Information Systems Engineering and Management (ISEM)

The 36 semester hour graduate program in Information Systems Engineering and Management (ISEM) is designed to educate the leaders who can plan, engineer/re-engineer, and manage the systems needed to support the modern digital enterprises. Graduate studies in ISEM cut across the following three active areas of work:

- *Information Systems*: latest technologies and approaches (e.g., web-based components, mobile computing and wireless communications, business intelligence, emerging technologies)
- *Systems Engineering*: systems thinking and emphasis on systems instead of individual components; enterprise architectures consisting of people, processes and technologies
- *Management:* business strategies, entrepreneurship, planning, integration, security, governance, global enterprises, agile enterprises

ISEM is a flexible and interdisciplinary program that emphasizes the entire Learn, Plan, Do, Check (LPDC) cycle instead of one narrow area of work (see Figure1). Digital enterprises and the digital technologies that support such enterprises are at the center of ISEM. The core and recommended courses of the program allow the student to *Learn* about digital enterprises and technologies, *Plan* (i.e., translate their knowledge into working solutions), *Do* (i.e., architect, engineer and integrate the solutions), and *Check* (i.e., secure and manage the solutions). The student can then take elective courses in topics that span project management, analytics, multimedia management, entrepreneurships, digital health, enterprise management, leadership, financial aspects of systems, learning technologies, business intelligence, Internet technologies, information security and governance, mobile computing, and others. Specializations and "bridge courses" to other HU Programs, displayed as the outermost circle are also available to the ISEM students.

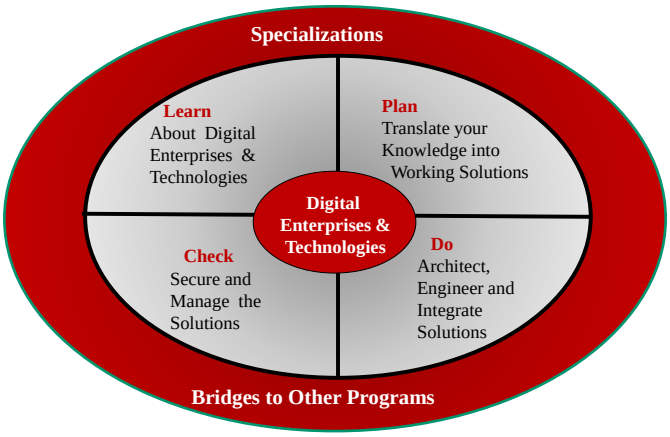

Figure 1: Conceptual View of ISEM

ISEM students may build their own specialization by taking different courses from the large pool of graduate courses available at HU or specialize in areas such as Analytics, Cyber Security, Digital Health, Enterprise Engineering, and Software Engineering and Development. Students can also pursue a master's thesis project to investigate areas of individual or professional interest. An experiential project course serves as the required capstone of the program. Figure 2 shows a more detailed view of ISEM that displays the overall structure of the 36 credit hours (12 courses) program:

- The five core required courses that provide a mixture of technical and management topics

- The five electives that can be chosen from a large pool of courses in diverse topic areas. The students may select five electives from any of these topic areas to build their own specialization or choose to specialize in predetermined topic areas
- The two capstone courses that allow the students to synthesize their knowledge into an experiential project or a research thesis

