PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

I. To prepare students to excel in research or to succeed in Footwear manufacture profession through globally renowned rigorous post graduate education.

II. To provide students with a solid foundation in Footwear Science and Engineering required to excel in their profession for an inclusive growth in footwear manufacture.

III. To train students with good scientific and engineering knowledge so as to comprehend, analyze, design, and create novel products and solutions for the real life problems.

IV. To inculcate students in professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate leather manufacture to broader social context.

V. To provide students with an academic environment aware of excellence, leadership, written ethical codes and guidelines, and the life-long learning needed for a successful professional career.

PROGRAMME OUTCOMES (POs):

On successful completion of the programme,

1. Graduates will demonstrate knowledge of mathematics, science and engineering.
2. Graduates will demonstrate an ability to identify, formulate and solve technological problems.
3. Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data.
4. Graduates will demonstrate an ability to design a system, component or process as per needs and specifications.
5. Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
6. Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
7. Graduates will demonstrate knowledge of professional and ethical responsibilities.
8. Graduate will be able to communicate effectively in both verbal and written form.
9. Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.
10. Graduate will develop confidence for self education and ability for life-long learning.
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<td>Footwear Components and Accessories</td>
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<td>Modern footwear styling</td>
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<td>Technology of Speciality and Non – Leather Footwear</td>
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<td>Testing of Footwear Materials and products([Lab])</td>
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<td>Computer Aided Design and Manufacturing for footwear</td>
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**Professional Electives (PE)**

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<td>FW7004</td>
<td>Mechanics of Machinery (For B. Tech. Leather Technology Students)</td>
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<td>2.</td>
<td>FW7008</td>
<td>Theory and Practice of Leather manufacture (For B.E Mechanical, Production, Industrial Engg. Students)</td>
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<td>3.</td>
<td>FW7001</td>
<td>Computational Methods and Computer graphics</td>
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<td>4.</td>
<td>FW7002</td>
<td>Gait Analysis</td>
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<td>FW7003</td>
<td>Leather Product Design And Methodology</td>
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<td>6.</td>
<td>FW7005</td>
<td>Organization And Management Of Footwear Sector</td>
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<td>7.</td>
<td>FW7006</td>
<td>Pedorthic Footwear</td>
<td>PE</td>
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<td>8.</td>
<td>FW7007</td>
<td>Quality Control Management In Footwear Industries</td>
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**Employability Enhancement Courses (EEC)**

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<td>FW7007</td>
<td>Project work Phase -II</td>
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OBJECTIVE
The objective of this course is to provide the fundamental knowledge about foot and its modelling.

UNIT I  ANATOMY OF HUMAN FOOT  9
Lower limb - bones, muscles, nerves and fascia, their functions in structural stability (static & dynamic) muscles in helping in walking, muscle relate to limb functions like flexion, extension, etc. Science in Shoe Design.

UNIT II  GROWTH AND DEFORMITIES  7
Growth of foot from infancy to maturity, arches of foot, relationship between foot shape and last. Different types of foot deformities like Pes Cuvus, Valgus, Blisters, Gangrene, injuries in sports, methods of prevention etc foot care and protection.

UNIT III  BIO MECHANICS  7
Free body diagram, analysis - biomechanics of walking, running and other sports. Types of forces - friction, moments.
Gait analysis and foot comfort - gait patterns, pressure distribution etc. in case of normal and abnormal feet.

UNIT IV  ESSENTIALS OF THERAPEUTIC FOOTCARE  7
Footwear Criteria to address foot problems; comfort Elements; Principles of protective footwear; Common features of therapeutic footwear.

UNIT V  SOLID MODELLING  15
Basic principles of solid modelling and surface modelling using contours and geometry. Use of solid modelling in designing and developing modern footwear. Introduction to Foot Anthropometry; Design of anthropometric foot surveys; Data collection and Statistical Analysis of foot data; Establishment of sizing systems.
Lasts: Different measurement of feet and lasts - methods, units, sizing systems such as English, French, American, German, Japan Mondo-point their conversion and comparison. Materials for last making, manufacturing technique. Model development.

