



Ministry of Education

Test Blueprint for National Exit Examination to be held in 2015 E.C

Band: One

Program: - Bachelor of Science Degree in Leather Product Engineering

Compiled By:

Mr. Biniyam Solomon

Address:

Contact: +251921243999

Email: biniko139@gmail.com

Mr. Zerihun Teshome

Contact: +25129271356

Email: zerihunteshome2006@gmail.com

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Ethiopia**

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1. Introduction

Ethiopia started to implement the Agricultural Development Led Industrialization (ADLI) in the mid-1990s which provides a broad policy vision and direction for Ethiopia by defining the fundamental role of Agriculture in early industrialization.

The leather industry sector is one of the leading foreign currency-generating sectors of the country. Therefore, the sector needs more foreign and local investments to come in the areas of footwear, glove, leather garment, leather goods, and articles. In addition, the sector is one of the sectors that is believed to play a significant role in strengthening the overall economy of the country, thereby making a major contribution to the achievement of the five-year goals of the ongoing Growth and Transformation Plan (GTP) Ethiopia is known to be the leading African country in terms of livestock and this huge potential resource will play a significant role for the leather tannery and leather product sector which leads making Ethiopia as a leading exporter to the rest of the world

Leather product engineering is a profession that deals with the application of scientific and engineering principles to the design and controls of all aspects of leather and leather product manufacturing and to capable the students on creativity, and development, making them influential in the challenges of the leather engineering profession. This profession also aims to apply existing gained knowledge from the profession in new ways thereby creating new systems and opportunities as well as adapting existing technology to local production conditions and solving the challenges of leather industries. Additionally, the professionals are also enabled to do research on leather industry plant layout and facility design, leather product manufacturing design and improvement, and designing and creating leather products. The leather product Engineering program's educational objectives and outcomes are used as long and short-term objectives, respectively, by utilizing a set of tools for indirect and direct measurements of program assessment components.

An **exit exam** refers to a specific form of assessment that many higher education institutions utilize to examine the basic level of education obtained by its students. Also known as an end-of-course test, an exit exam may help a university make pertinent decisions to improve the quality of institution-wide education and, in some cases, can help assess the standard of

education in specific courses or departments. In many instances, students are required to pass these exit exams in order to fulfill the requirements necessary to graduate. Generally speaking, the exit exam is made up of a balance of questions usually collated from the past year's core courses of study in the Leather Product Engineering program. The problems allocated to each department naturally will be relevant to their area of expertise. The engineering profession is moving dynamically as we start the twenty-first century. The role of engineers has also changed as they are often part of technical teams, and in addition to the technical proficiency and professional skills they bring, they are expected to demonstrate managerial and team-building skills and have a wider knowledge and appreciation of the societal, economic, and environmental, health, and safety issues related to their industries and profession. The engineering applications are founded on a solid core of scientific and engineering knowledge that instills the "engineering sense", and the teaching philosophy emphasizes cooperative and collaborative teaching and learning with an emphasis on individual and group activities, effective communication, professional responsibility, self-learning & lifelong learning, and teamwork.

2. Significance of Test Blueprint Preparation

Creating a test blueprint will help plan which questions to include in the exit exam and ensure that it adequately assesses the learning objectives of the course. The test blueprint will be important for the knowledge and skills to be assessed and will enable the building of purpose-driven, successful exams. Test blueprints are a simple tool to guide the examination board to be reflective and intentional when creating exams. The test blueprint facilitates the design of a simple matrix to ensure test questions reflect the course's learning objectives and incorporate varying levels of cognitive, affective, and psychomotor domain difficulty and the relative weight of course content.

Test blueprints can be used for additional purposes besides test construction:

-  Appropriately assess the instructional objectives of the course.
-  Appropriately reflect key course goals and objectives – the material to be learned.
-  Include the appropriate item formats for the skills being assessed.

