

The Development and Revision of a Model Curriculum in Organizational and End-User Information Systems

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Abstract

This paper provides an overview of the development of a model curriculum in information technology—the Model Curriculum in Organizational and End-User Information Systems. The model was developed by a curriculum committee made up of educators and professionals in a variety of locales and specialties in the field of information technology and end-user information systems. The paper covers the evolution of the curriculum model; the process of its development, including the use of a groupware product named *Facilitate.com* that enabled the group of disparate committee members to overcome the challenge of working together on this project; and the final model curriculum, complete with fully developed courses.

Keywords: curriculum, IT curriculum, end-user information systems, curriculum development

Recognizing that the IT field is a rapidly changing and increasingly diverse one, educators and practitioners alike have a vested interest in educating potential personnel for high-tech careers. IT jobs have become increasingly complex as the view of technology has evolved from merely automating business processes to envisioning technology as a strategic enabler. "Using information systems strategically occurs when a person thinks of ways to use the technology as an enabler of organizational strategy and competitive advantage" (Jessup and Valacich, 1999). Keeping abreast of new technologies and business processes is

sometimes difficult, but developing curricula to keep pace with the virtual revolution can be a daunting task. This paper describes the results of a model curriculum project undertaken by the Organizational Systems Research Association (OSRA) to develop guidelines for undergraduate programs in the IT field for those specializing in the area of organizational and end-user computing. The rationale for the development of such a model curriculum is that there is a large group of IT workers who do not fall within categories such as computer scientists, systems analysts, and programmers. These IT workers are in a broad range of occupations,

including those who provide training and support for the end user.

1. BACKGROUND

The Organizational Systems Research Association (OSRA), formed in 1982, is a professional organization dedicated to promoting research and education in the areas of information technology and end-user systems. Members include educators in the field of information technology and end-user systems, information systems and business professionals, and students in information technology and end-user systems. Research interests of the members include, among others, end-user information systems, image and workflow processing, groupware applications, ergonomics/humans factors, performance support systems, and the Internet and intranets as support for end-user information systems.

Organizational and end-user information systems (OEIS) is defined as the application of information technologies to support business processes and maximize employee performance. The objective of OEIS is to improve overall organizational effectiveness in direct support of business goals and objectives. OEIS emphasizes the individual, group, and organizational side of the information revolution (OSRA, 1996).

2. EVOLUTION OF THE MODEL CURRICULUM

The need to educate personnel to meet the demands of the trend toward automating office functions was recognized by OSRA (originally known as the Office Systems Research Association) members. Preliminary work on the model curriculum for office systems education was begun in 1984, and the resulting curriculum was finalized in 1986. The VP for Professional Studies nominated a group of individuals to form a committee, known as the "Office Systems Curriculum Group" (OSCG), whose charge was to develop a model curriculum emphasizing the human side of the office, rather than hardware and software, which was the focus of computer science curricula at the time. Each of the group of scholars and practitioners met at least three of the following criteria:

- had five or more years of experience in the office systems field
- had completed research in the area of office systems
- held an advanced degree in office systems or a related field
- was a published author in the area of office systems
- held a leadership position in an office systems professional organization

The curriculum development process involved four stages that occurred from July, 1984, to January, 1986:

1. the review of the literature (preliminary step);
2. the development of the model curriculum;
3. the validation of the curriculum (including focus group meetings and telephone questionnaires); and
4. the finalization of the model curriculum.

Graduates of the OSRA Model Curriculum became user-oriented and were capable of planning and designing user-compatible systems and managing the change process required for the implementation of new office systems. The curriculum was designed within a framework of ten 3-semester credit hour courses. Components of the curriculum, designed for four-year schools, included the following:

1. General Education Courses—the humanities, social sciences, math, and natural sciences;
2. Standard Business Courses—a business component, which varies from school to school, depending upon accreditation status;
3. Office Systems Core Courses—the required courses integral to the curriculum; and
4. Office Systems Optional Courses—two courses selected from among communications, training and advanced studies courses (O'Connor and Thomas, 1987).

Table 1 is a listing of the courses that the team of educators and practitioners developed.