TOTAL :45 PERIODS

OUTCOME
At the end of this course the students will be able to understand anatomy, biomechanics of foot and methods to model the foot.

REFERENCES
FW7102 MATERIALS SCIENCE L T P C 3 0 0 3

OBJECTIVE
This course is to highlight the students on the properties and behavior of various materials.

UNIT I  FUNDAMENTALS OF MATERIAL SCIENCE  15
Atomic structure and interatomic bonding; classification of materials; structures of metals, ceramics and polymers; types and application of materials; materials selection and design consideration; Environmental issues in materials science.

UNIT II  ADVANCED MATERIALS  12
Smart materials, ferroelectric, piezoelectric, optoelectric, semiconducting behavior, lasers and optical fibers, photoconductivity and superconductivity, nano materials, super alloys, shape memory alloys.

UNIT III  MECHANICAL PROPERTIES  12
Stress-strain diagrams of metallic, ceramic and polymeric materials, modulus of elasticity, yield strength, tensile strength, toughness, elongation, plastic deformation, viscoelasticity, hardness, impact strength, creep, fatigue, ductile and brittle fracture.

UNIT IV  THERMAL PROPERTIES  5
Heat capacity, thermal conductivity, thermal expansion of different materials.

UNIT V  CHARACTERISATION OF MATERIALS  11
Outline of spectroscopy methods, x-ray diffraction, electron microscopy, optical microscopy and applications to material characterization and Identification of polymeric materials, glass transition in polymers, methods of measuring it.

TOTAL :45 PERIODS

OUTCOME
At the end of this course, the students will be able to understand the properties of various materials and some of the methods to characterize them.

REFERENCES

FW7104 TECHNOLOGY OF FOOTWEAR MANUFACTURING L T P C 3 0 0 3

OBJECTIVE
The objective of this course is present the students on various unit operations in footwear manufacture.

UNIT I  DESIGN AND PATTERN DEVELOPMENT  7
Preparation of standards and section for Men, Ladies & Children classic and other types of shoes and boots.

UNIT II  CUTTING

UNIT III  PRE-CLOSING & CLOSING
Checking incoming work, stitch making, skiving, punching and gimping, heat embossing, flow moulding, toe puff attachment, attaching linings and scrim, trimming linings, finishing off closed seams. Top line and other edge treatments, local reinforcements, attaching fasteners and trims. Threads, needles, Seam and stitch types, preparing for stitching, Dealing with thread breakages, automatic stitching, working environment faults and remedies, Types of stitching machines

UNIT I V  LASTING

UNIT V  POST LASTING & FINISHING
Principles and methods of various post lasting and finishing operation ; Sole attaching – preparation of lasted margin, upper preparation, sole preparation, sole cementing, uppercementing, halogenations; bottom fillers and shanks adhesive drying, heat activation, spotting,pressing, last slipping, health and safety, quality control and fault finding problems- solving,recommended bonding systems. Shoe room technique, packing and storing technique, Dressshoe, casual footwear, women footwear, work shoe, Ethnic footwear. Jodhpur boot and various boot. Safety footwear.

TOTAL:45 PERIODS

OUTCOME
At the end of this course, the students will be able to understand the various modules associated with footwear manufacture.

REFERENCES
UNIT I  MATHEMATICAL PROGRAMMING  12

UNIT II  DYNAMIC PROGRAMMING  10
Elements of DP models, Bellman’s optimality criteria, Recursion formula, Solution of multistage decision problem by DP method. Application is Heat Exchange Extraction systems.

UNIT III  PERT, CPM and GERT  9
Network representation of projects, Critical path calculation, construction of the time-chart and resource leveling, Probability and cost consideration in project scheduling, Project control. Graphical Evaluation and Review Techniques.

UNIT IV  ELEMENTS OF QUEUING THEORY  7
Basic elements of the Queueing model, M/M/1 and M/M/C Queues.

