



Ministry of Education

**Identified Competency Focus Areas and Core Courses
for Ethiopian Higher Education Institutions' Exit
Examination**

Program: Bachelor of Science in Statistics

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Courses and Competencies Identified for Exit Exam 2015 (First Draft)

1. Introduction

For about half a century, Addis Ababa University was the only Higher Education Institution (HEI) in the country responsible for Statistics education. Currently, with intensive expansion of HEIs, several young universities have initiated Bachelor of Science (B.Sc.) programs in Statistics to meet the demand for qualified statisticians in the growing socio-economic development of the local, regional and international affairs. In addition to expanding the programme, it is important to ensure that all first degree graduates from all universities in the country meet the graduate profile of the curriculum. One way to improve students' learning outcome in a way it links with labor market and economic growth is realizing exit exam throughout higher education institution based on the directives of Ministry of Education (MoE). Therefore the exit exam is designed to be given at the end of 4th year to assess students' knowledge, skill and attitude that required for awarding Bachelor of Science in Statistics in their higher education tenure. This document has six components including: introduction, expected profiles of graduates', competence and learning outcomes, courses to be included in the exit exam, categorizing courses by themes and conclusion.

1.1 Objectives of the Exit Examination

The national Statistics exit exam shall have the following objectives

- To produce skilled and competent manpower to national and international market.
- Assessing students' educational achievement in major areas of Statistics program.
- Ensuring whether the graduation profile of Bachelor of Statistics curriculum have achieved at least common standards of knowledge and practical skills.
- Facilitating the efforts of students to revise the core learning outcomes of the courses covered by the exit examination.
- Ensuring all graduates from HEIs satisfy the requirements of the labor market and employability through the national wide implementation of competency-based exit exam.
- Creating competitive spirit among Statistics departments in Ethiopia with the aim of encouraging them to give due attention to the national standards.

1.2 Significance of the Document

It is important to set competency areas of the subject matter (program) in order to measure the how much graduates are acquired with skills, knowledge and attitudes. The following shows us the significance or setting competencies and identifying core courses of the program;

- To set competencies that helps to assess the basic skills, knowledge and attitude of graduating students;
- To systematically identify the core courses which will be included the exit exam.

2. Expected Profiles of Graduates'

BSc. graduate in statistics is expected to:

- Demonstrate competence in data collection, management, summary and analysis required at many production and development sectors day to day activities;
- Plan and conduct sample surveys and experimental designs;
- Use statistical software to carry out necessary computation for statistical analysis of data;
- Write clear statistical reports and communicate the results of statistical analyses in non-technical language;
- Demonstrate professional ethics in his/her career;
- Assist in statistical research and the provision of statistical services in research establishments, business and government and non-government institutions;
- Supervise and/or manage activities of lower level statistical units or offices;
- Supervise and/or manage data processing activities in health sectors, financial, agricultural, educational, research institutions and industry sectors.

3. Competencies and Learning Outcomes

3.1 Competencies

It describes the desired knowledge, skills and behaviors of a graduate student. Any graduated of the program expected to have the following competencies from the selected courses

Table 1 list of core courses and competency gained from each course		
	Core courses	Competencies
Courses related to knowledge	➤ Basic Statistics	Competence in the methods of data collection, management, summary and analysis required in various discipline.
	➤ Statistical Methods	Demonstrate the basic concepts of parameter estimation, sampling distributions, sample size determination and hypothesis testing and ability to use these concepts for performing estimation and hypothesis testing.
	➤ Categorical data analysis	Ability to identify and apply statistical methods and models appropriate to the categorical data.
	➤ Design and Analysis of Experiment	Competency in the basic concepts of various experimental designs and their applications.
	➤ Time Series Analysis	Ability to demonstrate basic time series concepts, theories, components, methods and making forecasting and interpret the results
	➤ Regression Analysis	Ability to build a linear regression model and solve real world problems.
	➤ Demography	Ability to demonstrate the techniques used in the collection of demographic data
	➤ Social and Economic Statistics	Ability to use statistical methods for solving social and economic problems
	➤ Theory of Distribution	Demonstrate the real world problem with statistical distributions and have skills to make statistical inference
	➤ Statistical inference	
	➤ Statistical Quality Control	Use SQC techniques and procedures for quality monitoring and improvement
Courses related to skills	➤ Statistical Computing I ➤ Statistical Computing II	Skills to perform data management and analysis using Statistical packages and interpret outputs.
	➤ Research Method and Sample Survey Practice	Skills to plan and formulate statistical research and conduct sample survey.
Course related to attitude	All statistics courses	Ability to demonstrate professional ethics in his/her career and positive attitudes towards the application of statistics in real life application

