Texas Higher Education Coordinating Board

Making Opportunity Affordable in Texas:

A Student-Centered Approach

Tuning of Management Information Systems

Texas Higher Education Coordinating Board

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Management Information Systems Committee

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Definition of Tuning

"Tuning" is a faculty-led pilot project designed to define what students should know, understand, and be able to demonstrate after completing a degree in a specific field, and to provide an indication of the knowledge, skills, and abilities students should achieve prior to graduation at different levels along the educational pipeline – in other words, a body of knowledge and skills for an academic discipline in terms of outcomes and levels of achievement of its graduates.

Tuning provides an expected level of competency achievement at each step along the process of becoming a professional: expectations at the beginning of pre-professional study, at the beginning of professional study, and at the transition to practice. It involves seeking input from students, recent graduates, and employers to establish criterion-referenced learning outcomes and competencies by degree level and subject area. Through Tuning, students have a clear "picture" of what is expected and can efficiently plan their educational experience to achieve those expectations. The objective is not to standardize programs offered by different institutions, but to better establish the quality and relevance of degrees in various academic disciplines.

An overview of Lumina Foundation for Education's "Tuning USA" Initiative is available at: http://www.tuningusa.org; an overview of Tuning work to date in Texas is available at: http://www.thecb.state.tx.us/tuningtexas.

Definition of Management Information System

The Management Information Systems field of study produces graduates who are both business analysts, understanding accounting, finance, marketing and management, and also are information systems professionals, understanding how to develop and use information systems that help organizations achieve their organizational goals and objectives. The information system (IS) uses computer hardware, software, data, procedures, and people to provide the "right" information to the "right" people at the "right" time in the "right" format to meet the goals and objectives of an organization in a cost-effective manner. The Management Information Systems (MIS) professional must understand the goals, objectives, and decision processes of an organization, as well as the collection of data, the processing of data into usable information, and the storage and communication of both the data and the information. The professional must develop competencies in software development, systems analysis and design, database design, networking/telecommunications, and the management of projects integrating these areas. They must understand and work with an organization's technology infrastructure, and be prepared to integrate emerging technologies into that infrastructure. Finally, the professional also must protect the integrity, privacy, and security of the data and information held by the organization.

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Management Information Systems Expertise Profile

The expertise profile lists the types of course topics and expertise gained while earning a typical bachelor's degree in MIS. This expertise profile only includes those expertise areas outside of the Texas Core Curriculum because, in accordance with the Texas Education Code, each institution of higher education that offers an undergraduate academic degree program must design and implement a General Education Core Curriculum which is intended to provide a solid foundation for a college education.

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Management Information Systems Job Titles Employment Profile

The Job Titles Employment Profile lists the most common employment pathways (job titles) for a MIS professional during his or her early career. These positions serve some professionals throughout their career. Other MIS professionals move among these positions for personal growth or move into project management, technical sales, or executive management after gaining initial career success in one or more of these positions.

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Management Information Systems Economic Sectors Employment Profile

The Economic Sector Employment Profile lists the public and private employment pathways most often available to a graduate of a degree program in MIS. Almost every economic sector employs MIS graduates.

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Management Information Systems Key Competencies Profile

The key competencies profile is a schematic diagram that is derived from the competency table. It lists for each learning outcome (columns) the required competency levels according to Bloom's taxonomy (rows) that should be gained at each of four educational levels:

1. competencies from high school education, marked "HS";
2. competencies from the first two years of college or university, marked "CC";
3. competencies from the last two years of college or university, marked "BBA/BS"; and,
4. competencies post-graduation, marked "G."

