MARYMOUNT UNIVERSITY
Arlington, Virginia

STUDENT LEARNING ASSESSMENT REPORT

PROGRAM: MS Information Technology (IT)

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Program Description
Marymount's Information Technology (IT) program offers advanced study to prepare individuals for leadership roles in the IT industry, whether managing an enterprise infrastructure, designing computer systems with current life cycle methodologies, creating and maintaining high-quality computer software, engaging in cybersecurity management or technical operations, or managing complex IT projects. A dual degree in information technology and cybersecurity, a variety of electives, a research or project option, and specialized tracks enable individuals to tailor their graduate studies to their career needs in government or industry.

Students have the option of choosing a specialized track to complete their program including:

- Cybersecurity
- Health Care Informatics
- Project Management and Technology Leadership
- Software Engineering

The program is designed to provide the academic foundation for those seeking to become a chief information officer (CIO) or attain a similar senior IT position.

The full-time faculty for this program conduct research in information cybersecurity, data management, open source software, technology for health care, natural language processing, and other areas. Adjunct faculty work in the field in areas such as requirements analysis, cybercrime detection, hardware design, software development, database management, cybersecurity, and operations management.

Learning Outcomes

Learning Outcome	Year of Last Assessment	Assessed This Year	Year of Next Planned Assessment
Identify and solve complex problems in business and society using information technology, including the application and management of complex systems of hardware, software, networks, databases, and computer security.	2008-2009 2011-2012 2014-2015		2017-18

Learning Outcome	Year of Last Assessment	Assessed This Year	Year of Next Planned Assessment
Exercise leadership in analyzing, designing, developing, and integrating IT solutions that meet industry-wide standards using system engineering principles.	2007-2008 2010-2011 2013-2014		2018-19
Manage enterprise-wide information systems to ensure that an organization is competitive in today's global and high-performance environment following strong ethical principles.	2007-2008 2010-2011 2013-2014	XX	2019-20
Use specialized knowledge and skills to obtain skills and, if applicable, certifications in areas such as software development, database and storage technology, computer security, IT governance, and project management.	2008-2009 2011-2012 2014-2015		2017-18
Optimize the effectiveness of IT in an organization by effective IT governance, development of IT strategic plans, implementation of IT policies, and assurance of ethical awareness of the enterprise use of information	2009-2010		2018-19
Communicate effectively with others, including technologists and managers in the IT field and users and managers in the business context.	2008-2009 2009-2010 2011-2012		2017-18
Work effectively as a member or as a leader of a cross-disciplinary team in the IT field where teamwork is essential to the success of a time-critical project.	2007-2008 2009-2010 2014-2015	XX	2019-20
Develop the knowledge and skills required to pursue life-long learning in areas relating to information technology and to adapt to an ever-changing, global technology and business environment through information literacy activities relevant to a fast-changing discipline.	2010-2011 2013-2014	XX	2018-19

Summary of Assessment

The Marymount IT graduate programs (including the parallel program, the MS in Cybersecurity) continue to grow and attract more students, particularly from individuals who want to change careers. Some have a good background in information technology, others do not. A few students make use of the 5-year program and transfer to the M.S. degree after attending Marymount as an undergraduate. In 2016-17, the MS IT was in the top five graduate program at the university with some 67 students in fall 2016, as well as about 12 students in dual degree programs with the MS in Information Technology as one component (MBA/IT and HCM/IT).

Digital transformation, made possible through IT, is now a major enabler in improving government, health care, business, not-for-profits, and the lives of individuals. It is an increasingly important driver for the nation's economy. The Marymount program highlights the ethical effects of technology applications

and encourages students to ensure that technology is usable and available to all: from "K through Gray" is our motto. We aim to provide our students with the skills and expertise necessary to be ethical technology leaders in a wide variety of environments. Students are encouraged to make a technology-related contribution to the community in line with the new QEP and the charism of the RSHM.

To continue measuring the effectiveness of the program at high quality standards, the expected outcome measures have been increased by 10% (e.g., 70% to 80%) for all the outcome measures.

The first learning outcome assessed was the ability to manage enterprise-wide information systems to ensure that an organization is competitive in today's global and high-performance environment following strong ethical principles. The program emphasizes ethics throughout the curriculum, from the first course (IT510) through the IT capstone project (IT680). This standard was met. However, with the increase in international students in the program who have little or no management knowledge or experience, some curriculum changes are needed for the first course in the program, IT510.

