



Ministry of Education

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

Band: II

Program: - Bachelor of Science Degree in Information Science

Compiled By: Solomon Alemu (Jimma University)

Girma Aweke (Addis Ababa University)

January, 2023

Bahir Dar,

Ethiopia

Table of Contents

1. Introduction	1
2. Objective of test blueprint.....	2
3. Expected profile of the Graduates	2
4. General objective of the program	6
5. Specific objectives of the programs	6
6. Themes and list of courses.....	7
7. Total credit hour of the selected courses.....	9
8. Share of the Themes/Courses/Items in Percentage (%)	9
First theme	10
Second theme	10
Third theme	10
Fourth theme	10
Fifth theme.....	10
9. Conclusion	19

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.

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

A graduate's profile is the general description of the desirable qualities of graduates in real-world work. Graduates' profile helps to determine the students' conceptual knowledge, skills, and attitude that they possess. A graduate profile can be advanced through experience in the real world. It is known that Information Science graduates have the necessary understanding of theoretical, analytical tools, and practical implementation of current information. Similarly, they should have knowledge and skills in order to be competent around market area.

Accordingly, graduates in Information Science are expected to have the following professional qualities after completing their education: -

- Manage organizational knowledge,
- Access, share, disseminate and evaluate information,
- Organize, store and retrieve data/information/knowledge,
- Construct information retrieval system,
- Setup index files and various literatures,
- Create, standardize and harvest metadata, curating data,
- Design and create information/knowledge-based system/ Reasoning system,
- Review information platforms,

- Design and implement information strategy,
- Articulate and implement information policy,
- Design, create, implement and update new information system,
- Devise, design and implement a database,
- Conduct data mining and interpret mined data,
- Catalogue and classify record/ information/knowledge,
- Prepare subject/special bibliography,
- Design and build digital library
- Design, implement, evaluate and maintain web sites,
- Manage and maintain archival collection,
- Automate information resource centers,
- Develop and implement multimedia products,
- Design and Setup a computer network,
- Manage, Review and implement intellectual property law and right,
- Conduct research in information and related studies
- Conduct information/technology training,
- Provide business intelligence information,
- Plan, manage and control information resource centers.

In order to make clear demarcation between the three core competency areas, the following table is organized: -

Table 1. Competency areas and expected indicators

Areas of Competency	Expected Competencies to be achieved
Knowledge	After completing their education, Information Science professionals can: - • Understand technological, social, political, professional and economic environments of information, • Interpret information of different communities, • Recognise communication patterns across a range of communities, • Understand different programming languages, • Identify information skills,

Areas of Competency	Expected Competencies to be achieved
	• Understand how to create, capture, store, disseminate and retrieve information, • Apprehend ranges of media and their formats, • Realize the principles of Information and Communications Technologies; • Understand how to market information services.
Skills	After completing their education, Information Science professionals are expected to have the following transferable skills: - • Plan, design and manage automation system, • Design and implement a computer network, • Plan, manage and control information services, • Create and use information retrieval tools, • Produce, utilize and evaluate information standards, • Apply information and knowledge life cycle, • Apply programming languages to solve different real world problems, • Undertake independent projects and evaluate other systems project, • Develop local, regional, national and international information policies, • Analyse and evaluate the information needs, • Evaluate information and knowledge base systems, • Manage organizational knowledge, • Provide alternative solutions to problems, • Manage data and present appropriate results in a suitable manner, • Evaluate the quality of information retrieved,

Areas of Competency	Expected Competencies to be achieved
	• Produce a research report in a coherent and well-argued way, • Link and integrate theory, practice and work experience, • Undertake independent research, • Interact effectively with customers and peers, • Differentiate information and organizational structures, functions and goals, • Engage in discussions in a professional issues, • Create, manipulate and format documents using appropriate software, • Create and implement database of information system, • Design a multimedia presentation using appropriate software, • Use a range of electronic information systems like Web browsers, Internet search engines, OPACs and online hosts, • Communicate electronically, • Apply professional and ethical framework, • Continue professional development and lifelong learning.
Attitudes	After completing their education, information Science professionals are expected to have the following cognitive skills and attitudes:- • Appreciate and solve problems, work with information (being part of the solution), • Handle a mass of diverse data, assess challenges and draw conclusions, • Provide information analysis, judgment and attention to details, • Improve self-awareness, emotional intelligence and performance, • Appreciate creativity, decisiveness, and initiative,

Areas of Competency	Expected Competencies to be achieved
	• Demonstrate flexibility, adaptability, tolerance to challenges, • Motivate initiative, listening, questioning and influencing lifelong learning and • Play a leadership role.