Table 1: 1986 Model Curriculum Courses

Office Systems Core Courses
OS-1 Office Systems and Technologies
OS-2 Office Systems Planning
OS-3 Office Systems Implementation Strategies
OS-4 Office Systems Applications
OS-5 Integrated Office Systems
Office Systems Optional Courses (Select 2)
OS-6 Telecommunications
OS-7 Administrative Communication
OS-8 Training and Development in Office Systems
OS-9 Special Topics in Office Systems
OS-10 Professional Practice in Office Systems

Recognizing the need to revamp the curriculum developed in 1986, ten years later, in 1996, a group of educators and business professionals in the field of organizational and end-user information systems formed a 15-member curriculum revision committee to revise the model curriculum for undergraduate education in office systems created in 1986. This new curriculum model, to be known as the Organizational and End-user Information Systems Model Curriculum, was designed to prepare graduates of four-year college programs for entry-level positions in information technologies and end-user information systems. The underlying goal was that graduates should be able to:

- Analyze the needs of employees in a variety of business functions and recommend information systems solutions to improve performance.
- Assess the need for, design, implement, and evaluate information systems for the desktop computing environment.
- Assess the need for, design, implement, and evaluate training problems for non-technical personnel (end-users).
- Assess the need for, design, implement, and evaluate online help, reference systems, and user documentation.

- Assess the need for, design, implement, and evaluate networks.
- Assess the need for, design, implement, and evaluate software solutions.
- Select and apply project management methodologies. (OSRA 1996 Model Curriculum, 1996)

A graphical depiction of the 1996 model curriculum may be found in Appendix A. The model was created with an emphasis on flexibility with course titles serving as "casings for competencies and instructional modules" (OSRA, 1996). The groupings of course content, i.e. modules, were designed so that educators could implement them in different time frames (e.g., quarters or one (1) or two (2) credit courses). The model consists of seven core courses (OEIS 1-7) containing competencies that are considered to be essential and several optional courses (OEIS 8-11) "for more in-depth work in specialty areas and/or field experiences" (OSRA, 1996). The flexibility of the model allows for customization to accommodate different student populations and school missions. Additionally, the 1996 model "breaks new ground by emphasizing the technical aspects of multimedia desktop information systems along with organizational and individual factors that are vital to the success of any new system" (OSRA, 1996).

3. THE 2003 MODEL CURRICULUM

With the rapid changes in IT workforce requirements and technological tools used in the workplace, the OSRA Executive Board recognized the need to update its 1996 model curriculum. This process began in 2002 with the appointment of a chair, whose charge was to facilitate the process. His first step was to form a 20-member committee representing a wide variety of higher educational institutions and industries. Part of the rationale for inviting academics and business practitioners alike to participate in the project was to find people from different locales with a variety of IT specialties, i.e. heterogeneity was an issue. Although the team was primarily from different parts of the U.S., one representative from the Royal Melbourne Institute of Technology (RMIT) strengthened the membership by providing an international perspective.

Team Communication

Since the last curriculum revision in 1996, more sophisticated collaborative technologies have become available to facilitate the meeting process. At the same time, a number of institutions are facing budgetary constraints that do not make the face-to-face meeting a viable alternative. In the following sections, we describe the technological tools used by the 2003 OEIS Curriculum Revision Committee.

Blackboard Site

After forming the team, the chair needed to be creative in uncovering ways for this disparate committee to communicate with each other. He first created a Blackboard site at his university to get the team members started in the group process. Links to the OSRA Web site where participants could view the 1996 model provided a starting point for the team. Members of the committee could communicate with each other using the communication tools provided in Blackboard. Additionally, the following discussion board fora provided a framework for group members to begin thinking about the new model:

- Title of Curriculum—Organizational & End-user Information Systems
 - Should the name of the curriculum be changed? Or, is it an acceptable title? Why or why not?
- How Does This Curriculum Differ From Other MIS/CIS Programs?
 - What are the distinguishing characteristics of this program of study versus MIS/CIS that may attract undergraduate students? Are IT jobs available for this area of concentration/major?
- SWOT Analysis of the Model
 - What is one perceived STRENGTH, WEAKNESS, OPPORTUNITY and/or THREAT for this curriculum--as it currently exists? Insert the letter S, W, O, or T, before your statement.
- Academic/Professional Qualifications for Faculty Teaching in this Area
 - What would your dean/chair/administrator re-

quire for doctoral qualifications of the faculty to teach these courses at your institution?