The second learning outcome assessed was the ability to work effectively as a member or as a leader of a cross-disciplinary team in the IT field where teamwork is essential to the success of a time-critical project. Two of the three outcome measures were met. Teamwork was successful in the IT course, IT585, focusing on managing technical people, with the strong focus on the importance of teamwork and a graded assignment, as opposed to the course IT540 where the purpose of the course was more technical and the adjunct professor teaching assumed students could complete the group project in a short timeframe (1 week). Guidance has been given to faculty (full-time and adjuncts) to not give short deadlines for group projects.

The third learning outcome assessed was based on developing the knowledge and skills required to pursue life-long learning in areas relating to information technology and to adapt to an ever-changing, global technology and business environment through information literacy activities relevant to a fast-changing discipline. This standard was marginally met but there was a significant improvement from the last assessment. The Library and Learning Services liaison will be bought in at the end of the program to specifically address lifelong learning in the IT field.

Supporting Marymount's Mission, Strategic Plan, and Relevant School Plan

The MS in Information Technology program is fully compliant with the graduate education mission of Marymount University and the outcomes include both the opportunity to acquire a high level of competency in the IT field (identify and solve complex problems in business and society) and to gain experience in the application of advanced knowledge and skills (including leadership, strategy, management, and technical competence). It also includes skills that are commonly requested by today's employers (understanding the business value of IT, ethical data-driven decision-making, quantitative skills, problem solving, communication skills and the ability to work in teams). Finally, it recognizes the changing nature of the IT field and hence the need for life-long learning based on skills in information literacy and the ability to keep current with changes in the field.

Assessment Process and Continuous Improvement Based on Assessment

In the 2016-17 school year, the continued collection of data for the assessment process was effective with good participation from the departmental faculty (full-time and part-time). PIE also produced several reports used in this outcomes assessment and for continuous improvement of the program.

Outcome assessment techniques were discussed early at a department meeting of faculty in the Department of Information Technology, Cybersecurity, and Management Science. The plans from the previous assessment were discussed and implementation ideas were explored. Plans were put in place to focus on the three learning outcomes for the 2016-7 academic year. Common rubrics from previous evaluations were discussed, including how they would be applied and in which designated courses. Discussions were held on improving the rubrics being used and the level of detail in the rubrics. One adjunct professor was using a rubric that was 5,000 words long to assess an assignment and this was reviewed to show how detail can become excessive. The difference between rubrics for grading and rubrics for assessment were discussed as assessment needs to focus on specific areas and may not need all the criteria that goes into a grading rubric. Data collection requirements and deadlines were identified. A graduate assistant was appointed to be the coordinator for data collection and initial data analysis and a repository of information was created on the private cloud in the cybersecurity lab. All paper documents were scanned in to alleviate the need for paper files, particularly as the department would be packing up and moving in the summer time frame.

A number of other initiatives were also identified as part of our continuous improvement process including revising scheduling to meet the additional number of working students, the development of a new course on big data offered in Spring 2017, and the widespread inclusion of cloud computing, DevOps, Digital Transformation and the Internet of Things (IoT) through the technical aspects of the curriculum. Implementation of the planned QEP into the program was also discussed

The IT graduate program continues to grow with an increasing number of international students. Understanding the special needs of the new students is an ongoing task and so the early courses are closely watched to detect any deficiencies. A major challenge is keeping up with the technology body of knowledge. Faculty are constantly attending conferences and professional meetings to ensure that we keep abreast of the field. We use the assessment process to fine-tune our curriculum and to measure our teaching effectiveness. The Graduating Student Survey provides insights in how students feel at the end of the program, although the response rate is not as high as we would like. 100% of students rated faculty members as having a high level of expertise which is important to the program.

The IT program is fully compliant with Marymount's three pillars of intellectual curiosity, service to others, and building a global perspective including:

- Intellectual curiosity: the program meets the university's graduate program standards including the higher-level outcomes, as applied to the IT field. Students are encouraged to research topics in the demanding IT field throughout the program, culminating in a capstone research project.
- Service to Others: graduate students work closely with professional associations, one becoming Vice-President for Membership for the Information Systems Security Association (ISSA), the biggest professional group in the cybersecurity field. Graduates also act as mentors for the undergraduate students.
- Global Perspectives: our students and faculty are very diverse and consider IT in the global context. Students can elect to go on a global trip each year and Dr. Schaeffer takes her IT550 class to an event at the World Affairs Council each year.

