

MODEL CURRICULUM



Qualification Name:

ADVANCED CERTIFICATE IN SPORTS SHOE MANUFACTURING (ACSSM)

Qualification Code: **MSME/ACSSM/60**

Version: 1.0

NSQF Level: **4.5**

Model Curriculum Version: 1.0

Submitted By:

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COURSES / MODULE TEMPLATE

SEMESTER I

NOS/Module: FOOTWEAR DESIGN PRINCIPLES

NOS/Module Code: MSME/ACSSM/01

Outcomes:

After completion of course Student should be able to:

- Identify foot structure, function, and biomechanics.
- Recognize common foot shapes, arch types, and implications.
- Utilize various sizing systems and parameters effectively.
- Conduct girth measurements and interpret fitting indicators.
- Navigate through size charts and employ measuring devices accurately.
- Comprehend running biomechanics.
- Apply principles in sports shoe design effectively.
- Design footwear for comfort and performance.
- Address foot issues with customization and fit solutions.
- Define, measure, and classify lasts.
- Differentiate between foot and last anatomy.
- Utilize last exit devices and understand standardization and grading.
- Develop concepts through inspiration and trend analysis.
- Conduct market research for informed decisions.
- Create sketches and renderings.
- Select materials and patterns for prototypes.
- Produce technical drawings accurately.
- Utilize 3D modeling tools proficiently.
- Conduct fit and wear testing.
- Ensure accurate grading and sizing.
- Develop colorways and integrate brand identity.

Theory Hours: 30

Practical Hours: - 150

Theory Marks: 100

Practical Marks: 100

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Understanding Foot Anatomy	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Describe the structure and function of the foot. • Identify common foot shapes and arch types. • Explain the biomechanics of foot movement. 	<ul style="list-style-type: none"> • Structure and function of the foot. • Common foot shapes and arch types. • Biomechanics of movement. 	6	20
Unit II	Foot Measurement and Sizing Techniques	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Define foot parameters and sizing systems (UK, FP, US, Japanese, Mondopoint, International). • Apply sports shoe size systems and girth measurements. • Utilize foot measuring devices effectively. 	<ul style="list-style-type: none"> • Foot Parameters • Sizing System – UK, FP, US, Japanese, Mondopoint and International Sizing System • Sports Shoe Size System. • Girth Measurements, Identification of Fitting and Indicative Fitting • Shoe Size Charts • Foot Measuring Devices 	6	20
Unit III	Biomechanics of Sports Shoes	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Analyze the biomechanical aspects of running. • Evaluate biomechanical design principles for sports shoes. 	<ul style="list-style-type: none"> • Biomechanical Aspects of Running. • Biomechanical Design for Sports Shoes. 	6	20
Unit IV	Ergonomic Design	After completion of this unit Student should be able to:	<ul style="list-style-type: none"> • Designing for comfort and performance 	6	20

	Principles	<ul style="list-style-type: none"> • Design for comfort and performance in footwear. • Address common foot issues like pronation and supination. • Consider customization and fit for individual preferences. 	<ul style="list-style-type: none"> • Addressing common foot issues (e.g., pronation, supination) • Customization and fit considerations 		
Unit V	Fundamentals of Last Design and Engineering	<p>After completion of unit Student should know</p> <ul style="list-style-type: none"> • Define, introduce, and emphasize the importance of lasts. • Apply proportional measurements and classifications of lasts. • Differentiate between foot anatomy and last anatomy. • Identify key last shapes, profiles, and toe styles. • Understand last exit devices, standardization, and grading. 	<ul style="list-style-type: none"> • LAST – Definition, Introduction and Importance, Anatomy and Dimensions. • Proportional Measurements of a LAST • Classification of LAST • Difference Between Foot and LAST • Most Important Last Shapes, LAST Profiles and Different Toe Styles • Last Exit Devices, Standardization and Grading 	6	20
Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	PR Hours	PR Marks
Unit VI	Footwear Design Process	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> • Generate ideas and concepts for footwear design. • Draw inspiration from various sources such as art, culture, and nature. • Conduct research to understand consumer preferences and market trends in footwear. • Analyze fashion, technology, and cultural trends influencing footwear design. • Illustrate footwear designs through hand sketching and digital rendering techniques. • Communicate design concepts visually with clarity and detail. • Select appropriate materials for footwear design based on performance, aesthetics, and sustainability. • Consider factors like durability, flexibility, and environmental impact. • Develop patterns for footwear components using specialized software or traditional methods. • Create prototypes to test design feasibility and functionality. • Produce technical drawings and specification sheets detailing dimensions, materials, and 	<ul style="list-style-type: none"> • Inspiration and Concept Development • Market Research and Trend Analysis • Sketching and Rendering • Material Selection in Design • Pattern Making and Prototyping • Technical Drawing and Specification Sheets • 3D Modeling and Virtual Prototyping • Fit and Wear Testing • Grading and Sizing • Colorway Development • Brand Identity and Branding Elements 	150	100

		<p>construction methods.</p> <ul style="list-style-type: none">• Provide clear instructions for manufacturing processes.• Utilize 3D modeling software to create virtual prototypes of footwear designs.• Evaluate design elements and make modifications digitally before physical prototyping.• Conduct fit and wear tests to assess comfort, performance, and durability of footwear.• Gather feedback from testers to improve design and functionality.• Grade footwear patterns to accommodate different sizes and proportions.• Ensure consistency and accuracy in sizing across various markets.• Develop color palettes and combinations for footwear designs.• Experiment with different color schemes to enhance aesthetics and brand identity.• Define brand identity and values that align with target consumers.• Incorporate branding elements such as logos, labels, and packaging into footwear designs.			
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NOS/Module: MATERIALS & COMPONENTS