The level of response for each of the Bloom's taxonomy levels is described through active verbs; examples of verbs for each level can be found at:

<http://www.teach-nology.com/worksheets/time_savers/bloom/>

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Management Information Systems Key Competencies Diagram

MIS Key Competencies Diagram

Lumina Foundation Grant Management Information Systems Committee - June 2013

	Business Foundations	Mathematics	Information Systems Technology	Systems Analysis	Design & Development	Systems Implemetnation & Evaluation	Teamwork	Management & Leadership	Communication	Professional & Ethical Responsibility	Critical Thinking	Lifelong Learning
Evaluation	G	G	G	G	G	G	G	G	G	G	G	G
Synthesis	G	G	BBA/BS	G	BBA/BS	G	BBA/BS	BBA/BS	G	G	BBA/BS	G
Analysis	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS	BBA/BS
Application	BBA/BS	CC	CC	BBA/BS	BBA/BS	BBA/BS	BBA/BS	CC	CC	BBA/BS	CC	CC
Comprehension	CC	CC	HS	BBA/BS	BBA/BS	CC	CC	HS	HS	CC	CC	CC
Knowledge	HS	HS	HS	BBA/BS	CC	CC	HS	HS	HS	HS	HS	HS

G	competencies post-graduation
BBA/BS	competencies from last two years of college or university study
CC	competencies from first two years of college or university study
HS	competencies from high school education

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Management Information Systems Key Competency Tables and Learning Outcome Descriptions

The Management Information Systems competency table has 12 learning outcome titles, one for each learning outcome description:

1. Business Foundations
2. Mathematics
3. Information Systems Technology
4. Systems Analysis
5. Design and Development
6. Systems Implementation & Evaluation
7. Teamwork
8. Management and Leadership
9. Communication
10. Professional and Ethical Responsibility
11. Critical Thinking
12. Lifelong Learning

The competency table has four learning outcome categories (columns from left to right):

1. core competencies needed to enter higher education in Management Information Systems (HS);
2. pre-Management Information Systems competencies gained during first two years of study (CC);
3. baccalaureate-level Management Information Systems competencies (BBA/BS) gained during the last two years of college or university study; and
4. graduate-level Management Information Systems competencies gained after graduation (G).

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Management Information Systems Learning Outcome Descriptions

Learning outcome descriptions for each of the outcome titles of the competency table explain the knowledge, skills, and attitudes that should be achieved by the graduate.

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BUSINESS FOUNDATIONS

The foundational business competencies that are taught at the undergraduate level encompass the holistic understanding and appreciation of an organization's external and internal environments. Not-for-profit organizations (e.g., museums, education, charities, government agencies, and community service organizations) also apply foundational business principles in order to achieve their goals.

In applying these business competencies, the MIS professional understands and anticipates emerging challenges and opportunities created by external forces (e.g., competitive, social, economic, legal and regulatory, technological) to strategically and operationally develop and implement plans of action to maximize the effectiveness and efficiency of organizational units. Broad-based knowledge of the principles underlying specialized functions of business include, but are not limited to, accounting, finance, marketing, and management that will be required in the development of business action plans.

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Business Foundations			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge	**Comprehension**	**Application and Analysis**	**Synthesis and Evaluation**
Recognize general business practices. Recognize ups and downs of the economy. Recognize the importance of supply and demand.	Explain the purpose of financial statements, the interrelationships of financial data, and the principles underlying the reported valuations. Classify cost behavior and identify its impact on budgeting, responsibility accounting, cost control, and product costing. Explain the role of external financial institutions in effective business management. Identify legal implications and restrictions on business operations.	Use the fundamentals of business finance, marketing, production/operation, accounting, information systems, and the legal environment to solve business problems. Analyze environmental and financial information to formulate recommendations for decision-making. Outline and correlate special problems involving production and operational management and identify management strategies for each. Demonstrate and explain the concepts and strategies of the marketing mix variables (product, price, promotion, and distribution). Demonstrate and explain the management components of planning, organizing, leading, and controlling.	Integrate all fundamental business function concepts and strategies for management based on a given set of circumstances. Compare a wide range of alternatives and recommend a course of action in support of organizational goals and objectives.

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MATHEMATICS

Mathematics deals with the science of structure, order, and relation that has evolved from counting, measuring, and describing the shape of objects. It uses logical reasoning and quantitative calculation and is considered the underlying language of science, engineering, and economics. The principal branches of mathematics relevant to MIS include algebra, geometry, calculus, optimization, probability, and statistics.

