Ministry of Education

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

Program: - BSc in Information Systems

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Table of Contents

1. Introduction

Computer-based information systems are an integral part of organizations. Information systems (IS) support management processes at all levels (e.g., operational, tactical, and strategic management) in informed decision making, coordination, and control. In addition, ISs help managers and workers to identify and analyze problems, visualize complex subjects, create new products, and cope up the dynamics in the business environment.

The undergraduate IS program is one of the departments that has been producing educated citizens who can actively participate in the development endeavor of the country. The curriculum of the undergraduate degree program consists of twelve core and one elective modules. Generally, the four year study program consists of a total of 56 courses and 256 ECTS.

Thus, it is essential to check whether graduates have attained the expected learning outcomes of the program they have attended. An exit examination is one of the ways of assessing the attainment of the intended program outcomes with competencies at the end of the undergraduate study. The exit exam is a comprehensive examination that provides a means of measuring students' performance, competencies, and level of achievement. It also demonstrates students' aptitude and proficiency at the program level rather than the course level.

For this program, from 56 courses totally 15 core courses are selected for exit examination. The courses included in the exit exam are programming, networking, database system development, project management concepts. Mainly the courses are grouped into 5 themes such as Computer programming and Web-Technology, Computer networking and information security, Data and Information Management, Intelligent Systems and Information Systems Development and Management.

2. Objectives of the Exit Examination

The national public administration 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 public administration and development management (PADM)
- Ensuring whether the graduation profile of PADM curriculum have achieved at least common standards of knowledge and practical skills
- Improving public trust and confidence in public 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 satisfy the requirements of the labor market and employability through the national wide implementation of competency-based exit exam
- Creating competitive sprit among PADM departments in Ethiopia with the vies to encouraging them to give due attention to the national standards

3. 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;

4. Expected profiles of graduates

A graduate profile is a document that uses to specify the cognitive, personal, and interpersonal competencies that students should have when they graduate. It describes the attributes that the students should have at the end. The graduate profile for information systems program are shows as follow:

Graduate Profile (Competence)	Professional Profile
1. Analyze, Design, Implement, Test and Maintain Information Systems	✓ Develop business application ✓ analyze information systems ✓ Design information systems ✓ Write software programmes ✓ Analyze business processes ✓ Design user interfaces
2. Design, Implement, Test, Administer and Maintain Database Systems	✓ Administer database systems ✓ Analyze database systems ✓ Develop database
3. Analyze, Design, Configure, Test, Administer and Maintain Networks and Network Resources	✓ Design and Develop Computer Networks
4. Plan, Organize, Direct, Control, Lead Information Systems, Services and Resources	✓ Manage web content ✓ Manage e-business ✓ Serve as erp specialist ✓ Serve as chief information officer ✓ Shoulder responsibility of information auditing and compliance specialist ✓ Manage information systems architectures ✓ Manage information systems assets ✓ Manage information systems operations ✓ Manage information system projects ✓ Information systems security and risks

5. Develop Information Systems Projects, and Policies	✓ Develop ICT Policies ✓ Conduct research in Information Systems ✓ Offer Information Systems Consultancy and Training services
6. Provide Training and Consultancy Services	

Table 1: graduated profiles

5. Competencies and learning outcomes

Competencies in terms of:

Knowledge is the "know-what" component of a competency that is most familiar and commonly associated with any curriculum.

Skills constitute the method and means by which "know-what" is fulfilled by "know-how." As there is a significant time and practice aspect to skill and skill acquisition, skill development requires a progression through experience and the application of higher orders of cognitive load.

Attitude outline the "know-why" component of the skilled application of knowledge and capture the nuances brought about by the contextual application of knowledge-skill pairs. There is often a character and quality of application inherent in the domain and context of application that suggests the qualifiers inherent to that domain.

Information systems graduate's competencies expected to have **Management, Development, and Administrate and data and business Analysis competencies.** In general, the competencies in terms of Knowledge, skill and attitude of the graduates are explained in the following tables.

