



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

Band: _____

Program: - Bachelor of Science Degree in Software
Engineering

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1. Introduction

The Ministry of Education of Ethiopia has announced the implementation of exit exam for all undergraduate program students (public and private), beginning with the 2022/2023 academic year, in order to improve the quality of graduates produced by higher learning institutions. The exit exam aimed at checking whether students have acquired the required knowledge, skills and attitudes or not. To implement this, it requires determining competency areas for a specific program, which is already completed. Based on the competency areas prepared, it needs to plan the construction of tests.

Planning of a test is a first and vital step in the construction of an achievement test. An achievement test demands very systematic and careful planning, as a fact that good planning is a symbol of success. Tests are the tools that provide scores that measure level of student learning and study program learning outcomes. In order to achieve the valid and reliable measurement of student learning and program learning outcomes, the development of valid and reliable test is the mandatory. Test should be able to measure student performance in all dimensions of knowledge, skill and attitude. The carefully planned test construction contributes to improve the overall quality of the test in terms of test content validity, difficulty level, discrimination power and test reliability. Test preparation is not an easy task; it requires a careful planning and guideline to make the task simple. Test construction needs the preparation of test blue print. Test blueprint is defined as a complete plan that explains how to develop a test. The term refers to a map or specification of assessment to ensure that all aspects of the curriculum and educational domains are covered by the

assessment programs over a specified period of time. It helps curriculum developers/test constructors to match various competencies with the course content and the appropriate modality of assessment.

Generally, test blueprint will help to ensure tests: 1) Appropriately assess the achievement of instructional objectives of the course; 2) Appropriately reflect key course goals, objectives and the material learned or covered during the instruction period; and 3) Include the appropriate item formats along with the knowledge and skills being assessed.

Keeping this in mind, the team has prepared this test blueprint document in order to help the test developers or content specialists in their process of valid and reliable test construction. The major points considered in the process of preparing this test blue print guideline were the core competencies that have been already identified for the themes of courses, the course contents, course credit hours, and the learning outcomes with their corresponding levels of achievement by learning domains. In line with these, the number of test items that should adequately assess the performance of students in all the content topics will be determined through discussion with the content specialists who construct the blueprint and test for their corresponding study program.

Therefore, the main purpose of this manual is to give direction on how to develop blueprint for content specialists so that they can develop a test blueprint for their respective program.

2. Objective of test blueprint

Test blueprint preparation is generally opted to assist the preparation of a test that is representative, broadly sampled, and consisting of

complete knowledge domain expected of the Ethiopian higher education students on completion of their study program. The specific objectives of test blueprint are to:

- Facilitate the construction of a representative and balanced test items for the selected courses in accordance with the competencies identified.
- Guide test developers or writers to write or set appropriate test items.

3. Expected profile of the Graduates

The graduates of the program will be able to acquire:

A) Cognitive skill

- To make rational and justified decisions regarding the selection of methods, tools and
- techniques for the development of software application.
- Design, develop and maintain good quality software by applying software
- engineering principles
- Selecting the appropriate software model to develop a software based on the type of
- project.
- Ability to design the test cases for the application and test the application either by
- performing manual testing or automation testing using the appropriate testing tools
- Ability to design and develop advanced web sites using client side scripting and
- server side scripting languages
- Ability to design, develop and maintain database systems.
- Ability to assist in the software industry to produce good quality software by applying
- the software quality techniques.

B) Technical skill

- Use and apply current technical concepts and practice in the core area of Software Engineering.
- Design effective and usable Software Engineering solutions and integrate them into the End user environment.
- Assist in the creation of an effective Software Engineering project plan.

- Demonstrate independent critical thinking and problem solving skills in Software Engineering
- Use current techniques, skills, and tools necessary to maintain and check quality
- of Software Engineering and computer based systems.

C) Attitude skill

- Collaborate in teams to accomplish a common goal by integrating personal initiatives.
- Communicate effectively and efficiently with clients, users and peers both verbally and in writing, using appropriate terminology.
- Understand and explain the quantitative dimensions of a problem.
- Manage one's own learning and development, including time management and organizational skills in Software Engineering.
- Keep abreast of current developments in the discipline to continue one's own Software professional development.
- Recognize and be guided by the social, professional, and ethical issues involved in the use of Software Engineering technology.

4. General objective

Thus, the department aims at preparing students to empower them to face the challenge of the

field in the society and to enable them reap the fruit of globalization through extensive practical

work Train graduates who are equipped with the necessary methodologies and tools to develop

high standard software.