NOS/Module Code: MSME/ACSSM/02

Outcomes:

After completion of course Student should be able to:

- Understand materials used in sports shoes and the significance of material selection.
- Identify basic properties and functions of different materials in sports shoe manufacturing.
- Recognize types of leather, synthetic materials, and textiles used in sports shoes, along with their properties and applications.
- Describe midsole materials such as EVA, PU, foam technologies, and TPU, including their characteristics and benefits.
- Identify various outsole materials like rubber and thermoplastic elastomers (TPE) and understand their properties and uses.
- Explain the components involved in sports shoe manufacture, including toe puffs, midsoles, insoles, shanks, fillers, eyelets, and laces.
- Explore advanced and innovative materials used in sports shoe manufacturing, such as graphene-infused rubber and eco-friendly alternatives like organic cotton and recycled polyester

Theory Hours: 30

Practical Hours:

Theory Marks: 100

Practical Marks:

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Introduction to Materials in Sports Shoe Manufacturing	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Understand materials used in sports shoes. • Appreciate the importance of material selection. • Learn basic properties and functions of different materials. 	<ul style="list-style-type: none"> • Overview of materials used in sports shoes • Importance of material selection • Basic properties and functions of different materials 	5	10
Unit II	Upper Materials	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Explore leather types, properties, and uses. • Understand synthetic materials, their advantages, and applications. • Learn about textile types and their suitability. 	<ul style="list-style-type: none"> • Leather <ul style="list-style-type: none"> ○ Types of leather (full-grain, top-grain, split leather, etc.) ○ Properties and uses in sports shoes ○ Tanning and finishing processes • Synthetic Materials <ul style="list-style-type: none"> ○ Types of synthetic materials (PU, PVC, microfiber, etc.) ○ Advantages and disadvantages compared to leather ○ Applications in sports shoes • Textiles and Fabrics <ul style="list-style-type: none"> ○ Types of fabrics (mesh, knit, woven, non-woven, etc.) 	5	20
Unit III	Midsole Materials	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Study EVA and PU properties, processing, and applications. • Explore foam technologies for impact absorption and energy return. • Understand the benefits and uses of TPU in midsole construction. 	<ul style="list-style-type: none"> • EVA (Ethylene Vinyl Acetate) <ul style="list-style-type: none"> ○ Properties and benefits ○ Processing and applications • PU (Polyurethane) <ul style="list-style-type: none"> ○ Characteristics and uses ○ Comparison with EVA • Foam Technologies <ul style="list-style-type: none"> ○ Memory foam, responsive foam, and other innovations ○ Impact absorption and energy return • TPU (Thermoplastic Polyurethane) <ul style="list-style-type: none"> ○ Flexibility, durability, and support ○ Uses in midsole construction 	5	20
Unit IV	Outsole Materials	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Learn about rubber types and their properties. 	Rubber <ul style="list-style-type: none"> • Natural Rubber • Synthetic Rubber: SBR (Styrene-Butadiene Rubber), BR (Butadiene 	5	20

		<ul style="list-style-type: none"> Understand the characteristics and applications of thermoplastic elastomers (TPE). 	<ul style="list-style-type: none"> Rubber), NBR (Nitrile Rubber) Blown Rubber Carbon Rubber <p>Thermoplastic Elastomers (TPE)</p> <ul style="list-style-type: none"> TPU (Thermoplastic Polyurethane) EVA (Ethylene Vinyl Acetate) Polyurethane (PU) Blends and Compounds 		
Unit V	Components used in Sports Shoe Manufacture	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> Understand the purpose and role of various components like toe puffs, midsoles, and eyelets. 	<ul style="list-style-type: none"> Toe puffs & stiffeners Midsole Insoles / Sockliner Shanks Fillers Eyelets Laces etc 	5	20
Unit VI	Advanced and Innovative Materials	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> Understand advanced and innovative materials. 	<ul style="list-style-type: none"> Graphene-Infused Rubber Eco-Friendly Materials like Organic cotton, recycled polyester, etc. 	5	10

NOS/Module: CUTTING AND CLOSING TECHNIQUES**NOS/Module Code: MSME/ACSSM/03****Outcomes:**

After completion of course Student should be able to:

- Demonstrate proficiency in cutting leather, synthetics, and textiles.
- Identify types of cutting machines such as clicking presses, laser cutters, and die cutters.
- Compare and contrast manual versus automated cutting techniques.
- Apply clicking costing techniques for efficient material usage.
- Implement quality control measures in cutting processes to ensure precision and consistency.
- Execute pre-closing operations and techniques effectively.
- Operate different types of sewing machines including single needle, double needle, and computerized machines, and perform basic maintenance.
- Utilize various stitching techniques such as flat seam, zigzag, and overlock to achieve desired results.
- Select appropriate stitching materials and threads for different components of sports shoes.
- Explain sequence operations in the construction of various sports shoe designs to achieve optimal results.

