

## **Graduate IS Curriculum for the Millennium: Background, Process and Recommendation**

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### **ABSTRACT**

The MSIS 2000 model curriculum, prepared by the Joint ACM/AIS Curriculum Committee, provides guidelines for colleges and universities offering Masters degrees in Information Systems. This paper summarizes both the program and the procedures used to create it. In brief, the minimum masters program involves 10 courses for students with adequate preparation. This minimum program consists of 6 core course (data management; analysis, modeling, and design; data communications and networking; project and change management, information systems policy and strategy, and systems integration) and a 4-course career track. The procedure used included face-to-face and computer meetings among committee members and extensive consultation with the worldwide IS community.

### **INTRODUCTION**

This paper presents the history, initial design, curriculum process, and curriculum recommendations of the Joint ACM/AIS Curriculum Committee. This committee was tasked to create a model curriculum for the over 100 universities and colleges worldwide that offer a Master's degree in Information Science. The resulting curriculum is known as MSIS 2000.

### **BACKGROUND**

The original MS model curriculum in Information Systems was published in 1982 [Nunamaker et al., 1982]. In the late 1980's the curriculum was revisited. A meeting was held at the University of Arizona under the leadership of Jay Nunamaker which many of the people involved in the 1982 version attended. The conclusion of the attendees at the meeting

was that the existing curriculum was still serviceable and required minimum changes. This meeting was not documented.

In August 1995, Paul Gray of Claremont Graduate University invited representatives of interested schools to a meeting at the first AIS Americas Conference in Pittsburgh. Approximately 50 people from as many schools attended, including representatives of schools with and without MSIS degree programs. It was agreed that a problem existed, that little data was available on the state of the MS program, and that the group would meet again in the following year. Two of the attendees, John T. Gorgone of Bentley College and Vijay Kanabar of Boston University were asked to study existing programs so that a baseline of then current offerings could be established. The results were reported at the follow up meeting at AIS Americas 1996 jointly chaired by Paul

Gray and John T. Gorgone and published in Gorgone and Kanabar [1997]. Over 60 people attended.

The research identified 52 universities and colleges as having a specialized master's degree in IS. Fifty one percent of the programs were located in business schools and 49 percent elsewhere in the university. The top three program titles were MSIS, MSMIS and MSCIS respectively. The content and length of these programs varied widely. It was clear that a new model curriculum would be appropriate.

It was concluded that, while the basic guidelines being used by universities and colleges were the ACM's 1982 curriculum were useful as a course reference, course content had changed drastically by 1996. The external job market changed and IS graduates had a broader range of opportunities. New technologies appeared: World Wide Web, end-user development, data warehouses, rapid application development, enterprise resource planning and more. New concepts became important: competitive and strategic use of IS, project management, change management and collaborative work. More skills were needed in GUI and object-oriented design. Some MS programs became more technical while others were interested in change agent roles or the economics of computing.

A follow-up meeting was held at AIS Americas 1997 which led, in turn, to the appointment of the Joint ACM/AIS MSIS 2000 Graduate Curriculum Committee by ACM's Education Board and by the President of Association for Information Systems (AIS), Gordon Davis. The committee is co-chaired by John T. Gorgone (chair of ACM's CIS Task Force) for ACM and Paul Gray (chair of AIS's Graduate Curriculum Committee) for AIS. Each

member<sup>1</sup> appointed to the Curriculum Committee is a member of both professional societies. The Committee began work in January 1998.

## **PROCESS FOR DEVELOPING THE CURRICULUM**

The Gorgone and Kanabar [1997] research ascertained the most common core courses offered by the existing MSIS programs and proposed a model curriculum for MSIS degree programs. Of 27 different courses identified, the six most common courses being taught within a masters program were, in rank order: (1) Database Management Systems, (2) Analysis and Design, (3) Programming, Data, File and Object Structures, (4) Networks and Telecommunications, (5) Fundamentals of Information Systems, and (6) Information Technology Hardware and Software. The Committee decided to use the outcome of the research as a "straw model" to begin discussion.

The Curriculum Committee held two interactive meetings over the Internet, using AIS's Virtual Meeting Center (VMC), created by Munir Mandviwalla of Temple University. The first considered the "straw model" curriculum and the second focused on what the content of a graduate "IS core" should be. A meeting of the full Curriculum Committee at Bentley College on June 18-20, 1998 followed these virtual meetings.

