

Ministry of Education

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

Program: - BSc in Information System Engineering

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# Introduction

Information is increasingly becoming a key strategic resource for effective and sustainable development of any type of organization in the contemporary society. Recent advancements and applications of information systems and/or communication technologies have transformed the structure of the international and national economies, leading to new methods and practices in most institutions.

The program has twelve core and three elective modules that are grouped into five categories and is designed to be completed within 4 years of study. There is a total of 8 semesters (i.e. two per academic year) and each semester has 15 weeks. There is a total 56 course and 256 ECTS.

The exit exam is a type of exam that taken by graduating students in their terminal semester. Now a day it is offered in the different country. The exam is typically given to students towards the end of their higher education tenure, and is used to measure the general level of education received at a learning institution, rather than assessing skills gained from specific courses.

An exit exam is use as a tool for quality education. It refers to a specific form of assessment and 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. Furthermore, the exit exam is a comprehensive examination that provides a means of measuring students’ performance, competencies, and level of achievement of the. The exam demonstrates students’ aptitude and proficiency at the program level rather than the course level.

The main objective of the exit exam is to achieve quality education in the specific program. In this, for the information systems program totally 15 key courses are selected from 56 courses. Those courses are including 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, Database and Information Management, Intelligent Systems and Information Systems Development and Management.

# 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:

* **Analyze, Design, Implement, Test and Maintain Information Systems:** at the end, they expected to develop business application, analyze information systems, design information systems, analyze Business Processes and write software programmes.
* **Design, Implement, Test, Administer and Maintain Database Systems:** itcovers administer database systems, analyze database systems and develop database
* **Analyze, Design, Configure, Test, Administer and Maintain Networks and Network Resources:** Design, Develop and Administrator Computer Networks
* **Plan, Organize, Direct, Control, Lead Information Systems, Services and Resources:** in line with this, the student able toManage 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 Projectsand manageInformation Systems Security and Risks.
* **Develop Information Systems Projects, and Policies:** develop ICT Policies, conduct research in Information Systems and offer Information Systems Consultancy and Training services.

# Competencies and learning outcomes

The program competencies of the programs describe the knowledge, skills, and attitudes of the students at the end of graduation. Each program has its own competency. By observing individual student performance on program, can determine the extent to which students are mastering the learning competencies set forth by the program. The core Information Systems (IS) competencies from an industry perspective are as follows.

* **Management competency**
* **Project management:** application of processes, methods, skills, knowledge and experience to achieve specific project objectives according to the project acceptance criteria within agreed parameters.
* **System management:** administration of the information technology (IT) systems in an enterprise network or data center.
* **Data, Information, and Content Management**: collection, keeping, and using data securely, efficiently, and cost-effectively, delivery, retrieval, governance and overall management of information in any format. The term is typically used in reference to administration of the digital content lifecycle, from creation to permanent storage or deletion.
* **Web Content Manager:** ensure that the content of a website is well-structured, easy to find and meets the needs of its users.
* **E-business manager:** maintains and plans an organization's overall policies and goals regarding e-business development.
* **Development competency**
* **Systems Development:**  Demonstrate the ability to be a productive in a business systems development project requiring analysis and design, project management and implementation skills customized to the businesses architecture.
* **Software development / Application development:** design, make, install, use, and support application software.
* **Database Developer:** design, programming, construction, and implementation of new databases, as well as modifying existing databases for platform updates and changes in user needs.
* **Network development:** focuses on automating and scaling networks in order to allow companies to process data more efficiently.
* **Administrator competency**
* **IT Security and Risk Manager:** Measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation
* **Network Administrator:** focuses on installing, monitoring, troubleshooting, and upgrading network infrastructure
* **Database Administrator:** it focuses all activities related to maintaining a successful database environment.
* **Analysis competency**
* **Data analysis:** systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data.
* **System Analysis:** analyzed, modeled, and a logical alternative can be chosen.

A competency is commonly described as a combination of skills, knowledge and attitudes that enable an individual to perform a task or an activity successfully within a given context. In this case the program competency description in terms of knowledge, skill, and attitude as follow

**Knowledge:** the graduates expected to know basic business principles like strategic planning, resource allocation, leadership technique, production methods, and coordination of people and resources. They should have a strong understanding of technology like computer hardware and software. And also they should have knowledge to make a database work. Knowledge of these basic database principles is essential. Database administrators need to know how databases talk. This includes knowledge of a structured query language. Furthermore they should protect networks, they will need to know their ins and outs and intricacies.  This is because malware and other cyber security threats depends on computer networks to maximize damage.

**Skills:** skill is an important for information systems graduates. In order to be able to comb log records to recognize dangerous or atypical activity that could pose a threat they should have security skills. These security skills could stop attacks before they happen. When a security breach or a threat occurs, information security analysts need to communicate and document the danger in a concise and thorough manner. This takes excellent communication and documentation skills. Related to system development they should have applications and programming skills.

# Courses to be included in the 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.

* Basic Computer Programming
* Object Oriented Programming
* Data Structure and Algorithms
* Internet Programming
* System Analysis and Design
* Database Systems
* Introduction to Information Storage and Retrieval
* Data Communication and Computer Networks
* Systems and Network Administration and Information System Security
* Fundamentals of Artificial Intelligence
* Knowledge Management
* Introduction to Machine Learning
* Management of Information Systems and Services
* Information Systems Project Management
* Enterprise Systems

# 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 enables to develop different computer applications.

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

**Theme 3: Database 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.

**Theme and course mapping with program competency**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Themes** | **List of courses** | **competencies** |
| 1 | Computer programming and Web-Technology | Basic Computer Programming Object Oriented ProgrammingData Structure and AlgorithmsInternet Programming | Development  |
| 2 | Computer networking and information security | Data Communication and Computer NetworksSystems and Network Administration andInformation System Security | Administrator |
| 3 | Database and Information Management | Database SystemsIntroduction to Information Storage and Retrieval  | Development and Administrator |
| 4 | Intelligent Systems | Fundamentals of Artificial IntelligenceKnowledge ManagementIntroduction to Machine Learning | Analysis |
| 5 | Information Systems Development and Management | Management of Information Systems and ServicesInformation Systems Project ManagementEnterprise Systems | Management |

 Table 1: Theme and course mapping with program competency

# Conclusion

Everything that the learner should acquire from various knowledge, skills and values directly or indirectly should observed and measured during the study of an academic program. As a result, exit exams is a vital to the improvement of academic programs quality and effectiveness. In order to talk the exit exam for information system program total basic 15 course selected from 56 total course given in the program and those course clustered into 5 themes.