- Proposed New Model
 - After reviewing the model, what updates/revisions are a MUST for the new conceptual model?
- Accreditation Issues
 - What venues exist for accreditation of this type of program? Is it necessary?

Facilitate.com-Assisted Meeting

A lot of discussion ensued as to how the committee would meet synchronously for the first time. First, the chair thought members could plan a week-end visit to his educational institution and utilize the University's GroupSystems Center to expedite the meeting process and produce swift outcomes. However, the costs that would be involved in overnight stays and travel to the site were of great concern. The cost-effective solution resulted in using a Web-based collaborative tool—*Facilitate.com*.

A group facilitator from *Facilitate.com*, a San Francisco-based firm, worked with the chair of the OEIS curriculum revision committee to set a carefully crafted agenda before the scheduled meeting and facilitated group processes during the meeting. Additionally, she was available via teleconference throughout the duration of the meeting. During this meeting the committee arrived at a draft model of the new curriculum and the process of writing course descriptions and developing individual courses was begun. The chair assigned courses to teams whose expertise was compatible with the nature of the course. The draft courses were prepared and disseminated to the committee members. Each committee member reviewed the draft courses prior to the next meeting.

Face-to-Face Meeting

OSRA has its annual conference in February, so the OEIS Curriculum Revision Committee chair decided to organize a face-to-face meeting on the first evening of the conference. During this meeting, the teams presented the courses they had developed—distributing copies of course syllabi and supporting materials. The committee then worked together to refine the courses and

provide feedback to the development teams. The draft model was later presented to the membership in one of the conference sessions. (See Appendix B for a graphical depiction of the 2003 model curriculum.)

The 2003 model curriculum committee had been charged with the task of reviewing the 1996 curriculum and developing a revised and enhanced curriculum for 2003 that would ensure inclusion of the latest developments in information technologies. Much of the change in the IT field is a result of advances in technologies, such as networking, telecommunications, information security, the Internet and collaborative technologies. These areas have seen dramatic and rapid evolutionary and revolutionary change in recent years. The model has, therefore, incorporated new courses in telecommunications and networking, internetwork administration, ebusiness and Web technologies, collaborative technologies and knowledge management, and information systems security.

4. SUMMARY

Recognizing that the IT field, including the area of organizational and end-user computing, has experienced rapid change, the Organizational and End-User Information Systems Association set out to update the model curriculum in Organizational and End-User Information Systems created in 1986 and revised in 1996. The new curriculum model for 2003 was designed to be flexible; core courses and elective courses provide competencies and instructional modules that provide guidelines for schools wishing to adopt the curriculum model. The seven core courses include competencies that are considered vital, and the six optional courses can provide coverage of specialty areas and an internship field experience. Schools adopting this model can customize the courses to meet their students' needs.

The process involved in the development of the 2003 OEIS Model Curriculum included making effective use of state-of-the-art technologies, such as *Facilitate.com* and online communication tools—providing the OEIS Curriculum Committee with the possibility of working together more efficiently and resulting in a rewarding experience. Many higher education institutions in the

