit a report on the knowledge gained during the industrial visits and expert lectures.
3. Students will make a final presentation on a specific area identified from the industrial visits and expert lectures. The same will be assessed by a committee appointed by the department.



**SEMESTER V****20FD51 KNITWEAR DESIGN AND MANUFACTURE****3 2 0 4**

**EVOLUTION OF KNITTING:** History- reinventing classics, decade of change, art of knitting, craft versus industry, evolution of knitwear into apparel industry and knitwear designers. Knit wear foundation - fibers, yarn, needles, gauge, stitches, stretch and recovery, warp and weft knitting, basics of yarn, stitch fundamentals and classification of knitted garments. (11)

**FULLY CUT:** Design analysis, specification sheet, pattern making, marker planning, spreading, cutting and garment making for raglan T-shirt, halter neck T-shirt with shorts and babies frock. (8)

**CUT STITCH SHAPED GARMENT:** Design analysis, specification sheet, pattern making, preparation of blank, cutting blank, garment making for round neck jumper and vest. (8)

**FULLY FASHION:** Design analysis, specification sheet, shape generation, methods, dimension planning, looping process, control of defects for sweater, pull-over, slip over, cardigans. (9)

**INTEGRAL GARMENTS:** Design analysis, specification sheet for tank top, panty hose. Integral garments - upper and lower body. Trends in knitwear designing. (9)

**TUTORIAL PRACTICE:**

1. Collect knit swatches and analyze the texture, stretch, recovery and shrinkage for the following categories:
  - a. Fully cut.
  - b. Stitch shaped.
  - c. Fully fashioned.
  - d. Complete garment.
2. Design the following garments (rough sketch, design range, specification sheet and texture rendering):
  - a. T- shirt (turtle neck and raglan).
  - b. Jump suit (round neck).
  - c. Pull over, slip over, cardigans.
  - d. Tank top.
3. Design and develop clothing for pets.

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Lisa Donofrio, Ferrezza, Marilyn Hefferen, "Designing Knitwear Collection", Fairchild books, Inc, United States, 2008.
2. Terry Blackenbury, "Knitted Clothing Technology", Blackwell Science, Oxford, UK, 1996.

**REFERENCES:**

1. Sandy Black, "Knitwear in Fashion", Thames and Hudson, New York, United States, 2005.
2. Juliana Sissons, "Basics Fashion Design Knitwear", AVA, United States, 2010.

**20FD52 APPAREL PRODUCTION PLANNING AND CONTROL****4 0 0 4**

**PRODUCTION PLANNING AND CONTROL:** Production planning - objectives, levels, functions, strategies tools and challenges. Production control-objectives, importance and functions. Role of production planning and control department in apparel industry. Productivity – concept, measuring productivity and characteristics. Factory capacity and resources analysis. Applications of software in production planning and control. (15)

**INDUSTRIAL ENGINEERING:** Work study-concept, need. Method study – concept, objectives, procedure, process chart symbol types, operation analysis and motion analysis; Work measurement – concept, objectives, procedures, allowances, and standard data calculations. (15)

**CUTTING DEPARTMENT:** Cut order planning – fabric grouping, marker utilization, performance measurement parameters and economic cut quantities. Material handling in cutting, control forms in cutting department. (10)

**PRODUCTION DEPARTMENT:** Plant capacity -planning and managing. Plant layout - principles and types. Material handling in production. Production system-types, guidelines for selection. Flow process grid construction. Plant loading - line balancing techniques, critical path method, throughput time calculation, determination of machinery requirements for a new factory, planning for multi style production. (12)

**PRODUCTION SCHEDULING:** Principles and scheduling charts. Packaging - types, guidelines for selection. Control forms in production and packaging department. (8)

**Total L: 60****TEXT BOOKS:**

1. Glock R E and Kunz G I, "Apparel Manufacturing: Sewn Product Analysis", 4<sup>th</sup> Edition Prentice Hall, New York, 2004.
2. Karthik T and Ganesan P, "Apparel Manufacturing Technology", CRC Press, 2017.

**REFERENCES:**

1. Rameshbabu V, "Industrial Engineering in Apparel Production", Woodhead Publishing, 2012.
2. Bheda Rajesh, "Managing Productivity in Apparel Industry", 2012
3. Prasanta Sarkar, "Production Planning & Control in Apparel Manufacturing: The Beginner's Guide," Online Clothing study, 2017.

**20FD53 APPAREL MARKETING****3 0 0 3**

**MARKETING:** Marketing management- scope, core marketing concepts- target marketing, need, want and demand, value and satisfaction, transaction, networks, channel, competition, marketing mix, concepts. Strategic planning, implementation and control process. (11)

**MARKETING RESEARCH AND NEW PRODUCT DEVELOPMENT:** Steps- types of research, research design, data sources, sampling method, data collection, questionnaire design. New product development- types of new products, challenges, stages of new product development. Product life cycle – stages, marketing strategy for various stages of life cycle. (12)

**SEGMENTATION AND BUYING BEHAVIOUR:** Buying behaviour - factors influencing buying behaviour, consumer buying decision process, types of consumer decision making. Market segmentation, targeting, differentiation and positioning. (11)

**MARKETING MIX:** Product - hierarchy, product mix, line; Price – objectives, price decisions, procedure; Marketing channel – nature, functions, marketing systems - direct, vertical, horizontal and multichannel; Promotion – message, media selection, measuring effectiveness. (11)

**Total L: 45****TEXT BOOKS:**

1. Philip Kotler, "Marketing Management", Prentice Hall Inc. New Jersey, 1996.
2. Ruth E Glock and Grace I Kunz, "Apparel Manufacturing", Prentice Hall, New Jersey, 2005.

**REFERENCES:**

1. Evelyn C Moore, "Math for Merchandising", Prentice Hall, New York, 1999.
2. "The Textile Industry: Winning strategies for the New Millennium, Volume II" Textile Institute, UK, 1999.
3. Mike Easey, "Fashion Marketing", Wiley- Blackwell, Singapore, 2009.

**20FD54 APPAREL COSTING****3 2 0 4**

**COMMERCIAL ARITHMETIC AND COSTING:** Percentage – ratio and proportion, simple interest, discount. Costing – principles, types, methods and techniques; Elements of cost. Breakeven point, relation between average and marginal costs, relationship between average and marginal revenues, pre and post costing, cost quality, cost control. (12+5)

**THE BUDGETING PROCESS:** Budgeting - elements, advantages, limitations, types of budget, preparation of a budget, pricing methods. (10+5)

**ESTIMATION OF MATERIAL AND PROCESS COSTING:** Cost estimation for a garment order - total yarn requirement, total yarn cost, knitting, dyeing and cut makes trim (CMT) cost, other material cost, sewing thread requirement, calculation and its methods. Process costing- knitting, dyeing, printing, finishing, cutting, stitching, checking, packing, shipping and forwarding cost; Forex. (11+10)

**GARMENT COSTING:** Estimation of CMT and factory cost – round neck, polo t-shirt, vest, shorts and body suit. Factors to be considered for domestic and international market. Wastage calculation - forms of wastage, standardization of wastage percentage, approach to wastage calculation – industrial calculation method, rejection percentage, GSM, fabric shortage. Reverse costing of a product. (12+10)

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Khanna O P, "Industrial Engineering and Management", Dhanpat Rai Publications, New Delhi, 2013.
2. Krishnakumar M, "Apparel Costing a Functional Approach", Abhishek publications, Chandigarh, India, 2011.

**REFERENCES:**

1. Anthony G Hopwood, Christopher S Chapman, "Handbook of Management Accounting Research", Elsevier publisher, London, 2008.
2. Jawahar-Lal, "Cost Accounting", Tata McGraw-Hill Publishers, New Delhi, 2008.
3. Chakraborty S K, "Cost Accounting and Financial Management", New age International, New Delhi, 2004.
4. Allen R G D, "Mathematical Analysis for Economics", AITBS Publishers, New Delhi, 2002.

**20FD56 COMPUTER AIDED FASHION DESIGN LABORATORY II****0 0 4 2**

1. Demonstration of software related to CAFD Laboratory II.
2. Researching on the upcoming trends for a given season and creating an inspiration board, colour board and fabric board.
3. Creating textures.
4. Developing flat sketches for men's apparel.
5. Developing flat sketches for women's apparel.
6. Developing flat sketches for kid's apparel.
7. Developing spec sheet and tech pack for a garment.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD57 FASHION PHOTOGRAPHY LABORATORY****0 0 4 2**

1. Study the basics of digital photography and prepare a report on program setting, DSLR features and lenses.
2. Analyze the effect of exposure triangle in photography.
3. Explore the composition in photography.
4. Study the effect of light sources, light modifiers and lighting technique in photography.
5. Study the photo editing techniques and edit the captured photographs.
6. Prepare a lookbook for the following:
  - a. Product photography - advertisement, catalogue, grouping and lifestyle.
  - b. Macro photography - body features with accessories.
  - c. Fashion portrait - faces, hairstyles, headgears and makeup.
  - d. Fashion photography - catalogue, editorial, street fashion.
  - e. Outdoor photography - fashion and portrait.

**Total P: 60****REFERENCES:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.
2. John Hedge, "The Book of Photography", DK Publishing Inc., United States, 2005.

**20FD58 APPAREL PRODUCTION LABORATORY IV****0 0 4 2**

Developing the spec sheet, drafting and grading of pattern, constructing and analyzing the fit for the following garments:

1. Shorts
2. Sari blouse
3. Men's full sleeve shirt
4. Polo neck T-shirt
5. S B Vest

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD59 CRAFT TRAINING AND DOCUMENTATION****0 0 2 1**

Craft training and documentation involves the following:

1. Preliminary study of the selected craft
  - a. To collect articles related to chosen craft and study its evolution and techniques.
2. Visiting the craft cluster for two weeks
  - a. To undertake craft training.
  - b. To review the technicalities, design intervention and craft revival.
  - c. To explore the marketing strategies and role of craft promotion councils.
3. Development of innovative craft products based on the skill gained.
4. Documentation and presentation.

**SEMESTER VI****20FD61 RESEARCH METHODS****3 2 0 4**

**RESEARCH METHODOLOGY:** Objectives, types, significance, research approaches, research methods versus methodology, research process- sources of literature, defining the problem, criteria, design, sampling design, measurements and scaling techniques. Methods of data collection. Data organization- random samples – graphs, histograms and frequency distribution; Central tendencies - mean, median and mode; Measures of dispersion – range, percentile, quartile deviation, mean deviation, standard deviation. (12)

**CORRELATION AND REGRESSION:** Bivariate data, correlation - Karl Pearson's Coefficient of correlation, rank correlation, Spearman's Rank correlation coefficient; Regression– simple and multiple linear regression, regression co-efficient. (10)

**STATISTICAL INFERENCE:** Sampling distribution – estimation; Point estimation, interval estimation. Hypothesis Testing: General concepts - Errors in Hypothesis testing, One-and two-tailed tests - Tests concerning mean, proportion, and variance - Tests for Goodness of fit and independence of attributes. (12)

**ANALYSIS OF VARIANCE:** Introduction to design of experiments, analysis of variance- completely randomized design and randomized block design. (6)

**STATISTICAL QUALITY CONTROL:** Statistical basis for control charts - control limits, control charts for variables, mean charts; Range charts - control charts for defective , p, np charts, control charts for defects ,c charts. (5)

**TUTORIAL PRACTICE:**

1. Collect articles on fashion design, production and management, through various sources.
2. Identify the research problem and objectives for the collected articles.
3. Analyze the methodology and experimental design followed in the articles.
4. Identify the result interpretation followed in the collected articles.
5. Analyzing the different styles of referencing and citation.
6. Prepare a review article with referencing and citation.
7. Review the prepared article using anti - plagiarism software.

**Total L: 45 + T: 30 = 75****TEXT BOOKS:**

1. Kothari C R, "Research methodology", Wishwa Prakashan, New Delhi, 2000.
2. Jay L Devore, "Probability and Statistics for Engineers", Cengage Learning Pvt. Ltd., New Delhi, 2015.

**REFERENCES:**

1. Naval Bajpai, "Business Statistics", Pearson, New Delhi, 2017.
2. Brase/Brase, "Understandable Statistics", Houghton Mifflin, Boston, 2008.
3. Richard I Levin. David S Rubin, "Statistics for Management", Pearson Education, 2014.
4. Anderson, Sweeney and Williams "Statistics for business and economics", Cengage Learning, 2014.

**20FD62 FASHION RETAIL MANAGEMENT****4 0 0 4**

**RETAILING:** Characteristics and functions, trends, types, retailing channels, international fashion retailer strategy. (15)

**RETAIL LOCATION:** Location – types, choice, site evaluation. Space planning – location of departments and merchandise, leveraging space. Store layout- objectives, store design elements, visual merchandising and website design. (15)

**MERCHANDISE MANAGEMENT:** Sales forecasting- time series forecasting, with trend, with seasonality, qualitative methods and forecast error. Planning merchandise, merchandise control, merchandise procurement, merchandise allocation, merchandise performance. (15)

**RETAIL PRICING AND PROMOTION:** Objectives, pricing strategy, price adjustments and types. Promotion - promotion mix selection, advertising, sales promotion, personal selling and publicity. Ethics, social responsibility and consumerism. (15)

**Total L: 60****TEXT BOOKS:**

1. Chetan Bajaj, Rajnish Tuli, Nidhi V Srivastava, "Retail Management", Oxford University Press, New Delhi, 2005.
2. Barton Weitz and Michael Levy, "Retail Management", Tata Mc Graw-Hill Education, 2012.

**REFERENCES:**

1. Ellen Diamond, "Fashion Retailing: A Multi-Channel Approach", Pearson Education India, India, 2007.

2. John Fernie, Suzanne Fernie and Christopher Moore, "Principles of Retailing", Reed Elsevier India Private Limited, New Delhi, 2007.
3. Gibson G Vedamani "Retail Management", Jaico Publishing House, Mumbai, 2003.