UNIT V  ELEMENTS OF RELIABILITY THEORY  7
General failure distribution, for components, Exponential failure distributions, General model, Maintained and Non-maintained systems, Safety Analysis.

TOTAL : 45 PERIODS

OUTCOME
At the end of this course the students will be able to understand various concepts on operation research

REFERENCES

FW7111 FOOTWEAR FABRICATION – I LAB L T P C
0 0 6 3

OBJECTIVE
To impart practical exposure in lasting and upper preparation operations

UNIT I  LAST  30
UNIT II  UPPER PREPARATION  30

TOTAL:60 PERIODS

OUTCOME
At the end of the course, the students will be in a position to perform lasting and upper preparation for different styles of footwear

FW7201  FOOTWEAR CHEMICALS AND POLYMERS  L T P C
3 0 0 3

OBJECTIVE
The objective of this course is provide theoretical knowledge on various chemicals and polymers associated with footwear

UNIT I POLYMERIC MATERIALS FOR FOOTWEAR INDUSTRY  15
Definition and classification of polymers - Chemistry and mechanism involved in different polymerisation processes such as Stepwise, Addition, Ring opening, Free Radical polymerisations (Bulk, solution, suspension and emulsion polymerisations) – Copolymerisation - Anionic and Cationic polymerisations.


UNIT II MODIFICATIONS OF POLYMERIC MATERIALS FOR DIFFERENT FOOTWEAR COMPONENTS  10
i. Polymer Blending : High polymer blends - Plasticization – Other additives, fillers, Antioxidants, flame retardants, stabilizers, colorants and pigments - Post reactions of polymers
ii. Moulding techniques and equipment used in fabrication of polymer products such as :Injection moulding, calendering, Reaction Injection moulding (RIM), Blow moulding etc.

UNIT III PROPERTIES, SPECIFIC USES AND TESTING OF DIFFERENT POLYMER MATERIALS  8
Properties and test procedures for polymer materials such as rheological, mechanical, electrical, thermal, chemical and comfort - suitability of polymer materials for different components of footwear such as upper, lining, shank, insole, outer sole, heel, thread etc.

UNIT IV ADHESIVES  6
Adhesive formulations involving starch, glue, latex, rubber solutions, chloroprene, PU etc. Properties of adhesives & their choice for different purposes and in construction as in DIP, DVP, cemented etc. Mechanism of adhesion.
UNIT V  FOOTWEAR DRESSING CHEMICALS

Formulation of polymeric materials such as shoe polishes, upper dressings, glazing materials, lacquers, binders, resins - Properties and their application in footwear industry. Manufacture of shoe finishes.

TOTAL : 45 PERIODS

OUTCOME
At the end of this course the students will be able to understand various chemicals and polymers materials used in footwear components

REFERENCES:

FW7202  FOOTWEAR COMPONENTS AND ACCESSORIES  L T P C  3 0 0 3

OBJECTIVE
The objective of this course is provide the students with the knowledge on various components and accessories used for footwear manufacture

UNIT I  COMPONENTS

UNIT II  GRINDERIES AND CHEMICALS

UNIT III  FASTENERS

UNIT IV  ACCESSORIES
Ornaments, embellishments, studs, methods of manufacture, moulding, electroplating and polishing.

UNIT V  REINFORCEMENTS
Toe-puff and Stiffeners: Types of Toe-puff and stiffeners, manufacture techniques - Paint on liquids, impregnated fabrics, print on hot-melt resin, filmic. Recommended use. Non-metallic grinderies: Reinforcement tape - tape preparation - Vulcanization of adhesive. Fibre fastening, Velcro, etc.
OUTCOME
At the end of this course the students will be able to understand about various footwear components and their characteristics

REFERENCES

FW7203 MODERN FOOTWEAR STYLING L T P C 3 0 0 3

OBJECTIVE
The objective of this course is present the students on the footwear fashion trends and their consideration in product development.