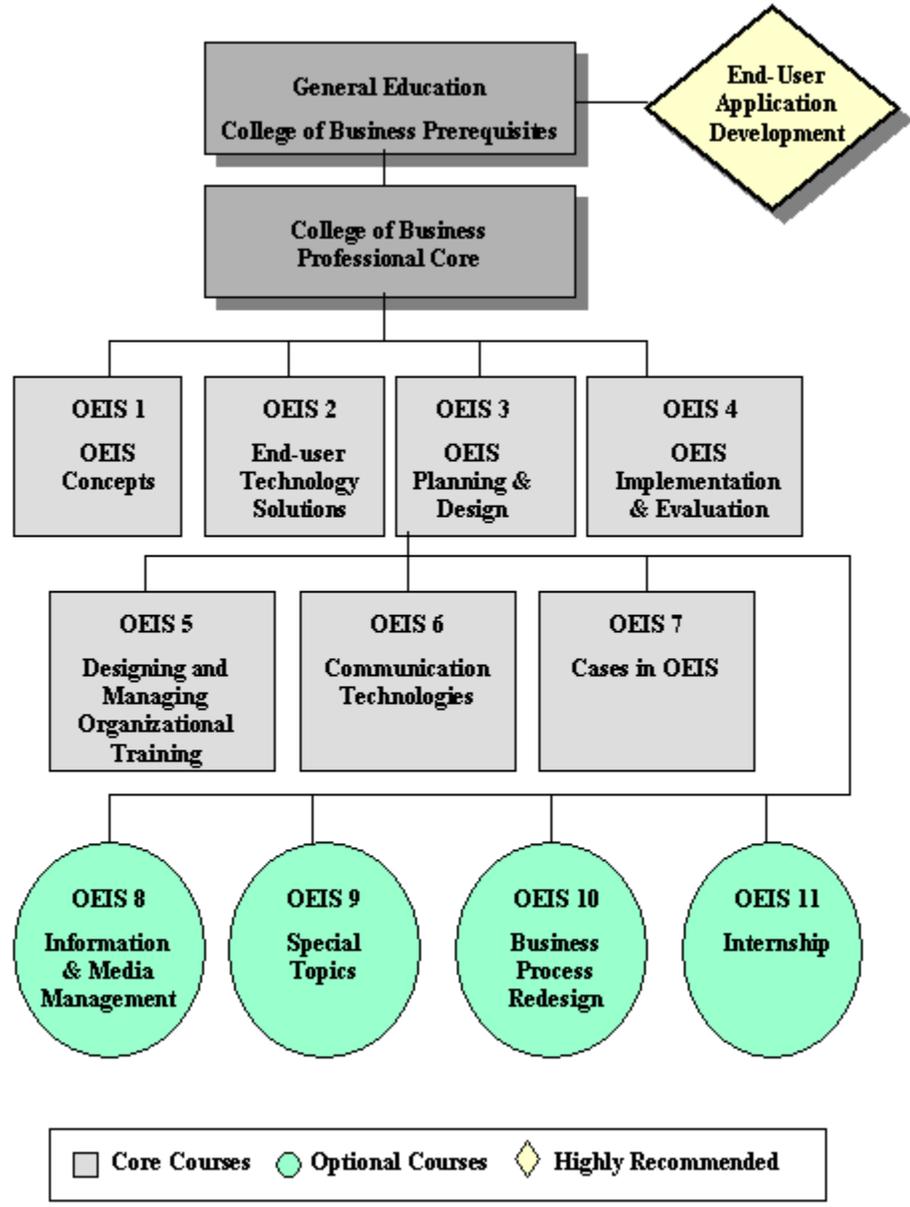
U.S. are currently using variations of the 1996 OEIS Model Curriculum, and we feel that the 2003 version will offer even greater flexibility with the inclusion of a variety of highly relevant and technologically current courses essential for a properly prepared IT workforce.