### 20FD63 APPAREL MERCHANDISING

4 0 0 4

**PRINCIPLES OF MERCHANDISING:** Terminology, significance, scope, role and responsibility of merchandisers, merchandising interface with other departments in the industry, role of buying house and buying office. (8)

**FASHION BUYING:** Buying house, role of fashion buyer, buying cycle, types of buyers, buying seasons and their significance in product, market and merchandise planning. Sourcing - ethical issues, negotiation, supplier performance, monitoring and evaluation, buying and the law, buying for own label fashion multiples, buying branded fashion merchandise. (15)

**SOURCING, MERCHANDISE PLANNING AND ORDER EXECUTION:** Classification of sourcing, Sourcing strategies for decision making, sourcing process, factors affecting sourcing process, vendor selection process, evaluating vendor reliability, shortage management. Process planning chart, development of time and action plan, calendar planning, sampling process, factory capacity planning, record maintenance, order management and prioritizing, in-house and sub contractor activities. (15)

**EXPORT PROCEDURE AND DOCUMENTATION:** Export procedure - receipt of confirmed order, production and clearance of products for exports, shipment negotiation of documents and realization of export proceeds, obtaining various incentives. Terms of payment, delivery term, export finance - pre-shipment and post- shipment. Documentation – Aligned Documentation system, commercial documents, regulatory documents. (12)

**BUSINESS COMMUNICATION:** Objective, importance, types, principles, merchandiser and communication, communication skills for a merchandiser, information systems and controls, management information system. (10)

**Total L: 60**

#### TEXT BOOKS:

1. R Rathinamoorthy, R Surjith, "Apparel Merchandising", Woodhead Publications India Pvt. Ltd., New Delhi, 2018.
2. Helen Goworek, "Fashion Buying", Prentice Hall, New Delhi, 2004.

#### REFERENCES:

1. M Krishan Kumar, "Apparel Merchandising" Abhishek Publications, Chandigarh, India, 2010.
2. Jeremy A. Rosenau and David L. Wilson, "Apparel Merchandising – The Line Starts here" Fair child publications, New York, 2007.
3. Harold Carr, "Fashion Design and Product development", John Wiley and Sons Inc., New York, 1991.

### 20FD64 VISUAL MERCHANDISING

3 0 0 3

**VISUAL MERCHANDISING ELEMENTS:** History, purpose, basics of display, basics of design - elements and principles, window in store front –straight, angled front, arcade front, corner; Display window constructions - closed back, open-back, island, shadow boxes, elevated, deep and tall. (12)

**STORE DESIGN AND MERCHANDISE PRESENTATION:** Store planning, mannequins – types and handling, fixtures – types and selection of fixtures, circulation plans – meaning and types, planograms – meaning, purpose, implementation and maintenance. Merchandise presentation – principles, categories, dominance factor, cross merchandising and point of purchase. (12)

**WINDOW DISPLAY:** Meaning and scope, types of display - one item, line of goods, related merchandise, assortment, promotional vs institutional; Types of display setting - realistic, environmental, semi-realistic, fantasy, abstract. Light and its impact on colour -the colour of light, importance, types of lights and lighting, light fixtures; Coloured lights and filters, planning store lighting. (11)

**MERCHANDISE DISPLAY:** Role of visual merchandiser, display calendar, planning a display, scheduling the promotion, attention drawing devices, technology in visual merchandising. (10)

**Total L: 45**

#### TEXT BOOKS:

1. Swati Bhalla and Anuraag S, "Visual Merchandising", Tata McGraw-Hill Education, New Delhi, 2010.
2. Martin M.Pegler, "Visual Merchandising and Display", Berg Publishers, UK, 2006.

#### REFERENCES:

1. Elaine stone, "Fashion Merchandising – An Introduction", New York, 2001.
2. Diamond J, "Contemporary Visual Merchandising and Environmental Design", Prentice Hall, New Jersey, 2006.

**20FD66 COMPUTER AIDED FASHION DESIGN LABORATORY III****0 0 4 2**

1. Demonstration of software related to CAFD Laboratory III.
2. Researching on the upcoming trends for a given season and creating a mood board/story board, colour board, print/fabric board and trims board.
3. Creating a design collection for men's apparel.
4. Creating a design collection for women's apparel.
5. Creating a design collection for kid's apparel.
6. Developing tech pack for garments.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD67 FASHION DRAPING AND STYLING LABORATORY****0 0 4 2**

Draping and construction of the following garments:

1. Basic Patterns:
  - a. Bodice.
  - b. Skirt.
  - c. Sleeve
2. Bodice Styles:
  - a. Bustier designs.
  - b. Cowl styles.
  - c. Halter styles.
  - d. Asymmetric styles.
3. Skirt Styles:
  - a. Skirt with yoke.
  - b. Wrap around skirt.
  - c. Peg top skirt with side cowls.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD68 APPAREL PRODUCTION LABORATORY V****0 0 4 2**

Developing the spec sheet, drafting and grading of pattern, constructing and analyzing the fit for the following garments:

1. Corset
2. Double Breasted Coat
3. Hooded T-shirt
4. Men's Trouser

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by Department of Apparel and Fashion Design.

**SEMESTER VII**  
**20FD01 PROJECT WORK I**

**0 0 24 12**

Every student shall undertake the project work I during seventh semester. The project work shall be undertaken in an industry/research organization in consultation with faculty guide and head of the department. Project work at industry/ research organization shall be jointly supervised by a faculty guide and an expert from the organization.



**SEMESTER VIII****20FD81 FASHION BRANDING****3 0 0 3****BRANDING PROCESS:** Brand definition, types of brand; Brand evaluation, extension, relaunch, revitalization, failure. (11)**ELEMENTS OF BRANDING:** Brand evolution, Brand positioning-definition, need for positioning, brand repositioning, Brand equity- definition, measuring brand equity, building brand equity , brand awareness; Brand identity- definition, models of brand identity and elements of brand identity; Brand personality- definition, scale of brand personality and scales of brand personality and use of brand personality, brand communication and brand image- definition, Kapferer's model of brand image, brand gap. (12)**FASHION BRAND CONSUMERS:** Brand consumers, branding strategies of mass market, luxury brand, private labels; Brand communication; E-tailing, global branding. (11)**BRAND TRENDS:** Interactive brand, wireless brand, mobile technologies and audio targeting, virtual brand, redesigning the brand – impact of new technology, micro brands and experiential branding. (11)**Total L: 45****TEXT BOOKS:**

1. Uche Okonkwo, "Luxury Fashion Branding Trends, Tactics, Techniques", Palgrave Macmillan, 2007.
2. Kaled K Hameide, "Fashion Branding Unraveled", Fairchild Books, New York, 2011.

**REFERENCES:**

1. Joseph Hancock, "Brand Story", Fairchild books, New York, 2009.
2. Wolfgang Schaefer and J P Kuehlwein, "Rethinking Prestige Branding", Kogan Page Ltd., London, 2015.
3. Alina Wheeler, "Designing Brand Identity", John Wiley & Sons, New Jersey, 4<sup>th</sup> edition, 2013.
4. Mark Tungate, "Fashion Brands", Kogan Page Ltd., London, 3<sup>rd</sup> edition, 2012.

**20FD82 ERGONOMICS IN CLOTHING DESIGN****3 0 0 3****HUMAN BODY STRUCTURE AND ANTHROPOMETRICS:** Skeletal system, body growth and somatotypes. Anthropometrics - traditional, static and dynamic, development of anthropometry, need for Indian anthropometric data. Measuring dimensions- standing and sitting postures, head, neck, hand and foot dimensions, measurements in special postures- cross-legged and squatting. Body scanning – operations and applications. (12)**APPAREL SIZING SYSTEMS:** Existing sizing system, development of new sizing system, international sizing, principles of sizing system, body shape analysis, identification of key dimensions for apparel sizing system, size categories in men's, women's and children's wear. (10)**ERGONOMICS:** Need, requirements, principles, types-physical, cognitive and organizational. Effects of ergonomics, biomechanics, range of motion, selection of anthropometric data for clothing design, providing mobility in clothing, fit and movement, analyzing the effects of clothing on movement; Fit and pressure comfort- factors, subjective and objective evaluation; Fastening systems. (12)**CLOTHING FOR SPECIAL NEEDS:** Design requirements, ergonomic design of clothing for medical uniforms, sportswear, swim wear, leisure clothing, intimate wear, military clothing, specially-abled, elderly men and women, infant, preschool children, school uniforms, maternity women and compressive garments. (11)**Total L: 45****TEXT BOOKS:**

1. Debkumar Chakrabati, "Indian Anthropometric Dimensions for Ergonomic Design Practice", National Institute of Design, Ahmedabad, India, 1997.
2. Watkins Susan and Lucy Dunne, "Functional Clothing Design: From Sportswear to Space suits, Fairchild Books, London, 2015.

**REFERENCES:**

1. John Arthur Roebuck, "Anthropometric Methods: Designing to Fit the Human Body (Monographs in Human Factors and Ergonomics)", Amazon, 1995.
2. K H E Kroemer, H B Kroemer, K E Kroemer-Elbert, "Ergonomics: How to Design for Ease and Efficiency (2<sup>nd</sup> Edition)", Prentice Hall, 2001.
3. Deepthi Gupta and Norsaadh Zakaria, "Anthropometry, Apparel sizing and Design" Textiles Institute, CRC press & Woodhead Publishing, England, 2014.

**20FD83 LOGISTICS AND SUPPLY CHAIN MANAGEMENT****4 0 0 4**

**SUPPLY CHAIN MANAGEMENT:** History, evolution, objective and importance, decision phases, process views, supply chain strategies, supply chain drivers and metrics. Supply chain performance measures, outsourcing - make vs buy. (10)

**MATERIAL MANAGEMENT IN SUPPLY CHAIN:** Demand forecasting in supply chain; Inventory management - types of inventory, inventory related costs, managing stocks, analyzing impact of supply chain redesign on inventory, multiple- item, multiple -location inventory management. Role of IT in supply chain management. (12)

**WAREHOUSING:** Types, warehouse design and layout, warehouse management system, planning warehouse distribution, cross-docking, stock keeping and accounting, material handling systems, containerization, automatic warehousing. (8)

**LOGISTICS:** Concepts and elements, logistics processes and challenges, integration with other business processes. Logistics network planning- network design, planning, costing, international logistics, transaction channels and distribution channel. 3<sup>rd</sup> party logistics, 4<sup>th</sup> party logistics. Online sales and logistics. Globalization in logistics. Government incentives for export - export promotion schemes for textile sector, market development schemes, interest equalization. Export license, outward and inward Foreign Direct investment regulations. (15)

**SUPPLY CHAIN INNOVATIONS:** Integration - internal and external integration, partnership and trust in a supply chain, efficient customer response, collaborative planning, forecasting and replenishment, electronic data interchange. Supply chain restructuring - supply chain mapping, supply chain process restructuring, moving from make to stock to configure to order supply chain. Agile supply chains - methodologies for handling disruptions. Emerging trends in supply chain management. Recent advances in technology. Globalization in supply chain. (15)

**Total L: 60****TEXT BOOKS:**

1. Sunil Chopra and Peter Meindl, "Supply Chain Management - Strategy, Planning and Operations", Pearson Prentice Hall, New Jersey, 2007.
2. Janat Shah, "Supply Chain Management", Pearson education India, 2009.

**REFERENCES:**

1. Benjamin S Blanchard, "Logistics Engineering and Management", Prentice Hall India, New Delhi, 2005.
2. D K Agrawal, "Textbook of Logistics and Supply Chain Management", Macmillan Publishers India limited, Kolkata, 2010.
3. Douglas M Lambert, James R Stock, Lisa and M Ellram, "Fundamentals of Logistics Management", McGraw Hill, Boston, 1998.

**20FD86 COMPUTER AIDED APPAREL DESIGN LABORATORY****0 0 4 2**

1. Demonstration of the tools and software used in computer aided apparel design laboratory.
2. Creating an avatar for men, women and children.
3. Drafting, grading, marker planning and analyzing the fit for the following garments:
  - a. Kid's Wear
  - b. Women's Wear
  - c. Men's Wear
4. Demonstration on digitizing the flat pattern and plotting the marker plans.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD87 FASHION ACCESSORIES LABORATORY****0 0 4 2**

1. Understanding the anatomy, types, materials, closures and steps in construction for the accessories given below.
2. Designing and constructing the accessories given below by researching and analyzing trends:
  - a. Belts
  - b. Eyewear
  - c. Footwear
  - d. Gloves
  - e. Handbags
  - f. Headgears
  - g. Hosiery
  - h. Jewellery

- i. Neck wear
- j. Umbrella

**Total P: 60**

**REFERENCES:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.
2. Jay Diamond and Ellen Diamond, "Fashion Apparel, Accessories and Home Furnishings", Pearson, May 2006.

**20FD88 PORTFOLIO DEVELOPMENT LABORATORY I**

**0 0 4 2**

1. Presenting the design collection by researching the trends, identifying the target customer and design requirements which includes the following:
  - a. Inspiration, concept / story board.
  - b. Client profile & indication of the market / country.
  - c. Research reference.
  - d. Colour board.
  - e. Fabric board.
  - f. Trims and accessories board.
  - g. Design sheets (illustration boards).
  - h. Flat sketches and magnification.
  - i. Specification sheet.
  - j. Cost sheet.
  - k. Resources.
  - l. Research binder.
2. Narrating the best works, craft documentation and internship projects by presenting in a look book.