UNIT I HISTORICAL EVALUATION & INTERNATIONAL TRENDS 10
Historical evaluation of footwear styling. Seasonal influences on fashion, cultural and geographical instances on footwear fashion. Market research and track record.

UNIT II FASHION CONSIDERATIONS 9
Design Criteria through effect of shape, colour, pattern, texture and decorative materials. Life cycle of fashion

UNIT III PRODUCT DEVELOPMENT 9

UNIT IV PRESENTATION TECHNIQUES 9
Organisation of shows and preparation of art portfolios; advertising; effect of foreign languages in the presentation and promotional activities.

UNIT V FASHION FORECAST 8
Direction of fashion trends in footwear production and marketing.

OUTCOME
This course will help the students to understand the factors contributing to the fashion trends in footwear.
REFERENCES
3. “Shoes and Leather News”, Published by bureau of foreign and domestic commerce, Dept of commerce, US, 1940.

FW7204 TECHNOLOGY FOR SPECIALTY AND NON LEATHER FOOTWEAR

OBJECTIVE
The objective of this course is to present the students on the technology to make non-leather and specialty footwear.

UNIT I LASTING

UNIT II GOOD YEAR WELTED CONSTRUCTION

UNIT III STITCHDOWN AND OTHER CONSTRUCTION

UNIT IV SPORTS & MOULDED FOOTWEAR
Footwear’s for sports. Relation between surface, activity and footwear. Materials and method of construction Preparation of uppers, sequence of operations, sponge rubber, moulded on slippers, soled rubber moulded on footwear, thermoplastic injection moulded on footwear, cellular polyurethanemoulded on footwear, Health and Safety

UNIT V ORTHOPEDIC & THERAPEUTIC FOOTWEAR
Need of Pedorthic and anatomically-correction, friction reduction and comfort qualities, off loading technique, materials and construction, evaluation technique

TOTAL : 45 PERIODS

OUTCOME
At the end of this course the students will be able to understand the techniques in making non-leather and other specialty footwear.
REFERENCES:

FW7211 FOOTWEAR FABRICATION II LAB L T P C

OBJECTIVE
To impart practical exposure in unit operations for full shoe manufacture

UNIT I  LAST  15

UNIT II  10
Practice in CAD/CAM and pattern grading using machine.

UNIT III  UPPER PREPARATION  25

UNIT IV  BOTTOM STOCK PREPARATION  20
Insole cutting - Sole cutting and cutting other sections/components. Leather/Rubber Sole preparation - Heel attaching - Heel treatment - Edge Treatment - Finishing.

UNIT V  LASTING AND FINISHING  10
Hand Lasting; M/c lasting for cemented construction.

UNIT VI  10
Practice in classic shoe making; moccasin construction; practice in shoe finishing.

TOTAL :90 PERIODS

OUTCOME
At the end of the course, the students will gain skill set to handle full show manufacture

REFERENCES
FW7212  TESTING OF FOOTWEAR MATERIALS AND PRODUCTS LAB

OBJECTIVE
The objective of this course is to provide practical exposure on the testing of footwear materials and products. Methods of sampling and conditioning of footwear materials and coated fabrics. Physical and chemical analysis of leather, lining, toe-puff, insole, and sole. Physico-mechanical properties of non-leather upper and lining materials and coated fabrics. pH and chloride content. Physico-mechanical properties of rigid Cellulose - Woven and Non-Woven insole. Testing of shoe - visual and physico-mechanical tests like seam strength, strap strength, toe load, heel pull-off (ladies), top-line strength, water resistance, etc. Testing of footwear grinders and accessories. Testing of safety shoe.

OUTCOME
At the end of this course, the students will have gained hands-on experience of testing footwear materials and products.

REFERENCES
1. BIS Standards.
2. “Quality manuals of footwear materials”, CLRI publications, 2000

FW7301  COMPUTER AIDED DESIGN AND MANUFACTURE FOR FOOTWEAR

OBJECTIVE
The objective of this course is to project the use of computer-assisted designing techniques for making footwear.