5. REFERENCES

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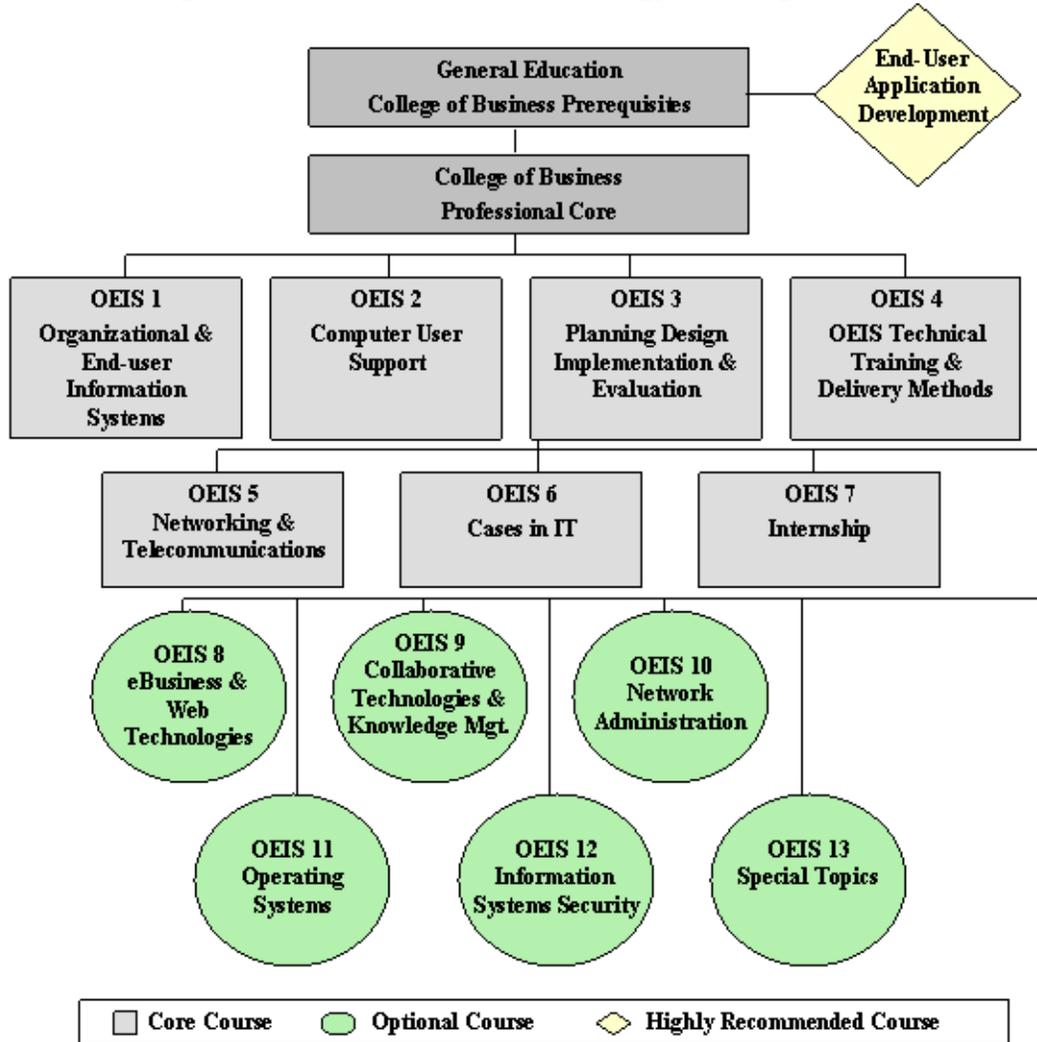
APPENDIX A – GRAPHICAL DEPICTION OF 1996 OEIS MODEL CURRICULUM

Organizational & End-User Information Systems 1996 Curriculum Model



APPENDIX B – GRAPHICAL DEPICTION OF 2003 OEIS MODEL CURRICULUM

**Organizational & End-User Information Systems 2003 Curriculum Model
*Advancing Education in Information Technology, Training, & Performance***



APPENDIX C – 2003 MODEL CURRICULUM COURSE DESCRIPTIONS

OEIS 1- Organizational and End-user Information Systems

An overview of organizational and end-user information systems (OEIS)--technologies, business processes, and worker performance, this course emphasizes methods used to plan for and implement information technologies in the workplace. This course discusses advances in information systems hardware and software, emphasizing applications designed for technology end users are discussed. Emphasis is on understanding end-user needs and how to select or design systems to address those needs. Work flow and systems analysis methodology, work (re)design, organizational change, systems implementation, and management issues are covered. Basic computer literacy is assumed. As an introduction to the OEIS curriculum, this course provides an overview of course content covered in depth in future courses.