**Total P: 60**

**REFERENCES:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**SEMESTER IX****20FD91 FINANCIAL MANAGEMENT****3 0 0 3**

**FINANCIAL MANAGEMENT:** Meaning, scope, objective, functions of finance manager and importance of financial management. Time value of money – compounding techniques, annual compounding techniques, present value of cash flow. (9)

**FINANCIAL STATEMENT ANALYSIS:** Financial statements-types and techniques of financial statement analysis – comparative statement analysis, balance sheet analysis, profit and loss account analysis, trend analysis, common size analysis, fund flow statement, cash flow statement, ratio analysis – liquidity ratio, solvency ratio, activity ratio, profitability ratio. (9)

**SOURCES OF FINANCE:** Long term – equity shares, debenture, preference shares, long term loans, fixed deposits. Short term – trade credit, bank credit, commercial papers, certificate of deposits, factoring. (9)

**WORKING CAPITAL MANAGEMENT & STOCK MARKET:** Planning of working capital – need, types – permanent and temporary working capital, factors determining working capital requirements. Inventory management – safety stock, economic order quantity, A-B-C analysis Indian stock market – share market terminology and stock exchange new issues. (9)

**CAPITAL BUDGETING:** Capital budgeting process and evaluation – pay-back method, average rate of return, net present value method, internal rate of return method, profitability index method. (9)

**Total L: 45****TEXT BOOKS:**

1. I M Pandey, "Essentials of Financial Management", Fourth Edition, Vikas publishing house Pvt. Ltd, 2015.
2. Prasanna Chandra, "Financial Management theory and practice", Eight edition, Tata McGraw Hill Education Pvt. Ltd, 2011.

**REFERENCES:**

1. Khan M Y, Jain P K, "Financial Management Texts, Problems and Cases", Tata McGraw Hill Publishing company Ltd., 2007.
2. James C, Van Horne, John Martin Wachowicz, "Fundamentals of Financial Management", 13<sup>th</sup> Edition, Prentice Hall, 2008.
3. Maheshwari S N, "Financial Management: Principles And Practice", Sultan Chand and Sons New Delhi 2014.
4. Rajiv Srivastava, Anil Misra, "Financial Management", Oxford University Press, New Delhi, 2010.

**20FD92 STORE PLANNING AND DISPLAY TECHNIQUES****3 0 0 3**

**STORE PLANNING AND DESIGN:** Functions of a store planner, floor plans – drawing to scale, materials; reading a floor plan – architectural symbols, store planning symbols, dimensional drawing. (8)

**POINT OF PURCHASE DISPLAY:** Application, users, designing the PoP unit, specialist in PoP design, PoP fixtures and checklist. Signage and graphics - signage – types of signs, sign materials, letter materials, sign layout, key points in creating signs; Graphics – development, images, classification. (10)

**MATERIALS AND PROPS:** Materials – boards, fabric, paper, paint, carpet, wood, other materials. Props – objects, furniture, merchandise used as props, display house props, in-house constructions. (8)

**EXHIBIT AND TRADESHOW DISPLAY:** Industrial display – types of exhibits, planning the exhibit, graphics lighting, special effects. (9)

**EXECUTION OF VISUAL PRESENTATION:** Selecting a merchandise, preparing the merchandise, assembly props and materials, preparing the display space, selecting the mannequin and forms, preparing the lighting, installing the display, display sketches, graphic floor plan, developing specific display. (10)

**Total L: 45****TEXT BOOKS:**

1. Diamond J, "Contemporary Visual Merchandising and Environmental Design", Prentice Hall, New Jersey, 2006.
2. Martin M.Pegler, "Visual Merchandising and Display", Berg Publishers, UK, 2006.

**REFERENCES:**

1. Elaine stone, "Fashion Merchandising – An Introduction", New York, 2001.
2. Swati Bhalla and Anuraag S, "Visual Merchandising", Tata McGraw-Hill Education, New Delhi, 2010.

**20FD93 ENTREPRENEURSHIP****3 0 0 3**

**INTRODUCTION TO ENTREPRENEURSHIP:** Definition – characteristics and functions of an entrepreneur – common myths about entrepreneurs, importance of entrepreneurship. Creativity and innovation - the role of creativity, the innovation process, sources of new ideas, methods of generating ideas, creative problem solving, entrepreneurial process. (12)

**FORMS OF BUSINESS ORGANIZATION:** Sole proprietorship, partnership, limited liability partnership, joint stock companies and cooperatives. (5)

**APPRAISAL OF PROJECTS:** Importance of evaluating various options and future investments- entrepreneurship incentives and subsidies, appraisal techniques. (5)

**DEVELOPING AN EFFECTIVE BUSINESS MODEL:** Importance of a business model, starting a small-scale industry, component of an effective business model. Financing the new venture - determining financial needs, sources of financing, equity, and debt funding. Case studies in evaluating financial performance. (11)

**MARKETING FUNCTION:** Industry analysis, competitor analysis, marketing research for the new venture – defining the purpose or objectives, gathering data from secondary sources, gathering information from primary sources, analyzing and interpreting the results, the marketing process. Intellectual property protection and ethics - patents, copyright, trademark, geographical indications – ethical and social responsibility and challenges. (12)

**Total L: 45****TEXT BOOKS:**

1. Donald F Kuratko and Richard M Hodgetts, "Entrepreneurship", South-Western, 2003.
2. Vasant Desai, "The Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, 2010.

**REFERENCES:**

1. S L Gupta and Arun Mittal, "Entrepreneurship Development", International Book House, 2012.
2. G S Sudha, "Management and Entrepreneurship Development", Indus Valley Publication, 2009.
3. V Badi and N V Badi, "Business Ethics", R Vrinda Publication (P) Ltd., 2012.
4. Arya Kumar, "Entrepreneurship", Pearson. 2012.

**20FD96 RETAIL PLANNING LABORATORY****0 0 4 2**

1. Identify suitable store location and select a site for fashion retail outlet.
2. Develop strategic and tactical plan to retail a fashion product.
3. Develop a human resource plan for retail business.
4. Plan and allocate merchandise and analyze the performance of merchandise. Execute supply chain management.
5. Plan and create promotions for the retail store.
6. Plan and execute visual merchandising for the store.
7. Analyze stock data and consumer data.
8. Develop an estimation for budget and turnover.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD97 SPECIALITY WEAR LABORATORY****0 0 4 2**

1. Understanding the ergonomic requirements design, draft, construct and analyze fit and comfort for the following categories:
  - a. School uniform
  - b. Specially-abled
  - c. Elderly
  - d. Maternity wear
  - e. Work wear

**Total P: 60**

**REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**20FD98 PORTFOLIO DEVELOPMENT LABORATORY II****0 0 4 2**

1. Constructing the garments designed in portfolio development laboratory I.
2. Presenting the constructed garments with a creative photo shoot.
3. Preparing a creative resume stating the design philosophy.
4. Preparing the portfolio.

**Total P: 60****REFERENCE:**

1. Laboratory manual prepared by the Department of Apparel and Fashion Design.

**SEMESTER X****18FD02 PROJECT WORK II****0 0 24 12**

Every student shall undertake the project work II during tenth semester. The project work shall be undertaken in an industry/research organization or in the college in consultation with faculty guide and head of the department. Project work at industry/ research organization shall be jointly supervised by a faculty guide and an expert from the organization.

**PROFESSIONAL ELECTIVES****DESIGN ELECTIVES****20FDA1 THEATRE AND FILM COSTUMES****3 0 0 3**

**INDIAN THEATRE:** Theatre evolution – ritual to theatre; Western, eastern, and Indian theatre - Sanskrit theatre and devotional theatres. (12)

**THEATRE COSTUMES:** Study of regional theatre, modern theatre and dance costumes; Theatre practitioners, image-makers. (11)

**FILM COSTUMES:** Fundamentals of costume design for film, design objectives, costume designer's process, the role of costume designer in film and television. (11)

**COSTUME DESIGN:** Developing design for film costumes, specialty costumes, accumulating, assembling and fitting the costumes. (11)

**Total L: 45****TEXT BOOKS:**

1. H S Shiva Prakash, "Incredible India - Traditional Theatres", Wisdom Tree, New Delhi, 2007.
2. Holly Colle and Kristin M Burke, "Costuming for film", Silman James, 1<sup>st</sup> edition, 2005.

**REFERENCES:**

1. Karen Brewster and Melissa Shafer, "Fundamentals of Theatrical Design", Allworth Press, New York, 2011.
2. Milly S Baranger, "Theatre – A Way Of Seeing", Cengage Learning, USA, 2015.
3. Richard La Motte, "Costume Design 101", Heinemann, Portsmouth, Michael Wiese Productions, USA, 2<sup>nd</sup> edition, 2010.
4. Sonal Mansingh, "Incredible India – Classical Dances", Wisdom Tree, New Delhi, 2010

**20FDA2 FOOTWEAR DESIGNING****3 0 0 3**

**DESIGNING OF FOOTWEAR:** Foot- anatomy, methods of feet measurement, factors influencing choice of footwear by consumers; Study of colours, chromatic cycle, material, components of footwear, types of footwear; Survey of designs. (7)

**DEVELOPMENT OF LAST:** Last - importance, types, tools, selection, preparation, model making, modeling points, quality of last materials, proper last fitting. Last profile; Making of last (center line, front, back, tread line) chappal and sandal pattern. Preparation of insole and sole pattern, standards and lining standards, section pattern for uppers and lining for various designs. Comparison of foot and last measurement. International sizing systems. Conversion from one scale to another. (12)

**PATTERN MAKING AND CUTTING:** Tools, methods and equipments for pattern making. Principles of grading - grading Methods -hand pantograph, geometrical, comparative and radial tools systems and CAD. Cutting based on different materials - manual cutting, machine cutting, die cutting and binding machine; Storage of patterns. (9)

**SEWING:** Seam – types; Edge treatments – types and machines. Binding - materials and application process. Finishing – types for different parts of footwear. (9)

**FITTING AND TESTING:** Judging the fit, care and maintenance. Testing and quality assessment - universal testing machines, methods and standards. Packing and marketing. (8)

**Total L: 45****TEXT BOOKS:**

1. Elinor Renfrew and Colin Renfrew, "Basics Fashion Design: Developing a Collection", AVA publishing, SA, 2009.
2. Tim Skyrme, "Bespoke Shoemaking, A Comprehensive Guide to Handmade Footwear", Artzand Publications, UK, 2006.

**REFERENCES:**

1. Lazlo Vass and Magda Molnar, "Handmade Shoes for Men", Hf Ullmann, Germany, 2010.
2. Sue Huey and Rebecca Proctor, "New Shoes: Contemporary Footwear Design", Laurence King Publishers, UK, 2011.
3. Jonathan Walford, "Shoes A-Z: Designers, Brands, Manufacturers and Retailers", Thames and Hudson, UK, 2010.

**20FDA3 WORLD ART AND CRAFT****3 0 0 3**

**ART AND CRAFT OF ASIA:** Evolution of world art; Study of art and craft - Cambodia, China, Indonesia, Japan, Laos, Malaysia, Myanmar, Nepal, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam and Pakistan. (12)

**ART AND CRAFT OF EUROPE:** Study of art and craft - Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Hungary, Iceland, England, Scotland, Germany, Italy, Latvia, Romania, France, Greece, Spain, Sweden and Switzerland. (11)

**ART AND CRAFT OF AMERICA:** Study of art and craft of North America – Canada, Mexico and USA; Study of art and craft of South America – Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador and Peru. (11)

**ART AND CRAFT OF AFRICA AND MIDDLE EAST:** Study of art and craft - Egypt, Kenya, Morocco, South Africa, Saudi Arabia, Jordan, Oman, Yemen, Turkey, Israel and Iran. (11)

**Total L: 45****TEXT BOOKS:**

1. Marilyn Stokstad and Michael W.Cothren, "Art History", Vol. 1 & 2, Pearson Publishers, New York, 2017.
2. Christina Maranci, "A Survival Guide for Art History Students", Pearson Publishers, New York, 2005.

**REFERENCES:**

1. Anne D'Alleva, "Methods and Theories of Art History", Laurence King Publishing, 2<sup>nd</sup> edition, London, 2012.

**20FDA4 SUSTAINABLE FASHION****3 0 0 3**

**RETHINKING FASHION DESIGN:** Designers; Consumption of fashion; Supply chain; Life cycle of a garment- design, fabric and garment production, distribution and retailing, usage and disposal; Developments in sustainable fashion; Ethical design; Sustainable garment design. (10)

**MATERIAL DIVERSITY:** Natural fibers-plant fibers, animal fibers; Sustainable fiber - organic, pineapple leaf fiber, lotus flower fiber, flax, recycled fibers; Naturally dyed fiber; Fabric finishes- bio materials, bio polymers and nano. (10)

**ETHICALLY MADE:** Weaving, knitting, non-woven; Fabric processing; Naturally dyed fabric; Production- zero waste technique, seam less garment technology. (10)

**SUSTAINABLE DESIGN STRATEGY:** Usage- laundry, maintenance, repairs; Disposal- recycle, sharing, reuse, remanufacture, up cycling, durability. (10)

**DISTRIBUTION:** Local communication, green washing, consumer engagement, collaboration. (5)

**Total L: 45****TEXT BOOKS:**

1. Alison Gwilt, "A Practical Guide to Sustainable Fashion", Bloomsbury, 2014.
2. Kate Fletcher, "Sustainable Fashion and Textiles" Routledge, 2014.

**REFERENCES:**

1. Kirsi Niinimäki, "Sustainable fashion: New approaches", Aalto Arts Books, 2013.
2. Miguel Angel Gardetti and Subramanian Senthilkannan Muthu, "Handbook of Sustainable Luxury Textiles and Fashion", Springer, 2016.

**20FDA5 CREATIVE THINKING IN FASHION DESIGN****2 2 0 3**

**CREATIVITY AND THE ENVIRONMENT:** Introduction to creative thinking, aspects of the designer's environment – physical and psychological; Scanning the environment, change of environment and environmentally friendly designing. (7+6)

**CREATIVITY, COGNITION AND CHARACTER TRAITS:** Creativity and cognition - creativity enhancing cognitive skills, theory of multiple intelligence and technology; Creativity and character traits – character traits associated with creativity, affective dimensions of design, expressing traits through fashion design and meanings of dress. (6+6)

**CREATIVITY AND MOTIVATION:** Intrinsic and extrinsic motivation, motivations to explore, human motivations, motivations to design and community involvement. (6+6)



**CREATIVITY AND THE DESIGN PROCESS:** Design process, the holistic approach of design, design as problem solving and pitfalls for designers. (6+6)

**CREATIVITY IN THE INDUSTRY:** Fashion design portfolio, professional presentations, fashion design in context, creative collaborations, the ethical designer and the future of fashion. (5+6)

**Total L: 30 + T: 30 = 60**

**TEXT BOOKS:**

1. Tracy Jennings, "Creativity in Fashion Design", Fairchild Publications, New York, 2011.
2. Rod Judkins, "The Art of Creative Thinking", Hachette Book Publishing, New York, 2015.

