IS 2009

Curriculum Guidelines for Undergraduate Degree Programs in Information Systems

Association for Computing Machinery (ACM)
Association for Information Systems (AIS)

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FOREWORD

The IS 2009 report is the latest output from model curriculum work for Information Systems that began in the early 1970s. Prior to this current effort, the most recent version of the IS undergraduate model curriculum is IS 2002 (Gorgone et al. 2003), published in early 2003. IS 2002 was a relatively minor update of IS'97 (Davis et al. 1997). Both IS 2002 and IS '97 were joint efforts by ACM, AIS, and DPMA/AITP (Data Processing Management Association/Association of Information Technology Professionals). IS'97 was preceded by DPMA'90 (Longenecker and Feinstein 1991) and ACM Curriculum Recommendations 1983 (ACM 1983) and 1973 (Couger 1973). IS 2002 has been widely accepted, and has also been the basis for accreditation of undergraduate programs of Information Systems. This report represents the combined effort of numerous individuals and reflects the interests of thousands of faculty. It is grounded in the expected requirements of industry, represents the views of organizations employing the graduates, and is supported by other interested organizations.

This report is part of the Computing Curricula 2005 project (CC2005; Shackelford 2005), which is a joint undertaking of the Computer Society of the Institute for Electrical and Electronic Engineers (IEEE-CS) and the Association for Computing Machinery (ACM) to develop curriculum guidelines for undergraduate programs in computing. In addition to IS 2009, the Computing Curricula series consists of several volumes that contain curriculum recommendations for other computing disciplines, including computer science, computer engineering, software engineering, and information technology [http://www.acm.org/education/curricula-recommendations]. All of these reports are under the control of separate committees; updates are published as they are completed.

All aspects of the computing field are facing rapid, continuous change. As a result, university-level Information Systems (IS) curricula need frequent updating to remain effective. Since most academic units have mechanisms to maintain currency of curricula, what is the role of professional society curriculum committees? If an IS academic unit were providing graduates solely to local business and government, the input on program contents could be derived from representatives of local organizations that hire the graduates. However, local employment is not the sole objective for undergraduate majors in Information Systems. Students from IS programs accept jobs in widely dispersed geographic areas. Therefore, the availability of curriculum models enables local academic units to maintain academic programs that are consistent both with regional, national, or global employment needs and with the common body of knowledge of the IS field. The first IS curriculum models were introduced in the early 1970s. This early work was followed by model curricula developed by ACM and AITP. Details of this history are reviewed in Appendix 1: Background of IS Curricula and Related Disciplines.

Professional society curriculum reports serve several other objectives. One important use is to provide a local academic unit with rationale to obtain proper resources to support its program. Often, the administration at a local institution is not aware of the resources, course offerings, computing hardware, software, and laboratory resources needed for a viable program. The administration may be unaware of the specialized classroom technology, library resources, or laboratory assistants essential for proper education of IS undergraduates. Finally, the administration might not recognize the rapid turnover of knowledge in the field and the need for resources to support constant retooling of faculty. Curriculum reports provide recommendations in these resource areas as well as recommended content for the body of knowledge to be taught.

We encourage you to get engaged in the ongoing curriculum development process on blogsandwikis.bentley.edu/iscurriculum that has been launched in the context of this curriculum revision project. We believe these efforts can be truly successful only if the broad global IS community participates widely.

The editors of IS 2009 thank those who have helped in this project. We also acknowledge with gratitude the permission we received from Communications of the AIS to include material in this report from the two CAIS papers that the task force published during the course of this project (Topi et al., 2007; Topi et al., 2008). We hope this ongoing cooperative curriculum development effort will continue to serve your needs. We are interested in your input and encourage you to let us know how you are using these materials and how they might be improved.

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EXECUTIVE SUMMARY

IS 2009 is the latest in a series of model curricula for undergraduate degrees in Information Systems. It builds on the foundation formed by this earlier work, but it is a major revision of the curriculum and incorporates several significant new characteristics. IS 2009 is the third collaborative effort by ACM and AIS. Both organizations have worldwide membership, and therefore, IS 2009 includes elements that make it more universally adaptable than its predecessors. IS 2009 is not directly linked to a degree structure in any specific environment but it provides guidance regarding the core content of the curriculum that should be present everywhere and suggestions regarding possible electives and career tracks based on those.