UNIT I  COMPUTER APPLICATIONS IN FOOTWEAR SECTOR
Definition, historical development, scope of applications and advantage.

UNIT II  HARDWARE IN CAD
Introduction, Principles, Capabilities and operation of graphical workstations, central processing units, graphic terminals, input/output devices, interface and storage devices, net-working concepts of LAN and WAN. Digitization: 2D & 3D Coordinate extracting, principles of digital and analog conversion, digital input/output processing systems. CNC devices for computer-aided cutting including laser and water jet, computer-aided manufacturing.

UNIT III  PATTERN ENGINEERING
Computerized techniques for pattern generation, grading and assessment of footwear patterns, consumption calculations, pattern nesting and costing, stitching etc. through computerized techniques.

UNIT IV  LAST MODELLING
Digitization with 3D Scanner; manipulation and optimization of digitized last; use of macros; last

TOTAL: 90 PERIODS

ATTACH

DIRECTOR

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Anna University, Chennai-600 025
comparison; grading wizard; flattening; 3D visualization of last and styles; concept of e-last; introduction to sole and sole mould design.

UNIT V ADVANCED COMPUTATIONAL TECHNIQUES IN CAD, RAPID PROTOTYPING
Principles and practice of foot scanner; conversion of foot dimensions to last model; creation of stl files for last manufacture; simulation – concepts and applications; robotics: concepts and applications in footwear manufacture

TOTAL : 45 PERIODS

OUTCOME
At the end of this course the students will be able to appreciate the use of computer hardware and software in designing and manufacturing footwear

REFERENCES
5. Desai and Abel, “Introduction to FEM”.
6. “Step by Step guide to CAD for footwear”: CAD Centre, SDDC, CLRI.
9. Mass Customization And Footwear: Myth, Salvation Or Reality?: A Comprehensive Analysis Of The Adoption Of The Mass Customization Paradigm In Footwear by Claudio R.Bor, Sergio Dulio; Springer Verlag, 2007

FW7311 INDUSTRIAL TRAINING / INTERNSHIP I

Objective
The industrial internship is expected to enhance the technical employability skills of the students.

Students are expected to pursue one month industrial/laboratory training during the summervacation. Seminar presentations need to be made based on their comprehension of their exposure.

Outcome
At the end of this course the students will have confidence in handling practical aspects of footwear manufacture and also to improve the presentation skills of the students.
OBJECTIVE
The objective of this course is to facilitate the students to identify innovative projects that promotes creativity.

Under Project Work Phase I the students are expected to pursue preliminary work on a project undertaken by and assigned to him/her by the Department. A report should be submitted based on the information available in the literature or data determined in the laboratory/industry. The objective of the project work is to make use of the knowledge gained by the student at various stages of the degree programme. Project Work Phase I is intended to facilitate the better completion of project extended through Project Work Phase II in Semester IV.

VIVA VOCE
The object of the viva-voce examination is to determine whether the objectives of the Project work have been met by the student as well as to assess the originality and initiative of the student as demonstrated in the Project Work.

OUTCOME
At the end of the project period phase I, students should be familiar with current thinking in their field, and able to apply the concepts to relevant research problems or practical applications.

OBJECTIVE
The objective of the project is to make use of the knowledge gained by the student at various stages of the degree programme. This helps to judge the level of proficiency, originality and capacity for application of the knowledge attained by the student at the end of the programme.

The students should continue their work proposed in Project Work Phase I and are expected to complete the proposed work. A report should be submitted based on the data determined in the laboratory/industry. The objective of the project work is to make use of the knowledge gained by the student at various stages of the degree programme. This helps to judge the level of proficiency, originality and capacity for application of the knowledge attained by the student at the end of the programme.

VIVA VOCE
The object of the viva-voce examination is to determine whether the objectives of the Project work have been met by the student as well as to assess the originality and initiative of the student as demonstrated in the Project Work.
**OUTCOME**
The project work is expected to shape the student to think originally, plan/execute work properly, analytical abilities and reporting/communication skills

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<th>MECHANICS OF MACHINERY</th>
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**OBJECTIVE**
The objective of this course is to orient the leather technology students on the mechanical engineering aspects associated with the machinery.

