

IS'15 - A Model Curriculum reflecting the emerging IS Profession

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Abstract

This proposed Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems is designed to reflect the actual job market in IS/IT. It is grounded in the requirements of industry for new graduates from business school affiliated information systems degree programs. The application software package orientation of the current IS/IT industry has created three major IS employment areas: Systems Administration/ Support; Project/ Systems/ Architecture Analysis and Implementation; and Systems Development and Programming of personal-level applications. This proposed curriculum recognizes these trends by reinserting and updating two IS 2002 courses and creating a new course based on two now significant IS 2002 learning units, while removing two courses "focused on concepts at a higher level of abstraction."

Keywords: IS Model Curriculum, IS undergraduate curriculum

1. STRUCTURE OF THE CURRENT IS INDUSTRY

The information systems industry has over the last decade become a prime force in the technologization of the world's professional and clerical workers. Meanwhile the IS curriculum development committees efforts have moved into astrospace by removing systems development from the core curriculum and adding courses "focused on concepts at a higher level of abstraction" (IS 2010, 27-28) The transition from IS 2002 to IS 2010 has moved our Standard Curriculum further and further from reality. The creators of IS 2010 seem to have forgotten that early versions of the IS curriculum reflected the job market for recent graduates. This version of the IS standard curriculum returns to that orientation.

The actual structure of the IS/IT/CT industry today is well illustrated by the following salary survey chart (Figure 1) from a recent Salary Survey (2013).

In today's world, the three areas of IS, IT and CT dominate three-quarters of the job market. Specifically,

- *System Administration and Support* of server based architectures and LAN based network architecture *operations* represent over a one-third of our industry (27% support + 8% help desk)
- *Project/ Systems/Architecture Analysis and Implementation* represent almost an additional one-third of our industry (11% + 7% systems, 5% + 5% project consulting)

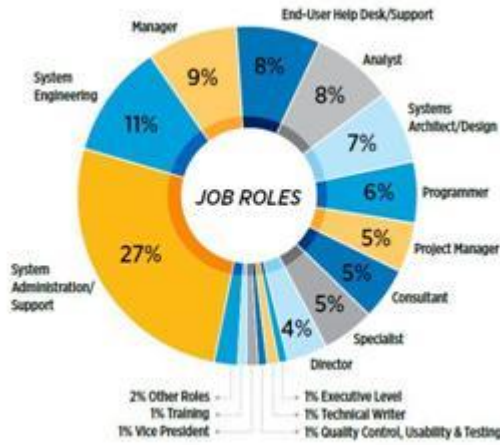


Table 1: IS Salary Survey

- System Development and Programming still represents an additional one-seventh of our industry (8% analysis + 6% programming).

Yet two of these areas are not represented in IS 2010. Instead theory oriented courses such as IS 2010.3 Enterprise Architecture and IS 2010.5 IT Infrastructure have been created. These courses should be taught at the MSIS level since they are too advanced for a core curriculum, while Systems Development, Systems Administration and Security courses should be included in the Core Curriculum.

The remainder of this paper postulates a revised IS'15 curriculum that reflects these trends and today's actual demand for IS undergraduates.

The following Figure 2: Course Patterns, presents potential IS'15 courses and the IS 2002 and IS 2010 courses they replace plus a new course for possible inclusion in the updated curriculum.

2. IS'15 COURSE DESCRIPTIONS

IS'15.GE – Personal Productivity with IS (Was a IS 2002 prerequisite course)

Catalog description

This information systems literacy course enhances personal productivity and problem solving skills by using office systems software packages for problem situations at home and at work.

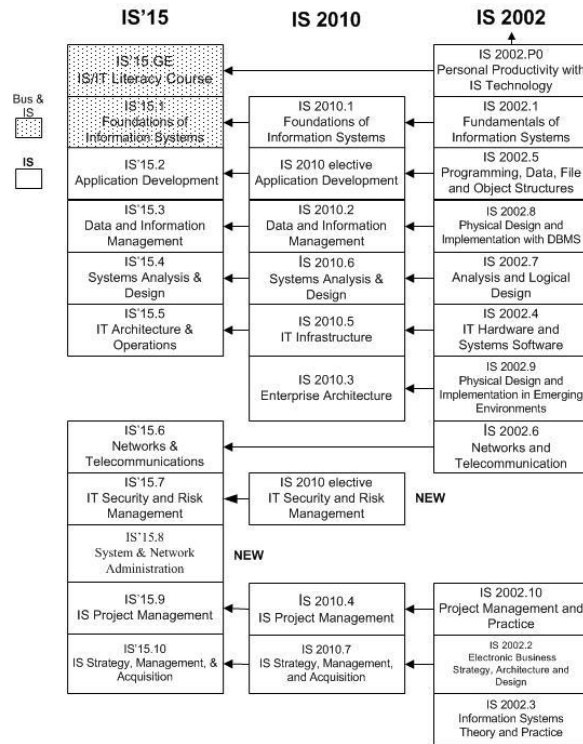


Figure 2: Course Patterns

This general education course (GE) enables students to improve their skills as knowledge workers. It includes hands-on experience using functions and features in office software such as spreadsheets, databases, presentation graphics, and Web authoring.