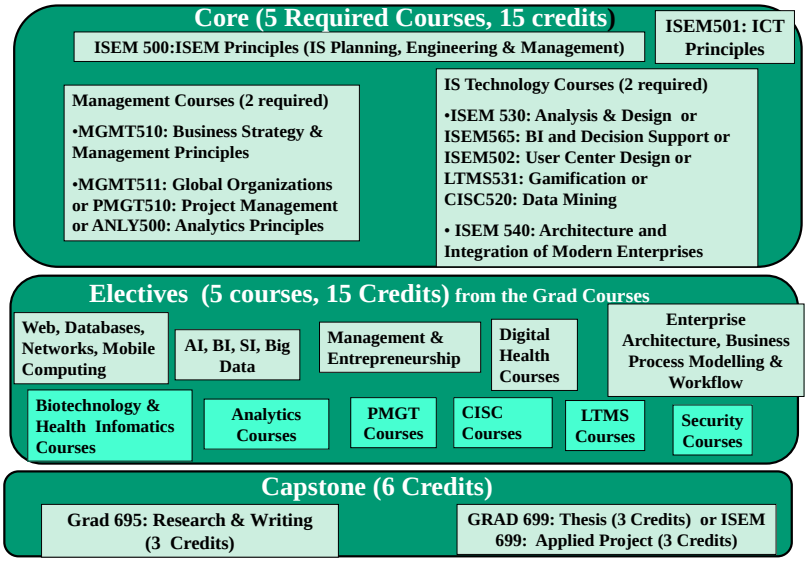

Figure 2: More Detailed View of ISEM Program

A Program for Career Change and/or Enrichment

ISEM is a very flexible interdisciplinary program that is especially suitable for *career change and/or career enrichment*. The Program can be customized for students with different backgrounds and educational/professional needs. A student can enter the ISEM program with the following backgrounds (see Figure3):

- IS/IT background who want management or more technology background
- Non-IS/IT background who want to develop IS/IT background
- Mixture who want more depth in technology or technology management

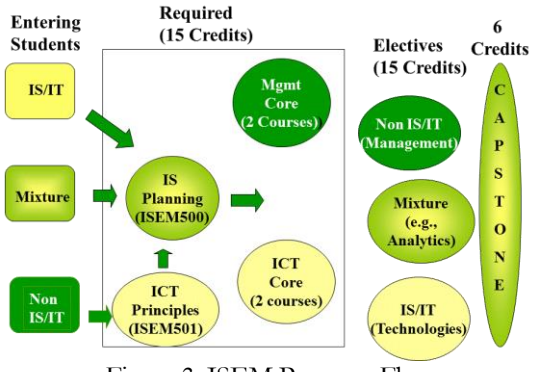

Figure 3: ISEM Program Flow

All entering students take the IS Planning course (ISEM 500) that covers the core concepts of ISEM. Students with minimal or no training in IS/IT are required to take a *bridge* course on ICT principles (ISEM 501) that covers the needed IS/IT concepts through hands-on experiments. The student then takes two management courses and two IS/IT courses for a well-rounded background. After the 15 credits of required courses, the student can then take 15 credits in areas of their interest (management, IS/IT or

mixture). The student can therefore study more management, more technologies or a mixture as part of the ISEM program. If needed, the student can use the 15 elective credit hours to specialize in digital health, entrepreneurship, digital government, project management, information security or enterprise architectures. A student may also choose to build a customized program of study by taking different electives from different areas of study.

Exhibit 0: ISEM Fulltime Faculty (Listed by first name)

- Amjad Umar, Ph.D (Univ of Michigan)., aumar@harrisburgu.edu, *Research Interests:* Computer Aided Planning, Engineering and Management; Next Generation Enterprises (NGEs); Enterprise Architectures and Integration; AI Applications in Business; Strategic Intelligence; Smart Enterprises, Cities and Communities; Mobile Computing and Wireless Communications; Information Security Management;
- Farooq Anjum, Ph.D., (University of Maryland), FAnjum@harrisburgu.edu, *Research Interests:* Mobile computing and wireless communications, Big Data applications, Artificial intelligence, Information security, wireless sensor networks, IoTs, Digital agriculture
- Iheb Abdellatif, Ph.D., IAbdellatif@harrisburgu.edu, *Research Interests:* Enterprise Architectures and Integration using SOA, Operations management, IoT Applications, web-based systems
- Jay Liebowitz, Ph.D., Jliebowitz@harrisburgu.edu, Distinguished Professor of Business and Finance, *Research Interests:* Knowledge management, artificial intelligence, Big Data Applications, Expert systems applications, Operations research, Financial engineering, Research methodologies
- Leena Pattarkine, Ph.D., LPattarkine@HarrisburgU.edu, *Research Interests:* Biotechnology systems, Biotechnology applications, pharmaceutical information systems, healthcare infomatics
- Mehdi Noorbaksh, Ph.D., (Univ of Texas, Austin), MNoorbaksh@harrisburgu.edu, International management and business, Strategic management, Global organizations, Healthcare systems and Global health, Energy and alternative sources, Risk management, International relationship issues
- Robert M. Pittman, Ph.D. (Binghamton University), RPittman@harrisburgu.edu, *Research Interests:* Large scale systems engineering, Technology management, Program management, Application of traditional engineering principles to small enterprises, Agile methods
- Saeed Sardari, Ph.D. (University of Maryland), SEsmaili@harrisburgu.edu, Research Interests: Nanotechnology, Digital health, Web applications, IoTs, Logic design, Semiconductor device physics, Analog and Digital Circuit design
- Shane Tomblin, Ph.D., (Univ of Kentucky), STomblin@harrisburgu.edu, *Research Interests:* Enterprise Engineering and Architectures, healthcare infomatics, information systems foundations, organizational learning, business process modeling and workflows, structuration, semiotics
- Stanley Nwoji, Ph.D., SNwoji@harrisburgu.edu, *Research Interests:* Business intelligence, Artificial neural networks, Data warehousing, Strategic management, Entrepreneurship, Data mining, International business, Medical infomatics, Digital marketing.