The meeting at Bentley produced the outline of the program presented in the first draft report. To involve the full information systems community, a series of presentations were made by committee members at the fifteen national and international meetings

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<sup>1</sup> The members of the committee are: David L. Feinstein, Jerry N. Luftman, George M. Kasper, Edward A. Stohr, Joseph S. Valacich and Rolf T. Wigand

listed in Table 1. At these meetings, the underlying concepts and proposed curriculum were discussed in detail. Meeting participants completed forms listing what

they liked best and least about the curriculum and made suggestions for changes. Many of these suggestions are included in the final recommendations.

**Table 1. Presentations on the MSIS 2000 Curriculum**

Meeting/Conference	Location	Date
Association for Information Systems (AIS) Americas	Baltimore, MD	Aug 1998
International Association for Computer Information Systems (IACIS)	Cancun, Mexico	Oct 1998
Information Systems Education Conference (ISECON) of Association of Information Technology Professionals (AITP)	San Antonio, TX	Oct 1998
INFORMS, College on Information Systems	Seattle, WA	Oct 1998
Decision Sciences Institute (DSI)	Las Vegas, NV	Nov 1998
Conference Board	Washington, D.C.	Nov 1998
Conference Board	Los Angeles, CA	Dec 1998
International Conference of Information Systems	Helsinki, Finland	Dec 1998
International Academy for Information Management	Helsinki, Finland	Dec 1998
Hawaii International Conference for Systems Science	Maui, HI	Jan 1999
ACM Special Interest Group in Computer Science Education	New Orleans, LA	Mar 1999
Association for Information Systems (AIS) Americas	Milwaukee, WI	Aug 1999
Information Systems Education Conference (ISECON) of AITP	Chicago, IL	Oct 1999
Interchange99 of Society for Information Management (SIM) International	Atlanta, GA	Oct 1999
Joint session of International Academy for Information Management and International Conference of Information Systems	Charlotte, NC	Dec 1999

With results from 10 of the meetings in hand, the co-chairs of the Committee met at Claremont Graduate University in April 1999 in preparation for a June 1999 meeting of the entire committee at Bentley College. These meetings completed development of the curriculum and created the initial drafts of the final report. Over the next five

months and more than 15 revisions later, the final report was completed. A draft of the final report was sent to major IS organizations for their review and endorsement. The report was then discussed in a meeting with the IS community at the Americas Conference of Information Systems (AMCIS 99) meeting in Milwaukee

in August 1999 and at three subsequent meetings. The final draft was completed in time for the ICIS 1999 meeting in Charlotte,

North Carolina. The final report was submitted to ACM's Education Board and AIS's Council for approval.

## THE MODEL CURRICULUM

**Figure 1: The Complete Master of Science in Information Systems Curriculum**

IS Foundations	Business Foundations	IS Core		Career Electives
Fundamentals of Information Systems	Financial Accounting	Data Management	Integration	<b>Tracks:</b> <ul style="list-style-type: none"> <li>● Electronic Commerce</li> <li>● Technology Management</li> <li>● Knowledge Management</li> <li>● Consulting</li> <li>● Enterprise Resource Planning</li> </ul>
		Analysis, Modeling & Design		
Information Technology Hardware & Software	Marketing (Customer Focus)	Data Communication & Networking		
		Project & Change Management		
Programming, Data & Object Structures	Organization Behavior	Information Systems Policy & Strategy		
Pre- / Co-requisite		Core		Elective
9-12	9 units	15	3 units	12+ units

The MS program (Figure 1) is designed to attract students with a wide range of backgrounds. Those entering immediately from undergraduate college may have a degree in information systems, computer science, business, engineering or some other field. The program is also intended to attract experienced IS professional and individuals seeking career changes. The program structure is designed to accommodate MS programs ranging from a minimum of 30 units (10 courses in one year) to 50 or more units. The structure consists of three parts:

- Foundation courses before entering the Core of the MS program.
- The IS Core
- A Career Elective track.

The IS foundation courses in Figure 1 are three of the top six courses identified in the Gorgone and Kanabar [1997] study. They are included as prerequisites in the

model curriculum to ensure that MS students have at least the minimum IS background to undertake the core. Students with this background, either by having completed undergraduate courses or by experience, may proceed directly to the Core IS courses. Of course, any program may require more than this minimum set of IS content for admission to the Core.