There are several reasons motivating this update. The work leading to the previous significant update, IS'97, took place more than 10 years ago, and in a rapidly changing field this alone is an important reason to re-evaluate the curriculum. There has been a great deal of change in technology and industry practices, including the globalization of IS development processes, introduction of Web technologies, emergence of a new architectural paradigm, widespread utilization of large-scale ERP systems, ubiquitous availability of mobile computing, and broad use of IT control and infrastructure frameworks, such as ITIL and COBIT. This curriculum is also introduced after a period when the interest in studies in Information Systems has significantly declined, and the field has to be able to reverse this trend. This curriculum revision also represents an effort to re-evaluate the core principles of the discipline through a very careful specification of the degree learning outcomes. Finally, new social networking technologies made it possible to attempt to include the IS community as broadly as possible.

This revision has four broad key characteristics that have shaped the outcome significantly. First, the curriculum reaches beyond the schools of management and business. Previous versions of the IS curriculum have been targeted to a typical North American business school; this model curriculum is, however, guided by the belief that even though business will likely continue to be the primary domain for Information Systems, the discipline provides expertise that is critically important for an increasing number of domains. Second, the outcome expectations of the curriculum have been very carefully re-evaluated and articulated first in the form of high-level IS capabilities and then in three knowledge and skills categories: IS specific knowledge and skills, foundational knowledge and skills, and domain fundamentals. Third, the curriculum is structured so that it separates the core of the curriculum from electives with the intent of supporting the concept of career tracks. Finally, the design of this curriculum includes enough flexibility to allow its adoption in a variety of educational system contexts.

The high-level IS capabilities that the curriculum specifies as the highest level outcome expectations are as follows:

- Improving organizational processes
- Exploiting opportunities created by technology innovations
- Understanding and addressing information requirements
- Designing and managing enterprise architecture
- Identifying and evaluating solution and sourcing alternatives
- Securing data and infrastructure, and
- Understanding, managing and controlling IT risks.

These high-level capabilities are translated into knowledge and skills in three categories:

1. IS specific knowledge and skills, including

    a. Identifying and designing opportunities for IT-enabled organizational improvement
    b. Analyzing trade-offs
    c. Designing and implementing information systems solutions, and
    d. Managing ongoing information technology operations
2. Foundational knowledge and skills, including
    a. Leadership and collaboration
    b. Communication
    c. Negotiation
    d. Analytical and critical thinking, including creativity and ethical analysis, and
    e. Mathematical foundations
3. Domain fundamentals, including
    a. General models of a domain
    b. Key specializations within a domain and
    c. Evaluation of performance within a domain.

The curriculum itself is designed to educate graduates who are prepared to enter the workforce equipped with the knowledge and skills specified in these three categories. As discussed above, it separates the core from career track electives and includes seven core courses: Foundations of Information Systems, Data and Information Management, Enterprise Architecture, IS Project Management, IT Infrastructure, Systems Analysis & Design, and IS Strategy, Management, and Acquisition. It is obviously not possible to offer a complete collection of career track electives in a model curriculum document, but we include a number of elective course descriptions as examples. Notable changes in the included courses are as follows: a) application development is no longer included in the core of the curriculum; b) data networking and computer architecture are covered at a higher level of abstraction in an IT Infrastructure course; c) enterprise architecture and IS project management are now part of the core; d) the personal productivity tools course has been removed from the curriculum, and e) the prerequisite structure has been simplified. Notably, both data & information management and systems analysis & design have maintained their central roles in core of the curriculum.

The task force believes that the outcome expectations, structure, and content of the new curriculum make it significantly more broadly applicable than the previous IS model curricula were. We hope that this document demonstrates that Information Systems as a discipline can make significant contributions to a number of domains, including but not limited to business, and that its core areas of expertise are highly valuable and even essential for the best practices and further advancement of a variety of collaborating domains.

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