**UNIT I  POWER TRANSMISSION**
Principles of Hydraulic, Pneumatic and mechanical systems of power transmission, Use of these systems either alone or in combination in the working parts of the machine. Electronic, magnetolectric, photo-cell and control safety systems.

**UNIT II  MECHANICAL PROPERTIES AND TRANSMISSION**

**UNIT III  MOTION AND INERTIA**
Kinematics - Velocity and Acceleration, Analysis of motion of simple mechanisms with special reference to footwear machines, Kinetics - Application of forces in machines - Inertia forces and torque - Fluctuation of energy and speed - Flywheel effect and punching press.

**UNIT IV  CAMS AND GEAR TRAINS**
Cams - Types and classification of cams and followers–Construction of cam profiles for different type of followers with simple harmonic, uniform acceleration and retardation motion –types of gears Application of simple, compound, reverted and epicycle gear trains.

**UNIT V  TRANSPORT SYSTEM**
Different types of material handling system in footwear industry. Manual, semi-automatic and automatic conveyors.

**OUTCOME**
At the end of this course the students will be able to understand the underpinning mechanical engineering concepts associated with the machineries.

**REFERENCES**
OBJECTIVE
This course objective is to orient the non-leather students on the fundamental science and technology of leather manufacture.

UNIT I  HIDES & SKINS & PRESERVATION  9
Hides and skins – origin, availability, flaying technique, histological characteristics, leather making materials, ante-mortem and postmortem defects and its effects in shoe making. Comparisons between different hides and skins from shoe maker point of view.

UNIT II  LEATHER PROCESS TECHNOLOGY  10
Principles and techniques involved in different unit processes and operations in leather processing (pre and post tanning). Bio processing of leather, Eco processing. Process device and importance machines in leather processing and costing of leathers.

UNIT III  FINISHING  7
Chemicals and auxiliaries used in leather finishing, its compatibility with shoe finishes. Application techniques. Texture and special finishes. Assortment.

UNIT IV  FOOTWEAR LEATHER MANUFACTURING  12
Process parameters and control for unit operations for Upper leather manufacturing from different kinds of raw materials. Special process techniques for Kid leather, soft upper and upper from sheep. Processes for the manufacture of sole and lining leathers.

UNIT V  TANNERY EFFLUENTS  7
Source of generation of liquid and solid wastes in tanneries. Characterization of liquid, wastes and assessment of critical parameters of pollution (solids, BOD, COD, nutrients, metals and phenolics)

TOTAL : 45 PERIODS

OUTCOME
Through this course the student gains an appreciation of the underpinning science and technology involved in manufacturing of leathers.

REFERENCES
OBJECTIVE
The objective of this course is to provide various theories on computation methods and graphics.

UNIT I  SOLUTION OF LINEAR EQUATION AND INTERPOLATION  9
Solution of a linear system by Gaussian, Gauss-Hordon, Jacobi and Gauss-seidal methods. Interpolation with Newton divided differences – Lagrange’s polynomial – numerical differentiation with interpolation polynomials. Numerical integration by trapezoidal, Simpson’s rule and two point Gaussian quadrature.

UNIT II  INITIAL AND B.VP FOR ODE  9
Taylor series, Euler, Modified Euler, RungeKutta method of Fourth order for First and Second order differential equations – Finite difference solution for the second order ordinary differential equation.

UNIT III  FINITE ELEMENT METHOD  9
Integral Formulation and variational methods – Mathematical concepts, weak formulation of BVP, variational methods of approximation, Two dimensional BVP – Model equation, Finite element discretization, Interpolation – function. Assembly of element equation, Axisymmetric problems– Mesh generation and interposition of Boundary condition.

UNIT IV  TWO DIMENSIONAL GRAPHICS  9
Line, circle, ellipse drawing algorithm, line attributes, curve attributes, character generation, line clipping algorithm, two dimensional geometric transformations.