Theory Hours: 30**Practical Hours: 180****Theory Marks: 100****Practical Marks: 100**

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Cutting Processes	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Inspect and grade the given leathers • Sort the leather based on their properties 	<ul style="list-style-type: none"> • Cutting leather, synthetics, and textiles • Types of cutting machines (e.g., clicking presses, laser cutters, die cutters) • Manual vs. automated cutting techniques • Clicking Costing Techniques • Quality control in cutting 	15	50
Unit II	Stitching and Sewing Processes	After completion of unit Student should be with throughknowledge on <ul style="list-style-type: none"> • Application of clicking press fir various purposes • Maintenance & inspection of clicking dies & clicking machines • Demands and requirements in thefactories 	<ul style="list-style-type: none"> • Pre-closing Operations and Techniques • Types of sewing machines (e.g., single needle, double needle, computerized) and basics maintenance. • Stitching techniques (e.g., flat seam, zigzag, overlock) • Stitching materials and threads • Sequence of operations of various sports shoe designs. 	15	50
Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	PR Hours	PR Marks
Unit III	Clicking Practical	After completion of unit Student should be with through knowledge on <ul style="list-style-type: none"> • Clicking of upper and lining components for various sports shoe designs during sports shoe production. 	<ul style="list-style-type: none"> • Clicking Pre-training Exercises • Sports Shoe Production – Clicking of upper and lining components for various sports shoes making. 	90	50
Unit IV	Closing Practical	After completion of unit Student should be with through knowledge on <ul style="list-style-type: none"> • Upper closing for sports shoes production, tailored to different sports events and shoe designs. 	<ul style="list-style-type: none"> • Closing Pre-training Exercises • Sports Shoe Production – Upper Closing for sports shoes making based on various sports events and shoe design. 	90	50

NOS/Module: MATERIALS MANAGEMENT

NOS/Module Code: MSME/ACSSM/04

Outcomes:

After completion of course Student should be able to explain/perform:

- Factors influencing materials selection, properties of common materials, and performance requirements for shoe components.
- Global vs. local sourcing, supplier evaluation, and effective relationship building.
- Planning, negotiation strategies, contract management, and supplier performance measurement.
- Inventory types, control methods like ABC analysis and JIT, and optimization techniques.
- Lean principles, waste reduction strategies, and their implementation in manufacturing.
- Sustainable sourcing practices, environmental considerations, and initiatives for waste reduction and sustainable packaging

Theory Hours: 30

Practical Hours: -

Theory Marks: 100

Practical Marks: -

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Materials Selection and Specification	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Understand factors influencing materials selection in sports footwear. • Identify properties and characteristics of common shoe materials. • Determine material performance requirements for different shoe components. 	<ul style="list-style-type: none"> • Factors influencing materials selection in sports footwear • Properties and characteristics of common shoe materials: textiles, synthetics, leather, foams, rubbers, etc. • Material performance requirements for different shoe components: upper, midsole, outsole, etc. 	5	20
Unit II	Sourcing Strategies and Supplier Relationships	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Analyze sourcing strategies like global vs. local and single vs. multiple sourcing. • Apply criteria for supplier evaluation and selection. • Develop and maintain effective supplier relationships. 	<ul style="list-style-type: none"> • Sourcing strategies: global vs. local sourcing, single vs. multiple sourcing, etc. • Supplier evaluation and selection criteria • Building and maintaining effective supplier relationships 	5	20
Unit III	Procurement Processes and Techniques	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Plan and forecast procurement effectively. • Utilize negotiation strategies and tactics. • Manage contracts and measure supplier performance. 	<ul style="list-style-type: none"> • Procurement planning and forecasting • Negotiation strategies and tactics • Contract management and supplier performance measurement 	5	10
Unit IV	Inventory Management and Control	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Classify inventory types and understand their management. • Implement inventory control methods such as ABC analysis, EOQ, and JIT. • Optimize inventory to minimize stockouts and overstocking. 	<ul style="list-style-type: none"> • Inventory types and classification • Inventory control methods: ABC analysis, EOQ, JIT, etc. • Inventory optimization techniques to minimize stockouts and overstocking 	5	20
Unit V	Lean Manufacturing and Waste Reduction	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Understand lean manufacturing principles and apply them in materials management. 	<ul style="list-style-type: none"> • Principles of lean manufacturing and its application in materials management • Waste reduction strategies: lean inventory, value stream mapping, 5S, etc. 	5	20

		<ul style="list-style-type: none"> • Implement waste reduction strategies like lean inventory and value stream mapping. • Integrate lean practices into sports shoe manufacturing processes. 	<ul style="list-style-type: none"> • Implementing lean practices in sports shoe manufacturing 		
Unit VI	Sustainability in Materials Management	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> • Practice sustainable materials sourcing and procurement. • Consider environmental and social factors in materials selection. • Implement sustainable packaging and waste management initiatives. 	<ul style="list-style-type: none"> • Sustainable materials sourcing and procurement practices • Environmental and social considerations in materials selection • Sustainable packaging and waste management initiatives 	5	10

NOS/Module: QUALITY CONTROL AND TESTING

NOS/Module Code: MSME/ACSSM/05

Outcomes:

After completion of course Student should be able to explain/perform:

- Principles of quality management including ISO 9001, Six Sigma, and Total Quality Management (TQM).
- Implementing quality control processes in sports shoe manufacturing.
- Inspection methods for incoming materials and components.
- Process control techniques such as Statistical Process Control (SPC), control charts, and Pareto analysis.
- Root cause analysis and corrective/preventive action (CAPA) processes.
- Common tests for sports shoe components including abrasion resistance, flexural stiffness, and tensile strength.
- Performance testing for cushioning, traction, stability, and other functional aspects.
- Fit and comfort testing, durability, and wear testing.
- Quality control checkpoints in shoe manufacturing including cutting, stitching, lasting, molding, and finishing.
- Quality control audits and process improvement initiatives.