Implementation of Planned Improvements from Last Year:

Outcome	Planned Improvement	Update *(Indicate when, where, and how planned improvement was completed. If planned improvement was not completed, please provide explanation.)*
Exercise leadership in analyzing, designing, developing, and integrating IT solutions that meet industry-wide standards using system engineering principles.	We planned to hold out-of-the classroom sessions with invited speakers who have solved specific IT problems, and to encourage faculty to bring outside speakers to stress problem solving.	A new adjunct was selected for the first class in the curriculum (IT510) and he has modified the class to emphasize problem solving throughout the systems lifecycle. As a working professional, he has brought in some good experiences and has had two invited speakers to emphasis solving problems at the IT management level. One session was held with an invited speaker form the Department of Commerce about Digital Transformation in the Government. About 30 students attended and asked some good questions. More sessions will be held this year.
Optimize the effectiveness of IT in an organization by effective IT governance, development of IT strategic plans, implementation of IT policies, and assurance of ethical awareness of the enterprise use of information	We planned to continue our approach of including ethical consideration in all programming associated with the effectiveness of IT and its management and governance.	IT governance and IT strategic planning are included in several courses, but particularly in IT610. We have continued to emphasize ethics throughout the program and to discuss how IT does, and can do more, to improve the quality of life for many people throughout the world. We have also focused on the digital transformation initiative.
Communicate effectively with others, including technologists and managers in the IT field and users and managers in the business context.	We planned to implement a more structured environment to improve writing and introduce the draft and final process in the early courses in the program.	We now stress writing in the orientation process and provide information on the CTL writing services. There is a more defined process where students can get feedback on their work from their peers but we have yet not modified the courses to use the draft/final process.

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Response to Last Year's University Assessment Committee Review

The overall comment was that this was a strong program and all parts of the outcomes assessment were deemed as acceptable. Additional language has been added to emphasize the connections with the charism of the RSHM and the new QEP. Work on the outcome related to obtaining certifications continues: we look at the different careers, the need for certifications, and celebrate students who obtain these certifications. A detailed review of rubrics for each outcome will be performed this year.

Outcomes and Past Assessment

Learning Outcome 1:

Manage enterprise-wide information systems to ensure that an organization is competitive in today's global and high performance environment following strong ethical principles.

Is this outcome being reexamined? X ☐ Yes ☐ No

When assessed in 2013-14, all three outcome measures were met. We had made some changes to the first course in the program, IT510, and reinforced ethics in it and in several other courses throughout the program (including IT610 and IT680). There was evidence of improved problem solving and management skills as students progressed in the program. Global programs have continued with a visit to Dublin, the new technology center for Europe, in Spring 2017.

Assessment Activity

Outcome Measures	Performance Standard	Data Collection	Analysis.
Direct: Evaluation of the final course project and presentation for each semester of IT510, Requirements Analysis	85% of students in IT510, Requirements Analysis, receive a value of 20 out of 25 for the report and presentation evaluated in accordance with rubric 1 (see attachment). (10% above the previous assessment)	47 students were enrolled in IT510 in academic year 2016-17. The final reports were retrieved from Canvas by the department chair before they were graded by the professors. She also attended the presentations and participated in the student survey of each presentation. She read each report and analyzed them using a pre-defined rubric, specifically looking for evidence of management concepts and ethical decision-making (see Rubric 1).	The reviews were made on a semester basis. 25 were evaluated in Fall 2016, 14 in Spring 2016, and 5 in Summer 2017 (3 students submitted late after the items were retrieved). Of the 44 students who completed the IT510 report and presentation, 38 students (86 %) received a score of 20 or more. The standard for the outcome of a good rating was met. It should be noted, however, of the 6

Outcome Measures	Performance Standard	Data Collection	Analysis.
		While there are many elements in the rubric, they combine together to indicate the quality of the technology proposed, how it can be managed and communicated, and its ethical basis. The maximum score was 25 and 20 or more is considered a good rating.	students who did not meet the standard 4 were international students in their first semester of the program.
Indirect: From the Graduating Student Survey, confidence that the student can "solve problems in your field using your knowledge and skills" and "can use technology effectively in a workplace situation	85% of students should feel good or excellent about their response to the questions "solve problems in your field using your knowledge and skills" and "can apply knowledge and skills to new situations" (10% above the previous assessment)	Data was collected from the 2016-17 Graduating Student Survey, conducted by the Office of Planning and Institutional Effectiveness	100% of the graduating students felt that they could "solve the problems in the field". 100% also felt that they could "use technology effectively in a workplace situation". The standard for the outcome was met and is a significant improvement over the previous assessment, 66.7%.
Direct: Review of the deliverables from the IT680, Master's Project. including report, presentation, and retrospective.	90% of students scored adequate or better on the rubric given in the attachment as Rubric 2 (10% above the previous assessment)	During the IT Master Project, students are asked to prepare a series of deliverables including the project proposal. Literature review, project report, presentation and a performance retrospective. The results were reviewed by a committee consisting of the department chair, two professors who taught in the program, and two other professors in the SBA. Each response was scored as fully, partly, or not at all and the committee grades were averaged (See Rubric 2)	There were 8 students in fall 2016, 18 students in Spring 2017 and 12 students in Summer 2017. Of the 38 reports, 24 were able to fully demonstrate their abilities in ethical management, 12 were considered adequate, and only 2 students were considered not competent. The adequate or greater score was achieved by 95% of the students in their final semester. The standard for the outcome was met.