**REFERENCES:**

1. Daniel Ling, "Complete Design Thinking Guide for Successful Professionals", Createspace Independent Pub, 2015.
2. Thomas Lockwood, "Design Thinking", Allworth Press, New York, 2009.

## 20FDA6 NEW PRODUCT DESIGN

**3 0 0 3**

**PRODUCT DESIGN:** Characteristics of successful product development. Designer and his team; Duration and cost, challenges of product development. Generic development process. Concept development, adaptation of generic product development process, product development process flow. Product development organizations – choosing an organizational structure. (12)

**PRODUCT PLANNING:** Types of product development projects, product planning process – identify opportunities, evaluate and prioritize projects, allocate resources and plan timing, complete pre-project planning, reflect on the results and the process. (8)

**PRODUCT SPECIFICATION:** Identifying the customer needs – interpreting and organizing the customer needs into hierarchy. Product specification – establishing target specifications, setting the final specifications. Concept – generation, selection, screening, scoring and testing. (12)

**PRODUCT ARCHITECTURE:** Types of modularity, implications, establishment, delayed differentiation, platform planning and related system level design issues. (5)

**COSTING AND PROTOTYPING:** Estimation of manufacturing costs, reducing component costs, assembly cost and production cost. Prototyping – principles, technologies, planning. (8)

**Total L: 45**

**TEXT BOOKS:**

1. Karl T Ulrich and Steven D. Eppinger, "Product Design and Development", Irwin/McGraw-Hill, New York, 2011.
2. Karl T Ulrich, "Design Creation of Artifacts in Society", Published by University of Pennsylvania, Philadelphia, 2011.

**REFERENCES:**

1. Harold Carr and John Pomeroy, "Fashion Design and Product Development", Wiley Publisher, 1993.
2. Linda Gorchels, "The Product Manager's Handbook", McGraw-Hill publishing Company, 2000.

## 20FDA7 FASHION SHOW MANAGEMENT

**3 0 0 3**

**FASHION SHOW:** Definition, history, terms, categories and specialized fashion presentation. (6)

**PLANNING:** Developing leadership, targeting the audience, timing the show, finding a venue, creating fashion show themes, estimating the budget, protecting people and things, finalizing the fashion show plan; Promotion – advertising, public relation, direct marketing, other forms of promotion, sponsorship, creative development of promotional material and documentation. (14)

**WORKROOM AND FRAMEWORK:** Merchandise selection process, relationships with merchants, merchandise pull, merchandise lineup, merchandise fitting, staging, the dressing area, backgrounds, props, seating patterns, lighting, music, sound system and verbiage. (12)

**FASHION MODELS:** Fashion models, model classification, career opportunities for models, modeling agencies, the downside of modeling, professional versus amateur models, number and rotation of models, model responsibilities, beauty on the runway and choreography. (5)

**FINAL SHOW:** Rehearsing, preparing backstage, media management, presenting the fashion show, closing the show, striking the show, being professional, canceling a show, wrapping up, evaluating specific elements and measuring success. (8)

**Total L: 45**

**TEXT BOOKS:**

1. Judith C Everett and Kristen K Swanson, "Guide to Producing a Fashion Show", Bloomsbury Publishing, USA, 2015.
2. Gill Stark, "The Fashion Show: History, Theory and Practice", Fairchild Books, USA, 2018.

**REFERENCES:**

1. Federico Poletti and Georgia Cantarini, "The Fashion Set: The Art of the Fashion Show", Roads Publishing, UK, 2016.

**20FDA8 FASHION STYLING****3 0 0 3**

**FASHION VS STYLE:** Evolution of style, the classicists, the rule-breakers, fast fashion, simple life and signature style – the magic words, break the rules, be inspired, proportion. Understanding body shapes. (9)

**STYLING AND ITS TYPES:** Fashion styling; Fashion stylist – responsibilities of a fashion stylist, qualities of a fashion stylist, areas of stylist; Types of styling - editorial, news paper, catalogue, commercial. (6)

**STYLING PROCESS:** Receiving a job offer, estimating & negotiating fee, following a brief, prepare for shoot, pre-production meeting, call sheets, working with public relation officer, call-ins, fittings, the shoot and credits. (12)

**STYLING TOOLS AND TECHNIQUES:** Stylist kit – main kit, on-set kit and fittings kit; Styling tips; Techniques – technical skills, testing, technical tips, portfolio book and contact book. (9)

**BUILDING A PORTFOLIO:** The book; Collecting, printing and sending of images, selection of images; Professional requirement; Presentation of images in book, digital portfolio, building a website. (9)

**Total L: 45****TEXT BOOKS:**

1. Danielle Griffiths, "Fashion Stylist's Handbook", Laurence King Publishing, UK, 2012.
2. Jo Dingeman's, "Mastering Fashion Styling", Macmillan International Higher Education, UK, 1999.

**REFERENCES:**

1. Hillary Kerr, Katherine Power, "What to Wear, Where: The How-to Handbook for Any Style Situation", Harry N. Abrams Publisher; New York, 2011.
2. Alexandra Fullerton, "How to Dress: Secret styling tips from a fashion insider", Pavilion Books, UK, 2018.

**20FDA9 FASHION JOURNALISM****3 0 0 3**

**JOURNALISM AND MEDIA:** History, evolution, scope, functions, kinds and principles. Fashion industry – brands, seasons, designers, market, design process. Fashion media and audiences – print media, broadcast, online, tablet edition. Importance of brand, audiences and advertising agencies. (11)

**NEWS WRITING:** Ideas, sources and interviewing. Writing fashion news and features – ground rules for writing, writing news – online, e-tail and audience. Developing the news content. (12)

**REPORTING:** The shows, catwalk, trends – spotting, reporting and critical analysis. Fashion photography – product, ideas for shoot, planning a shoot, photography for different media and fashion video. (11)

**SOCIAL MEDIA AND PUBLIC RELATIONS:** Fashion blogging and social media – benefits and appeal of blogs, brands, impact on journalism, ethics and transparency. Public Relations – introduction, importance, public relations and fashion journalist, law and ethics. (11)

**Total L: 45****TEXT BOOKS:**

1. Julie Bradford, "Fashion Journalism", Routledge Taylor and Francis group, 2015.
2. Frank Barnas, "Broadcast News Writing, Reporting, and Producing", Taylor and Francis, 7<sup>th</sup> Edition, 2017.

**REFERENCES:**

1. Wheeler S, "Feature Writing for Journalists", Routledge (1st Edition), 2009.
2. Merry Aronson, Don Spetner, Carol Ames, "The Public Relations Writer's Handbook: The Digital Age", John Wiley & Sons, London, 2010
3. W. Richard Whitaker, Janet E. Ramsey, Ronald D. Smith, "Media Writing: Print, Broadcast, and Public Relations" Routledge, 3rd Edition 2009.
4. Seth Gitner, "Multimedia Storytelling for Digital Communicators in a Multiplatform World", Routledge, 2015

## PRODUCTION ELECTIVES

### 20FDB1 INTIMATE APPARELS

**3 0 0 3**

**CLASSIFICATION AND QUALITY REQUIREMENTS:** Types- whole body, upper body and lower body. Classification - kid's, women's and men's intimate apparel. Quality requirements- fibers, fabrics, designs. Comfort aspects, physical and physiological health effects. (6)

**MEN'S WEAR:** Drafting and construction– long johns, tank top, tanga, boy shorts, knickers, bikini underwear, thong, boxer briefs, boxer shorts and jockstrap. (7)

**WOMEN'S LINGERIE:** Drafting and construction - waist 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. Night wear - drafting and construction - night gown, pajamas, negligee, peignoir and baby doll. (13)

**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. (6)

**INTIMATE APPAREL ACCESSORIES AND PRODUCTION TECHNOLOGY:** Bra wire, hook and eye tape, ring and slider, buckle, plastic bone, elastics and threads. Production technology - Principles, methods, technical aspects and controls of lamination, molding and welding for production of intimate apparels. (13)

**Total L: 45**

#### TEXT BOOKS:

1. W Yu, J Fan, S C Harlock and S P N, "Innovation and Technology of Women's Intimate Apparel", Woodhead Publishing Limited, England, 2006.
2. Ann Haggart, "Pattern Cutting for Lingerie, Beach Wear and Leisure Wear", Black Well Science Limited, France, 2001.

#### REFERENCES:

1. Lynn Nottage, "Intimate Apparel / Fabulation", Theatre Communications Group, USA, 2006.
2. Stokes Terry, "Intimate Apparel", Brooklyn: Release Press, USA, 1980.

### 20FDB2 SPORTS WEAR

**3 0 0 3**

**FABRIC SELECTION IN SPORTSWEAR DESIGN:** Design considerations, advances in sportswear manufacturing techniques, performance requirements; Waterproof fabrics and finishes, wearable electronics, new approaches in corporate social responsibility, elastomeric fibers, yarns and fabrics in sportswear, biomimetic textiles. (12)

**KNITTING TECHNOLOGY FOR SEAMLESS SPORTSWEAR:** Requirements, manufacturing technique, application, advances in non-traditional fabric joining technologies. (11)

**SPORTSWEAR FOR PERFORMANCE:** Physiological strain in sports, thermal strain indicators, thermal sensation. Assisting sports performance, wearable sensors – requirements, types, potential and commercial applications. (11)

**SPORTSWEAR FOR PROTECTION:** Cold weather sportswear - requirements, type of textiles and thermal insulation properties. (11)

**Total L: 45**

#### TEXT BOOKS:

1. Roshan Shishoo, "Textiles for Sportswear", Woodhead Publishing, Cambridge, 2015.
2. Marie O'Mahony and Sarah E Braddock, "Sportstech", Thames & Hudson, London, 2002.

#### REFERENCES:

1. Klaus N Hang, Sportswear International, "The Sports Bible", DFV Publishing Group, Frankfurt, 2008.
2. Joy McKenzie, "The Best in Sportswear Design", BT Batsford, London, 1997.
3. Susan M Watkins and Lucy E Dunne, "Functional Clothing Design", Fairchild Books, London, 2015.

### 20FDB3 FASHION DENIM WEAR

**3 0 0 3**

**DENIM MANUFACTURING:** Yarn characteristics, quality requirements, spinning, yarn dyeing and sizing. Lycra - properties, yarn parameters, factors influencing denim manufacturing. Fabric - characteristics, types, fabric parameters, fabric faults. Manufacture of lycra denim and knit denim. (11)

**DENIM PROCESSING AND FINISHING:** Dyes - properties, characteristics, conditions, requirements, for dyeing and chemistry of dyeing; Machinery - types, process variable, parameters, factors influencing dyeing. Precautions and developments, assessment of dyed fabrics, knitted denims- processing parameters, problems and troubleshooting. Finishing - permanent press, preshrinking, integrated finishing and shrinking range, sanforizing, pre-drying, ammonization and skewing. (12)

**DENIM GARMENTING AND WASHING:** Men's wear, children's wear, style variations, construction sequence, sewing parameters, machinery used, special attachments, sewing threads, seam and stitch parameters, trims, accessories, size and fit requirements, care labeling. Washing - process conditions, machines, chemicals used for special effects – pumice stones, acid and enzyme wash, denim bleaching, bio polishing and bio stoning , sand blasting, potassium permanganate spray, grinding, whiskering, ozone and laser fading. (12)

**UNCONVENTIONAL DENIMS:** Tinted, over dyed, reverse, pseudo and stretch denim. Denim effects - peach skin effect, quick wash, vintage wash, golf wash, tie 'n' wash, marble wash, crush and sueding. (10)

**Total L: 45**

#### TEXT BOOKS:

1. Parmar M S, Satsangi S S and Jai Prakash, "Denim – A fabric for all", NITRA Publications, 1996.
2. Li Y, "Denim Apparel Design, Manufacture and Finishing", CRC Press, 2005.

#### REFERENCES:

1. Roshan Paul, "Denim: Manufacture, Finishing and Applications", Elsevier, Woodhead Publishing Ltd., Cambridge, 2015.
2. Michael Harris, "Jeans of the Old West – A History", 2010.
3. Graham Marsh, Paul Trynka and June Marsh, "Denim: From Cowboys to Catwalks: A History of the world's Most Legendary Fabric", Samurai Publications, 2005.

## 20FDB4 GARMENT SIZE AND FIT ANALYSIS

**3 0 0 3**

**ANTHROPOMETRIC DATA SURVEY:** Significance, methodology and statistical compilations, data collection, measuring procedure, accuracy of measurements, subject and sample size selection. Analyzing anthropometric data for developing sizing system, apparel size designation and labeling. International apparel sizing and standardization of sizes. (8)

**SUBJECTIVE AND OBJECTIVE EVALUATION OF CLOTHING FIT:** Importance, fit standards, influential factors. Testing methods for dimensional fit, subjective rating scales, subjective fitting guide, algebraic evaluation of clothing fit, clothing waveform, pressure evaluation and 3D modeling. (10)

**SUBJECTIVE AND OBJECTIVE ASSESSMENT OF CLOTHING APPEARANCE:** Assessment of fabric surface smoothness, seam appearance, crease retention and appearance retention of finished garments. Objective evaluation of clothing appearance - fabric properties related to clothing appearance and fit, fabric wrinkling and pilling, seam pucker and overall garment appearance. (10)

**GARMENT DRAPE:** Measurement of fabric drape, empirical relationship of static drape, dynamic and seamed fabric drape, modeling fabric and garment drape, drape models in commercial CAD systems. (5)

**GARMENT DESIGN FOR INDIVIDUAL FIT:** Pattern alteration for fit, three dimensional apparel design systems for pattern generation and garment fit. Computer design and digital fit of clothing, wearing comfort and body motion analysis. Fitting solutions - analyzing the causes for poor fit and solving fitting problems in trouser, sari blouse, skirt and ladies' top. (12)

**Total L: 45**

#### TEXT BOOKS:

1. Fan J, Yu W and Hunter L, "Clothing Appearance and Fit", Textile Institute, Wood head Publishing Limited, England, 2004.
2. Editors of Creative publishing, "The Perfect Fit- classic guide to alter patterns", Creative Publishing International, USA, 2005.