UNIT V  THREE DIMENSIONAL GRAPHICS  9
Bezier curves, Bezier surfaces, generation of quadric surfaces, Three dimensional geometric transformations, viewing transformations– projections.

TOTAL :45 PERIODS

OUTCOME
At the end of this course the students will be able to understand different theories on computation methods and computer graphics.

REFERENCES
FW7002 GAIT ANALYSIS  

L T P C  3 0 0 3

OBJECTIVE
The objective of this course is provide knowledge and demonstration on GAIT analysis

UNIT I  LOWER LIMB ANATOMY
Basic anatomical terms; Neuromuscular anatomy; Bones of pelvis and legs; Joints, Ligaments, Muscles, Tendons and Fascia.

UNIT II  PRINCIPLES OF BIOMECHANICS
Reference planes of motion; Kinematics; Limb Movements; Motion Of Joints; Kinetics; Force; Momentum; Inertia ; Pressure; Torque; Work, Power and Energy.

UNIT III  GAIT
Terminology used in Gait; Gait Parameters Definition and Description; Phases of Gait Cycle; Fundamentals in Gait Analysis; Balance and Posture; Ground Reaction Force; Energy Transfer; Mechanical Analysis; Mathematical Modelling

UNIT IV  INFLUENCE OF FOOTWEAR ON GAIT
Influence of footwear on hip, knee, ankle and foot movement; Abnormal walking base; Common pathologies affecting gait and corrective measures using footwear.

UNIT V  GAIT ANALYSIS TECHNIQUE
Visual/observational gait analysis; 2D video analysis; 3D video analysis; Inertial sensors; Electrogoniometers; Force platforms; Wearable sensors; Pressure platforms; Electro myography; Energy consumption.

TOTAL :45 PERIODS

OUTCOME
At the end of this course the students will be able to understand GAIT analysis and will be able to appreciate their use in footwear design

REFERENCES:

OBJECTIVE
The objective of this course is to present various concepts of design and specific reference would be given on the process of leather product design.

UNIT I  HISTORY OF DESIGN
History of art and architecture and its influences in product design, History of garments, textiles and costumes, History of personal accessories, History of footwear and leather goods, Relevance of personal accessories in respect of sociological status, Visual appeal and Vablen’s conspicuous consumption, Trickle down theory and its relevance in product history.

UNIT II  ELEMENTS OF DESIGN
Elements and theories of design, Application of the basic elements of design, Ergonomics and interactive scenario of the design elements, Applications of the elements in the relevance of space and demography, Elements of design and its application in socio psychology.

UNIT III  DESIGN METHODOLOGY
The golden rule in nature and importance of it in design, Gastolt’s law and its importance in design, Semiotics in design, Brain storming method of idea generation, Understanding the consumer need and demand, Concept of space and patterns in nature, Product usage and its categories, Product mix and innovation, Design process for accessories, Types, categories and usage of footwear and leather goods.

UNIT IV  FASHION TREND AND FORECAST ANALYSIS
Definition and etymology of fashion, trend, style and elements of trend direction, Types of trend direction review process, Application micro and macro trend directions, Importance of soil, Economical, Political and Psychological influences in trend direction, Development of forecast and understanding of styling, Discussions on various trend agencies and periodicals, Understanding the trends in accessories.

UNIT V  LEATHER PRODUCT DESIGN PROCESS
Market and category research, Trend analysis, Concept development, Client analysis, Material selection, Color selection and functionality of the product, Brainstorming and idea generation, Design development and basic illustrations, Fine tuning the basic designs to create the collection, development of the prototype.

TOTAL : 45 PERIODS

OUTCOME
At the end of this course the students will be able to understand and appreciate the concepts and trends in leather products designing.

REFERENCES:
OBJECTIVE
The objective of this course is to present students on various aspects of organization management in the footwear sector.

