

Wollo University Leather Engineering Department				
Course Number	LENG3192			
Course Title	Polymers and composite materials			
Degree Program	B.Sc. Leather Engineering			
Module	19: Footwear Materials study			
ECTS Credits	5			
Cr. Hrs.	3			
Contact Hours	Lecture	Tutorial	Practice or Laboratory	Home study
	2	2	1	3
Course Objectives & Competences to be Acquired	<ul style="list-style-type: none"> • To impart on types, physical properties and processing of polymer matrix and composites, metal matrix composites and ceramics matrix composites • To study matrix material, particulates and fibres of polymer matrix composites, MMC and ceramic matrix composites. • To develop knowledge on processing, interfacial properties and application of computers 			
Course Description	<ul style="list-style-type: none"> • Chemistry and Classification of Polymers – Properties of Thermo plastics – Properties of Thermosetting Plastics – Applications – Merits and Disadvantages • Extrusion – Injection Moulding – Blow Moulding – Compression and Transfer Moulding – Casting – Thermo Forming General Machining properties of Plastics – Machining Parameters and their effect – Joining of Plastics – Mechanical Fasteners – Thermal bonding – Press Fitting. • Fibres – Fabrication, Structure, properties and applications - Glass, Boron, carbon, organic, ceramic and metallic fibers whiskers– Matrix materials structure – polymers, – metals and ceramics – Physical and chemical properties • Open mould process, bag moulding, compression moulding with BMC and SMC filament winding – pultrusion – centrifugal casting – injection moulding – structure, properties and application of PMC's 			

	<p>– Carbon Matrix Composites - Interfaces – Properties – recycling of PMC.</p> <ul style="list-style-type: none"> • Solid state fabrication techniques – diffusion bonding – powder metallurgy techniques plasma spray, chemical and physical vapour deposition of matrix on fibres Chemical vapour infiltration – Sol gel – liquid state fabrication methods – infiltration – squeeze, casting – rheo casting – compocasting - Interfaces properties– application of MMC and ceramic matrix composites
Course Outline	<p>UNIT – I PROPERTIES OF POLYMERS</p> <p>Chemistry and Classification of Polymers – Properties of Thermo plastics – Properties of Thermosetting Plastics – Applications – Merits and Disadvantages.</p> <p>UNIT –II PROCESSING OF POLYMERS</p> <p>Extrusion – Injection Moulding – Blow Moulding – Compression and Transfer Moulding – Casting – Thermo Forming General Machining properties of Plastics – Machining Parameters and their effect – Joining of Plastics – Mechanical Fasteners – Thermal bonding – Press Fitting.</p> <p>UNIT – III INTRODUCTION TO FIBRES AND COMPOSITE MATERIALS</p> <p>Fibres – Fabrication, Structure, properties and applications - Glass, Boron, carbon, organic, ceramic and metallic fibers whiskers– Matrix materials structure – polymers, – metals and ceramics – Physical and chemical properties</p> <p>UNIT – IV PROCESSING OF POLYMER MATRIX COMPOSITES</p> <p>Open mould process, bag moulding, compression moulding with BMC and SMC filament winding – pultrusion – centrifugal casting – injection moulding – structure, properties and application of PMC’s – Carbon Matrix Composites - Interfaces – Properties – recycling of PMC.</p>

	<p>UNIT – V Processing of - Metal Matrix Composites and ceramic matrix composites</p> <p>Solid state fabrication techniques – diffusion bonding – powder metallurgy techniques plasma spray, chemical and physical vapour deposition of matrix on fibres Chemical vapour infiltration – Sol gel – liquid state fabrication methods – infiltration – squeeze, casting – rheo casting – compocasting - Interfaces properties– application of MMC and ceramic matrix composites.</p>
Pre-requisites	None
Semester	III Year II Semester
Status of Course	Major
Teaching & learning Methods	<ul style="list-style-type: none"> • lecture + Lab experiments
Assessment/Evaluation & Grading System	<ul style="list-style-type: none"> • Continuous assessment 50% • Final Examination 50 %
Attendance Requirements	<ul style="list-style-type: none"> • Minimum of 80% attendance during lecture hours • 100% attendance during practical hours is mandatory