IS'15.1 - Foundations of Information Systems

(Is a modified IS 2010.1 course)

Catalog description

This course is designed to introduce students to contemporary information systems and demonstrate how these systems are used throughout global organizations. The focus of this course will be on the key components of information systems - people, processes, application software, hardware, data, and communication technologies and how these components can be integrated and managed to create competitive advantage. Through the knowledge of how IS provides a competitive advantage students will gain an understanding of how information is used in organizations and how IS enables improvement in quality, speed, and agility. This course also provides an introduction to systems and development concepts, technology acquisition, and various

types of application software that have become prevalent or are emerging in modern organizations and society.

Since information systems are an integral part of all administrative activities and careers, this course is normally required of all business students and is frequently taken by students throughout the university.

IS'15.2 - Application Development

(was a IS 2010 elective course, no longer an elective under this proposal)

Catalog description

This course introduces students to the fundamental concepts and models of application development so that they can understand the key processes related to building functioning applications and appreciate the complexity of application development. Students will learn the basic concepts of program design, data structures, programming, problem solving, programming logic, and fundamental design techniques for event-driven programs.

The course will include hands-on experience in the program development life cycle: gathering requirements, designing a solution, implementing a solution in a programming language, and testing the completed application.

IS'15.3 - Data and Information Management

(description modified from IS 2010.2 course)

Catalog description

This database-oriented course provides the students with an introduction in the core concepts in data and information management. It is centered on the core skills of identifying organizational information requirements, modeling them using conceptual data modeling techniques, converting the conceptual data models into relational data models and verifying its structural characteristics with normalization techniques, and implementing and utilizing a relational database using an multi-user database management system. The course will also include coverage of basic database administration tasks and key concepts of data quality and data security.

In addition to designing and developing database applications, the course helps the

students understand how large-scale custom and packaged systems are highly dependent on the use of DBMSs. Building on transactional database understanding, the course provides an introduction to data and information management technologies that provide decision support capabilities under the broad business intelligence umbrella.

IS'15.4 Systems Analysis & Design

(same as IS 2010.6)

Catalog description

This course discusses the processes, methods, techniques and tools that organizations use to determine how they should conduct their business, with a particular focus on how computer-based technologies can most effectively contribute to the way business is organized and operates. The course covers a systematic methodology for analyzing a business problem or opportunity, determining what role, if any, computer-based technologies can play in addressing the business need, articulating business requirements for the technology solution, specifying alternative approaches to acquiring the technology capabilities needed to address the business requirements, and specifying the requirements for the information systems solution in particular, in-house development, development from third-party providers, or purchased commercial-off-the-shelf packages .

IS'15.5 - Information Technology Architecture and Operations

(an updated IS 2002.4 and IS 2010.4 course)

Catalog description

This course provides an introduction to IT architecture and operations issues. It covers topics related to the design, installation, configuration, and operation of infrastructures of systems software, computer systems, and communication networks (data centers), with an overall focus on the operational services and capabilities that such data center configurations enable in an organizational context.

It gives students the knowledge and skills that they need for communicating effectively with professionals whose special focus is on IT facilities and operations and for designing organizational processes and software solutions that require in-depth understanding of IT infrastructure capabilities and limitations. It

prepares the students for organizational roles that require interaction with external vendors of IT infrastructure components and solutions. The course also focuses on technical aspects of computer and network privacy and security, business continuity, and the role of infrastructure in regulatory compliance.

IS'15.6 - Networks and Telecommunication
(same as IS 2002.6)

Catalog description

This course provides an in-depth knowledge of data communications and networking requirements including networking and telecommunications technologies, hardware, and software. Emphasis is upon the analysis and design of networking applications in organizations. Management of telecommunications networks, cost-benefit analysis, and evaluation of connectivity options are covered. Students learn to evaluate, select, and implement different communication options within an organization.