OEIS 2- Computer User Support

This course introduces the responsibilities of a computer user support specialist and develops skills for microcomputer troubleshooting. Students develop skills necessary to work with help desk and support center operations to better fulfill end user support needs. Students examine how to support and communicate with non-computer professionals; use a variety of software, remote management tools to evaluate support applications, call tracking, and statistical analysis of calls/issues. Students develop problem-solving skills and install, configure and troubleshoot microcomputer hardware and software. Prerequisites: computer literacy, demonstrated skills in using hardware and application software.

OEIS 3- Planning, Design, Implementation, & Evaluation

This course covers the four stages of OEIS development: assessment, design, implementation, and evaluation. Students learn methods and procedures that empower them to define and solve large-scale OEIS problems or address new opportunities. In studying the integration of hardware/software into jobs and the work environment, the course will give attention to various organizational development and management factors including strategic planning, techniques for developing ROI, planned change strategies, human factors, and job redesign. Students will complete a systems analysis and design proposal with special attention given to inter-organizational goals.

Prerequisite: OEIS-1

OEIS 4- Technical Training & Delivery Methods

This core course builds upon skills and knowledge acquired in OEIS 1, 2, and 3. Students briefly overview change management, learning, and training theory in conjunction with technical training practices, which are supportive of and conducive to, organizational and end-user information systems implementation where OEIS tools are to be integrated into the work environment. Students focus on the design, development, and delivery of technical training. Students investigate and apply delivery methods including both traditional and state-of-the-art techniques. Planned change strategies (including addressing resistance to change) for technology implementation are also addressed, along with the application of relevant theories and evaluation of technical training effectiveness.

OEIS 5- Telecommunications & Networking Foundations

This course provides foundation information and skills relating to telecommunications and networking in the business environment including conceptual information, telecommunication applications, networking fundamentals, and the use of the Internet/intranets. Management issues and practical applications are an integral part of this course.

OEIS 6- Cases in IT

As a capstone course, this class involves the analysis, synthesis, evaluation and application of advanced concepts, theories, principles, and skills associated with information technologies (IT) or other comprehensive OEIS capstone experience through case studies for developing the solution to business problems and redesigning business processes. The course is ideally taken in the student's last term before graduation.

OEIS 7- Internship

This course is designed to provide the senior-level student an experiential learning arrangement related to information technology in an approved on-campus site or off-campus site. Students may perform information systems trainer/consultant and/or end-user support duties. Students will meet periodically with the instructor to discuss problems and issues relevant to the area of organizational and end-user information systems. Compensation may or may not be granted for the internship/practicum.

Prerequisites: *Senior standing and prior permission of the instructor*

OEIS 8- e-Business & Web Technologies

This course (or course stream—*foundation and Practicum*) is dedicated to investigating principle aspects of implementing and administering Web-based applications for both non-profit and for-profit organizations, where the e-business aspect has gradually become an integral part of the entire business model. It will provide the students with a foundation in the fundamentals of evolving Internet technologies and Web authoring using currently popular Web development software. Topics include: E-Business models and strategies, Intermediate and advanced HTML, design principles of hypermedia, Website hosting and setup procedures, Web server administration, information security, Internet protocols, XML, dynamic PHP/MySQL Web content driven by back-end databases, and streaming media. The students will apply the knowledge and skills learned to create or redesign an actual e-business Website as the group project that utilizes recommended Website development practices. The students are required to publish their Website projects on the Internet and ensure that all features and functions are properly working.

OEIS 9- Collaborative Technologies & Knowledge Management

This course is designed to provide the senior-level OEIS student with an introduction to group decision support systems, electronic meeting management, desktop video conferencing, as well as other groupware applications. Students will be introduced to concepts fundamental to an understanding of groupware tools and various collaborative technologies for enhancing group processes and computer-mediated communication in today's digital economy. The course addresses a wide range of topics including implementation, design, electronic facilitation,

tion, as well as GSS, as an enabling technology in business process reengineering, knowledge management and collaborative learning. Special emphasis will be placed on using groupware technologies and systems to create, store, and distribute explicit and tacit knowledge within contemporary organizations.