- Wouter Popelier, Lecturer in ISEM, WPopelier@harrisburgu.edu, *Research Interests:* Digital Infrastructure, Next Generation Databases and Networks, Enterprise Architecture Frameworks, Software development quality assurance, Data flow and modeling

Highlights of MS in ISEM

The following courses comprise the Master of Science in Information Systems Engineering and Management program (36 semester hours):

- Five Core Required Courses (15 semester hours)
- Five Elective Courses (15 semester hours) from any Graduate Programs at HU
- Two Capstone Courses (6 semester hours)

Exhibit 1 shows the important information about ISEM Courses and Exhibit2 shows all ISEM Courses and Other Related Courses at a glance. This information can be used for planning purposes. For course descriptions and administrative details, please consult the Graduate Catalog (at MyHU home Page, left corner)

Exhibit 1: Important Course Information

ISEM Required Core Courses (15 semester hours)

ISEM 500	Strategic IS Planning, Engineering & Management	(3)
ISEM 540	Architecture and Integration of Modern Enterprises	(3)
MGMT 510	Business Strategy and Management Principles	(3)

CISC 510 Object-Oriented Software (3) or
ISEM 502: User-Centered Design
ISEM 530 Analysis and Design of Modern Information Systems or
ISEM 565 Business Intelligence and Decision Support Systems or
LTMS 531 Designing Serious Games and Simulations

ANLY 500 Analytics I: Principles and Applications (3) or
MGMT 511 Digital and Global Organizations or
PMGT 510 Principle of Project Management

Capstone Courses – 6 semester hours:

GRAD 695	Research &Writing	(3)
GRAD 699/ISEM 699	Master's Thesis or Applied Project	(3)

Elective Courses (15 Semester hours):

The ISEM students can take 15 semester hours from *any* of the following areas (ISEM, Analytics, Management, Digital Health, ITPM, or LTMS. This Individualized Concentration allows the ISEM students to build their own customized specializations and concentrations. For example, a student interested in starting a company in Health Analytics may take 2 courses in healthcare, 2 in Analytics and 1 in Entrepreneurship.

Students do have the option of completing Predefined Concentrations (15 semester hours) in Analytics, Digital Health, Software Engineering or Information Security.

Exhibit2: ISEM Courses and Other Related Courses at a Glance

Core Courses for MS in ISEM (15 semester hours)

- ISEM 500: IS Planning, Engg & Mgmt
- MGMT 510: Business Strategy & Management Principles
- ISEM 540: Architecture and Integration of Modern Enterprises
- ISEM 502 User Centered Design or ISEM530 or ISEM565 or CISC510 or LTMS531
- MGMT 511 Digital and Global Enterprises or PMGT510 or ANLY500

ISEM Capstone (6 Semester Hours)

- GRAD 695: Research Methods & Writing
- GRAD699/ISEM 699: Applied Project or Research Thesis