3. Expected profile of the Graduates

-  To be able to utilize the knowledge of mathematics and science in the Leather product engineering profession.
-  To have basic and modern knowledge about Leather Science, Leather Technology, the chemistry of tanning.
-  To be able to design leather products and collections
-  To be able to define, interpret and solve the problems related to Leather Product Engineering
-  To be able to design and apply a trial/project in the Leather product Engineering field and to make a conclusion by evaluating the experimental data.
-  To be able to use advanced techniques and modern tools necessary for Leather product Engineering applications.
-  To be able to perform executive abilities (leadership, organization, time and risk management, quality awareness, productivity, etc.)
-  To have a social responsibility and be ethically conscious.
-  To show awareness of universal subjects such as environment, health, productivity, product design, quality, and security in solving Leather product Engineering problems and to realize the solutions.
-  To be able to use the information technologies necessary for the Leather product Engineering field.
-  To be able to show the skill of evaluating and marketing leather items.

4. General objective

The national public administration exit exam shall have the following objectives

-  To produce skilled and competent manpower to the national and international market
-  Assessing students' educational achievement in major areas of leather product engineering
-  Ensuring that the graduation profile of the leather product engineering curriculum has achieved at least common standards of knowledge and practical skills
-  Improving public trust and confidence in leather and leather product industries administration activities of professionals

- ✚ Facilitating the efforts of students to revise the core learning outcomes of the courses covered by the exit examination
- ✚ Ensuring all graduates from HEIs in leather product engineering satisfy the requirements of the labor market and employability through the national wide implementation of the competency-based exit exam
- ✚ Creating a competitive spirit among leather product engineering departments in Ethiopia with the vies to encourage them to give due attention to the national standard.

5. Specific objectives

- ✚ To deliver knowledge on raw hides/skins nature, classification, defects, and skill on how to preserve, characterize and process in to leather.
- ✚ To deliver knowledge and skills on pre-tanning operations (soaking, liming, de-liming, bating, degreasing and pickling)
- ✚ To deliver knowledge and skills on basic concepts of tanning technologies, tanning materials, auxiliaries and their properties.
- ✚ To deliver knowledge and skills on basic concepts of post-tanning, crust preparation and finishing
- ✚ To understand basic design elements and principles.
- ✚ To know fashion terminologies, fashion movements, and fashion cycles, sketching, and illustration skills.
- ✚ To Emphasis is placed on basic design techniques for leather products.
- ✚ To understand of the processes and principles of leather product designing and pattern making.
- ✚ To practice Computer Application in Product Design to developing patterns using CAD and grade using appropriate CAD software.
- ✚ To focuses on the development of skills, attitudes, and knowledge of students in applying the concepts and approaches for designing and creation designs, patterns, and grading the patterns.

- ✚ To introduce the fundamental concepts of hand cutting and machine cutting. Leather, synthetic and related materials identification, cutting requirement, cutting tools, and machinery will be discussed.
- ✚ To trained on operating different types of cutting machines, perform nesting (layout) of patterns for effective utilization of leather and related material, perform the cutting of different types of leather and non-leather material, carry out calculation of Leather, synthetic and related upper material consumption.
- ✚ To introduce the fundamental concepts of sewing, needle, sewing machine, and perform sewing operation. Under this course.
- ✚ To give the training on operating the different types of sewing machines, top threading, bottom threading & bobbin binding, and needle changing. Leather goods construction aims to provide students the knowledge, skills, and attitudes required to assemble and fabricate various types of leather goods components and products using appropriate construction techniques, tools, and equipment.
- ✚ To introduce the fundamental concepts of operating the different types of ancillary machines, making different types of seams and top lines.
- ✚ To perform the process of making children, derby, and oxford and court shoe upper. Students will also be taught about different types of conveyor systems, quality checkpoints, and reports.
- ✚ To introduce the fundamental concepts of making bottom components of footwear.
- ✚ To give the training about the different types of bottom components, their properties, interlocking process while cutting the bottom components, insole making process, machines used for making the insoles, and cost calculation the insole.
- ✚ To perform hand and machine lasting.
- ✚ To perform Finishing practices that include identification of different types of leather finishes, application of basic finishing techniques required tools, and packaging as per customer's requirement.
- ✚ Introduce for the donation of quality, quality management, Basic concepts of quality from manufacturing industries perspectives
- ✚ To understand about quality systems, Quality systems, Basic Elements in Quality System, Quality Management, Quality Control, quality assurance.