IS professionals must be two-culture individuals, who understand both the IS and the business culture. Therefore, students are required either to present a background in business courses or to take three business foundation courses. The list is representative. It was derived from the original ACM '82 model, which included 8 to 10 of the common body of business knowledge courses then required by AACSB. Limiting the business foundations to 3 courses takes into account that up to 50

percent of the MSIS programs are not located in a business school. A program may require more than the minimum business foundations for admission to the core. In the case of some career elective tracks, additional business breadth and/or depth may be required.

The IS Core courses include the other three of the top six courses identified by the 1997 study (data management; analysis, modeling, and design; and data communications and networking). The committee and the feedback of the attendees of conference presentations agreed that these courses are essential parts of the core of knowledge for IS. Although the topics of these three Core courses were included in the ACM '82 curriculum, in the intervening years the contents of these courses altered drastically as new technologies and new software became available. For example, such topics as data warehousing and data mining, object-oriented systems, and ATM (asynchronous transfer mode) were not even known. The intent is to offer modern versions of courses in these areas suitable for the 21<sup>st</sup> century.

Students with MS degrees in IS can expect to move into managerial positions quite rapidly. They therefore should be knowledgeable in the managerial considerations in information systems. The next two IS Core courses (Project and Change Management and IS Policy and Strategy) are designed to accomplish that goal. The Project and Change Management course is brand new. It examines how systems and technologies are created and implemented. It focuses on project planning, scheduling, and budgeting as the managerial tasks in project management and then recognizes that project implementation implies change management. IS Policy and Strategy was the capstone course in the ACM '82 Curriculum. The Committee

believes that the time has come to make this course part of the core knowledge for MS degree holders. This course, which typically is case based, looks at the IS project portfolio from the view of the senior IS executive and from the business executive. It shows the students how policy and strategy considerations affect every aspect of IS.

The Integration course, the capstone of the core, is a second new feature in the curriculum. Integration is a multi-billion dollar industry that attracts senior people and it is virtually neglected in IS education. The need for integration is driven by the need for innovation, coordination, and speed. These three characteristics are the result of competition, globalization, emerging technologies, and organizational change. These phenomena demand integration of organizational and technological perspectives.

Integration can be viewed from three perspectives: (1) Integrating the Enterprise, (2) Integrating the IS Function, and (3) Integrating IS Technologies. Each perspective could merit a course of its own. The curriculum recommends that schools offer one of these courses or create a course that looks at all three perspectives. The choice depends on the capabilities of the school's faculty, the needs of regional industry, and the objectives of the students.

Integrating the Enterprise is oriented toward what to build, not how to build it. Its objectives are to (1) provide an integrated view of the firm and its relations with suppliers and customers, and (2) demonstrate an integrated set of business processes and functional applications that meet business needs. Integrating the IS Function focuses on managing IS functions on a day-to-day basis. Its objectives are to (1) design effective/efficient IS organizational processes, (2) assess the

impact of emerging technologies, (3) define human resource needs, (4) leverage IS governance alternatives, (5) evolve the role of the CIO, and (6) demonstrate the value of IS. Integrating IS Technologies is concerned with how to develop an integrated IS architecture including (1) architectural and platform choices, priorities and policies, (2) assess the impact of emerging technologies, (3) role of standards, and (4) role of vendor strategies.

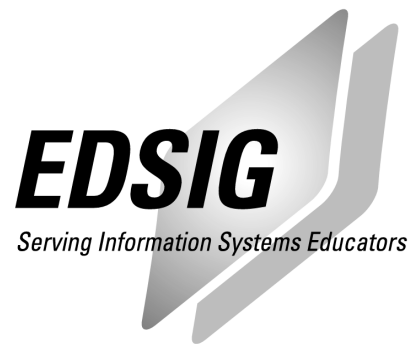
In keeping with the philosophy that students taking an MS program should be able to specialize in a field that leads to employment, the program includes a career track. Each school would choose one or more career tracks based on its local market and its faculty expertise. Each career track consists of 4 or more related electives that prepare a student for an emerging specialization such as electronic commerce, for managing complex projects such as ERP, for consulting, or for some other area in

long-term demand such as systems analysis. The curriculum strongly recommends that students undertake a practicum as part of their career track in which they solve a real problem for a company under constraint of time and budget.

## REFERENCES

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