Mathematics plays a key role in being able to formulate and solve problems. The MIS professional must have a solid foundation in basic mathematical/statistical techniques. The ability to analyze data, understand data, and summarize the findings in a clear and concise manner, both graphically and in writing, is important for the MIS professional. The most effective MIS professional recognizes when data are suspect using a combination of mathematical, business, and information systems knowledge to help end-users detect data-quality problems.

Mathematics			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge	**Comprehension and Application**	**Analysis**	**Synthesis**
Formulate and solve problems in mathematics using algebra and apply this knowledge to the solution of a business-related problem.	Explain key concepts and problem-solving processes in mathematics through basic algebraic functions, and apply these math concepts to solve basic MIS-related problems.	Understand and use probability, statistical measures, and system optimization to analyze and select strategies related to MIS problems.	Analyze a complex problem to identify the key mathematical principles, formulate the problem in mathematics, solve it for quantitative solution, and apply advanced mathematic concepts as necessary for complex information systems.

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INFORMATION SYSTEMS TECHNOLOGY

Information Systems Technology (IS/IT) is a major component of a management information system. Technology consists of the products, inventions, and standards that are used for the purpose of doing things more efficiently and effectively. IS/IT refers to all hardware, operating systems and programming languages, data capture and storage, networks, and applications integrated into the management information system.

The MIS professional must match the IS/IT to the information needs of the organization as discovered and documented through the analysis and design process, resulting in an enterprise architecture appropriate for the scale of the organization.

Information Systems Technology			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge and Comprehension	**Application**	**Analysis and Synthesis**	**Evaluation**
Describe when to use computers and personal/business productivity software. Give examples showing a basic understanding of personal/business productivity software to address and solve information needs. Distinguish between the different types of personal/business productivity software.	Implement the proper procedures for setup and operation of a personal computer. Function effectively with classroom assignments using a wide variety of personal/ productivity software. Demonstrate fluency with a wide variety of personal/ productivity software.	Analyze information systems technology options in relation to organizational needs and identify alternative solutions. Integrate an understanding of information systems technology and organizational needs to specify an appropriate information system. Select and construct a specific information systems technology solution based on organizational needs and specifications.	Evaluate emerging information systems technologies to meet organizational needs. Assess existing information systems technologies in relation to current and anticipated organizational needs.

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SYSTEMS ANALYSIS

Systems Analysis for the MIS professional consists of breaking down an information system (IS) into its components for the purpose of focusing on the requirements of the system to satisfy an organizational problem, opportunity, or directive. This problem-solving approach is carried out in the early phases of a systems development project and is largely independent of any technology to be specified in the Systems Design and Development activities which follow. However, performed at an organizational level, IS Systems Analysis is conducted in a modern environment that demands attention also be given to improving processes and technologies. The MIS professional defines system requirements, identifies alternative options and solutions, and recommends the desired solution.

The MIS professional develops these system designs to meet information systems needs at various organizational levels by applying the appropriate methods, techniques, and tools in a manner consistent with the overall goals of an organization. The MIS professional also should be familiar with factual information related to IS Systems Analysis processes and should be able to explain the key concepts related to IS Systems Analysis. The results of the systems analysis include defined alternatives and recommendations.

Appropriate techniques and tools – including traditional and modern approaches – are required to carry out IS Systems Analysis. Systems Analysis for MIS also involves the ability to select and apply the appropriate methods, techniques, and tools to the IS development project at hand to produce a system design based on organizational requirements rather than on technology.

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Systems Analysis			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
		Knowledge, Comprehension, Application, and Analysis	**Synthesis and Evaluation**
Begins at Baccalaureate level.	*Begins at Baccalaureate level.*	Identify, understand, describe, and demonstrate the use of methodologies, techniques, and tools for determining the information requirements of an organization. Formulate, determine, and select the essential elements necessary to create a logical design of an information system that meets the specific needs of an organization, but without technology specifics. Distinguish between the various methods, techniques, and tools used for performing systems analysis and be able to give appropriate examples.	Develop information systems solutions that are supported by systems analysis methods in order to achieve organizational information strategy. Evaluate existing and proposed information systems solutions in relation to organizational needs and strategies.