4. General objective of the program

The Bachelor of Science Degree in Information Science is aimed at producing new graduates to satisfy the scarce skilled human power of the country and pay a concern to insufficient emphasis on information resource centers, services and its sciences, which would have played a great role in the country's academic revolution. The challenge also, is to both broaden horizons and to sharpen skills that will be important as the student matures as a professional and alleviate the country's skilled human resource in the sector.

5. Specific objectives of the programs

The specific objectives of the Information Science program are to produce skilled professional information scientist:

- That can plan, design, develop, organize, and manage traditional and modern information resource centers/libraries/agencies in the country;
- Understand the relationship among society, people, organizations, and technology and identify the implications for managing and using information technology in the information resource centers and information agencies through management skills, critical thinking, problem solving, decision-making and appropriate for the workplace;
- Assume a leadership role in traditional and interdisciplinary research and scholarship that address information issues;
- Educate within and for a rapidly changing technological world and understand how technology is reshaping and affecting information resource centers/agencies and the profession;

- Prepare students to understand the interactions between social factors and information environments;
- Create understanding of the historical, social, cultural, educational, political, and economic dimensions of information on information resource centers and agencies;
- Create understanding of the role of information technologies, services and organizations in globalization;
- Teach and foster professional attitudes and information service philosophy;
- Involve in the development activities of the community and community organizations.

6. Themes and list of courses

National Exit Examination in Information Science program for undergraduate students' competency has five thematic areas. These are: -

1. **Foundation of Information Science**
2. **Programming**
3. **Data management and Networking**
4. **Knowledge management**
5. **Scientific studies and communication**

The number of courses included under each thematic area and total credit hour are mentioned below: -

Table 2. The five thematic areas of Information Science Program

S.No.	List of Themes in Information Science Program	Number of courses included	Credit hour/ ECTS
1	Foundation of Information Science	7	17/29
2	Programming	8	24/40
3	Data Management & Networking	6	17/28
4	Knowledge Management	8	24/42
5	Scientific Studies & Communication	7	19/33
Total		36	101/172

Table 3. Selected courses for Exit Examination

S. No	List of Themes	List of courses	Course Code	Cr.hr/ ECTS
1	Foundation of Information Science	1. Introduction to Information Science	INSC 2111	3/6
		2. Information Storage & Retrieval system	INSC 4913	3/5
		Total		6/11
2		3. Fundamental of Programming I	INSC 2221	3/5
		4. Fundamental of Programming II	INSC 2222	3/5

S. No	List of Themes	List of courses	Course Code	Cr.hr/ ECTS
	Programming	5. Visual Basic Programming	INSC 3223	3/5
		6. Internet Programming	INSC 3713	3/5
		Total		12/20
3	Data Management & Networking	7. Fundamentals of database	INSC 2115	3/5
		8. Data Communication and Networking	INSC 2524	3/5
		Total		6/10
4	Knowledge Management	9. Knowledge Organization and management	INSC 3414	4/7
		10. Automation of library and Information Systems	INSC 3624	3/5
		11. Multimedia System	INSC 4615	3/5
		Total		10/17
5	Scientific Studies & Communication	12. Scholarly Communication	INSC 3826	2/4
		Total		2/4

7. Total credit hour of the selected courses

The total credit hour/ECTS for selected courses for national exit exam of Information Science program is 36/62.

8. Share of the Themes/Courses/Items in Percentage (%)

In order to identify the share of each thematic areas for exit exam, we used the following formula: -

$$\text{Share of theme (T)} = \frac{a}{b} \times 100,$$

Where “a” is the total credit hours of a theme and “b” is the total credit hours of the all the five themes. Total credit hours of a theme is the sum of credit hours of courses in the theme.

$$\text{Share of Foundation of Information Science} = \frac{a}{b} \times 100$$

$$\text{Share of Foundation of Information Science theme} = \frac{6}{36} \times 100 = 17\%$$

$$\text{Share of Programming theme} = \frac{12}{36} \times 100 = 33\%$$

$$\text{Share of Data Management & Networking theme} = \frac{6}{36} \times 100 = 17\%$$

$$\text{Share of Knowledge Management theme} = \frac{10}{36} \times 100 = 28\%$$

$$\text{Share of Scientific Studies & Communication theme} = \frac{2}{36} \times 100 = 5\%$$

In order to identify the share of each course for exit exam, we used the following formula: -

$$\text{Share of courses per theme (C)} = \frac{\text{Credit hour of the course}}{\text{Credit hour of the theme}} \times 100$$