ISEM Elective Courses

Digital Technology Courses

- ISEM 501: Information & Communication Technologies
- ISEM 534: Database Design and Management
- ISEM 536: IT Infrastructure & the Internet
- ISEM 551: Web-based Software Engg
- ISEM555: Mobile Computing and Wireless Communications
- ISEM 558: IoTs and Embedded Systems
- ISEM570: IT Quality Assurance

Business Intelligence (BI) Related Courses

- ISEM 503: Artificial Intelligence Principles and Applications
- ISEM564: Big Data Applications
- ISEM 565: Business Intelligence and Decision Support
- ISEM572: Smart Enterprises and Strategic Intelligence

ISEM Courses (Cont)

Enterprise Engineering Courses

- ISEM 530: Analysis & Design of Information Systems
- ISEM 550: Information Security Management
- ISEM 525: Business Process Modeling and Workflow
- ISEM539: Enterprise Architectures Frameworks
- ISEM 560: eGovernment and eCommerce
- ISEM 568: Aligning Business Strategy with IT Strategy
- ISEM 574: Block Chains and Bit Coins

Enterprise Management and Entrepreneurship Courses

- ISEM 547: IT Management
- MGMT 512: Marketing in the Digital Age
- MGMT 513: Financial and Managerial Accounting
- ISEM 520 Service Science, Management and Engineering
- MGMT 531: Business Entrepreneurship Principles
- MGMT 532: Business Entrepreneurship Management
- MGMT 533. Business and Entrepreneurial Financing
- ISEM 561 Public Administration
- ISEM 562: Public Policy

Digital Health and Life Sciences Courses

- ISEM 521: Life Science for IT Professionals
- ISEM 541: Healthcare Systems
- ISEM 542: Health Informatics and Information Systems
- ISEM 543: Digital Health
- ISEM 544: Social, Technical and Organizational Issues in Digital Health
- ISEM545: Healthcare Data

Electives from Other Graduate Programs

- Analytics Courses
- CISC Courses
- Learning Technologies Courses

Electives from Other Graduate Programs

- PMGT Courses
- Biotechnology Courses
- Healthcare Infomatics Courses

Exhibit3: Concentrations and Capstone

Individualized Concentration: The Master of Science in Information Systems Engineering and Management student can choose courses totaling 15 semester hours of credit from any of the graduate programs at HU. Although ISEM students can take any courses from any graduate program, they are encouraged to choose electives that focus on their professional area of interest. In addition, ISEM students are expected to use the concepts learned in these electives to strengthen their capstone courses.

This option allows the ISEM students to focus on areas such as the following:

- **AI for Business** by taking at least 9 semester hours in AI (e.g., ISEM503, ISEM565 and ISEM572) and using AI concepts in ISEM Capstone.
- **Technology Management** by taking ISEM547 (IT Management), 2 courses in ITPM and using Technology Management concepts in ISEM Capstone.
- **Digital Technologies** by taking at least 9 semester hours in Digital Technologies (e.g., ISEM534, ISEM536, ISEM555) and using Digital Technology trends in ISEM Capstone.
- **Digital Health** by taking at least 9 semester hours in Healthcare and using Healthcare concepts in ISEM Capstone.
- **Information Security** by taking at least 9 semester hours in Security and using Security in the Capstone.
- **Analytics, Project Management, TechPreneurship and CISC** by taking 3 courses from any of these programs and using any of these concepts in ISEM Capstone.
- An almost unlimited number of highly creative areas of focus by combining any graduate course work in ISEM with other HU courses to meet the changing needs of modern digital enterprises.

In other words, the transcript of an ISEM graduate and the Capstone topic defines the concentration and not a pre-specified rigid list of courses.

Capstone Study

Capstone study (6 semester hours of research thesis or practical project) is a unique characteristic of the Graduate programs at Harrisburg University. The 6 semester hours of work concludes the Master's degree and helps the student to synthesize their knowledge and gain further insights through research investigation or practical exploration. The student has to take GRAD 695 (Research Methodology and Writing) before enrolling in ISEM 699 (Applied Project in ISEM) or GRAD 699 (Graduate Thesis). Additional information can be found in the ISEM Capstone Guide.

For Additional Information:

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