6. Themes and list of courses

The proposed core courses for the exit exam are grouped in to 6 themes as shown in table 1 below.

Table 1 Categorization of Courses into themes

S.No	Course theme	Courses	Course code	ECTS
1	Introduction to Leather material and process	Basic Leather Processing	LpEg3111	5
		Tanning and post tanning	LpEg3113	5
		Leather Dyeing and finishing	LPEg3122	4
2	Fundamentals of Leather Product Design	Creative Design	LpEg2104	5
3	Pattern Making	Leather Goods Pattern Making	LpEg3111	6
		Footwear Pattern Making	LpEg3113	6
		Leather Garment Pattern Making	LpEg3112	5
		Cutting technology	LpEg3121	5
4	Closing Technology	Footwear Closing technology	LpEg3132	5
		Leather Goods Construction	LpEg3133	6
		Leather Garment Construction	LpEg4131	6
5	Footwear Finishing Technology	Bottom Component Technology	LpEg3142	3
		Lasting and Finishing Technology	LpEg4141	5
6	Leather quality Management and Testing	Physical Testing of Leather and leather products	LpEg4201	4
Total Credit Hours				70

7. Total credit hours of the selected courses

Table 2 Total credit hours of the selected courses

S. No	Courses Name	Course code	ECTS
1	Basic leather processing	LpEg3111	5
2	Tanning and post Tanning	LpEg3113	5
3	Leather Dyeing and finishing	LPEg3122	4
4	Creative design	LpEg2104	5
5	Leather goods pattern making	LpEg3111	6
6	Footwear pattern making	LpEg3113	6
7	Leather garment pattern making	LpEg3112	5
8	Leather Cutting Technology	LpEg3121	5
9	Footwear closing technology	LpEg3132	5
10	Leather goods construction	LpEg3133	5
11	Leather garment construction	LpEg4131	6
12	Bottom component technology	LpEg3142	3
13	Lasting and finishing technology	LpEg4141	5
14	Physical testing of leather and leather product	LpEg4201	4
Total Credit Hours			70

8. Share of courses per theme and learning out comes for Bachelor of Science Degree in Leather Product Engineering

Table 3 Share of courses per theme and learning out comes

Themes	Course Name	Learning outcomes
Theme One: Introduction to Leather Material and Process Share of courses per theme (C) = $\frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$ $= \frac{14}{70} \times 100$ Share = 20 items from the total	Basic Leather Processing	1. The course aims to give knowledge to the students about skins and hides. 2. Also, different Animal species, recognize basic chemical components in leather. 3. The course covers a detailed outline of the processing of the preserved raw hides 4. Processing stages from soaking to pickling.
	Tanning and post tanning	1. The students will be able to understand the introduction to tanning and various tanning methodologies 2. To impart knowledge about the basic concepts of tanning, the classification of the tanning materials, and the various properties imparted by various tanning materials. 3. To have a clear understanding of processing the various types of tanned leather into various types of leather with desired performances, like upper leathers, garment leathers, glove leathers, etc., 4. Knowledge about the various steps of post-tanning.
	Leather Dyeing and finishing	1. The students will be able to understand the processes of dyeing, dyestuffs, and fat-liquoring; the definition 2. Classification of finishes; the structure of finishes; and finish formulations. 3. Materials for the leather finish; preparations for leather finishing; leather finishing coats.
Theme Two: Fundamentals of Leather Product Design Share of courses per theme (C) = $\frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$ $= \frac{5}{70} \times 100$ Share = 8 items from the total	Creative Design	1. The student Select inspiration sources for a fashion collection and Identify concepts for product design, 2. To Edit and presents the fashion collection; 3. Students able to Sketching different ranges of fashion products and developing a fashion portfolio.
Theme Three: Pattern Making Share of courses per theme (C) = $\frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$ $= \frac{22}{70} \times 100$	Leather Goods Pattern Making	1. Understand the terminologies used in designing and pattern making and be able to identify and interpret various styles of leather goods, accessories, and Components, 2. The student is able to Develop design specifications for different types of leather goods and Make patterns for various kinds of leather good and practices Cut patterns for various kinds of leather goods.
	Footwear Pattern Making	1. The student understands the last, sketch, solely based on the fashion, design, and construction concepts and requirements, 2. The student makes a mask the last according to work specification and also practices to develop the mean form for the selected last.