Students will gain in-depth experience of networking and telecommunications fundamentals including LANs, MANs, WANs, intranets, the Internet, and the WWW. Data communication and telecommunication concepts, models, standards, and protocols will be studied. Installation, configuration, systems integration and management of infrastructure technologies will be practiced in the laboratory.

IS'15.7 - IT Privacy, Security and Risk Management

(description modified from the IS 2010 elective course)

Catalog description

This course presents the principles and topics of Information Technology Privacy, Security, and Risk Management at the organizational and systems levels. Students will learn critical security principles that enable them to plan, develop, and perform security tasks. The course will address hardware, software, processes, communications, applications, and policies and procedures with respect to organizational IT Privacy, Security and Risk Management.

IS'15.8 - System and Network Administration

(a new IS 2015 course using LUs from IS 2002)

Systems architectures and networks administration and support; including design, implementation and operation of a networked server center, its user support and resource management, and its internetworking and interfacing with the Internet. Includes hands-on installation, operation and support of a popular server-level operating system.

Additional information on this new course included in an attachment

IS'15.9 - IS Project Management

(same as IS 2010.5)

Catalog description

This course discusses the processes, methods, techniques and tools that organizations use to manage their information systems projects. The course covers a systematic methodology for initiating, planning, executing, controlling, and closing projects. This course assumes that project management in the modern organization is a complex team-based activity, where various types of technologies (including project management software as well as software to support group collaboration) are an inherent part of the project management process. This course also acknowledges that project management involves both the use of resources from within the firm, as well as contracted from outside the organization.

IS'15.10 - IS Strategy, Management & Acquisition

(same as IS 2010.7)

Catalog description

This course explores the issues and approaches in managing the information systems function in organizations and how the IS function integrates / supports / enables various types of organizational capabilities. It takes a senior management perspective in exploring the acquisition, development and implementation of plans and policies to achieve efficient and effective information systems. The course addresses issues relating to defining the high-level IS infrastructure and the systems that support the operational, administrative and strategic needs of the organization. The remainder of the course is focused on developing an intellectual framework that will allow organizations to critically assess existing IS infrastructures and emerging technologies as well as how these enabling technologies might affect organizational strategy. The ideas developed and cultivated in this course are

intended to provide an enduring perspective that can help leaders make sense of an increasingly globalized and technology intensive business environment.

“higher level of abstraction” course IS 2002.9 showed minimal implementation. This validates the approach of this curriculum.

3. STRUCTURE OF THE PROPOSED IS 2015 CORE CURRICULUM

The structure of the proposed courses shown by Figure 3 is based on the knowledge prerequisite levels of literacy, scope, tools and jobs/roles.

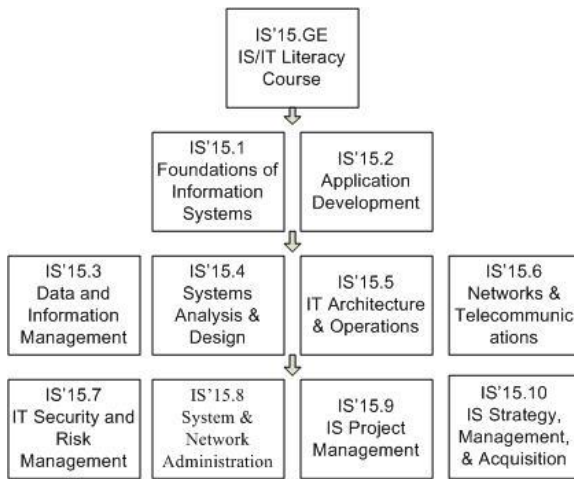


Figure 3: Course Flow

4. IMPLEMENTING A NEW IS MODEL CURRICULUM

The proposed curriculum standard modifications are justified as follows.

Last year a survey was performed of the implementation status of the IS standard curriculum (Bell et al., 2013). The survey, see Figure 4 shows a high implementation rate for four of the seven IS 2002 courses included in the IS 2010 curriculum and an average implementation rate for two other courses. As shown in the following table (Bell, 2012), the

IS 2002	National Adoption	CSULA Adoption
IS 2002.P0 Personal Productivity with IS Technology		GE/ Core
IS 2002.1 Fundamentals of Information Systems	87%	Core
IS 2002.5 Programming, Data, File and Object Structures		Core
IS 2002.8 Physical Design and Implementation with DBMS	97%	Core
IS 2002.7 Analysis and Logical Design	84%	Core
IS 2002.4 IT Hardware and Systems Software	70%	Core
IS 2002.6 Networks and Telecommunication		Core
IS 2002.9 Physical Design and Implementation in Emerging Environments	17%	
IS 2002.10 Project Management and Practice	38%	Core
IS 2002.2 Electronic Business Strategy, Architecture and Design (Capstone)	44%	Core
IS 2002.3 Information Systems Theory and Practice		