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DESIGN AND DEVELOPMENT

Systems design and development for the MIS professional uses the results of systems analysis (alternatives and recommendations) to determine the logical and physical specifications of the information system. These specifications provide the guiding criteria for conception and construction of the information system.

The MIS professional provides for or performs the planning, designing, development, management, and use of hardware, software, data, and procedures that people use to support the organizational goals in an efficient and effective manner based on the specifications. Design and development are linked processes that begin with an analysis of the organization's needs and use human ingenuity to conceive and create a working solution that meets those needs. The creation of that working solution requires in-depth working knowledge of the organization's existing information system along with knowledge of the appropriate technology tools and methods that enable the design and development processes. These tools may include technologies such as platforms, operating systems, programming languages, database management systems, and networking/telecommunications, as well as special purpose software applications.

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Design and Development			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
	Knowledge	**Comprehension, Application, Analysis, and Synthesis**	**Evaluation**
Begins at college level.	Identify, understand, describe, and demonstrate the use of personal/business productivity software to design solutions for organizational needs and problems.	Identify, understand, describe, and demonstrate the use of MIS design and development methodologies, techniques, and tools for determining the information requirements of an organization. Formulate, determine, and select the essential MIS design and development elements necessary to create a logical design of an information system that meets the specific needs of an organization. Distinguish between the various methods, techniques, and tools used for performing MIS design and development. Be able to give appropriate examples.	Evaluate the design of complex information systems. Assess information systems' compliance with user needs and relevant constraints.

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SYSTEMS IMPLEMENTATION AND EVALUATION

Systems implementation and evaluation refers to all organizational activities working toward the adoption, management, and everyday function of a system improvement or new system solution. For the MIS professional, these activities begin at the completion of the design and development phases and may include hardware and software acquisition or development, user preparation, site and data preparation, installation, testing, start-up, and user acceptance.

The MIS professional must maintain and control the budget, schedule, and resources while managing the project scope, risk, and resolution of issues in order to keep the implementation process on track. The professional utilizes advanced knowledge of business software to assess business needs and issues that arise during implementation and then recommends solutions or develops resolutions for these issues.

Post-implementation evaluation is necessary to learn whether the intended objectives of the implementation were met. The MIS professional must understand the objectives of the organization and the information system itself in order to evaluate the implementation and ensure operational reliability. This evaluation includes an assessment of whether the project, as completed, delivered the benefits outlined in the project plan and an appraisal of whether the completed project met the reasonable expectations of end users.

Systems Implementation and Evaluation			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
	Knowledge and Comprehension	**Application and Analysis**	**Synthesis and Evaluation**
Begins at college level.	Define an information system. Explain how an information system is used in an organization.	Develop a multifaceted information system solution requiring a team effort. Formulate a systems implantation plan. Deliver a completed, working MIS project.	Create, implement, and evaluate an information system solution that meets organizational needs and constraints. Assess the alignment of the information system solution with the strategic goals of the organization.

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TEAMWORK

The MIS professional must be able to function as a member of a team. Teamwork requires understanding team formation and evolution, personality profiles, team dynamics, collaboration among diverse disciplines, problem solving, time management, and how to foster and integrate a diversity of perspectives, knowledge, and experiences.

The MIS professional eventually will work within two different types of teams. The first is intra-disciplinary and consists of members from within the MIS and/or IT sub-disciplines. The second is multidisciplinary and is a team composed of members of different professions—for example, an MIS professional working with an economist or financial analyst on the financial implications of a project, or an MIS professional working with users or management within or across various business functional areas such as marketing, accounting, or operations.

The MIS professional functions effectively as a member of both an intra-disciplinary team and a multidisciplinary team, both as a member of a project team and as a project leader. The Project Management Institute's* methods, standards, and procedures help the professional participate and direct management information systems projects to successful completion, including proper functionality, compliance with schedule, and conformity to budget.