First theme

1. Share of Introduction to Information Science course = $\frac{3}{6} \times 100 = 50\%$
2. Share of Information Storage & Retrieval system course = $\frac{3}{6} \times 100 = 50\%$

Second theme

1. Share of Fundamental of Programming I course = $\frac{3}{12} \times 100 = 25\%$
2. Share of Fundamental of Programming II course = $\frac{3}{12} \times 100 = 25\%$
3. Share of Visual Basic Programming course = $\frac{3}{12} \times 100 = 25\%$
4. Share of Internet Programming course = $\frac{3}{12} \times 100 = 25\%$

Third theme

1. Share of Fundamentals of database course = $\frac{3}{6} \times 100 = 50\%$
2. Share of Data Communication and Networking course = $\frac{3}{6} \times 100 = 50\%$

Fourth theme

1. Share of Knowledge Organization and management course = $\frac{4}{10} \times 100 = 40\%$
2. Share of Automation of library and Information Systems course = $\frac{3}{10} \times 100 = 30\%$
3. Share of Multimedia System course = $\frac{3}{10} \times 100 = 30\%$

Fifth theme

1. Share of Scholarly Communication course = $\frac{2}{2} \times 100 = 100\%$

Table 4. Test Blueprint (Table Specification) for BSC in Information Science

Themes	Name of Courses	Crhr	Share of the themes in %	General objective of the course	Learning Outcomes	Learning outcomes								No. of items
						Cognitive						Affective	Psychomotor	
						Remembering	Understanding	Application	Analysis	Evaluation	Creation/Synthesis			
Foundation of Information Science	Introduction to Information Science	3	17%	Introduce basic issues in information science, including the nature of information & overview of information science	Describe processes and systems for managing data, information and knowledge by individuals and organizations		X							
					Evaluate processes and systems for managing data, information and knowledge by individuals and organizations					X				
					Apply data, information and knowledge management tools to address the actual information problems of an organization by working in teams			X						
					Valuing the interaction between evolution of information technology & information society						X			
					Explain the interactions between the evolution of information technology, information policy, the information professions, and what has been called “the information society.”		X							

	Information Storage & Retrieval system	3		Giving sufficient information for processing, indexing, querying, organization, and classification of textual documents.	Describe components and kinds of information retrieval systems		X										
					Analyze the different retrieval models such as Boolean model, vector based retrieval model, and probabilistic retrieval model				X								
					Apply query languages, query operations, string manipulation and search algorithms			X									
					Explain current issues in information retrieval		X										
					Explain the retrieval process		X										
					Describe automatic text operation and automatic indexing		X										
Programming	Fundamental of Programming I	3	33%	Describe and apply the basics of C++ programming (syntax and semantic elements of the programming)	Understand basic concepts in computer science such as Boolean logic and problem decomposition		X										
					Apply programming skills to solve biological problems			X									
					Understand programming concepts that will assist in learning other languages (like Java, perl, or python)		X										
					Analyse simple problems and formulate solutions				X								
					Develop computer programs						X						
					Learn data structures	X											
	Fundamental of Programming II	3		Describe and implement the basic data structure elements in C++ that serve as holding	Understand basic concepts in computer science such as Boolean logic and problem decomposition		X										

			homogenous data primitives	Analyse simple problems and formulate solutions				X					
				Develop computer programs for quality program solving					X				
				Describe and implement the basic data structure elements in C++		X							
				Describe and exercise the Arithmetic and Logic operations implemented in C++		X							
				Practice good programming disciplines and styles						X			
	Visual Basic Programming	3	Create Windows applications using the Visual C# or other recent visual programming languages.	Differentiate between Command Line Interface and Visual programming				X					
				Declare, initialize and assign values to variables within an application					X				
				Give properties of a control, writing code and Message Box					X				
				Create the code syntax for simple programming statements using C# or other language					X				
				Create Windows applications using the Visual C# or other recent visual programming languages					X				
				Working with Database					X				
	Internet Programming	3	Introduce the fundamentals of web site creation concepts, develop, manage, and maintain professional web sites using	Introduce the fundamentals of web site creation concepts		X							
				Understand Internet programming tasks		X							

				HTML, JavaScript and Cascading Style Sheets.	Demonstrate knowledge of HTML, and CSS			X						
					Demonstrate knowledge of website development concepts and terminology			X						
					Demonstrate a significant ability to plan, design, develop, manage, and maintain HTML-based websites			X						
					Create functional JavaScript for use in web pages to add interactive applications to a site						X			
					Design, develop, implement and maintain HTML, XHTML, CSS, JavaScript-enhanced website						X			
Data Management & Networking	Fundamentals of database	3	17%	Analyse and apply the concepts of design and implementation of database systems	Design and implement a complete database application						X			
					perform basic data administration tasks						X			
					build server-side support for Web-based persistent database applications						X			
					Describe some aspect of the real world in terms of a conceptual model		X							
					analyse some aspect of the real world in terms of a conceptual model				X					