Share = 31 items from the total		- The student is able to develop the upper standard, lining standard, insole, toe puff, and counter stiffener standard. - The student is able to develop design variations of the basic styles and pattern-making footwear.
	Leather Garment Pattern Making	- Introducing students to professional pattern-making terms, industrial practices, concepts, and principles using the basic dress pattern set as a base for understanding. - Students will be able to understand the fundamentals of measurements and pattern-making techniques. - Students will be familiar with the construction of basics and design variations of Bodices, skirts, sleeve, Trousers, and Blouses.
	Cutting technology	- The student able to identify Leather and non-leather materials properties and quality requirement in cutting section, understand the difference between hand and machine cutting techniques. - The student knows different types of cutting section machines, features, classification, appropriateness for the specific application and technological advancements, - Types of Leather defects, Leather grading methods, Leather sorting and storage techniques, Nesting/layout techniques, cut component inspection, different types of quality checkpoints, and report generation during cutting, Preparation for sewing, Calculation of profit and loss on the purchase of finished leather.
Theme Four: Closing Technology Share of courses per theme (C) = $\frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$ = $\frac{17}{70} \times 100$ Share = 24 items from the total	Footwear Closing technology	- The student knows about the different types of ancillary stitching machines used in the upper making. - The student is able to Know about the different types of top lines used for upper making. To Perform making of children, derby, and oxford and court shoe uppers. - The student is able to know about the different types of transportation systems used for upper production. - The student understands the different types of quality checkpoints during upper-making and report generation.
	Leather Goods Construction	- The student understands and performs preparation techniques used in leather goods construction and practices different leather goods manufacturing machinery. - The student is able to understand and perform the construction procedures of major types of leather goods.
	Leather Garment Construction	- The student is able to assemble leather garment components. - The student able practice finishing operation and determine requirements for repair of leather garments. - The student is able to Prepare leather garments for repair work.
Theme Five : Footwear Finishing Technology Share of courses per theme (C) = $\frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$	Bottom Component Technology	- The student to Know about the different types of the bottom components used for making the footwear. - The student able to Identify the different types of materials used for making the bottom components and the student Know about the different types of shanks used for making insoles. - Student able to understand the process of making different types of insoles and calculate the insole cost.

$= \frac{8}{70} \times 100$ Share = 11 items from the total	Lasting and Finishing Technology	1. The student able to understand the concepts and fundamentals of lasting process and understand the different methods of lasting and method of producing footwear. 2. The student Carryout hand lasting and understand the sequence of operations of hand lasting, quality checkpoints and the student Understanding of different types of machines for cemented construction. 3. The student able to understand the finishing concept, identification of the different types of leather finishes. 4. The student knows the Use different tools for cleaning, repairing, filling the object for shoe finishing and know about final packing after full shoe inspection.
Theme Six: Leather Quality Management and Testing Share of courses per theme (C) = $\frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$ $= \frac{4}{70} \times 100$ Share = 6 items from the total	Physical Testing of Leather and leather products	1. The student able to understand the genesis of quality concepts, explain quality control and 2. The student able to understand quality assurance concepts, identify basic principles of TQM, Understand ISO 9001 3. The student able to using quality assurance tools, apply statistical quality control, Understand the testing of materials and quality requirements and able to Understanding of testing equipment.