*The Project Management Institute (PMI) is a not-for-profit organization that advances the project management profession through globally recognized standards and certifications, collaborative communities, an extensive research program, and professional development opportunities.

Teamwork			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge	**Comprehension**	**Application, Analysis, and Synthesis**	**Evaluation**
Identify collaborative learning and teamwork strategies. Describe the teamwork process. Describe good "people skills" and personal traits needed for successful teamwork.	Discuss what makes a team function well and how teamwork leads to a reduction in errors and improved outcomes. Explain teamwork do's and don'ts.	Demonstrate team leadership skills. Organize, plan, and create solutions to MIS problems through teamwork. Facilitate collaboration with individuals from outside the team. Conduct team exercises.	Evaluate, appraise, and assess the performance of individuals within the team and the performance of the overall team on projects. Recommend procedures and methods for the improvement of team performance.

MANAGEMENT AND LEADERSHIP

Management generally includes a combination of planning, organizing, monitoring, reporting up-line, and allocating scarce resources to optimize desired outcomes toward achievement of organizational goals and objectives. Although management is often perceived as supervising the work of other persons, initial management duties during the early stage of an MIS professional's career typically involve the management of tasks, time, organizational tools, and organizational investments, and the delivery of expected workplace outcomes.

Leadership includes setting goals, establishing strategy, and developing plans intended to implement the strategy to achieve the goals. Leadership almost always requires obtaining enthusiastic buy-in and contributions from others who are not always direct-report employees and who likely cannot be forced to support the goals, strategy, and plan. Even with direct-report employees, an effective leader will inspire more often than command. Leadership requires excellent communication skills; the ability to know what to communicate to whom, with which message, via what means; and the ability to detect, define, and productively resolve conflict.

As the MIS professional advances within the structure of the organization, the employee will move into more complex roles requiring a mixture of leadership activity and management duties. Leadership and management each have multiple dimensions within which the successful MIS professional will need to demonstrate excellence in the progression through sequentially more-responsible roles.

Management & Leadership			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge and Comprehension	**Application**	**Analysis and Synthesis**	**Evaluation**
Define and explain leadership and management.	Articulate leadership and management concepts and apply those to a group effort inside or outside the classroom.	Select and organize project teams for MIS projects. Structure successful group projects from project initiation to project completion based on the use of leadership and management concepts.	Evaluate the leadership and management styles of others and self. Assess the quality of the MIS team's product output.

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COMMUNICATION

The MIS professional must be able to communicate effectively in both oral and written forms using appropriate technology and media to communicate concisely and understandably with both technical and non-technical individuals and audiences in a variety of settings. In addition to traditional oral and written communication, other forms of communication include listening, observing, presenting, questioning, and reading. These communication skills are normally taught and learned across the curriculum—that is, over all of the years of formal education and in most courses.

Within the scope of a professional career, the MIS professional must be capable of producing professional quality memos, reports, and information systems documentation. In accomplishing these tasks, this person will be required to use various virtual collaboration tools, such as wikis, blogs, shared collaboration spaces, and the like to communicate with others on projects that often have global participation. To meet the organization's goals and objectives, the MIS professional must exhibit and apply communication skills in composing, generating, and presenting ideas, reports, and summaries in clear, logical, and correct prose that is adapted to specific audiences.

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Communication			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge and Comprehension	**Application**	**Analysis**	**Synthesis and Evaluation**
List and describe the basic elements of oral, written, virtual, and graphical communication. Identify the role of technology in document development and know the basic functions and capabilities of word processing, spreadsheet, and presentation software. Describe the appropriate use of the various forms of communication and comprehend the importance of entering higher education with adequate skills in writing, reading, listening, and speaking including the effective usage of grammar, punctuation, sentence structure, and content organization in formulating written documents and oral presentations.	Demonstrate effective communication skills exhibited in content, organization, logical reasoning, writing, and oral delivery to a specific audience. Demonstrate the ability to interpret technical documents. Establish a position with supporting evidence and logical reasoning. Apply the rules of grammar and composition in verbal and written communications.	Organize a report, presentation, or executive summary of complex ideas using clear, logical, and correct prose adapted to a specific audience. Select appropriate technology and media to communicate concisely. Use listening, writing, reading, and oral communication skills effectively in delivering team-based collaborative projects.	Create comprehensive written documents and oral presentations that combine diverse elements into a professionally integrated whole. Assess research proposals, technology publications, and specifications. Compare and contrast alternative solutions to Information Technology problems and justify recommendations.