					Define database and benefits of database systems	X										
					Understand database management systems		X									
					Make right design decisions on the database structures for particular applications							X				
	Data Communication and Networking	3			Explore the various types of data communication systems, networks and their applications.	Understand the concepts and principles of data communications and computer networks		X								
					Understand Protocols and various networking components		X									
					Differentiate TCP/IP & OSI Reference Model				X							
					Build small to medium level Computer networks						X					
					Understand subnets		X									
					Explore the various types of data communication systems		X									
Knowledge Management	Knowledge Organization and management	4	28%	Provide techniques for Subject analysis, classification and control of information resources of all kinds	Understand how to organize knowledge		X									
					Assign subject headings to different information sources			X								

				Understand different classification scheme	X											
				Differentiate different classification scheme			X									
				Apply different classification scheme		X										
				Identify different cataloguing techniques	X											
				Implement different cataloguing techniques		X										
				Extract and organize metadata of resources		X										
	Automation of library and Information Systems	3	Identify and implement the library automation requirements	Understand library automation	X											
				Identify the library automation requirements	X											
				Implement the library automation requirements		X										
				Identify library automation software	X											
				Apply library automation software		X										
				Identify the library automation modules	X											
				Organize the library automation modules						X						

	Multimedia System	3		Identify & Manage different formats of information	Identify different formats of information		X									
					Manage different formats of information						X					
					Understand concepts of text, image, video and audio representation		X									
					Identify various colour models in image and video		X									
					Understand data compression algorithms		X									
					Implement data compression algorithms			X								
					Understand Optical Storage Media and Multimedia Authoring and Tools		X									
					Work with various colour models in image and video			X								
Scientific Studies & Communication	Scholarly Communication	2	5%	Examine the ways in which scholarly information is produced, disseminated, and evaluated	Examine the ways in which scholarly information is produced, disseminated, and evaluated				X							
					Understand Print and digital modes of production		X									

					Identify the role of the information professional in scholarly communication		X										
					Use simple bibliometric techniques to describe the literatures			X									

Table 5: The calculation of share of themes, courses and items from a course from a total of 100 test items for Information Science program

Themes	Course Name	Learning outcomes	Credit hour	Weight of course or proportion	Number of test items from each course	Cognitive						Affective	Psychomotor	Total
						Remember	Understand	Apply	Analyse	Evaluate	Create			
Theme One	Introduction to Information Science		3	3/6*100= 50%	0.5*17 = 9	-	4	2	-	2	-	1	-	9
Share = 17 items from the total	Information Storage & Retrieval system		3	3/6*100= 50%	0.5*17 = 8	-	5	2	1	-	-	-		8
	Theme one total credit		6											
Theme Two	Fundamentals of Programming I		3	3/12*100 = 25%	0.25*33=9	1	3	2	2	-	1		-	9
Share = 33 items from the total	Fundamentals of Programming II		3	3/12*100 = 25%	0.25*33=8	-	4	-	2	-	1	1	-	8
	Visual Basic programming		3	3/12*100 = 25%	0.25*33=8	-	-	-	2	-	6	-	-	8
	Internet programming		3	3/12*100 = 25%	0.25*33=8	-	2	4	-	-	2	-	-	8
	Theme two total credit		12											

Theme Three	Fundamentals of database		3	3/6*100=50%	0.5*17 = 9	1	2	-	1	-	4	1		9
Share = 17 items from the total	Data communication and networking		3	3/6*100=50%	0.5*17 = 8	-	6	-	1	-	1			8
	Theme Three total credit		6											
Theme Four	Knowledge Organization and management		4	4/10*100=40%	0.40*28=12	-	5	6	1	-	-			12
Share = 28 items from the total	Automation of library & Information Systems		3	3/10*100=30%	0.30*28=8	-	5	2	-	-	1			8
	Multimedia Systems		3	3/10*100=30%	0.30*28=8	-	5	2	-	-	1			8
	Theme Four total credit		10											
Theme Five	Scholarly Communication		2	2/2*100 = 100%	1*5 = 5	-	3	1	1	-		-		5
Share = 5 items from the total	Theme Five total credit		2											
Total			36			2	44	21	11	2	17	3	-	100

9. 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 all programs, 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.

Finally, we recommend all concerned bodies to contribute their effort for the successful implementation of the National Exit Exam.