Competencies and learning outcomes		
In terms of Knowledge	**In terms of Skill**	**In terms of Attitude**
✓ Elaborate the underlying principles of Internet and Web-Technology ✓ Clarify programming principles and logic ✓ Explain the underlying princiles of computer networks and network resources ✓ Acquire an understanding of network security and its changing character ✓ Realize how network security is conceptualized and carried out ✓ Understand the underlying princiles of database and database managment systems ✓ Explain the data and file structures for information retrieval ✓ Understand content-based multimedia systems and compression applications ✓ Describe different types and characteristics of intelligent agents ✓ Evaluate knowledge management system ✓ Understand the principles and theories of Management Information Systems (MIS) and its impact on organizations. ✓ Describe IT's strategic importance in business and the essential elements of strategic plan development ✓ Define strategies for the effective utilization of IS/IT in organizations. ✓ Understand contemporary managerial issues in effectively choosing, ✓ Explain models and issues of organizational transformation and convergence. ✓ Understand the concepts, experiences and practices of managing IT related projects ✓ Explain how an organizational process often spans different functional areas	➢ Develop web-based systems ➢ Administer online systems ➢ Develop applications using programming languages ➢ Design and configure computer networks ➢ Develop database systems ➢ Administer database systems ➢ Represent knowledge and implement inference techniques to provide solutions partially observable environments using propositional and first ➢ Develop intelligent systems ➢ Able to prepare data and apply machine learning methods to achieve a learning goal within an intelligent system. ➢ Develop project proposal and project plan ➢ Apply software development process principles, and practices and crate a high-quality software ➢ Analyze user requirements using uml of oo techniques. ➢ Design systems using uml diagrams ➢ Apply cryptography security technique, systems and network security applications. ➢ Develop multimedia systems ➢ Deploying, and utilizing it in business to gain competitive advantage ➢ Demonstrate basic computational	♣ To have good personal confidence on application and system development ♣ To have the sense of co-operation in system development. ♣ Coordinate and facilitate system projects in a professional manner ♣ To have interpersonal group skills in software development ♣ To have interpersonal communication ♣ To have information systems ethics ♣ To have responsibilities, and characteristics of the IS professional

✓ Understand how enterprise systems integrate functional areas into one enterprise wide information system. ✓ Explain the system development process, from planning though analysis and design to implementation and maintenance. ✓ Explain the need for object-oriented systems analysis and design ✓ Understand the object technology and modeling principles. ✓ Know the techniques of modeling aspects of systems ✓ Identify and investigate threats to information systems security	and design problems using IS development with appropriate methodologies, software tools and innovative methods for improving processes and organizational change.	

Table 2: List of competencies

6. Courses included in the exit exam

As it explained earlier at introduction, exit exam plays key role for quality education. The main idea behind an exit exam is the need to check whether students have attained the intended learning outcomes of the program they have attended. Providing quality education is a major goal of universities in the Ethiopia. Being able to track and evaluate student knowledge before students graduate is a key in determining the direction of the university and whether it is meeting its mission objectives. Exit Exam is use as a tool to measure educational quality. The examination tests students' knowledge of their program learning outcomes as well as measuring the university's educational quality. As a result, in order to measure students' knowledge of their program learning outcomes the following courses are selected for information systems program.

No.	Course name	Credit hours	ECTS
1	Basic Computer Programming [1]	3	5
2	Object Oriented Programming	4	7
3	Multimedia Information Systems	3	5
4	Internet Programming	3	5
5	System Analysis and Design	3	6

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[1] Basic Computer Programming and Basic Computer Programming II

6	Database Systems[2]	3	5
7	Introduction to Information Storage and Retrieval	3	5
8	Data Communication and Computer Networks	3	5
9	Information System Security	3	5
10	Fundamentals of Artificial Intelligence	3	5
11	Knowledge Management	3	5
12	Introduction to Machine Learning	3	5
13	Management of Information Systems and Services	3	5
14	Information Systems Project Management	3	5
15	Enterprise Systems	3	5
	Total	**49**	**83**

Table 3: List of courses

7. Categorizing courses in to themes

Bused on those relations those courses which listed above are grouped into following themes.

Theme 1: Computer programming and Web-Technology: this theme includes the courses that enable to develop different computer applications.

Theme 2: Computer network and information security: the theme contains list of course that enables network development skills and information security.

Theme 3: Data and Information Management: it contains the concepts related to data base design and managements, database administration and the way of information managements.

Theme 4: Intelligent Systems: this theme includes knowledge extraction concepts.

Theme 5: Information Systems Development and Management: this part covers the management at development and practical labels.

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[2] Fundamental of Database systems and Advanced database systems

8. Conclusion

This guideline is designed to implement the national exit exam for BSc in information systems undergraduate program throughout Ethiopian higher education institution. The guideline contains the following components to be considered during the implementation:

- Professional and graduate profiles
- Competency and learning outcomes of the program
- Alignments of graduate profile and competency of the program
- Core courses for the selected competency

The key competencies of the program and the courses which align the competency areas are selected for the national exit exam. The program has twelve core and one elective modules that is designed to be completed within 4 academic years with a total of 56 courses and 256 ECTS. For the national exit examination 15 major courses are selected and clustered under five themes.

The National exit exam contents must focus on selected core courses of the program and the exam emphases on competencies of information systems program as stipulated in the curriculum. This guideline will be modified and changed when the curriculum is revised.