#### REFERENCES:

1. Lynn Macintyre and Mary Tilton, "Easy Guide to sewing", Taunton Press, USA, 2009.
2. Sandra Betzina , "Fast Fit-Easy Pattern Alterations for Every Figure", The Taunton Press, Inc., Singapore, 2003

## 20FDB5 ERGONOMICS IN APPAREL INDUSTRY

**3 0 0 3**

**ERGONOMICS:** Importance, categories, types, micro and macro ergonomics, anatomical and mechanical structure of the human body, understanding the mind functioning and body movement, human senses. Body interaction with the environment, posture and movement, muscular work and neuro control of movements. (10)

**HUMAN FACTORS AND ERGONOMICS:** Principles, postural stability, body mechanics, musculoskeletal, anatomy of spine and pelvis. Biomechanics of spinal loading, static posture, fundamental aspects of sitting and standing, anatomy – bones, joints, muscles, ligaments, leg and abdominal muscles, physiology of standing, varicose veins, sitting posture, spine problems. (10)

**ANTHROPOMETRICS:** Designing for a population, statistical essentials, types and uses of anthropometric data, applications of anthropometry in design and ergonomics. (8)

**ERGONOMIC PRINCIPLES:** Ergonomic conditions of work, ergonomic principles- designing workplace, working process, determining working time, handling material, tools and designing environment . (8)

**ERGONOMIC DESIGN OF WORKPLACE:** Storage of textile materials, garment manufacture preparation, cutting, sewing and finishing rooms, garment warehouse and distribution, maintenance workplace and clothing store. (9)

**Total L: 45**

**TEXT BOOKS:**

1. Gordana Colovic, "Ergonomics in the Garment Industry", Woodhead Publishing, India, 2014.
2. Bridger R S, "Introduction to Ergonomics", CRC press, India, 2009.

**REFERENCES:**

1. John Arthur Roebuck, "Anthropometric Methods: Designing to Fit the Human Body (Monographs in Human Factors and Ergonomics)", Amazon, 1995.
2. K H E Kroemer, H B Kroemer, K E Kroemer-Elbert , "Ergonomics: How to Design for Ease and Efficiency (2nd Edition)", Prentice Hall, 2001.

## 20FDB6 THREADS AND NEEDLES FOR SEWING

**3 0 0 3**

**THREADS:** Requirements and characteristics of sewing threads, types and application -spun, core spun, continuous filament. Technical sewing threads- aramid, polyetherketone, ceramic, polypropylene, polytetrafluoroethylene, fiber glass, polyethylene, tencel, acrylic, linen, elastic and soluble threads. (12)

**NEEDLES:** Anatomy, size and numbering, characteristics, types and application. Seam and stitch types. OEKO-TEX standards. Selection of threads and needles for different fabric types. (6)

**THREADS FOR SPECIFIC PURPOSE:** Applications - embroidery, high temperature and geo textiles. Ticket numbering, determining thread requirement and cost. Sewing of touch-me-not fabric- selection of sewing thread, stitch structure, needle and other parameters. (10)

**CONSTRUCTION AND CHARACTERISTICS OF THREADS:** Construction- methods, fiber types, twist and direction, ply and cord, size, colour matching and finishes. Characteristics- stresses generated during sewing and impact. Seam performance- compatibility, seam appearance and serviceability. (10)

**TESTING AND QUALITY CONTROL:** Sewability - bulk, mechanical and colour properties of threads. Yellowing; Seam – quality analysis, performance of sewing thread, testing of sewing thread for resistance of UV degradation, sewing defects and seam puckering. (7)

**Total L: 45**

**TEXT BOOKS:**

1. J V Rao and R K Gaur, "Sewing Threads", Northern Indian Textile Research Association, India, April 2006.
2. Glock R E and Kunz G I, "Apparel Manufacturing: Sewn Product Analysis", Prentice Hall, New Jersey, 1995.

**REFERENCES:**

1. J O Ukponmwan, A Mukhopadhyay and K N Chatterjee, "Sewing Threads", The Textile Institute International, Oxford, UK, 2000.
2. Ukponmwan J O, Chatterjee K N and Mukhopadhyay A, "Sewing Threads", The Textile Institute, Manchester, 2001.

## 20FDB7 SMART APPARELS

**3 0 0 3**

**MARKET AND APPLICATION:** Definition, market segments, future perspectives, applications -medical purposes, transportation, energy, protection, security, communication and textile electronics; Other fields. (10)

**SENSORS AND OUTPUT DEVICES:** Transduction, information processing, application and technologies in sensors. Power supply- requirements of portable and energy harvesting devices, energy storage and power management, challenges and opportunities. (11)

**DESIGNING AND MATERIAL SELECTION:** 2D and 3D design development. Knit - influence of knitwear on smart wearables, Application and its relevance. Woven - selection of structure, ease of movements, wicking and thermoregulation, protection and safety; Conductive fabrics – type and structure. Nonwovens - material, process and application. (12)

**PRODUCTION TECHNOLOGIES AND PRODUCTS:** Garment construction, developments in fabric joining, embroidery techniques, print technology. Smart cloth - health, ageing population, specially abled and arts. Environmental and waste issues. (12)

**Total L: 45**

**TEXT BOOKS:**

1. J McCann and D Bryson, "Smart clothes and wearable technology", CRC Press Woodhead Publishing, London, 2009.
2. Vladan K, "Smart Textiles and their Applications", Woodhead Publishing, UK, 2016.

**REFERENCES:**

1. L Ashok Kumar and C Vigneswaran, "Electronics in Textiles and Clothing Design, Products and Applications", CRC Press Woodhead Publishing, London, 2016.
2. Xiaoming Tao, "Smart fibers, fabrics and clothing", CRC Press, Woodhead Publishing, London, 2001.

## **20FDB8 GARMENT TRIMS AND ACCESSORIES**

**3 0 0 3**

**TRIMS AND ACCESSORIES:** Importance and classification. Criteria and factors affecting choice of trims and accessories. (6)

**CLOSURES:** Buttons and buttonholes, buckles, clips, elastics, grommets, hook and eye, thread loops, eyelets, frogs, metal fasteners, plastic fasteners, rivets, snaps, hook and loop tape and zippers –functions, applications, types, styles and industry trends. (12)

**SUPPORT MATERIALS:** Interlining, lining, adhesives, shoulder pads, sleeve headers, tapes, collar stays, corsets, felt, fusible, suspenders, underwire and waistbands – functions, applications, types, styles and industry trends. (13)

**GARMENT TRIMS:** Bindings, edgings, piping, laces, flat trims – braids, tapes, cords, ribbons and bands, labels, embroidery, appliqué, bows, Inset trims, webbings, screen printing, heat transfer and digital printing-functions, application procedure, types and industry trends. (14)

**Total L: 45**

**TEXT BOOKS:**

1. Jay Diamond and Ellen Diamond, "Fashion Apparel, Accessories and Home Furnishings", Pearson Prentice Hall, New Jersey, 2007.
2. Elaine Stone, "The Dynamics of Fashion", Fairchild Publications, New York, 2001.

**REFERENCES:**

1. Jennette A Jarnow, "Inside the Fashion Business", Macmillan publishing, New York, 1999.
2. Gini Stephen Frings, "Fashion Concept to Consumer", Prentice Hall, New Jersey, 2004.
3. Harrold Carr and Barbara Latham, "Technology of Clothing Manufacture", Blackwell Scientific Publications, UK, 2000.
4. Ruth E. Glock and Grace I Kunz, "Apparel Manufacturing Sewn Product Analysis", Prentice Hall, New Jersey, 2004.

## MANAGEMENT ELECTIVES

### 20FDC1 HUMAN RESOURCE MANAGEMENT

**3 0 0 3**

**NATURE AND SCOPE OF HUMAN RESOURCE MANAGEMENT:** Meaning and definition of HRM, objectives and functions of HRM, models of HRM, HRM in a changing environment, human resource management in the wake of globalization. (10)

**TRAINING AND DEVELOPMENT:** Principles of learning, objectives, types and training methods, management development - its meaning, scope and objectives. Wage and salary administration - principles and techniques of wage fixation, job evaluation, incentive schemes. (10)

**PERFORMANCE APPRAISAL:** Process, methods, factors that distort appraisal, case studies in methods to improve performance, role of performance in the performance management process, performance appraisal vs. potential appraisal. (7)

**MORALE AND MOTIVATION OF EMPLOYEES:** Morale-importance of moral and motivation methods of employees, empowerment – factors affecting empowerment – process – benefits. (8)

**WORK ENVIRONMENT AND TERMS AND CONDITIONS OF EMPLOYMENT:** Fatigue – safety – accident prevention accident records – factories act of 1948 and pollution legislations. Trends in HR: HR outsourcing – HRIS – management of turnover and retention- workforce renationalization- managing separation- case studies in trends in employee engagement and retention. (10)

**Total L: 45**

#### TEXT BOOKS:

1. Gary Dessler, "Human Resource Management", Prentice Hall of India, New Delhi, 2009.
2. VSP Rao, "Human Resources Management Text and Cases", Excel Books, 2010.

#### REFERENCES:

1. Dezenzo A David and Robbins P Robbins, "Human Resource Management", John Wiley and Sons, Inc, MA., 2002.
2. Aswathappa K, "Human Resource and Personnel Management – Text and Cases", Tata McGraw Hill, 2007.
3. Bernardin H, John, "Human Resource Management – An experiential Approach", Tata McGraw Hill, 2004.
4. Cascio H, Wayne, "Managing Human Resources – Productivity, Quality of Work Life and Profits", Tata McGraw, 2009.

### 20FDC2 OPERATIONS MANAGEMENT

**3 0 0 3**

**INTRODUCTION TO OPERATIONS MANAGEMENT:** Operations management – nature, importance, historical development, transformation processes, differences between services and goods, a system perspective, functions, challenges, current priorities, recent trends - operations strategy – strategic fit, framework - supply chain management . (9)

**FORECASTING, CAPACITY AND FACILITY DESIGN:** Demand forecasting – need, types, objectives and steps - overview of qualitative and quantitative methods, capacity planning – long range, types, developing capacity alternatives, overview of sales and operations planning, facility location – steps in selection, location models, facility layout – principles, types, planning tools and techniques. (9)

**DESIGN OF PRODUCT, PROCESS AND WORK SYSTEMS:** Product design – influencing factors, approaches, legal, ethical and environmental issues, process – planning, selection, strategy, major decisions, work study – objectives, procedure, method study and motion study, work measurement and productivity – measuring productivity and methods to improve productivity. (9)

**MATERIALS MANAGEMENT:** Materials management – objectives, planning, budgeting and control, purchasing – objectives, functions, policies, vendor rating and value analysis, stores management – nature, layout, classification and coding, inventory – objectives, costs and control techniques, overview of JIT. (9)

**SCHEDULING AND PROJECT MANAGEMENT:** Project management – scheduling techniques, PERT, CPM, scheduling - work centers – nature, importance, priority rules and techniques, shop floor control, flow shop scheduling – Gantt charts, personnel scheduling in services. (9)

**Total L: 45**

#### TEXT BOOK

1. Chary S N, "Production and Operations Management", Tata McGraw Hill Publishing Co. Ltd., Noida, 3<sup>rd</sup> edition, 2009.
2. Pannerselvam R, "Production and Operations Management", Prentice Hall India, New Delhi, 2<sup>nd</sup> edition, 2008.

#### REFERENCES

1. Richard B Chase, Ravi Shankar, F Robert Jacobs and Nicholas J Aquilano, "Operations and Supply Management", Tata McGraw Hill Pub Co., Ltd., Noida, 12<sup>th</sup> Edition, 2010.
2. William J Stevenson, "Operations Management", Tata McGraw Hill Pub Co. Ltd., Noida, 9<sup>th</sup> Edition, 2011.
3. Kanishka Bedi, "Production and Operations Management", Oxford University Press India, New Delhi, 2008.

4. Aswathappa K and Shridhara Bhat K, "Production and Operations Management", Himalaya Publishing House, Mumbai, 2<sup>nd</sup> Edition, 2008.

### 20FDC3 GLOBAL MARKETING

**3 0 0 3**

**SCOPE AND CHALLENGES OF INTERNATIONAL MARKETING:** Developing global awareness – strategic orientation – planning and organizing international marketing; Market entry strategies. (9)

**CONSUMER PRODUCT STRATEGY:** Standardizing and adaptation- global brands and national brands- product strategy in services segment. Product strategy for business- quality and global standards- business services- relationship marketing hours. (9)

**INTERNATIONAL MARKETING CHANNELS:** Channel-of-distribution and its structures – distribution patterns – alternative choices – selecting, motivating channel members. (9)

**INTEGRATED MARKETING COMMUNICATIONS AND ADVERTISING:** Standardization and adaptation –legal and linguistic limitations – personal selling and sales management; recruiting, training and motivating sales force – evaluating and controlling. (9)

**PRICING STRATEGY:** Approaches for international marketing – leasing – counter trade – transfer pricing. Case studies. (9)

**Total L: 45**

#### TEXT BOOKS:

1. Czinkota M and Ronkainen R, "International Marketing", 10/E, Cengage Learning., 2013.
2. Cateora P R, Graham J L and Salwar P, "International Marketing", Tata Graw – Hill, 2008.

#### REFERENCES:

1. Kotabe M and Helsen K, "Global Marketing Management", Sage Publications, 2012.
2. Gillespie G, Jeannet J P and Hennessey H D, "International Marketing", Cengage Learning, India, 2008
3. Albaum G and Duerr E, "International Marketing and Export Management", 7/E, Pearson India, 2012.
4. Warren J Keegan, Naval K Bhargava, "Global Marketing Management", Pearson, New Delhi, 2013.