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PROFESSIONAL AND ETHICAL RESPONSIBILITY

Ethics relies on the ability to apply moral principles in real-life situations and is context-dependent. The MIS professional should understand the professional and ethical responsibilities as stated by the Ethics Codes and Codes of Behavior of appropriate professional organizations such as the Association of Information Technology Professionals (AITP), Information Systems Audit and Control Association (ISACA), and Information Systems Security Association (ISSA).

As stated in the Code of Ethics of the Association of Information Technology Professionals, the MIS professional must not use knowledge of a confidential nature to further personal interests, nor should the MIS professional violate the privacy and confidentiality of information entrusted to the MIS professional or to which the MIS professional may gain access. The MIS professional also should understand the impact of unprofessional and unethical behaviors through knowledge of past incidents and resulting consequences and must demonstrate the ability to understand the global context in which information systems are developed and adhere to professional and ethical standards.

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Professional and Ethical Responsibility			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge	**Comprehension**	**Application and Analysis**	**Synthesis and Evaluation**
Recognize the need for ethical behavior. Identify generally accepted ethical concepts and principles.	Describe and discuss ethical concepts. Explain ethical and unethical issues.	Apply ethical concepts and principles to the cultural and ethical complexities in a global business environment. Develop and suggest appropriate ethical resolutions and implications to real-world situations. Analyze a situation and apply standards of professional and ethical responsibility to determine appropriate action. Demonstrate the capacity to implement a professional code of ethics in example cases.	Specify ethical behavior with respect to privacy and organizational need-to-know. Design and develop information systems that provide privacy assurance. Compare and contrast ethical values in organizations to one's personal values to determine the "right" course of action with respect to information systems.

CRITICAL THINKING

The MIS professional is routinely required to use critical thinking skills that benefit the organization. In today's world of sound bites, headlines, 30-second commercials, 140-character tweets, and 160-character text messages, critical thinking often delivers the best results from a focused, deliberate examination that is free of interruptions. Critical thinking is often as simple as making the right decision, given complex circumstances, uncertainties, competing options, and conflicting priorities.

Decisions made by the MIS professional often require the ability to connect seemingly unrelated information to form a well-reasoned appraisal that is made within the full context of the situation. This process, known as synthesis, can be particularly useful when diagnosing technical malfunctions, but can also be very useful in a wide variety of situations that are unrelated to technical malfunctions. Other decisions require deconstruction of context, prioritization of competing needs or opportunities, or a comparison/contrast of differing needs, options, or opportunities. This type of thinking is referred to as analysis. Critical judgment of the truth, ethics, business-value, human-value, and artistic-value of a workplace product, project, claim, or plan is required from the MIS professional to reach various decisions. Such thinking is referred to as evaluation.

Many decisions made by the MIS professional require the ability to draw conclusions about proposals or decisions that are consistent with known principles or other types of benchmarks for objectivity. This type of thinking is referred to as deductive reasoning. In other cases, the MIS professional needs to form well-reasoned generalities from specific situations. This type of thinking is referred to as inductive reasoning. Even more frequently, the MIS professional needs to form reasoned arguments for or against a particular path of action using reason or logic with empirical evidence to support the arguments. The formation, presentation, and defense of these arguments must be in the context of multiple competing points of view.

In summary, critical thinking skills, as demonstrated by the MIS professional, include the ability to synthesize, analyze, and evaluate information and the situation, and the ability to reason both deductively and inductively to reach the most appropriate decision given the organizational context, individuals involved, and circumstances.