Theory Hours: 30

Practical Hours: 60

Theory Marks: 100

Practical Marks: 100

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Introduction to Quality Control in Sports Shoe Manufacturing	At the end of this Unit Student should be able to <ul style="list-style-type: none"> • Understand key quality control concepts and terminology relevant to sports shoe production. • Recognize the importance of quality control in ensuring the overall quality and performance of sports shoes. • Trace the historical perspectives and evolution of quality management within the footwear industry. 	<ul style="list-style-type: none"> • Overview of quality control concepts and terminology • Importance of quality control in sports shoe production • Historical perspectives and evolution of quality management in the footwear industry 	7	25
Unit II	Quality Management Systems	At the end of this Unit Student should be able to <ul style="list-style-type: none"> • Explain the principles of quality management, including ISO 9001, Six Sigma, and Total Quality Management (TQM). • Demonstrate the ability to implement quality control processes specifically tailored for sports shoe manufacturing. 	<ul style="list-style-type: none"> • Principles of quality management: ISO 9001, Six Sigma, Total Quality Management (TQM) • Implementing quality control processes in sports shoe manufacturing 	7	25
Unit III	Quality Assurance Techniques	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Apply various inspection methods for evaluating incoming materials and components used in sports shoe production. • Utilize process control techniques such as Statistical Process Control (SPC), control charts, and Pareto analysis to monitor and maintain quality standards. • Understand the root cause analysis and corrective/preventive action (CAPA) processes to address quality issues effectively. 	<ul style="list-style-type: none"> • Inspection methods for incoming materials and components • Process control techniques: Statistical Process Control (SPC), control charts, Pareto analysis • Root cause analysis and corrective/preventive action (CAPA) processes 	8	25
Unit IV	Quality Control in Manufacturing Processes	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Identify and implement quality control checkpoints throughout the various stages of shoe manufacturing, including cutting, stitching, lasting, molding, and finishing. 	<ul style="list-style-type: none"> • Quality control checkpoints in shoe manufacturing: cutting, stitching, lasting, molding, finishing, etc. • Quality control audits and process improvement initiatives 	8	25

		<ul style="list-style-type: none"> Conduct quality control audits to assess compliance with quality standards and initiate process improvement initiatives as necessary 			
Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	PR Hours	PR Marks
Unit V	Testing Standards and Protocols	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> Familiarize with industry testing standards and regulations such as ASTM, EN, and ISO pertaining to sports shoe manufacturing. Conduct common tests for sports shoe components including abrasion resistance, flexural stiffness, and tensile strength. Perform performance testing to evaluate cushioning, traction, stability, and other functional aspects of sports shoes. Conduct fit and comfort testing, as well as durability and wear testing, to ensure overall product quality and user satisfaction. 	<ul style="list-style-type: none"> Overview of industry testing standards and regulations (e.g., ASTM, EN, ISO) Common tests for sports shoe components: abrasion resistance, flexural stiffness, tensile strength, etc. Performance testing for cushioning, traction, stability, and other functional aspects Fit and Comfort Testing Durability and Wear Testing 	60	100

EMPLOYABILITY SKILLS I**NOS/Module: Employability Skills and Entrepreneurship****NOS/Module Code: MSME/ES/04****Outcomes:**

After completion of course Student should be able to:

- Understand and use of computer for day to day activity
- Operate computer with MS office tool
- Develop communication competence
- Develop report writing skills
- Develop Resumes or Curriculum Vitae.
- Interact effectively with co-workers and customers.
- Make persons excellent workers and suitable to work in a team.
- Overcome communication barriers.
- Create awareness on Engineering Ethics and Human Values.

Theory Hours: 60**Practical Hours: -****Theory Marks: 100****Practical Marks: -**

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Fundamentals of Computer Application & Communication Skill	After completion of unit Student should be able to <ul style="list-style-type: none"> • Understand and write simple sentence. • Acquire listening & writing Skills • Understand Technical Writing • Write Letter, Job Application and Reports 	<ul style="list-style-type: none"> • Computer Application : Introduction and Function of computer system, Basics of MS office (MS word, PPT and Excel), concept and use of email. • Communication Skill: Reading and understanding simple sentences about self, work and environment. Construction of simple sentences. Writing simple English. Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills. 	15	25
Unit II	Teamwork	After completion of unit Student should be able to <ul style="list-style-type: none"> • Understand the process of team formation • Understand Group Dynamics • Manage Team Performance & Team Conflicts 	<ul style="list-style-type: none"> • Teamwork: Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts. 	15	25
Unit III	Ethics, Moral & Professional Values	After completion of unit Student should be able to <ul style="list-style-type: none"> • Understand the concept of human Values and Civic Rights • Understand Operator Ethics and Social experimentation • Understand Environmental Ethics. 	<ul style="list-style-type: none"> • Ethics, Moral & Professional Values: Human Values, Civic Rights, Operator Ethics, Operator as Social Experimentation, Environmental Ethics. 	15	25