9. Test Blueprint (Table Specification) for Bachelor of Science Degree in Leather Product Engineering

Table 4 Total credit hours of the selected courses

Themes	Course Name	Credit hour	Weight of course or proportion	Number of test items from each course	Learning outcomes	Cognitive						Affective	Psychomotor	Total
						Remember	Understand	Apply	Analyze	Evaluate	Create			
Introduction to Leather material and process Share = 20 items from the total	Basic Leather Processing	5	$5/14 = 0.35$	$0.35 \times 20 = 7$	1	-	1	-						1
					2		1	-	1					2
					3		1	-	1					2
					4	1				1				2
					Total	1	3	-	2	1				7
	Tanning and post tanning	5	$5/14 = 0.35$	$0.35 \times 20 = 7$	1	1	1							2
					2				1	1				2
					3					1				1
					4	1		1						2
					Total	2	1	1	1	2				7
	Leather Dyeing and finishing	4	$4/14 = 0.28$	$0.28 \times 20 = 6$	1		1							1
					2			1	1	1				3
					3				1		1			2
					Total		1	1	2	1	1			6
	Theme one total credit	14												
Fundamentals of Leather Product Design Share = 8 items from the total	Creative Design	5	$5/5 = 1$	$1 \times 8 = 8$	1	1	1				1			3
					2		1	1				1		3
					3			1		1				2
					Total	1	2	2		1	1	1		8
	Theme two total credit	5												
Pattern Making Share = 31 items from the total	Leather Goods Pattern Making	6	$6/22 = 0.27$	$0.27 \times 31 = 9$	1	1		1		1	1	1		5
					2	1	1	1			1			4
					Total	2	1	2		1	2	1		9
	Footwear Pattern Making	6	$6/22 = 0.27$	$0.27 \times 31 = 9$	1		1		1		1			3
					2			1						1
					3		1		1		1			3

					4				1		1			2
					Total		2	1	3		3			9
	Leather Garment Pattern Making	5	5/22 = 0.22	0.22*31 = 7	1	1	1							2
					2				1	1	1			3
					3		1				1			2
					Total	1	2		1	1	2			7
	Cutting technology	5	5/22 = 0.22	0.22*31 = 7	1		1		1					2
					2	1	1							2
					3			1	1	1				3
					Total	1	2	1	2	1				7
	Theme three total credit	22												
Closing Technology Share = 24 items from the total	Footwear Closing technology	5	5/17 = 0.29	0.29*24 = 7	1		1							1
					2		1		1	1	1			4
					3		1							1
					4				1					1
					Total		3		2	1	1			7
	Leather Goods Construction	6	6/17 = 0.35	0.35*24 = 9	1		1	1	1	1	1			5
					2		1	1				1		4
					Total		2	2	1	1	1	1		8
	Leather Garment Construction	6	6/17 = 0.35	0.35*24 = 9	1		1							2
					2				1	1	1	1		4
					3			1		1	1			3
					Total		1	1	1	2	2	1		8
	Theme four total credit	17												
Footwear Finishing Technology Share = 11 items from the total	Bottom Component Technology	3	3/8 = 0.37	0.37*11 = 4	1		1							1
					2	1		1						2
					3				1					1
					Total	1	1	1	1					4
	Lasting and Finishing Technology	5	5/8 = 0.62	0.62*11 = 7	1	1	1							2
					2			1			1			2
					3				1					1
					4		1	1						2
					Total	1	2	2	1		1			7
	Theme five total credit	8												
Leather quality	Physical Testing of Leather and leather products	4	4/4 = 1	1*6 = 6	1	1	1							2
					2		1		1					2

Management and Testing					3			1	1					2	
					Total	1	2	1	2					6	
	Theme six total credit	4													
Share = 6 items from the total															
Total		70					11	25	15	19	12	14	4	0	100

10. Conclusion

As a conclusion, these draft documents start with the rationale behind the implementation of Exit Exam which is bringing quality education in Ethiopian higher education institutions and the document summarizes the major requirements (core) which are expected from every Leather Product Engineering up on successful completion of the program. In relation to these the requirements major areas of competencies, courses and themes are included and can be taken as the major focus areas in the preparation of exit exam for the students who have finalized their study in the department of Leather Product Engineering in undergraduate program. Since Leather Product Engineering is the broadest of all engineering disciplines which has lots of modules and course including the common and general engineering course; the core course (14) are selected in in 6 course themes in this document and those core course can be considered as basics for leather product engineering accomplishment which measures the student's fundamental knowledge, skill and attitudes about leather, leather products, and related to every sub-discipline in the field and considered as major focus area for the Exit Exam preparation