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Critical Thinking			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge	**Comprehension and Application**	**Analysis and Synthesis**	**Evaluation**
Recognize that critical thinking skills are vital for today's MIS professionals to enable them to separate fact from fiction and to integrate information from global sources to solve business problems. Recognize that acquiring critical thinking skills is an increasingly important part of the MIS formal education process.	Understand the necessity for a systematic approach to problem solving and explain the difference between the requirements for deductive and inductive reasoning. Produce reasoned arguments, prepare simple experiments to test a hypothesis, and use logic to propose a solution to structured problems.	Organize seemingly unrelated information to form a well-reasoned basis for a decision made within the full context of the situation. Combine advanced, reasoned arguments and information from multiple sources for facilitating solutions to structured business information problems.	Compare and contrast the logical structure of alternative solutions to organizational information systems requirements. Assess, in a structured manner, and decide among alternatives, which information system can best meet the needs of an organization.

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LIFELONG LEARNING

The MIS professional is responsible to oneself and the organization for continuous learning. This is particularly important in management information systems practices, because the rate of new knowledge creation grows exponentially and new technologies make older technologies obsolete within a few months or years. It is critical for the MIS professional to systematically learn and gain expertise in new technologies, skills, tool sets, and business practices.

Some of this new knowledge will be provided in a structured format by the professional's employer. Consistently and routinely, the MIS professional will learn above and beyond that which is provided by the employer. This new knowledge will help the MIS professional better serve the organization and will position the MIS professional for career advancement. This also will help the organization use management information systems to develop and maintain a competitive advantage toward the achievement of organizational goals and objectives.

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Lifelong Learning			
Core Competencies Needed from High School to Enter Higher Education in Management Information Systems (HS)	**Pre-MIS Competencies Gained During First Two Years of Study (CC)**	**Baccalaureate-Level MIS Competencies (BBA/BS)**	**Graduate-Level MIS Competencies (G)**
Knowledge	**Comprehension and Application**	**Analysis**	**Synthesis and Evaluation**
Identify the need for lifelong learning.	Describe the use of new technologies within organizations. Demonstrate the ability to learn new technologies.	Direct a self-managed plan for ongoing learning that keeps business and technology skills current. Differentiate between the use of multiple technology tools, compare and contrast the applicability of different tools to the same situation, and formulate how to learn and help users learn to identify and select their information systems needs using a structured approach.	Integrate knowledge of evolving technology with changing organizational practices. Develop the ability to understand, use, build, create, implement, and evaluate information systems using technologies, processes, and methods previously unavailable. Recommend the best option supported by appraisal of resources, needs, and options. Develop methods, content, and tools that help others remain current in their knowledge, skills, and practices.

Community College Program of Study for Transfer to a Management Information Systems Program

FRESHMAN YEAR

First Semester (Fall)		SCH	Second Semester (Spring)		SCH
ECON 2301	Principles of Macroeconomics	3	ECON 2302	Principles of Microeconomics	3
BCIS 1305 or 1405	Business Computer Applications	3 or 4	ENGL 1302	Composition II	3
BUSI 1301	Business Principles	3	MATH 1325 or 1425	Math for Business II	3 or 4
ENGL 1301	Composition I	3	XXXX #####	TX Core Curriculum	3
MATH 1324	Math for Business I	3	XXXX #####	TX Core Curriculum	3
		15 or 16			**15 or 16**

SOPHOMORE YEAR

First Semester (Fall)		SCH	Second Semester (Spring)		SCH
BUSI 2301	Business Law	3	MATH 2342 or 2442	Elementary Statistical Methods	3 or 4
SPCH 1321	Business & Professional Communication	3	XXXX #####	TX Core Curriculum	3
ACCT 2301 or 2401	Principles of Financial Accounting	3 or 4	ACCT 2302 or 2402	Principles of Managerial Accounting	3 or 4
XXXX #####	TX Core Curriculum	3	XXXX #####	TX Core Curriculum	3
XXXX #####	TX Core Curriculum	3	XXXX #####	TX Core Curriculum	3
		15 or 16			**15 or 16**