Unit IV	Motivational Training Behavioral Skills	After completion of unit Student should be able to <ul style="list-style-type: none"> Acquire confidence building attitude. Acquire Personal goal setting. 	<ul style="list-style-type: none"> Characteristics Essential to Achieving Success The Power of Positive Attitude Self-awareness Importance of Commitment, ways to Motivate Oneself Personal Goal setting and Employability Planning. 	15	25
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SEMESTER II

NOS/Module: LASTING & MAKING TECHNIQUES

NOS/Module Code: MSME/ACSSM/06

Outcomes:

After completion of course Student should be able to:

- Identify different types of lasting techniques such as board lasted, slip lasted, and strobel.
- Describe the machines and techniques used in lasting to shape the upper around the last.
- Recognize various types of midsoles like EVA and PU, and understand their attachment methods.
- Explain the different outsole materials used in sports shoes and the bonding techniques involved.
- Understand the injection molding, compression molding, and co-molding processes for midsoles and outsoles.
- Explain the trimming and buffing processes involved in removing excess materials and smoothing edges and surfaces.
- Describe the painting and printing techniques used for applying logos, designs, and coloring to sports shoes.
- Understand the final polishing for aesthetic purposes, quality control checks, and packaging procedures for shipment.

Theory Hours: 30

Practical Hours: 90

Theory Marks: 100

Practical Marks: 100

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Lasting Process	After completion of unit Student should be with through knowledge on <ul style="list-style-type: none"> Different types of lasting techniques including board lasted, slip lasted, and strobel. Lasting machines and techniques used to shape the upper around the last. Various types of midsoles such as EVA and PU, and their methods of attachment. Different outsole materials used in sports shoes and the bonding techniques involved. 	<ul style="list-style-type: none"> Types of lasting (e.g., board lasted, slip lasted, strobel) Lasting machines and techniques Types of midsoles (e.g., EVA, PU) and their attachment Outsole materials and bonding techniques 	10	40
Unit II	Molding Processes	After completion of unit, Students should know the <ul style="list-style-type: none"> Knowledge of injection molding, compression molding, and co-molding processes. 	<ul style="list-style-type: none"> Midsole and Outsole Molding <ul style="list-style-type: none"> Injection molding Compression molding Co-molding processes 	10	30
Unit III	Finishing Processes	After completion of unit Student should be with through knowledge on <ul style="list-style-type: none"> Sequence of operations of Full Shoe Quality control in lasting & making 	<ul style="list-style-type: none"> Trimming and Buffing <ul style="list-style-type: none"> Removing excess materials Smoothing edges and surfaces Painting and Printing <ul style="list-style-type: none"> Applying logos and designs Techniques for coloring and printing Polishing and Packaging <ul style="list-style-type: none"> Final polishing for aesthetics Quality control checks Packaging for shipment. 	10	30

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	PR Hours	PR Marks
Unit VI	Shoe Making Practical	After completion of unit Student should be with through knowledge on <ul style="list-style-type: none">• Techniques for removing excess materials and smoothing edges and surfaces.• Applying logos, designs, and coloring using various techniques.• Final polishing for aesthetics, conducting quality control checks, and packaging procedures for shipment.	<ul style="list-style-type: none">• Shoe Production – Lasting & Making for production sports shoes based on various sports events and shoe design.	90	100

NOS/Module: ADVANCED MANUFACTURING TECHNOLOGIES

NOS/Module Code: MSME/ACSSM/07

Outcomes:

After completion of course Student should be able to explain:

- Principles and applications of additive manufacturing.
- Processes like FDM, SLS, and SLA.
- Materials used in 3D printing.
- CAD software for design and digital prototyping.
- Integration of CAD/CAM systems.
- Role in manufacturing, including cutting and stitching.
- Use of collaborative robots (cobots).
- Smart factories and IoT sensors.
- Data analytics and predictive maintenance.
- Technologies for customization and personalized design.
- Business models and consumer trends.
- Concepts and emerging technologies.

Theory Hours: 60

Practical Hours: -

Theory Marks: 100

Practical Marks: -

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Introduction to Advanced Manufacturing in Sports Footwear	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Understand the sports footwear industry, emphasizing its importance. • Recognize the significance of advanced manufacturing techniques in meeting consumer demands. • Identify key challenges and opportunities in sports shoe manufacturing. 	<ul style="list-style-type: none"> • Overview of the sports footwear industry • Importance of advanced manufacturing techniques in meeting consumer demands • Key challenges and opportunities in sports shoe manufacturing 	12	20
Unit II	Additive Manufacturing (3D Printing)	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Explain the principles of additive manufacturing and its applications in sports footwear. • Describe additive manufacturing processes like FDM, SLS, and SLA. • Recognize the materials used in 3D printing, including thermoplastics, elastomers, and composites. 	<ul style="list-style-type: none"> • Principles of additive manufacturing and its applications in sports footwear • Additive manufacturing processes: Fused Deposition Modeling (FDM), Selective Laser Sintering (SLS), Stereolithography (SLA) • Materials used in 3D printing: thermoplastics, elastomers, and composites 	12	20
Unit III	Computer-Aided Design (CAD) and Digital Prototyping	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Gain proficiency in using CAD software for footwear design. • Implement digital prototyping techniques for rapid iteration and testing of designs. • Integrate CAD/CAM systems for efficient 	<ul style="list-style-type: none"> • Introduction to CAD software for footwear design • Digital prototyping techniques for rapid iteration and testing • Integrating CAD/CAM systems for seamless manufacturing workflows 	12	20