3.2 Learning Outcomes

At the end of the courses students are expected to:

- Understand the methods of data collection, organization, presentation, analysis and interpretation;
- Understand the concept of multidimensional random variables and their joint, marginal and conditional distributions, properties and applications;
- Have acquired enough theoretical and practical knowledge about linear regression analysis;
- Understand the most common discrete probability distributions used as a basis to the derivation of statistical methods for the analysis of categorical data.
- Understand the framework of hypothesis testing for carrying out statistical inference.
- Demonstrate basic time series concepts, theories, methods and making forecasting and interpret the results.
- Understand the demographic data and its significance together with the implications of variations in demographic measures.
- Apply statistical theories and methods to analyses and report results about social and economic problems.
- Use MINITAB, SPSS, R, and SAS to carry out graphs and statistical data analysis.
- Define basic concepts of experimental design and identify the principles for the application of different experimental designs.
- Understand the underlying statistical theory of estimation and hypothesis testing.

4. Categorizing Courses In To Themes

Based on similarity of their natures, courses that are covered by the exit examination shall be divided in to the following five themes.

Theme 1: Fundamental of Statistics(7 Cr Hrs)

1. Basic Statistics
2. Statistical Methods

Theme 2: Statistical Computing and research method(9 Cr Hrs)

1. Statistical Computing I
2. Statistical Computing II
3. Research Method and Sample Survey Practice

Theme 3: Statistical Modeling(17 Cr Hrs)

1. Regression Analysis
2. Time Series Analysis
3. Design and Analysis of Experiment
4. Categorical Data Analysis
5. Statistical Quality Control

Theme 4: Statistical Theories(6 Cr Hrs)

1. Theory of Distribution
2. Statistical Inference

Theme 5: Social Statistics (6 Cr Hrs)

1. Demography
2. Social and Economic Statistics

5. Courses To Be Included In The Exam

Table 2 Core courses listed on harmonized curriculum are the main focus area for preparing exit exam.				
No	Course Title	Course Code	Cr Hrs	ECTS
1	Basic Statistics	Stat 2011	3	5
2	Statistical Methods	Stat 2013	4	7
3	Statistical Computing I	Stat 2021	3	5
4	Statistical computing II	Stat 3022	3	5
5	Regression analysis	Stat3041	3	5
6	Design and Analysis of Experiments	Stat 3042	4	7
7	Categorical Data Analysis	Stat 3062	3	5

8	Time Series Analysis	Stat 3043	4	7
9	Demography	Stat 4071	3	5
10	Social & Economic Statistics	Stat 4072	3	5
11	Research Method and Sample Survey Practice	Stat3032	3	5
12	Statistical Inference	Stat 4052	3	5
13	Quality control	Stat 4081	3	5
14	Theory of distribution	Stat 4051	3	5

6. Conclusion

In general, graduates of BSc in Statistics are expected to demonstrate competency in data management and data analysis using different statistical software for effective scientific decision making.

Based on graduate profile, competency and learning outcomes, for exit examination 14 courses selected from 5 themes (fundamental of statistics, statistical computing and research method, statistical modeling, statistical theories and social statistics). These courses are: Basic Statistics, Statistical Methods, Theory of Distribution, Statistical Computing I, Statistical Computing II, Time Series Analysis, Demography, Regression Analysis, Social and Economic Statistics, Statistical Inference, Design and Analysis of Experiment, Categorical Data Analysis, Statistical Quality Control and Research Method and Sample Survey Practice.

Appendix

Statistics

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Courses and Competencies Identified for Exit Exam

(Draft)