OEIS 10- Internetwork Administration

This course is designed to develop senior-level OEIS students' advanced network administration skills. Both client and server applications will be dealt with and a strong emphasis will be placed on network operating system software. Students will also be exposed to multi-vendor networking topics and specific course topics will include: Setting up and configuring a Working Web Server, Web Site Security using SLL, DNS (Domain Name System), DHCP (Dynamic Host Configuration Protocol), WINS (Windows Internet Naming Service), Remote Access, IP (Internet Protocol) Routing, IP (Internet Protocol) Security, NAT (Network Address Translators), and other core networking/internetwork applications.

OEIS 11- Operating Systems

This course will provide the theoretical foundation and skills required to install, troubleshoot, maintain, and support operating systems. A thorough survey of personal computer and intermediate server operating systems available today will be provided, including Windows, UNIX, Macintosh, and DOS. Topics include their functional similarities and differences, file management distinctions, installation procedures, printer and other peripheral device management, interoperation with legacy systems, maintenance, backup operations, and troubleshooting methods.

OEIS 12- Information Systems Security

Information Systems Security is an introduction to end-user systems security from a management aspect. The course emphasizes the methods for the management of information security through the development of policies, procedures, audits, and logs. It also provides an understanding of the methods used for identifying threats and vulnerabilities, as well as analyses of the legal, ethical, and privacy issues in information systems and discusses emerging technologies related to systems security.

OEIS 13- Special Topics

This course is the study of advanced concepts and issues relevant to OEIS. Content will vary according to the needs and interests of the students and the interests and expertise of the faculty. Selected topics should emphasize current technological advancements and OEIS management concerns. Prerequisites: Generally, students should have completed the core OEIS courses. Specific prerequisites should be established by the instructor(s) when the course is designed.

APPENDIX D – SAMPLE COURSE SYLLABUS**OEIS 8 - e-Business and Web Technologies****Course Description**

This course (or course stream—*Foundation* and *Practicum*) is dedicated to investigating principle aspects of implementing and administering Web-based applications for both non-profit and for-profit organizations, where the e-business aspect has gradually become an integral part of the entire business model. It will provide the students with a foundation in the fundamentals of evolving Internet technologies and Web authoring using currently popular Web development software. E-Business models and strategies, Intermediate and advanced HTML, design principles of hypermedia, Website hosting and setup procedures, Web server administration, information security, Internet protocols, XML, dynamic PHP/MySQL Web content driven by back-end databases, and streaming media are among the topics covered. The students will apply the knowledge and skills learned to create or redesign an actual e-business Website as the group project that utilizes recommended Website development practices. The students are required to publish their Website projects on the Internet and ensure that all features and functions are properly working.

Course Outcomes

Upon completion of this course (or course stream), students should be able to:

FOUNDATION

- Evaluate the e-business models and strategies, and how they match the best interest and needs of a business
- Assess the impact of e-business implementations to the economy at individual, home, regional, and global levels
- Analyze winning and losing business Websites
- Indicate major components in establishing a functioning Website
- Construct and process Web image files (JPG's and GIF's) for optimal quality without losing efficiency in downloading
- Develop basic and advanced HTML code to create WebPages
- Employ JavaScript to perform client side scripting that will enhance Website appeal and functionality

PRACTICUM

- Describe the full-cycle process of implementing e-business project applications
- Examine accessibility issues
- Troubleshoot browser compatibility issues
- Employ XML and associated markup languages for data exchange
- Design PHP/MySQL back-end databases to enhance business functions
- Compare various security and assurance issues of Web transactions, and make recommendations
- Install, manage, and troubleshoot various Web server related function, performance, and security issues (i.e., Webmastering)
- Construct a rich media environment (e.g., streaming media content, sights and sounds, etc.) to enhance customers sensational interest and involvement

Course Approach

The structure of this course will be like running an e-business consulting firm. The instructor will serve as the principle consultant, and the students will be situated in the role as junior consultants or interns. The semester-long experience should cover problem-posing praxis in reflecting upon both hands-on technical skills and interpersonal/project management skills. While the students are designing and implementing a real-world Web application, they will also be looking at current topics and trends in e-business through e-journals—so that they could keep a log of information gathering and communicate with others in lay-person's language. This situated learning approach will encourage them to follow guided instructions as well as self-motivated exploration to complete the entire process of creating a Web presence from beginning to end.