5. Specific objectives

Propose futuristic software designs and solutions to existing infrastructures.

- Enable graduates to work in a team and corporate environments that encompass local and global software industries.
- Prepare graduates for further study and research in software engineering areas where enhancement needs to be taken.
- To provide software engineering education for the students with at most quality and

thereby to cultivate confidence in the students to serve the country better.

- Assisting Government's policy of increasing trained manpower, thereby reducing the shortage of skilled manpower in software engineering areas that are required for different organizations, to develop the nation.
- Assisting the industrial community and institutions around in the region to achieve excellence.
- Train software engineering graduates that are globally competent and productive.
- Design, develop and maintain software of an industrial standard for private, nongovernmental and government clients.
- Create Software Engineers who can conduct research in the ICT discipline and technologies emerging every day.

6. Themes and list of courses

S/N	Themes		Courses to be included in the Exit Exam	ECTS
1	Problem analysis and programming	1	Computer Programming	7
		2	Fundamental of Data structure and analysis	7
		3	Object Oriented Programming	5
		4	Web Design and Programming	7
		5	Mobile Application Development	5
		6	Fundamentals of Database	5
2	Networking and Software Security	7	Fundamentals of Networking	5
		8	Software and information security	5
3	Software requirement, Design, and construction	9	Fundamentals of Software Engineering	7
		10	Requirement Engineering, Architecture and Design	7
4	Software project	11	Software Project Management	5

	management and quality assurance •	12	Software Testing, Verification and Quality Assurance	7
5	Operating system and computer organization	13	Operating System and System Programming	5
6	Miscellaneous	14	Artificial Intelligence	5
		15	Big data Modeling	5

7. Total credit hour of the selected courses

8. Formulas used in Test blue print preparation

- o **Percent share for Theme i** = $\frac{\text{Total Credit hour of the Theme } i}{\text{Total Credit hour of the Program } i} \times 100$
- o **Percent share for Course i** = $\frac{\text{Credit hour for Course } i}{\text{Total Credit hour of the Theme } i} \times$
Percent share for Theme i
- o **Total test items for Theme i** = $\frac{\text{Total Credit hour for Theme } i}{\text{Total Credit hour for Program } i} \times \text{Total of items for the program}$
- **Total of items for course** = $\frac{\text{Credit hour for Course } i}{\text{Total Credit hour for Theme } i} \times \text{Total number of items for Theme } i$
- o
- **Learning outcomes in terms of the three domains (Cognitive, Affective and Psychomotor)**

9. Test Blueprint (Table Specification) for BSC Software Engineering

Themes and Share of the themes in %	Name and Share of the Courses in %	ECTS	General objective /Competency	Specific objectives /learning outcomes	Learning outcomes								No. of items
					Cognitive						Affective	Psychomotor	
					Remembering	Understanding	Application	Analysis	Evaluation	Creation/			
Problem analysis and Programming 41.38	Computer Programming 0.19	7	Conduct investigation of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.	Understand the general structure of a program		2							8
				Analyze the variety of problems and generate appropriate algorithmic solutions				2					
				Understand data storage and manipulation		2							
				Create a program using programming constructs					2				
	Data Structures and Algorithm 0.19	7	Apply knowledge of mathematics, and software engineering specialization to address	Explain the basic techniques for the design and analysis of efficient Algorithm		2		1					8
				Develop appropriate algorithmic solutions to the problems					2				
				Understand the principles of data storage and manipulation by applying data structures and algorithms		2	1						
Object oriented programming	5		Implement I/O functionality to read from and write to data and text files						3			6	

Key: In the cells/boxes there are numbers that indicate the number of items that correspond to the levels of domains.

10. Conclusion

Exit examination can have a vital role in producing knowledgeable, skillful and attitudinally matured graduates. It contributes to prepare competent graduates as it can serve as a quality check for effectiveness. It also helps in improving academic programs quality and effectiveness. Furthermore, it can create the platform for cooperation among academic programs at different universities to work jointly to improve the programs quality.

In view of this, this document is produced to assist the setting of the exit examinations for Software Engineering program, which is being delivered by Ministry of Education. To meet the graduation profile, competency and learning outcome, exit exam competency selection and identifying core course was done for 2015 EC graduating students. As a result, preparing test blueprint is necessary to prepare fairly distributed items based on the above criteria.