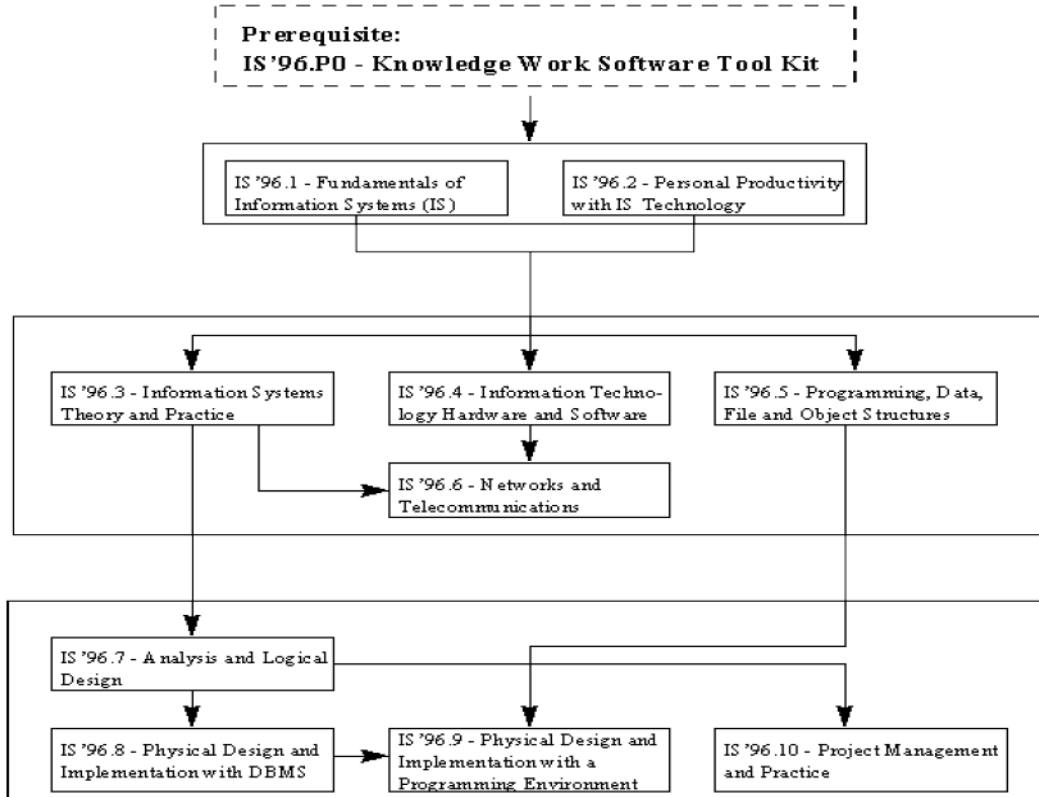
Figure 4: Course Adoption

The omission of the system development course from the IS 2010 core is also a serious problem both from the need of our students seeking entry level positions and from its incompatibility with ABET IS accreditation (Bell, Mills & Fadel, 2013).

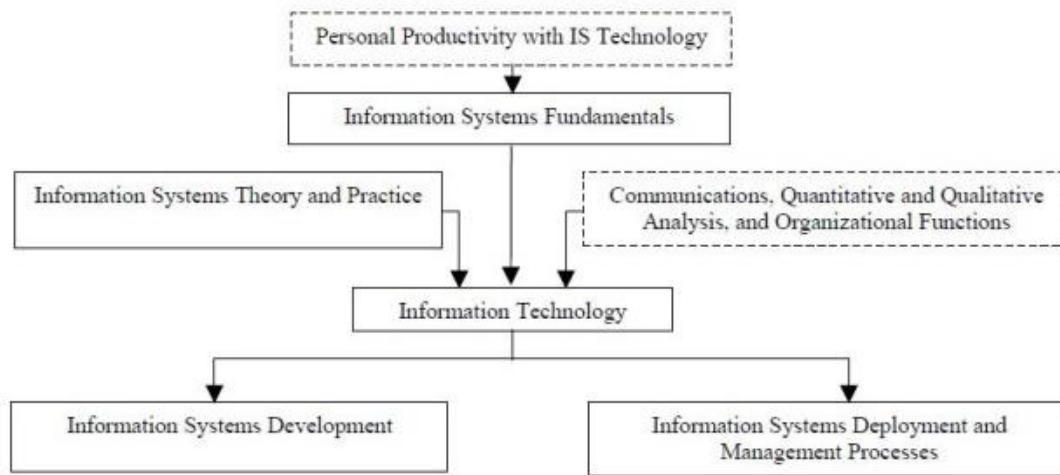
ICCP and its Affiliate Societies (AIS, AITP, and ACM) need to create a team to draft, verify, and publish a new industry structure oriented IS Model Curriculum, hopefully based on this paper. Until a draft is published, the ICCP sponsored University Curriculum Assessment Exam (ISA) outline should continue to be based on the IS 2002 Standard.