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Interpretation of Results

Extent this learning outcome has been achieved by students *(Use both direct and indirect measure results)***:**

All three measures were met and there was significant improvement from when the learning objectives were previously assessed.

Program strengths and opportunities for improvement relative to assessment of outcome:

Ethics is a strong point throughout our curriculum and is covered in each course. IT550, Ethics, Law, and Policy in the Information Age, is a required course taken by all students in the program. The focus is on just not the students' own ethical behavior but the IT professionals' responsibility to design and manage computer systems which support the ethical use of computers. We introduce it in the first course in the program (IT510, Requirements Analysis) and reinforce it throughout the series of course, culminating in the final project course, IT680.

Graduates from the program were highly confident in their ability to manage enterprise-wide information systems with an emphasis on ethical standards. This is evidenced by their early work in IT510, Requirements Analysis, and their understanding and presentation in line with ethical guidelines such as the ACM Code of Ethics.

However, the number of international students in the program increased significantly in the 2016-7 school year with a major cohort recruited from India. These students are generally recently graduated from technical colleges and had little management experience. These were the majority of students who did not meet the outcome measure for their first course.

Discuss planned curricular or program improvements for this year based on assessment of outcome:
IT510 is the first course in the program and is designed to present the entire systems lifecycle from an enterprise-wide perspective. Ethical management is incorporated throughout the course but assumptions are made as to the student's understanding of key management concepts. A section will be added early in the course that reviews these concepts in more depth and stresses their importance. In addition, a guest lecturer will be brought in to show the application of these concepts in the digital transformation of an organization.

Learning Outcome 2: Work effectively as a member or as a leader of a cross-disciplinary team in the IT field where teamwork is essential to the success of a time-critical project.

Is this outcome being reexamined? X ☐ Yes ☐ No

In the 2014-15 assessment, the three selected outcome measures were met for the first time, with an increased focus on the skills required for effective teamwork, particularly given the very busy lives of many of the students.

Assessment Activity

Outcome Measures *Explain how student learning will be measured and indicate whether it is direct or indirect.*	Performance Standard *Define and explain acceptable level of student performance.*	Data Collection *Discuss the data collected and student population*	Analysis *1) Describe the analysis process.* *2) Present the findings of the analysis including the numbers participating and deemed acceptable.*
Direct: Evaluation of communication activities in the design project in IT540, Enterprise Data Management and Analysis, which is the first group project in the course and has a short deadline.	Students rate 80% of the team members as effective or very effective in the communication process on the design project in IT540, Enterprise Data Management and Analysis. 8 out of 10 on the rubric (Rubric 3) is considered as effective. (10% increase in the measure from the last assessment)_	A questionnaire was given as a confidential evaluation by the student of the team as a whole and each member of the team was asked to assess the team leadership and team membership skills of each of the team members. There were 22 students in Fall 2016 and 26 students in Spring 2017 (total 48 students).	Of the 48 total students.44 individuals responded to the questionnaire. Of these 33 students (75%) rated their team as effective but 18 (41%) of the students marked at least one of their team members as not fully participating in the project, or very late in submitting the work needed for the team project to be completed on time and to their quality standards. Non-participation is considered a measure of poor teamwork. The standard was not met.
Indirect: From the Graduating Student Survey, students showed confidence in their ability to work as part of a team and to lead a team	By the end of their program, 90% of students should feel good or adequate about their ability to cope in a team environment in the IT field where work is often fast-paced and deadline driven. Students should also feel confident in their ability to lead a team.	Data was collected from the 2016-17 Graduating Student Survey, conducted by the Office of Planning and Institutional Effectiveness. Responses to 2 questions were evaluated: 1) work as part of a team, 2) lead a team	100% of students felt confident in their ability to work as part of a team and 100% felt confident in their ability to lead a team. This standard was met.