### 20FDC4 STRATEGIC BUSINESS MANAGEMENT

**3 0 0 3**

**STRATEGY:** Nature and essence. Strategy vs policies and tactics, levels of strategy. Process of strategy – steps. Strategic analysis - environmental analysis – PESTEL frame work, MC Kiney's 7S framework, organization's strategy with respect to environment. Competitive forces – porter's five forces framework internal analysis – resources, critical success factor (CSF), quantitative and qualitative assessments, SWOT analysis and bench marking. (11)

**BUSINESS LEVEL STRATEGY:** Cost analysis – causes and effects of high costs, influence of market conditions on cost, experienced curve - causes of experience curve effect, experience curve and competitive strategy and limitations of experience curve. Differentiation and focus strategies. (9)

**CORPORATE LEVEL STRATEGY:** Growth strategies – expansion - expansion through intensification and integration, international expansion. Diversification – concentric, conglomerate, alternate routes of diversification - mergers, acquisitions and Demerger strategic partnering. Case studies. (9)

**STRATEGIC IMPLEMENTATION:** Structural dimensions – matching organization structure to strategy, determinants of organization structure. Strategy related benefits and limitations. Behavioural dimensions – role of leadership, functions of leadership, leadership styles. (9)

**STRATEGY CONTROL AND EVALUATION:** Strategic control process and evaluation, business portfolio analysis – BCG Matrix, GE's business planning grid. (7)

**Total L: 45**

#### TEXT BOOKS:

1. Petter Gottschalk, "Strategic knowledge management technology", Idea group publishers, Canada, 2010.
2. Ghosh P K, "Business Policy Strategic Planning and Management", Sultan Chand and Sons, New Delhi, 2008.

#### REFERENCES:

1. Johnson Gerry and Scholes Kevan, "Exploring Corporate Strategy", Prentice-Hall of India, New Delhi, 2004.
2. Rao, Subba P, "Business Policy and Strategic Management", Himalaya Publishing House, Mumbai, 2004.
3. David R, Fred, "Concepts of Strategic Management", Prentice Hall Incorporation Ltd., New Delhi, 1997.
4. Srivastava, R M, "Management Policy and Strategic Management (Concepts, skills and practice)", Himalaya Publishing House, Mumbai, 2009.



## 20FDC5 TOTAL QUALITY MANAGEMENT

**3 0 0 3**

**TOTAL QUALITY MANAGEMENT:** Quality, quality planning, quality control, quality assurance, total quality management. TQM axioms – commitment, scientific knowledge, involvement. Consequences of total quality, total quality management excellence model (TQMEX). (5)

**DEMING AND JURAN APPROACH TO TQM:** Deming's fourteen points for quality management, five deadly sins and diseases, implementing Deming's philosophy, Deming's cycle, opinions of Deming. Juran Approach - habit of quality, quality trilogy, universal break through sequence, Comparison of Juran and Deming approaches. (8)

**CROSBY AND QUALITY TREATMENT:** Crosby's quality vaccine, Crosby's absolutes for quality management, fourteen steps for quality improvement. Building blocks of TQM - Kaizen – objectives, Kaizen and innovation. Total productive maintenance - failure mode and effect analysis, eight pillars of TPM. (12)

**TOOLS AND TECHNIQUES IN TQM:** Statistical quality control – process capability analysis, seven quality improvement tools. Taguchi method. Six sigma methodology. Benchmarking and its types. Quality Function Deployment (QFD), 5S concept. (9)

**MANAGEMENT SYSTEMS FOR TQM:** ISO 9000 system – concepts, classifications and benefits. ISO 9001 - requirements and implementation in apparel industry. ISO 14001 – triggers for adopting environment management system, implementation strategic quality management - principles of quality management, quality planning road map, strategic planning process. Concept of customer driven quality. Case study - implementation of TQM in apparel industry. (11)

**Total L: 45**

### TEXT BOOKS:

1. Dale H Besterfield, "Total Quality Management", Pearson Education, New Delhi, 2011.
2. Poonima M Charantimath, "Total Quality Management", Pearson Education, New Delhi, 2011.

### REFERENCES:

1. Logothetics N, "Managing for Total Quality - From Deming to Taguchi and SPC", Prentice Hall Ltd., New Delhi, 1997.
2. David H, "ISO 9000 quality system handbook", Butterworth publishing, New Delhi, 2006.
3. Douglas C Montgomery, "Introduction to Statistical Quality Control, Wiley Student Edition", 4th Edition, Wiley India Pvt Limited, 2008.
4. James R Evans and William M Lindsay, "The Management and Control of Quality", Sixth Edition, Thomson, 2005.

## 20FDC6 BUSINESS ETHICS AND SOCIAL RESPONSIBILITY

**3 0 0 3**

**INTRODUCTION:** Definition & nature business ethics, characteristics, ethical theories; Causes of unethical behaviour; Ethical abuses; Work ethics; Code of conduct; Public good. (6)

**ETHICS THEORY AND BEYOND:** Management of ethics - ethics analysis [Hosmer model]; Ethical dilemma; Ethics in practice ethics for managers; Role and function of ethical managers- comparative ethical behaviour of managers; Code of ethics; Competitiveness, organizational size, profitability and ethics; Cost of 30 ethics in corporate ethics evaluation. Business and ecological / environmental issues in the Indian context and case studies. (10)

**LEGAL ASPECTS OF ETHICS:** Political – legal environment; Provisions of the Indian constitution pertaining to business; Political setup – major characteristics and their implications for business; Prominent features of MRTP & FERA. Social – cultural environment and their impact on business operations, salient features of Indian culture and values. (9)

**ENVIRONMENTAL ETHICS:** Economic environment; Philosophy of economic grow and its implications for business, main features of economic planning with respect to business; Industrial policy and framework of government contract over business; Role of chamber of commerce and confederation of Indian industries. (10)

**CORPORATE SOCIAL RESPONSIBILITY AND GOVERNANCE:** Definition- evolution- need for CSR; Theoretical perspectives; Corporate citizenship; Business practices; Strategies for CSR; Challenges and implementation; Evolution of corporate governance; Governance practices and regulation; Structure and development of boards; Role of capital market and government; Governance ratings; Future of governance- innovative practices; Case studies with lessons learnt. (10)

**Total L: 45**

### TEXTBOOKS:

1. S A Sherlekar, "Ethics in Management", Himalaya Publishing House, 2009.
2. William B Werther and David B Chandler, "Strategic Corporate Social Responsibility", Sage Publications Inc., 2011

**REFERENCES:**

1. W H Shaw, "Business Ethics", Cengage Learning, 2007.
2. Philip Kotler and Nancy Lee, "Corporate social responsibility: Doing The Most Good for Company and Your Cause", Wiley, 2005.
3. Subhabrata Bobby Banerjee, "Corporate social responsibility: The Good, The Bad and The Ugly", Edward Elgar Publishing, 2007.
4. Robert A G Monks and Nell Minow, "Corporate governance", John Wiley and Sons, 2011.

**20FDC7 INTELLECTUAL PROPERTY RIGHTS****3 0 0 3**

**INTRODUCTION TO INTELLECTUAL PROPERTY RIGHTS:** Basic concepts of intellectual property- patents copyrights, geographic indicators, history of intellectual property rights the way from WTO to WIPO- TRIPS, nature of intellectual property, industrial property, technological research, inventions and innovations. (9)

**NEW DEVELOPMENTS:** Procedure for grant of patents, TM, GIs, trade secrets, patenting under PCT, administration of patent system in India, patenting in foreign countries. (9)

**INTERNATIONAL TREATIES AND CONVENTIONS:** The TRIPs Agreement, PCT Agreement, the patent act of India, patent amendment act (2005), design act, trademark act, geographical indication act, Bayh- dole act and issues of academic entrepreneurship. (9)

**NATIONAL CONVENTIONS:** Strategies for investing in R&D, patent Information and databases, intellectual property rights strength in India, traditional knowledge, case studies. (9)

**INTELLUCTAL PROPERTY VALUATION:** The technologies, know how, concept of ownership, significance of intellectual property in value creation, intellectual property valuation and intellectual property valuation models, application of real option model in strategic decision making, transfer and licensing. (9)

**Total L: 45****TEXT BOOKS:**

1. V Sople Vinod, "Managing Intellectual Property", Prentice Hall of India Pvt. Ltd, 2006.
2. S P Satarkar, "Intelluctual Property Rights and Copyrights", Ess Ess Publications, 2003.

**REFERENCES:**

1. Primer, R Anita Rao and Bhanoji Rao, "Intelluctual Property Rights", Lastain Book company.
2. Edited by Derek Bosworth and Elizabeth Webster, "The Management of Intelluctual Property", Edward Elgar Publishing Ltd., 2006.
3. WIPO Intelluctual Property Hand book.
4. Deborah E Bouchoux, "Intellectual Property: The Law Of Trademarks, Copyrights, Patents, And Trade Secrets", Cengage Learning India P Ltd, New Delhi, 2015.

**20FDC8 FASHION ADVERTISING AND PROMOTION****3 0 0 3**

**ADVERTISING:** Concept, objectives, functions, principles of advertisement, social, economic and legal implications of advertisements, setting advertisement objectives, advertisement agencies – selection and remuneration, advertisement campaigns. Case studies. (9)

**ADVERTISEMENT MEDIA:** Media plan, type and choice criteria, reach and frequency of advertisements, cost of advertisements - related to sales, media strategy and scheduling. Design and execution of advertisements - message development, types of advertisements, layout, design appeal, copy structure; Advertisement production – print, radio, television and web. Media research – testing validity and reliability of advertisements, measuring impact of advertisements. Case studies. (9)

**SALES PROMOTION:** Definition, role, scope, objectives, techniques – trade and consumer oriented. Sales promotion – requirement identification, designing of sales promotion campaign, involvement of salesmen and dealers, out sourcing sales promotion, national and international promotion strategies, integrated promotion, coordination within the various promotion techniques, online sales promotions. Case studies. (9)

**PUBLIC RELATIONS:** Objectives, scope, functions, process, advantages and disadvantages. Integrating public relations into promotional mix- marketing public relation functions, measuring the effectiveness, tools and techniques. Public relations and media relations - public relations consultancy, pros and cons. Opinion survey of public relations in public and private enterprises. Public relations - research, evaluation, counseling- marketing public relations. Public relations - department structure and budgeting. Public relations agencies. (9)

**PUBLICITY:** Meaning, objectives, tools, goals, scope, importance. Difference between marketing, public relations and publicity. Social publicity – web and social media; Publicity campaigns. (9)

**Total L: 45****TEXTBOOKS**

1. George E Belch and Michel A Belch, "Advertising & Promotion", Tata McGraw Hill, 7<sup>th</sup> edition, 2010.
2. Wells, Moriarty and Burnett, "Advertising, Principles & Practice", Pearson Education, 7<sup>th</sup> Edition, 2007.

**REFERENCES**

1. S H H Kazmi and Satish K Batra, "Advertising & Sales Promotion", Excel Books, New Delhi, 2001.
2. Julian Cummings, "Sales Promotion", Kogan Page, London 1998.
3. E Betch and Michael, "Advertising and Promotion", McGraw Hill, 2003.
4. Kenneth Clow and Donald Baack, "Integrated Advertisements, Promotion and Marketing communication", Prentice Hall of India, New Delhi, 2003.

**20FDC9 ORGANIZATIONAL BEHAVIOUR****3 0 0 3**

**INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR:** Meaning and importance, Hawthome studies, basic organizational behaviour model, different approaches to organizational behaviour, significance of organizational behaviour. (5)

**PERSONALITY AND PERCEPTION:** Personality - personality and its determinants, big five personality traits, personality types and attributes, Myers – Briggs type indicator and other primary traits, major personality attributes influencing organizational behaviour. Perception - meaning, perceptual process, selective attention (sensory perception), perceptual barriers, overcomng perceptual distortion, social identity theory, attribution theory, values and attitudes. (9)

**EMOTIONAL INTELLIGENCE AND MOTIVATION:** Emotional intelligence - definition, categories of emotions, dimensions, organizational behaviour applications of emotions. Motivation - definition, characteristics, process, theories and prorganisational behaviourlems. (9)

**LEADERSHIP and GROUP DYNAMICS:** Leadership - foundations, theories of leadership styles and effectiveness, recent approaches. Group Dynamics - difference between group and team, types of groups, model for team effectiveness, troubles with team and social loafing. (9)

**ORGANIZATIONAL CULTURE:** Characteristics of an organizational culture, elements of organizational culture, importance of sub - culture, dimensions of culture, artifacts, adaptive culture and bi-culture audit, changing and strengthening culture. (5)

**EMPLOYMENT RELATIONSHIP AND THE PSYCHOLOGICAL CONTRACT:** Concepts, types of psychological contracts, employability, trust and psychological contract, socialization process psychological contracting, organizational careers. Work Stress - understanding stress at workplace, causes and consequences, stress coping strategies. (8)

**Total L: 45****TEXT BOOKS:**

1. McShane L.Steven, Von Glinow Mary Ann and Sharma R Radha, "Organizational Behaviour", 15/E, Tata McGraw Hill, 2015
2. Stephen P R,Timothy A Judge and Seema Sanghi M, "Organizational Behaviour", 13/E, Pearson Education, 2009.

**REFERENCE**

1. Hellriegel D and Slocum J W, "Organizational Behaviour", 10/E, Mason OH: Q South – Western, 2005.
2. Rao V S P, "Organizational Behaviour", 1/E, Excel Publications, 2009.
3. Nelson L Debra and James Campbell Quick, "Organizational Behaviour", 3/E, Thomson Publishing, 2006.
4. Fred Luthans, "Organizational Behaviour: An Evidence Based Approach", Mcgraw Hill Education (I) P Ltd, Chennai, 2017.

