SCIENCE MATHEMATICS AND TECHNOLOGY - INFORMATION SYSTEMS CONCENTRATION - FOR STUDENTS MATRICULATED AFTER JULY 1, 2011 BUT BEFORE AUG. 31, 2015

About Information Systems

Information systems specialists focus on integrating information technology solutions and business processes to meet the information needs of businesses and other enterprises, enabling them to achieve their objectives in an effective, efficient way. The science, mathematics and technology perspective on information technology emphasizes information, with technology as an instrument for generating, processing and distributing information.

Professionals in the discipline are concerned primarily with:

- The information that computer systems can provide to aid an enterprise in defining and achieving its goals.
- The processes that an enterprise can implement or improve using information technology.

They must understand both technical and organizational factors and be able to help an organization determine how information and technology-enabled business processes can provide a competitive advantage.

> "The information systems specialist plays a key role in determining the requirements for an organization's information systems and is active in their specification, design, and implementation. As a result, such professionals require a sound understanding of organizational principles and practices so that they can serve as an effective bridge between the technical and management communities within an organization, enabling them to work in harmony to ensure that the organization has the information and the systems it needs to support its operations. Information systems professionals are also involved in designing technology-based organizational communication and collaboration systems.'" (Computing Curricula 2005, p. 14).

Our guiding authority for this document is Computing Curricula 2005 and the IS 2010 Body of Knowledge. This joint effort by the Association for Computing Machinery (ACM), the Association for Information Systems (AIS) and The Computer Society (IEEE-CS) includes current curricular recommendations from the leading professional organizations in the computing fields. Students should read Computing Curricula 2005 to understand how computing disciplines are related.

Information systems, as a disciplinary concentration, probably would not be the best choice for someone primarily interested in computing infrastructure needs of the organization (e.g., hardware and connectivity); for such individuals, a concentration in information technology or computer studies would be more appropriate. On the other hand, students interested primarily in the abstract, theoretical concepts of computing would be better served by a concentration in computer science.

At Empire State College, the variation among degrees in information systems occurs with the identification of the area of study. Each student must design a degree program that meets the general guidelines for an area of study. The information systems curricular guidelines represent a common core of knowledge, which any information systems degree will contain within those general guidelines.

Foundation

To be successful in the workplace, students must understand the role(s) of IS in an organization, and develop good communication, interpersonal and quantitative skills.

Communications skills

All students should already have, or develop, skill and confidence with communication, particularly communicating in writing. Technical communication, the specialty of communicating technical information, is of particular value to individuals in this field.

Quantitative reasoning

All students should already have, or develop, skill and confidence with the interpretation of material containing quantitative information and mathematical symbols, and should have, or develop, an ability to express ideas using mathematical symbols and language. It is important to be able to articulate an understanding of mathematics, not just perform calculations. The choice of mathematical subject matter for development of quantitative reasoning will depend on the student's background and interest. Subjects such as algebra, statistics, finite math or technical math are all good choices. In addition, students would benefit from an understanding of basic statistical concepts to support in-depth analysis of data. Students should include material beyond the introductory level and in areas such as discrete math or advanced quantitative methods in business. Discrete mathematics supports algorithmic thinking, and such study would cover logic, the concept of complexity, methods of proof and graph theory. The advanced quantitative methods would include topics such as decision making under uncertainty and linear programming.

Information Technology

Students should show, through their degree program and their rationale, that they have both foundational knowledge and knowledge beyond the foundation in this area. Typically, at least some content in the information technology area will be at the advanced level.

Programming

Students should already have, or develop, an understanding of programming, not just coding. This involves problem solving with logic.

Database

Students should demonstrate an understanding of data modeling, database programming and basic database-administration concepts.

IT infrastructure

Students should be familiar with the technical foundations of information systems. This typically includes operating systems, networks and computer/systems security.

Organizational, Ethical and Social Context

Students must understand their social and professional responsibilities as computer professionals as well as the role(s) of IT in the organization.

Professional, legal and ethical aspects

Students must understand their social and professional responsibilities as computer professionals as well as the role(s) of IT in the organization.

Organizational context and behavior

Students should understand the contexts within which they work and be prepared to take on the roles expected of professionals.

Students should develop skills in leadership, collaboration and negotiation.

Theory, Development and Management of Systems

Students must include systems analysis and design as central to understanding information systems. Students must have familiarity with project management concepts, as well as an understanding of the issues involved in the acquisition and management of information systems.

Systems analysis and design

This knowledge should encompass an understanding of the systems life cycle and issues in requirements definition and system implementation at the advanced level. The student should know the system analysis and design life cycle from analyzing the business case through requirements modeling and system architecture to system operations and support and the major activities in each phase, as well as understand how the process helps address the larger organizational needs.

Project management

Skills and knowledge of project management methodologies and skill in applying the techniques of project management are required. This knowledge should encompass an understanding of the project life cycle from planning to closing and the key knowledge areas (scope, cost and time management) to ensure that organizational resources are planned and deployed effectively and that evaluation and quality are maintained in the system-development process.

information systems strategy

Students should understand the issues and complexities involved in the effective acquisition and management of information systems within an organization, including assessment of existing infrastructure along with emerging technologies, an understanding of globalization and a strategic perspective.

Individual Context

Each student brings his or her own goals and background to the study of IS. It is these goals for future study or work which will provide the context for the student's degree.

Students must develop an appreciation for the type(s) of organization in which they work, or intend to work, as well as the interpersonal and communication skills needed to be successful in that environment. For example, a student who intends to work in a government (federal, state, local) should understand bureaucracies, politics and regulations, while a student who works in a scientific research environment should understand how scientists view data, design studies, etc.

Some students may be interested in information systems as supporting managerial decision making within or across functional areas of business. For this student, an understanding of these functional areas should be included.

Currency

Information systems and the environment in which they exist are always changing. Degree programs must demonstrate currency in the field and show understanding of emerging and evolving technology and environment relevant to their individual context.

Currency can be viewed in two ways: on the one hand, currency refers to current technologies; on the other, currency can be seen as not-obsolete.

If students want to use earlier learning in their programs they should consider how old, how specialized and how extensive the earlier learning is. Courses which encompassed analysis, problem definition, algorithms, data structures, programming concepts and testing methodology may provide a useful foundation to explore recent developments in computer technology. Courses which are product specific (hardware or software) may be less useful. When earlier learning is judged to provide a useful foundation within the program, students should be sure to incorporate opportunities to bridge to newer platforms or applications within their degree program.

Rationale

Students should discuss in their rationale essay how each of the above topics are incorporated into their degree program, how the program is designed to meet their goals and how the program meets the currency criteria discussed above. It is not necessary that the specific terms used above appear in individual study titles.