UNIT I PRODUCTION MANAGEMENT
Overview of production management and organization in a factory. The functions of a production manager in production planning and control. Production cost, Introduction to work study. Method study and work measurement, materials handling, manpower planning, layout, equipment selection.

UNIT II MARKETING STRATEGY
i. Consumer psychology - factors affecting supply and demand - Market channels in the domestic market - Export Import policy.

UNIT III PERSONNEL MANAGEMENT
Principles - Motivation, Employee training and development - Job analysis, Recruitment, Performance Evaluation Technique, wages and salary, labour laws and factory acts in footwear industry.

UNIT IV ERGONOMICS AND COMMUNICATION
i. Basic man/machine relationship - Machine organisation in industrial environment.
ii. Recording, Storage & retrieval of information - Instruction - Reporting information feedback process - Telephone and other communication means - Memoranda.

UNIT V FOOTWEAR TRADE AND INDUSTRY IN INDIA
Structure and concentration of the industry, production, employment, sub-contracting systems and trade practices in different sectors of industry. Origin of industry and its growth trends. Industrial/trade policies and role of various developmental organisations. International trade in footwear in relation to leather manufactures, export procedures, incentives, duties and major importing countries and competitors.

TOTAL: 45 PERIODS

OUTCOME
At the end of this course, the students will be able to understand the organizational management associated with the footwear sector.

REFERENCES
5. "Employment and working conditions and Competitiveness in the Leather and Footwear Industry", ILO.
FW7006 PEDORTHIC FOOTWEAR

3 0 0 3

OBJECTIVE
The objective of this course is present the complications associated with foot and strategies to fabricate appropriate footwear

UNIT I INTRODUCTION
Pedorthics – Role of Pedorthist – Pedorthic evaluation – Patient management -implementation and Practice management.

UNIT II FOOT DEFORMITIES AND LOCOMOTION
Descriptive knowledge on High arches, Flat feet, Forefoot varus, Calluses, Plantar fascitis, Metatarsalgia, Morton's neuroma, Hallux valgus, Hallux Rigidus, Hammer or Claw toes, Heel spur, Talgia, Frequent ankle sprains. Gait analysis-gait cycle, Gait patterns. Types of forces friction.

UNIT III FOOT ORTHOSES
Orthoses; Raw material- Kind of foot orthoses - Fabrication techniques and Finishing. Clinical management.

UNIT IV FOOT COMPLICATIONS AND LIFESTYLE DISEASES
Enumeration of Lifestyle diseases such as Diabetes, Obesity etc; Foot related complications; Risk levels of foot ; Foot characteristics – low risk to high risk; Principles of therapeutic footwear and Bio-mechanical principles in design and development of footwear.

UNIT V CORRECTIVE FOOTWEAR FABRICATION TECHNOLOGY

TOTAL : 45 PERIODS

OUTCOME
At the end of this course the students will be able to understand the foot deformities and the need/means for the development of specialty footwear

REFERENCES
OBJECTIVE
The objective of this course is present students on the quality control and management aspects associated with footwear manufacture.

UNIT I CONCEPTS OF QUALITY
Definition of quality, quality control theory, fundamentals of statistics and probability, confidence intervals, testing significance, statistical process control techniques, analysis, defect diagnosis and prevention.

UNIT II QUALITY IMPROVEMENT
Concepts of TQM, TQC, KANBAN, Zero defects, JIT – continuous improvement – HRD in quality management – quality grades, Dr. Deming’s 14 points management concept, TQA.

UNIT III STANDARDIZATION
Historical development of standards, aims techniques, management, formulations, implementation of international and national standards – economic benefits.

UNIT IV QUALITY ASSURANCE SYSTEM
Introduction to ISO – 9000 and 14000 and related international /national standards, case study.

UNIT V ACCREDITATION AND CERTIFICATION BODIES
Relevant standards, internal and external audit, corrective action, remedies.

TOTAL: 45 PERIODS

OUTCOME
At the end of this course the students will be able to understand the requirement of different quality control and management tools and their application in footwear manufacture

REFERENCES