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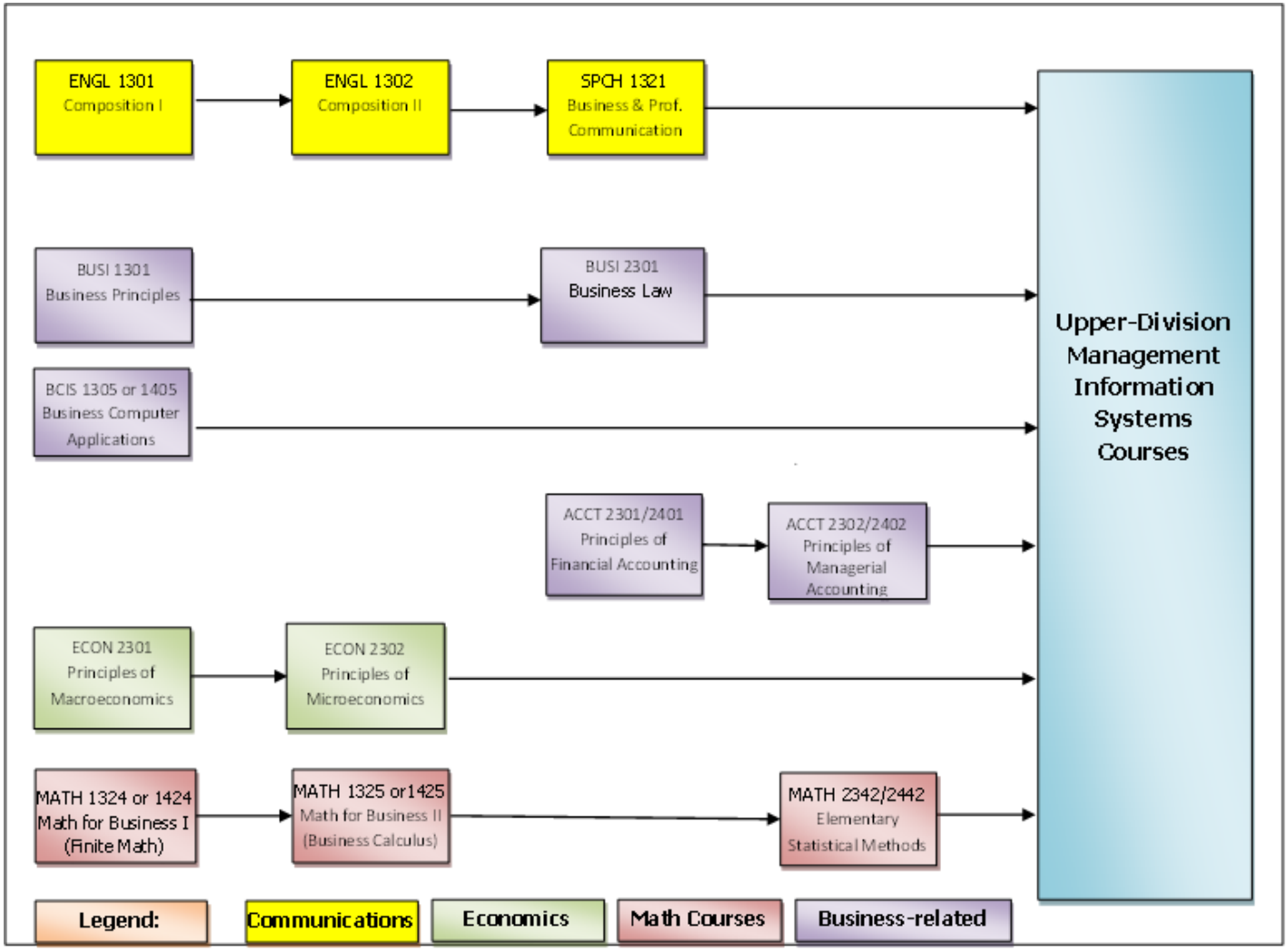
Management Information Systems Suggested Flowchart for First Two Years



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