**20FDD1 FASHION CONSUMER BEHAVIOUR****3 0 0 3**

**CONSUMER BEHAVIOUR IN FASHION:** Definition, consumer behaviour and marketing mix, fashion purchases, customization and consumer satisfaction. (10)

**INTERNAL INFLUENCES:** Perceive, learn, and remember, motivation, attitude, personality, and life style. (12)

**EXTERNAL INFLUENCES:** Diffusion of innovation, age, family, lifecycle, social, demographic, psychographic. (8)

**SOCIAL AND CULTURAL INFLUENCES:** Social media and communication, social class, cultural, ethnic, religious, geographic, regional and racial, consumer neuroscience. (10)

**ETHICS AND SOCIAL RESPONSIBILITY:** Consumer theft, shoplifting, counterfeiting, fur and animal testing, labor practices, consumer protection act and product safety. (5)

**Total L: 45**

**TEXT BOOKS:**

1. Patricia Mink Rath, Stefani Bay, Richard Petrizzi, Penny Gill, "The Why of the Buy Consumer Behaviour and Fashion Marketing", Bloomsbury Publishing, New York, 2014.
2. Frank Kardes, Maria Cronley, Thomas Cline, "Consumer Behaviour", Cengage Learning, USA, 2010.

**REFERENCES:**

1. J Paul Peter, Jerry Olso, "Consumer Behaviour & Marketing Strategy", McGraw Hill, London, 2010.
2. Michael R Solomon, Nancy J Rabolt, "Consumer Behaviour in Fashion", Pearson education, New Delhi, 2006.

**OPEN ELECTIVES**  
**DEPARTMENT OF APPLIED SCIENCE**  
**20QH27 COLOUR SCIENCE**

**3 0 0 3**

**LIGHT AND COLOUR:** Sources of light. Colour rendering, reflection, refraction, transmission, absorption and scattering. Colour attributes assessment of colour appearance. (7)

**COLOUR PERCEPTION:** The nature of colour-the physical basis of colour, the human colour vision system. Theories of colour vision, hue, luminosity, lightness, saturation, reducing power and opacity. Metamerism. (7)

**COLOUR DESCRIPTION:** Arrangement of colour, visual attribution of colour, Beer-Lambert's law, colour primaries and colour mixing, additive and subtractive colour mixing, colour specification, colour order systems – Munsell colour order system and Ostwald colour order system. (10)

**COLOUR MEASUREMENT:** Principles of colour measurement, tristimulus values, CIE diagram, standard illuminant, standard observer, spectral reflectance, graphic representation, numeric representation. (10)

**COLOUR MATCHING:** Single constant ( K/S) Kubelka – Munk theory, spectral match, tristimulus match. Computer colour matching -concept of computer colour matching (CCM) system. Application of CCM system to textile processing. Advantages of CCM system. Limitations of CCM system. (11)

**Total L: 45**

**TEXT BOOKS:**

1. Gulrajani M L, "Colour Measurement: Principles, Advances and Industrial Applications", Woodhead Publishing Ltd, Cambridge, 2010.
2. Xin J, "Total Colour Management in Textiles", Woodhead Publishing Limited, Cambridge, 2006.

**REFERENCES:**

1. Volz H G, "Industrial Colour Testing – Fundamentals and Techniques", VCH, 1994.
2. Lucas J, "Colour Measurement – Fundamentals – Vol. I", Eurotex, 1996.
3. McDonald R, "Colour Physics for Industry", Woodhead Publishing Limited, Cambridge, 1997.

**20QH28 PLASMA TECHNOLOGY IN TEXTILE INDUSTRY**

**3 0 0 3**

**GASES AND COLLISION PROCESS:** Masses and number of atoms, kinetic energy and temperature, mean speed, pressure, Avogadro's Laws, number density of gases, impingement flux, monolayer formation time, mean free path, probability of collision, energy transfer and collision frequency. Gas flow types. ionization, excitation, relaxation, recombination, dissociation, electron attachment, ion-neutral collisions, metastable collisions. (10)

**GLOW DISCHARGE:** Plasma species, electron and ion temperature, plasma potential. Glow discharges - DC discharges, RF discharges, microwave discharges, dielectric barrier discharges. Low temperature plasma generation sources. (10)

**PLASMA DIAGNOSTICS:** Plasma diagnostics - electrical probe techniques, spectroscopic methods, optical emission spectroscopy, magnetic diagnostics. (10)

**SURFACE INTERACTION OF TEXTILE WITH PLASMA:** Etching effects of plasma on substrate surface, radical formation on substrate surface, chain scission of surface molecules on polymer substrate, cross-linking formation, functionalization on polymer surface by gas plasma treatment. (10)

**PLASMA ASSISTED DEPOSITION TECHNIQUES FOR FUNCTIONAL TEXTILE:** Physical vapor deposition. Plasma enhanced chemical vapor deposition. Process optimization. (5)

**Total L: 45**

**TEXT BOOKS:**

1. Brian Chapman, "Glow Discharge Processes: Sputtering and Plasma Etching", John Wiley and Sons, 1980.
2. Ian Hutchinson, "Principles of Plasma Diagnostics", Cambridge University Press, 2<sup>nd</sup> edition, 2003.

**REFERENCES:**

1. Milton Ohring, "Materials Science of Thin films", Academic Press, 2<sup>nd</sup> edition, 2006.
2. "Antimicrobial Textiles", Edited by Gang Sun, Woodhead Publishing in association with The Textile Institute, 2016.

**20QH42 ENVIRONMENTAL SCIENCE****3 0 0 3**

**INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES:** Definition of environment-scope and importance of environmental studies. Forest resources - uses and overexploitation of forest – deforestation. Water resources-water footprint -use and over utilization of surface and ground water – conflicts over water – dams-benefits and problems. Land resource: Land degradation – soil erosion – desertification -waste land reclamation. Energy resources: Growing energy needs – renewable and non renewable energy resources – alternate energy resources .Role of an individual in conservation of natural resources. (9)

**ECOSYSTEM:** Concept of ecosystem - food chain and food web – Ecological pyramids – energy flow in ecosystems – characteristic features, structure and functions of the forest, grassland and aquatic ecosystems. (9)

**BIODIVERSITY:** Biodiversity – types – values of biodiversity – Global biodiversity – India as a mega diversity nation- threats to biodiversity – conservation of biodiversity. (9)

**ENVIRONMENTAL POLLUTION:** Definition – causes, types and effects of air pollutants on materials, plants, animals and humans- control methods. Water pollution - sources - classification of pollutants - effects of water pollution. Composition of domestic and industrial waste water. Waste water analysis – Self purification of rivers – Standards for discharge of effluents into water bodies – Waste water treatment methods. Thermal pollution – causes and control methods. Soil pollution – causes, effects and control methods. Solid waste Management – types, causes and effects. Solid waste disposal methods. Definition – causes, effects and control methods of noise and marine pollution. (9)

**SOCIAL ISSUES AND THE ENVIRONMENT:** Population growth, variation among nations – population explosion. From unsustainable to sustainable development – Urban problem related to energy - water conservation, rain water harvesting – water shed management. Environmental ethics – issues and possible solutions. Global warming, green house effects, ozone layer depletion, climate change and acid rain. Human health and environment. Process of EIA - ISO 14000 - environment protection act. (9)

**Total L: 45****TEXT BOOKS:**

1. Girrad J, "Principles of environmental chemistry", Jones & Bartlett Learning, 2014.
2. Deswal S and Deswal A, "An introduction to Environmental Science", Dhanpat Rai & Co Pvt. Ltd.2006.

**REFERENCES:**

1. Sethi M S, "Environmental Chemistry", Shri Sai Printographers, New Delhi, 2012.
2. De A K, "Environmental Chemistry", New Age Publications (Academic), India. 2010.
3. Rao M V R K, "Energy resources: Conventional & Non-conventional", BSP Publications, 2006.
4. Masters G M, "Introduction to Environmental Engineering and Science", Prentice Hall of India, 2004.

**20QH43 GREEN CHEMISTRY****3 0 0 3**

**INTRODUCTION TO GREEN CHEMISTRY:** Definition – principles and concepts of green chemistry – green chemistry and sustainable developments. Atom economy: atom economic reactions, rearrangement reactions and addition reactions - atom un-economic reactions, substitution reactions, elimination reactions and Witting reactions. Reducing toxicity – measuring toxicity. Need of green chemistry for day today life. Design and development of environmentally friendly chemical pathways. (9)

**MEASURING AND CONTROLLING ENVIRONMENTAL PERFORMANCE OF GREENER PRODUCTS:** Importance of measurement – lactic acid production, safer gasoline. Introduction to life cycle assessment (LCA) – carbon footprint - green processes metrics – environmental management systems – ISO 14001 – eco labels – legislation – integrated pollution prevention and control (IPPC).Catalysis – environmental friendly catalysts - bio-catalysts, biodegradable polymers, alternative solvents and ionic liquids. (9)

**RENEWABLE RESOURCES:** Renewable feedstocks – applications of renewable materials: biodegradable plastics – compostable chemicals. Biomass energy: production of ethanol from biomass – production of biodiesel. Bio refinery chemicals from fatty acids - polymer from renewable resources – some other natural chemical resources. Hydrogen generation from algae biological pathways – storage and transportation. (9)

**GREEN TECHNOLOGY FOR ENERGY PRODUCTION:** Green and brown energy resources – solar energy – wind energy – hydropower energy – tidal energy – ocean thermal energy – geothermal energy. Fuel cells - hydrogen as a fuel. (9)

**GOING GREEN:** Green dyeing – building the green house – eating green – drinking green – green office – green resources. Global environmental issues and green computing methods. (9)

**Total L: 45****TEXT BOOKS:**

1. Lancaster M, "Green chemistry: An Introductory Text", The Royal Society of Chemistry, 2016.
2. Marteel-Parrish E A, Abraham M A, "Green chemistry and engineering: A pathway to sustainability", John Wiley & Sons, Inc., Hoboken, New Jersey, 2013.

**REFERENCES:**

1. Mcdilda M G, "The Everything Green Living Book", Adams Media, 2007.
2. Sethi M S, "Environmental Chemistry", Shri Sai Printographers, New Delhi, 2012.
3. Deswal S, Deswal A, "An Introduction to Environmental Science", Dhanpat Rai & Co Pvt. Ltd, 2012.
4. Rao M V, "Energy Resources: Conventional & Non-conventional", BSP publications, 2010.

**20QH44 INDUSTRIAL CHEMISTRY****3 0 0 3**

**HIGH POLYMERS:** Classification – polymerization reactions –synthesis of high polymers–physical and mechanical properties of polymers – glass transition temperature and factors affecting the glass transition temperature. Molecular weight of the polymers: Number and weight average. Fiber forming polymers- elastomeric material. Thermosetting and thermoplastic materials. Elastomers: natural rubber and synthetic rubber – Buna - N, Buna-S and neoprene. Vulcanisation of rubber – foamed polymers. Compounding of polymers. Polymer processing techniques: compression, extrusion, injection, blow molding and calendering. (9)

**PIGMENTS & PAINTS:** Inorganic and organic pigments, dyes, metallic and pearl pigments, testing of pigments, latent solvents and non-solvents. Binder ratio, dilution ratio and dilutability. Classification of paints, constituents and properties of paints. Additives: definition, types of additives. Special paints – fire retardant paints, water repellent paints, temperature indicating paints - composition and applications. (9)

**WATER FOR INDUSTRIES:** Water quality parameters– hardness – units - estimation of hardness by EDTA method – alkalinity– DO– BOD and COD –causes and consequences. Requisites of water for various industries. Water treatment methods: external conditioning – zeolite and demineralization process. Internal conditioning of boiler feed water. Requisites of potable water – water treatment for municipal supply -screening, sedimentation with coagulation and filtration (principles only) – break point chlorination - desalination process. Waste water treatment for pollution control and reuse. (9)

**CORROSION AND ITS CONTROL:** Chemical and electrochemical corrosion – mechanisms. Galvanic corrosion, concentration cell corrosion - atmospheric corrosion, pitting corrosion and crevice corrosion. Stress corrosion, corrosion fatigue, fretting and cavitation. Factors influencing corrosion. Corrosion prevention and control - material selection and design - cathodic protection - use of inhibitors. (9)

**LUBRICANTS:** Lubricants – mechanism of lubrication – viscosity, viscosity index, flash and fire points – oiliness – cloud and pour points – aniline point (determination not included) – additives for lubricants. Greases – types and uses, solid lubricants – graphite and MoS<sub>2</sub>. Synthetic lubricants – silicone oil and fluorinated lubricants. (9)

**Total L: 45****TEXT BOOKS:**

1. Fried J R, "Polymer Science And Technology", Pearson Education, 2014.
2. Roussak, O V and Gesser H D, "Applied chemistry: A textbook for Engineers and Technologists", Springer, 2013.

**REFERENCES:**

1. Kuriacose J C and Rajaram J, "Chemistry in Engineering and Technology", Vol I & II, Tata McGraw hill, 2012.
2. Gowarikar V R, Viswanathan N V and Sreedhar J., "Polymer science", New Age International (P) Ltd., New Delhi, 2003.
3. Sharma, B K, "Industrial chemistry", Goel publishing House, Meerut. 2009.
4. Jain P C, and Monica, "Engineering chemistry", Dhanpat Rai Publishing Company, New Delhi, 2012.
5. Chawla S, "A text book of engineering chemistry", Dhanpat Rai & Co, 2005.

## DEPARTMENT OF ENGLISH

### 20QF10 ENGLISH AND SOFT SKILLS FOR EMPLOYABILITY

**3 0 0 3**

**SELF MANAGEMENT AND ATTITUDES:** Self Concept, Stress management, Positive attitude, Influential Skills, Initiative, Empathy, Social Etiquette (5)

**COMMUNICATION STYLES :** Presentation Skills, Interpersonal Communication Skills, Interviewing Skills, Verbal and Nonverbal (body language) skills, Active Listening, Professional Writing, Effective email writing (16)

**TEAM WORK:** Inter team cooperation, Intra team cooperation, Diversity, Productivity, Goal Setting and action (4)

**LEADERSHIP SKILLS:** Empowerment, Planning, Establishing Credibility, Vision & direction, Supervision, Mentoring, Decision-making, Creativity, Flexibility, Team problem solving (5)

**MANAGING TIME AND PRESSURES:** Managing Change, Time management, Effective meetings (5)

**EFFECTIVE AND EXCELLENT CUSTOMER SERVICE:** Communication with the customer- telephonic and online services, Managing conflicts or Challenging communication, Setting and resetting customer expectations, Building customer confidence, Growing customer relationship, Opportunity management, Developing team approach to meet customer needs. (10)

**Total L: 45**

**TEXTBOOK:**

1. Monograph prepared by the Faculty, Department of English, 2018.

**REFERENCES:**

1. Charles J and Stewart William B Cash, "Interviewing: Principles and Practices", Tata Mc-Graw Hill, New Delhi, 2010.
2. Rao M S, "Soft Skills –Enhancing Employability- Connecting Campus with Corporate", IK International Publishing House, New Delhi, 2010.
3. Simon Sweeney, "English for Business Communication", Cambridge University Press, New Delhi, 2012.
4. Jean Naterop, B and Rod Revell, " Telephoning in English", Cambridge University Press, Cambridge, 2011.