		manufacturing workflows.			
Unit IV	Automation and Robotics	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> Understand the role of automation and robotics in sports shoe manufacturing. Implement automated cutting, stitching, and assembly processes. Evaluate the benefits and challenges of collaborative robots (cobots) in footwear production. 	<ul style="list-style-type: none"> Role of automation and robotics in sports shoe manufacturing Automated cutting, stitching, and assembly processes Collaborative robots (cobots) in footwear production: benefits and challenges 	12	20
Unit V	Industry 4.0 and Future Trends	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> Gain an overview of Industry 4.0 concepts and technologies. Understand the implementation of smart factories and connected manufacturing systems. Recognize the use of IoT sensors for real-time monitoring of production processes. 	<ul style="list-style-type: none"> Overview of Industry 4.0 concepts and technologies Smart factories and connected manufacturing systems IoT sensors for real-time monitoring of production processes Data analytics and predictive maintenance for optimizing manufacturing efficiency 	12	20

NOS/Module: INDUSTRIAL ENGINEERING AND PRODUCTIVITY**NOS/Module Code: MSME/ACSSM/08****Outcomes:**

After completion of course Student should be able to:

- Define productivity and its importance.
- Identify factors affecting productivity.
- Explain methods for measuring productivity and benchmarking.
- Introduce work study and method study techniques.
- Describe time study, motion study, and work sampling.
- Explain process mapping and value stream mapping.
- Discuss process improvement methodologies such as Lean, Six Sigma, and Kaizen.
- Introduce tools like 5S, SMED, Poka-Yoke, and Kanban for process optimization.
- Overview production planning and control functions.
- Discuss demand forecasting techniques and aggregate production planning.
- Introduce materials requirement planning (MRP), master production scheduling (MPS), and capacity requirements planning (CRP).
- Define human factors and ergonomics principles.
- Discuss ergonomic risk assessment methods.
- Explain designing for human performance and safety, including workstation design and human-machine interface design.

Theory Hours: 60**Practical Hours: -****Theory Marks: 100****Practical Marks: -**

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Productivity Concepts and Measurement	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Understand productivity's significance and factors affecting it. • Explain methods for measuring productivity and benchmarking. 	<ul style="list-style-type: none"> • Understanding productivity and its significance in organizational performance. • Factors affecting productivity: labor, capital, technology, and management. • Methods for measuring and evaluating productivity: total factor productivity, partial productivity, and multi-factor productivity. • Benchmarking and best practices in productivity improvement. 	12	20
Unit II	Work Study and Method Study	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Introduce work study and method study techniques. • Describe time study, motion study, and work sampling principles and applications. 	<ul style="list-style-type: none"> • Introduction to work study and method study techniques. • Time study: principles, procedures, and application in work measurement. • Motion study: principles of motion economy, motion analysis techniques, and time-motion studies. • Work sampling: sampling techniques, sample size determination, and application in work measurement. 	12	20
Unit III	Process Analysis and Improvement	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Explain process mapping, value stream mapping, and improvement methodologies like Lean and Six Sigma. • Introduce tools for process optimization such as 5S, SMED, and Kanban. 	<ul style="list-style-type: none"> • Process mapping and flowcharting techniques. • Value stream mapping (VSM) for identifying value-added and non-value-added activities. • Process improvement methodologies: Lean manufacturing, Six Sigma, Kaizen, and continuous improvement. • Tools and techniques for process optimization: 5S, SMED, Poka-Yoke, and Kanban. 	12	20
Unit IV	Production Planning and Control	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Provide an overview of 	<ul style="list-style-type: none"> • Overview of production planning and control (PPC) functions and 	12	20

		<p>production planning and control functions.</p> <ul style="list-style-type: none"> Discuss demand forecasting, aggregate production planning, and materials requirement planning. 	<p>responsibilities.</p> <ul style="list-style-type: none"> Demand forecasting techniques: qualitative and quantitative methods, time series analysis, and forecasting accuracy measures. Aggregate production planning (APP): capacity planning, production scheduling, and resource allocation strategies. Materials requirement planning (MRP), master production scheduling (MPS), and capacity requirements planning (CRP). 		
Unit V	Ergonomics and Human Factors Engineering	<p>After completion of this unit Student should be able to:</p> <ul style="list-style-type: none"> Understand ergonomic principles and human-machine interface design. Explain ergonomic risk assessment methods and designing for human performance and safety. 	<ul style="list-style-type: none"> Understanding human factors and ergonomics principles in design and workplace layout. Ergonomic risk assessment methods: anthropometry, biomechanics, and physiological measurements. Designing for human performance and safety: workstation design, tool and equipment ergonomics, and musculoskeletal disorders prevention. Human-machine interface design: usability testing, interface design guidelines, and user-centered design principles. 	12	20

NOS/Module: COST CONTROL IN SPORTS SHOE MANUFACTURE**NOS/Module Code: MSME/ACSSM/09****Outcomes:**

After completion of course Student should be able to:

- Understand the significance of cost control in sports shoe manufacturing.
- Explain cost management principles and objectives.
- Describe the relationship between cost control and profitability.
- Classify costs into direct costs (materials, labor) and indirect costs (overhead, administrative).
- Analyze cost behavior including fixed costs, variable costs, and semi-variable costs.
- Perform cost-volume-profit (CVP) analysis including breakeven analysis, contribution margin, and profit forecasting.
- Apply methods for estimating product costs such as job order costing, process costing, and activity-based costing (ABC).
- Develop manufacturing budgets including production, materials, labor, and overhead budgets.
- Conduct variance analysis by comparing actual costs to budgeted costs.