4. REFERENCES

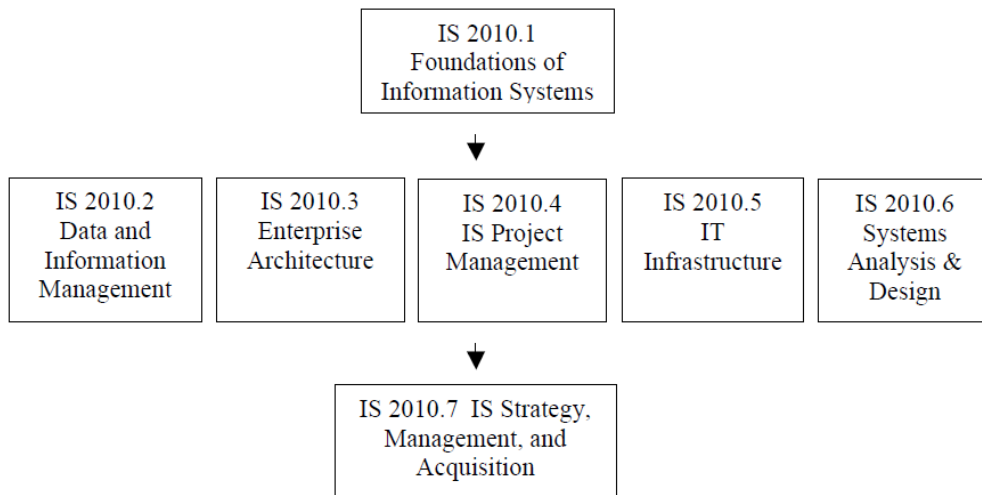
[IS'97](#) Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems. AM, AIS, AITP, 1997.



[IS 2002](#) Model Curriculum and Guidelines for Undergraduate Degree Programs in Information Systems. ACM, AIS, AITP.



[IS 2010](#) Curriculum Guidelines for Undergraduate Degree Programs in Information Systems. ACM, AIS.



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Attachment

The course description that follows is based on course IS 2002.6 and Learning Unit Numbers 37-41 (IS 2002, page 45).

IS'15.8 - System and Network Administration

Systems architectures and networks administration and support; including design, implementation and operation of a networked server center, its user support and resource management, and its internetworking and interfacing with the Internet. Includes hands-on installation, operations and support of a popular server-level operating system.

A system administrator's responsibilities include:

- Analyzing system logs and identifying potential issues with computer systems.
- Introducing and integrating new technologies into existing data center environments.
- Performing routine audits of systems and software.
- Performing backups.
- Applying operating system updates, patches, and configuration changes.
- Installing and configuring new hardware and software.
- Adding, removing, or updating user account information, resetting passwords, etc.
- Answering technical queries and dealing with often frustrated users.
- Responsibility for security.
- Responsibility for documenting the configuration of the system.
- Troubleshooting any reported problems.
- System performance tuning.
- Ensuring that the network infrastructure is up and running.

Objectives of a Systems and Network Administration course (From IS '97 and IS 2002)

Introduce the requirements for security, interoperability, and systems integration

- explain concepts of interoperability and systems integration in relation to policies and practices

- explain components of hardware and software to connect and implement networked solutions for PC networks and more advanced LAN and WAN environments.

- explain installation and configuration of a distributed system

- explain OS considerations to enable a client server environment

Learn how to install, configure, and operate a multi-user operating system

- build system software command structures (e.g. JCL) for both mainframe and microcomputer systems involving the macro facilities of the operating system
- install, configure and operate a multi-user operating system

Learn how to install equipment necessary to implement a local telecommunication system, e.g. cable, modems, Ethernet connections, gateways, and routers

- explain, install and test modems, multiplexers and Ethernet components
- explain, install and test bridges and routers on appropriate hardware
- install and operate terminal emulation software on a PC
- explain and construct organizational plans for the use of EDI

Learn how to design, install, configure, and manage a LAN

- design, install and manage a LAN
- explain and implement security appropriate for an end-user environment involving access to an enterprise level IS