## DEPARTMENT OF APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCES

### 20QH01 OPTIMIZATION TECHNIQUES

**3 0 0 3**

**LINEAR PROGRAMMING:** Introduction to Operations Research – Modeling with linear programming - Graphical method for two dimensional problems – Simplex Algorithm – Two Phase Simplex Method – Special cases of Simplex Method. (12)

**SIMPLEX MULTIPLIERS:** Dual and Primal – Dual Simplex Method– Transportation problem and its solution – Assignment problem and its solution by Hungarian method. (12)

**DECISION THEORY:** Decision Analysis – Decision making under certainty, uncertainty and risk. (6)

**DYNAMIC PROGRAMMING:** Introduction – Recursive nature of computations – Forward & backward recursion for shortest path problem. (8)

**CPM AND PERT:** Critical path network model – CPM computations – PERT calculations. (7)

**Total L: 45**

**TEXT BOOKS:**

1. Hamdy A Taha, "Operations Research – An introduction", Pearson, 2016
2. Hillier and Lieberman, "Introduction to Operations Research", McGraw Hill , 2017.

**REFERENCES:**

1. Richard Bronson and Govindasami Naadimuthu, "Operation Research (Schaum's Outline Series)", McGraw Hill Education, 2017.
2. Wayne L Winston, "Operations Research: Applications and Algorithms", Duxbery press, 2003.



## 20QH02 DATA BASE MANAGEMENT SYSTEMS

**2 2 0 3**

**BASIC CONCEPTS:** Introduction to databases - purpose of database system - characteristics of database approach - advantages of using DBMS - database concept and architecture - data abstraction - data models instances and schema - data independence - schema architecture - components of a DBMS - database languages - database manager - database administrator - database users. (5)

**DATA MODELING:** Introduction - data associations - entities, attributes, relationships - structural constraints - weak and strong entity types - design of entity relationship data model (ERD). (4)

**RELATIONAL MODEL:** Introduction to relational data model - basic concepts - enforcing data integrity constraints - relational algebra operations - extended relational algebra operations (4)

**RELATIONAL DATABASE MANIPULATION:** Introduction to Structured Query Language (SQL) - SQL Commands for Defining Database, Constructing Database, Manipulations on Database - Basic Data Retrieval Operations - Advanced Queries in SQL - Functions in SQL - Aggregation - Categorization - Updates in SQL - Views in SQL- conversion of ERD into tables – applications. (8)

**DATA STORAGE:** Introduction to physical storage – File Organization – Organization of Records. (3)

**DATA BASE DESIGN THEORY:** Database Design Process – Relational database Design – Anomalies in a database - Functional dependencies – axioms – Normal forms based on primary keys – First, Second and Third Normal form - Boyce\_Codd Normal form – examples. (5)

### TUTORIAL PRACTICE:

Implement the following using any RDBMS:

1. Defining and creating database structures such as tables, constraints, indexes and views using DDL.
2. Manipulating and retrieving information from single and multiple tables using DML.
3. Working with SQL complex queries to retrieve data from a database with multiple tables.
4. List of experiments (Problem Sheets) will be given.
5. Students will develop any RDBMS application with appropriate Front-End.

**Total L: 30 + T: 30 = 60**

### TEXT BOOKS:

1. Elmasri R and Navathe S B, "Fundamentals of Database Systems", Pearson Education, 2016.
2. Silberschatz A, Korth H and Sudarshan S, "Database System Concepts", McGraw Hill, 2019.
3. Raghu Ramakrishnan and Johannes Gehrke, "Database Management System", McGraw Hill, 2014.

## 20QH03 WEB DESIGNING

**2 2 0 3**

**INTRODUCTION:** WWW – presentation / business logic layer-Browser architecture – HTTP architecture, Methods, Web Server Architecture. (4)

**HTML:** Basic Structure – HTML tags – Tables – Forms – Links – Frames – DOM – Styling Tags – Images. (6)

**CSS:** Introduction – Types (Where to place CSS) – Rules – Selectors – Styling Fonts – Layouts – Positioning – Bootstrap. (4)

**JAVASCRIPT:** Scripting Languages – Syntax – Variables – Data Types – Operators – Expressions – Conditional Statements – Loops – Arrays – Functions – Event Handling – Enhancing HTML Documents with JavaScript – JQuery – Angular JS. (6)

**PHP:** Evaluation of PHP - Basic syntax – Variables – Constants- Data types –Operator – Expression – Form Processing – Looping – Functions- Arrays – String – Sessions – Cookies – Node.js. (6)

**WEB PUBLISHING / HOSTING:** Host Registration – Domain Registering – Server FTP Upload – AJAX – JSON – MYSQL (4)

### TUTORIAL PRACTICE:

1. Create a simple website using html.
2. Create a website using CSS and JavaScript.
3. Create a simple php page to get the name of the user.
4. Create and upload a website to the web using FTP.

**Total L: 30 + T: 30 = 60**

### TEXT BOOKS:

1. Elizabeth Castro and Bruce Hyslop, "Visual Quickstart Guide: HTML5 and CSS3", Peachpit Press, 2013.
2. Thomas A. Powell and Fritz Schneider, "JavaScript: The Complete Reference", McGraw Hill, 2017.

**REFERENCES:**

1. Larry Ullman, "PHP for the Web", Peachpit Press, 2016.
2. Luke Welling, "PHP and MySQL Web Development", Pearson, 2015.

**20QH04 PYTHON PROGRAMMING****2 2 0 3****INTRODUCTION:** Python Interpreter – Program execution – Interactive prompt – IDLE User Interface. (3)**TYPES AND OPERATIONS:** Python object types – Numeric types – Dynamic typing – String fundamentals – Lists – Dictionaries - Tuples – Type objects. (4)**STATEMENTS AND SYNTAX:** Python statements - Assignments – Expressions – if Tests – while Loops - for Loops – Iterations – Comprehensions. (3)**FUNCTIONS AND GENERATORS:** Function basics – Scopes – Arguments – Recursive functions – Anonymous functions – lambda – Generator functions - (5)**MODULES AND PACKAGES:** Python program structure – Module Imports – Standard library modules – Packages – Namespaces. Introduction to NumPy Library, Matplotlib library (5)**CLASSES AND OOP:** OOP concepts - Classes – Instances – Inheritance – Overloading operators. (3)**EXCEPTIONS:** Exception basics – try – except – raise. (2)**FILES:** Opening files – Using files – Text files – Binary files. (5)**TUTORIAL PRACTICE:**

Implement the following:

1. Data types, assignments, expressions.
2. Branching and Iterations.
3. Lists, tuples and dictionaries.
4. Decomposing into functions.
5. Classes, objects, inheritance.
6. Modules, package and namespaces.
7. Exceptions.
8. Text files and binary files.
9. Exercises on NumPy Arrays, Plots

**Total L: 30 + T: 30 = 60****TEXT BOOKS:**

1. Mark Lutz, "Learning Python", O'Reilly Media, 2013.
2. Tony Gaddis, "Starting out with Python", Pearson Education, 2017.

**REFERENCES:**

1. Christian Hill, "Learning Scientific Programming with Python", Cambridge University Press, 2018.
2. Magnus Lie Hetland, "Beginning Python", A Press, 2017.

**DEPARTMENT OF TEXTILE TECHNOLOGY****20TH01 NON WOVEN FABRICS****3 0 0 3****RAW MATERIAL AND WEB FORMATION:** Applications of nonwovens in wearable, household and technical textiles. Comparison of nonwovens with other fabrics. Classification of nonwovens. Raw material. Nonwoven manufacturing processes- dry lay process, wet-lay process and Extrusion lay process. (11)**WEB BONDING:** Types of bonding methods. Mechanical Bonding – Needling, Loop formation processes and stitch bonding. Chemical bonding – saturation bonding, foam bonding, spray bonding and print bonding,. Thermal bonding -calendar bonding. Spun bonding and melt blown processes. (12)**FINISHING AND TESTING OF NONWOVENS:** Mechanical finishing methods. Chemical finishing methods. Nonwoven finishing for apparels. Testing of nonwoven fabrics. Identification of nonwovens. (11)

**NONWOVEN PRODUCT DEVELOPMENT AND APPLICATIONS:** Nonwovens for apparel –interlinings, protective clothing and footwear clothing. Nonwoven product development for garments, decorative fabrics, home textiles and technical textiles. Re-utilization of nonwovens. (11)

**Total L: 45**

**REFERENCES:**

1. Wilhelm Albrecht, "Nonwoven Fabrics", Wiley – VCH, Verlag GmbH and Company, 2003.
2. Krcma R, "Manual of Nonwovens", Textile Trade Press, 1993.
3. Russel.S, "Handbook of Nonwovens", Textile Institute Publication, UK, 2004.
4. Irsak O, "Nonwoven Textiles", Textile Institute, UK, 1999.
5. Mrstina V and Feigl F, "Needle Punching Technology", Elsevier Science Publishers, India, 1990.

**DEPARTMENT OF FASHION TECHNOLOGY**

**20HH01 INDUSTRIAL ENGINEERING TECHNIQUES FOR APPAREL INDUSTRY**

**3 0 0 3**

**INDUSTRIAL ENGINEERING & PRODUCTIVITY:** Industrial Engineering - Definition, scope, techniques, roles and functions of industrial engineer in apparel industry. Productivity - Definition, measurement methods, causes for low productivity in apparel industry, suggestions for productivity improvement. Work study- Definition, techniques, procedure. (9)

**METHODS ENGINEERING**–Method study - Definition, procedure, process charts and symbols. Charts indicating process sequence- outline process chart, flow process charts, charts using time scale –multiple activity chart; Diagrams indicating movement – flow diagram, string diagram, travel chart, examples. (9)

**MOTION ANALYSIS:** Operation analysis –Objectives, procedure, examples. Motion Analysis: Objectives, procedure, principles of motion economy, two handed process chart, micro motion analysis–Procedure, SIMO Chart, examples. (9)

**WORK MEASUREMENT:** Definition, procedure, techniques - time study: procedure, rating, allowances and standard time. Predetermined motion time standards (PMTS), Standard data- General Sewing Data (GSD), examples. Standard allowed minute (SAM) range for various styles of garments .Applications. (9)

**WORK ENVIRONMENT& PLANT LAYOUT:** Work Environment: Lighting, ventilation, climatic condition – temperature control, humidity control, noise control, safety and ergonomics. Services- physical plant, production, personnel, administration, convenience related. Layout: Objectives, types of layout – fixed, process, product, group and combination. Layouts for apparel industry. (9)

**Total L: 45**

**TEXT BOOKS:**

1. George Kanawaty, ILO, "Introduction to Work study", Universal Publishing Corporation, Mumbai, 2005.
2. Kiell B Zandin, Maynard's, "Industrial Engineering Hand Book", Mc Graw Hill, Inc. New York, 2001.

**REFERENCES:**

1. Chuter A J "Introduction to Clothing Production Management", Blackwell Publishing, Oxford, UK, 2007.
2. Colovic G, "Management of Technology Systems in Garment Industry", Woodhead Publishing India Pvt Ltd, New Delhi, 2010.
3. Rajesh Bheda, "Managing Productivity of Apparel industry", CBI publishers and Distributors, New Delhi 2002.
4. Ramesh Babu V, "Industrial engineering in apparel production", Woodhead publishing India Pvt Ltd, New Delhi 2011.

**20HH02 LEAN MANUFACTURING FOR APPAREL INDUSTRY**

**3 0 0 3**

**LEAN MANUFACTURING:** Objectives, traditional manufacturing Vs lean manufacturing, Concepts: Value creation and waste elimination - major kinds of waste, pull production, continuous improvement (Kaizen), standard work, group technology -cellular manufacturing system, Benefits. (9)

**LEAN TOOLS:** Visual controls, 5S principles, total quality management (TQM), total productive maintenance (TPM),poka yoke ,root cause analysis – Fishbone diagram,5 whys technique. Quick changeover/Set-up time reduction, line balancing. Case studies. (9)

**VALUE STREAM MAPPING:** Definition, purpose, principles, mapping symbols, takt time, steps- current state map, future state map. Case studies from apparel manufacture. (9)

**JUST IN TIME MANUFACTURING:** Concept, elements, traditional systems vs. Just in time manufacturing system, implementation of JIT manufacturing in apparel manufacture, case studies. (9)

**IMPLEMENTATION:** Road map, senior management involvement, barriers, challenges, creation of lean culture, best practices in apparel industry. Case studies. (9)

**Total L: 45**

**TEXT BOOKS:**

1. Askin R G and Goldberg J B, "Design and Analysis of Lean Production Systems", John Wiley and Sons Inc., US, 2003.
2. Micheal Wader, "Lean Tools: A Pocket guide to Implementing Lean Practices", Second Edition, Productivity and Quality Publishing Pvt Ltd, Chennai, 2017.

**REFERENCES:**

1. Lonnie Wilson, "How to implement lean manufacturing", Second Edition, McGraw-Hill, New York, 2015.
2. Colovic G, "Management of Technology Systems in Garment Industry" Woodhead Publishing, India, Pvt Ltd, New Delhi, 2010.
3. John W Davis, "Lean manufacturing: Implementation Strategies That Work: A Roadmap to Quick and Lasting Success" Industrial Press Inc., New York, 2009.
4. Bill Carreira, "Lean Manufacturing That Works: Power Tools For Dramatically Reducing Waste and Maximizing Profits", Prentice Hall of India, New Delhi, 2007.