Theory Hours: 30**Practical Hours: -****Theory Marks: 100****Practical Marks: -**

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Introduction to Cost Control	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Understand the importance of cost control in sports shoe manufacturing. • Provide an overview of cost management principles and objectives. • Explain the relationship between cost control and profitability. 	<ul style="list-style-type: none"> • Understanding the importance of cost control in sports shoe manufacturing. • Overview of cost management principles and objectives. • Relationship between cost control and profitability. 	10	30
Unit II	Cost Classification and Analysis	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Classify costs into direct costs (materials, labor) and indirect costs (overhead, administrative). • Analyze cost behavior including fixed costs, variable costs, and semi-variable costs. • Conduct cost-volume-profit (CVP) analysis including breakeven analysis, contribution margin, and profit forecasting. 	<ul style="list-style-type: none"> • Classification of costs into direct costs (materials, labor) and indirect costs (overhead, administrative). • Cost behavior analysis: fixed costs, variable costs, and semi-variable costs. • Cost-volume-profit (CVP) analysis: breakeven analysis, contribution margin, and profit forecasting. 	10	35
Unit III	Cost Estimation and Budgeting	After completion of this unit Student should be able to: <ul style="list-style-type: none"> • Apply methods for estimating product costs such as job order costing, process costing, and activity-based costing (ABC). • Develop manufacturing budgets including production, materials, labor, and overhead budgets. • Perform variance analysis by comparing actual costs to budgeted costs. 	<ul style="list-style-type: none"> • Methods for estimating product costs: job order costing, process costing, and activity-based costing (ABC). • Developing manufacturing budgets: production budgets, materials budgets, labor budgets, and overhead budgets. • Variance analysis: comparing actual costs to budgeted costs 	10	35

NOS/Module: MERCHANDISING AND SUPPLY CHAIN

NOS/Module Code: MSME/ACSSM/10

Outcomes:

After completion of course Student should be able to:

- Identify retail formats.
- Plan product ranges for outlets.
- Design layout and display.
- Manage retail inventory.
- Analyze pricing and costing.
- Develop promotion strategies.
- Use retail technology.
- Understand brand policies and franchising.
- Apply visual merchandising.
- Understand collection building stages.
- Implement supply chain integration.
- Apply inventory management techniques.
- Manage logistics and distribution.

Theory Hours: 30

Practical Hours: -

Theory Marks: 100

Practical Marks: -

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Retail Merchandising	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Identify various retail formats and their characteristics. • Evaluate and plan product ranges suitable for retail outlets. • Design effective layout and display strategies. • Implement inventory management techniques in a retail setting. • Analyze retail pricing, costing, and profit strategies. • Develop promotional plans considering seasonality and competition. • Utilize technology for enhancing retail operations. • Understand brand policies and the franchising concept. • Apply visual merchandising techniques to enhance the retail environment. 	<ul style="list-style-type: none"> • Retail formats • Planning product range and its feasibility for a retail outlet • Layout and display • Inventory management of the retail store • Retail pricing, costing and profit planning • Retail promotion, seasonality and retail competition • Technology in retailing • Brand Policies and concept of Franchise etc • Visual merchandising in the retail environment 	10	35
Unit II	Collection Building	After completion of this unit Student should be able to get knowledge on <ul style="list-style-type: none"> • Understand the stages and activities involved in footwear collection building. • Plan collection frames efficiently. • Develop prototypes and validate them with market feedback. • Execute the complete process of collection building. • Present collections effectively to stakeholders. • Create "pathfinder" samples and prepare for production tooling. 	<ul style="list-style-type: none"> • Stages and activities of footwear collection building • Collection frame planning • Create prototypes • Check with market • Complete collection building • Presenting the collection • Make "pathfinder" samples • Prepare tooling 	10	30
Unit	Supply Chain	After completion of this unit Student	<ul style="list-style-type: none"> • Introduction to supply chain 	10	35

III	Management	should be able to get knowledge on <ul style="list-style-type: none"> • Explain the fundamental concepts and components of supply chain management. • Implement strategies for supply chain integration and collaboration. • Apply inventory management techniques such as EOQ, safety stock, and ABC analysis. • Manage logistics and distribution activities including transportation and warehousing. • Implement effective practices for order fulfillment and reverse logistics. 	management (SCM) concepts and components. <ul style="list-style-type: none"> • Supply chain integration: coordination, collaboration, and information sharing among supply chain partners. • Inventory management techniques: EOQ model, safety stock, ABC analysis, and inventory control policies. • Logistics and distribution management: transportation, warehousing, order fulfillment, and reverse logistics. 		
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EMPLOYABILITY SKILLS II

NOS/Module: Employability Skills and Entrepreneurship

NOS/Module Code: MSME/ES/04

Outcomes:

After completion of course Student should be able to:

- Understand the basic qualities of an entrepreneur
- Understand the process of becoming an entrepreneur
- Understand about various govt. schemes for Start-up