Students will work in teams that will last the entire semester. The instructor will provide a solid foundation of technical skills to students—more importantly, s/he will be a role model who leads and facilitates team efforts as participants in all team projects. There will be a focus on creativity, entrepreneurship, and using a team approach to develop creative ideas and observe the processes and factors crucial to a successful e-business operation. The topics and trends section of this course is expected to change as the e-business environment develops and changes itself—hence, a deepened understanding of change management for businesses to survive and succeed.

Course Content

FOUNDATION

1. The Basics of E-Business. Topics covered include Internet and e-business concepts. The instructor will illustrate the scope of e-business through a series of real-world cases. Module participants will learn about basic technological issues, barriers and challenges to success, and the electronic value chain. This module provides a foundation and common understanding for all the material that follows.

2. Making E-Business Work for You. Businesses that rely on websites cannot hope to attain their full potential without considering the marketing aspects of the website. Marketing is covered keeping in mind the global concerns related to both business-to-business (B2B) and Business-to-Consumer (B2C) marketplaces. Business forces pertaining to selling-chain management, managing the order acquisition process, selling-chain infrastructure, and online sourcing are all covered in this important module. Clearly, a consumer's willingness to buy online hinges on a sound understanding and implementation of an effective marketing plan. Topics covered include: Branding, including strategies and costs (trade-offs); Acquiring and retaining customers; Establishing an effective business presence on the web; Meeting the needs of website visitors; Identifying and reaching potential customers; Marketing strategies for the web as contrasted to traditional marketing methods; Distribution channels.

3. E-Business Strategy Formulation. The module starts with the introduction of an organization-wide framework for e-business. The overall question addressed is - how does e-business fit into the organizational business plan? The role of e-business goes beyond the realm of information technology and requires involvement across all business functions. The objective of this module is to prepare participants for online business, to reorganize business processes, to analyze competitors, to decompose the value chain, to prepare content, to test and deploy an e-business model.

4. Creating an Effective Web Presence. The focus of this module is to involve participants in designing meaningful websites. Website features that captivate customers and provide a high degree of usability are discussed. Designing user-friendly web interfaces and meaningful content based on business needs are emphasized. Topics covered include HTML editors, web navigation and search issues, multimedia, creating dynamic content, and interactivity. Current trends in disabled and multilingual accommodations are also covered.

PRACTICUM

5. E-Business Investment and Risk Management. This module covers the economic and financial aspects of e-business. Returns on investment, fixed/variable cost structure, and infrastructure costs are considered for traditional and e-business models. Challenges associated with managing operational, economic and legal risks of e-business are considered. Participants will have a realistic assessment of risk and the financial and economic implications of committing to an e-business strategy.

6. E-Business Applications, Infrastructure and Databases. An essential part of e-business is to effectively manage the data resources of an organization. This module starts with business issues related to planning for data, including data needs for decision-making and supporting customers. Technology issues such as databases, data models, data warehousing, data mining, storage, security, and recovery are covered. Business cases will also be introduced in conjunction with some powerful tools that will clearly demonstrate the need and importance of data resource management for organizations involved in e-business.

7. Privacy, Security, and Legal Issues. This topic has continued to be of major importance for all vendors who are involved in e-business. How can a business ensure safe transactions with customers, suppliers and partners over the web? Topics include firewalls, encryption algorithms, access policies, network security, and disaster recovery systems. Global contracts, jurisdiction on the Internet, secure transactions, online disclaimers, digital signatures, and intellectual property are part of the legal segment of this module. On the completion of this module, participants will have a clear understanding of the components of an effective security strategy and of the legal ramifications of doing business on the Internet.

8. Making the Transition to E-business. This module will provide students with some initial assistance with their organization's e-business needs. The content and structure of this module will focus on the development and design of a basic e-business blueprint for each participant. Content from previous modules will be integrated in this culminating final project.