Theory Hours: 60

Practical Hours: -

Theory Marks: 100

Practical Marks: -

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	TH Hours	TH Marks
Unit I	Concept of Entrepreneurship	After completion of unit Student should be able to <ul style="list-style-type: none"> • Understand the process of setting up a business • Acquire the knowledge of preparing project report • Understand the processes of Bank loan • Understand about various govt. schemes for Start-up 	<ul style="list-style-type: none"> • Entrepreneurship, Enterprises, Types of enterprises. • Role & Function of Preparation of Project • Role of Various Schemes, and Institutes for self-employment. • Sources of finance, financial institutions, and agencies to familiarizes with the Policies /Programmes & procedure & the available scheme. 	60	100

NOS/Module: FINAL PROJECT

NOS/Module Code: MSME/ACSSM/11

Outcomes:

After completion of course Student should be able to:

- Identifying target users, conducting market research, and generating innovative design concepts.
- Translating conceptual ideas into detailed sketches, refining designs based on feedback.
- Choosing appropriate materials, prototyping key features, and fabricating functional prototypes.
- Conducting comprehensive testing, performing biomechanical analysis, and gathering feedback from users.
- Calculating production costs, conducting cost-benefit analysis, and determining pricing strategies.
- Developing a visual narrative storyboard communicating the design process and key features.
- Assessing technical feasibility, analyzing market demand, and calculating financial projections.

Theory Hours:

Practical Hours: - 120

Theory Marks:

Practical Marks: - 200

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	PR Hours	PR Marks
Unit 1	Project Report Preparation	<p>At the end of this Unit Student should have practical knowledge in</p> <ul style="list-style-type: none"> • Identify target users, conduct market research, and generate innovative design concepts. • Translate conceptual ideas into detailed sketches, and refine designs based on feedback. • Choose appropriate materials, prototype key features, and fabricate functional prototypes. • Conduct comprehensive testing, perform biomechanical analysis, and gather feedback from users. • Calculate production costs, conduct cost-benefit analysis, and determine pricing strategies. • Develop a visual narrative storyboard illustrating the design process and key features. • Assess technical feasibility, analyze market demand, and calculate financial projections. 	<p>Research and Conceptualization</p> <ul style="list-style-type: none"> • Identify Target Users, Sports Activities, and Performance Requirements • Conduct Market Research • Generate Innovative Design Concepts and Sketches <p>Design and Development</p> <ul style="list-style-type: none"> • Translate Conceptual Ideas into Detailed Design Sketches and Digital Models • Refine Design Concepts Based on Feedback <p>Material Selection and Prototyping</p> <ul style="list-style-type: none"> • Choose Appropriate Materials for Components • Prototype Key Features and Components • Fabricate Functional Prototype <p>Testing and Evaluation:</p> <ul style="list-style-type: none"> • Conduct Comprehensive Testing: • Perform Biomechanical Analysis and Wear Testing: • Gather Feedback from Test Users <p>Costing:</p> <ul style="list-style-type: none"> • Calculate the total production costs, including materials, labor, and overheads. • Conduct a cost-benefit analysis to assess the economic viability of the project. • Determine pricing strategies based on cost analysis and market research. <p>Storyboard Development:</p> <ul style="list-style-type: none"> • Develop a visual narrative storyboard that communicates the design process, key features, and benefits of the sports shoe prototype. • Use sketches, renderings, photographs, and diagrams to illustrate key concepts and features. • Ensure consistency in style, tone, and branding throughout the storyboard. <p>Techno-Economic Feasibility Report:</p> <ul style="list-style-type: none"> • Assess the technical feasibility of the project, including product design and manufacturing processes. • Analyze market demand, competition, and distribution channels. 	120	200

			<ul style="list-style-type: none"> Calculate financial projections, including revenue forecasts, cash flow analysis, and return on investment (ROI). 		
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NOS/Module: IN PLANT TRAINING

NOS/Module Code: MSME/ACSSM/12

Outcomes:

After completion of course Student should be able to:

- Design and develop innovative sports footwear using advanced technologies.
- Effectively manage materials sourcing and utilization, prioritizing sustainability and performance.
- Implement lean manufacturing practices and automation techniques for efficient production control.
- Conduct comprehensive quality control measures throughout the production process, ensuring high product standards.
- Strategize and execute omni-channel retailing and data-driven merchandising activities to optimize sales and customer engagement in the footwear industry.

Theory Hours:

Practical Hours: - 200

Theory Marks:

Practical Marks: - 100

Unit No.	Unit Name	Unit Level Outcomes	Contents (Chapters/Topics)	PR Hours	PR Marks
Unit I	In plant Training	At the end of this Unit Student should have practical knowledge in <ul style="list-style-type: none"> • Proficiency in integrating technology for innovative and customizable sports footwear design. • Mastery in sourcing and utilizing sustainable and performance-driven materials for sports footwear manufacturing. • Expertise in implementing lean practices and automation for efficient and agile production processes. • Skill in conducting rigorous inspections and utilizing data-driven approaches to ensure high-quality sports footwear. 	<ul style="list-style-type: none"> To understand the present practical trends in the footwear industry in respect of all aspects of sports footwear manufacturing Design & Development Materials Control Production control Quality Control Measures at various stages of production. Retailing & Merchandising activities in the footwear industry 	200	100