Outcome Measures *Explain how student learning will be measured and indicate whether it is direct or indirect.*	Performance Standard *Define and explain acceptable level of student performance.*	Data Collection *Discuss the data collected and student population*	Analysis *1) Describe the analysis process.* *2) Present the findings of the analysis including the numbers participating and deemed acceptable.*
	(10% increase in the measure from the last assessment).		
Direct: Performance on a group project in an online course	Teammates rated 80% of their team members as effective or very effective communicators in working on an online team project in IT585, Managing Technical People, in Spring 2016. 8 out of 10 is considered as effective on the rubric (Rubric 4). (10% increase in the measure from the last assessment).	A questionnaire was given to assess communication effectiveness as a confidential evaluation by one team member of another (2 or 3 person teams, selected by the instructor). This was a graded assignment and each student developed their own questionnaire and applied it to two other persons on their team.	There were 21 students in IT585 in Spring 2016 (the course is only offered once a year). Of these 17 (81%) of students received 8 or more on the assigned ru The standard was met.

Interpretation of Results

Extent this learning outcome has been achieved by students *(Use both direct and indirect measure results)***:**

Two of the three outcome measures were met and students leaving the program were 100% confident in their ability to work in a team and to lead a team.

Program strengths and opportunities for improvement relative to assessment of outcome:

Teamwork is practiced throughout the curriculum. However, with our diverse student base, many of whom are working, faculty must be aware of students' other commitments, many only able to do their school work at certain times of the day or on days when they are not working.

Discuss planned curricular or program improvements for this year based on assessment of outcome:

Faculty have been advised to give adequate time for group interaction, since students gave different time constraints. Group projects should be given a timeline of at least 2 weeks.

In the Graduating Students Survey, 100% of the students indicated that they were confident in their ability to collaborate with others from different backgrounds and experiences and have an interest in cultures different from their own. This is important with all the issues the IT industry is facing in

integrating females and minorities in the IT workplace. This result is a testament to Marymount's diverse student body. Our IT graduate program is about 40% female, way above the workplace numbers.

Also in the Graduating Students Survey, 100% of students were confident in their leadership skills.

Learning Outcome 3: Develop the knowledge and skills required to pursue life-long learning in areas relating to information technology and to adapt to an ever-changing, global technology and business environment through information literacy activities relevant to a fast-changing discipline.

Is this outcome being reexamined? X ☐ Yes ☐ No

If yes, give a brief summary of previous results (including trends) and any changes made to the program.

In the last assessment of this learning objective (2013-14), students did not meet the performance standard. This outcome was not met with two assessment measures not meeting the standard and the third just meeting the standard. It was determined that additional resources should be made available in all courses to ensure that students are aware of the expectations for finding information and evaluating it effectively.

Assessment Activity

Outcome Measures *Explain how student learning will be measured and indicate whether it is direct or indirect.*	Performance Standard *Define and explain acceptable level of student performance.*	Data Collection *Discuss the data collected and student population*	Analysis *1) Describe the analysis process.* *2) Present the findings of the analysis including the numbers participating and deemed acceptable.*
Indirect: From the Graduating Student Survey, confidence that the student can "find appropriate sources of information" and "evaluate the quality of information".	The performance standard is that 80% of students rated their ability to find appropriate sources and evaluate the quality of information as good or excellent. (10% increase in the measure from the last assessment).	Data was collected from the 20016-17 Graduating Student Survey, conducted by the Office of Institutional Effectiveness. Data was reviewed for responses to two questions relating to information literacy: "Find appropriate sources of information" "Evaluate the quality of information (e.g., scholarly articles, newspapers)"	80% of students rated themselves as good or excellent for the question on their ability to find appropriate sources of information, increase of 20% over the previous survey results. 90% of students indicated that they felt confident in their ability to evaluate the quality of information. This reflects their ability to find and evaluate information in the changing IT field. This standard was met.

Outcome Measures *Explain how student learning will be measured and indicate whether it is direct or indirect.*	Performance Standard *Define and explain acceptable level of student performance.*	Data Collection *Discuss the data collected and student population*	Analysis *1) Describe the analysis process.* *2) Present the findings of the analysis including the numbers participating and deemed acceptable.*
Indirect: From the Graduating Student Survey, confidence that the student can "apply knowledge and skills to new situations"	The performance standard is that 80% of students rated their ability to apply knowledge to new situations". (10% increase in the measure from the last assessment).	Data was collected from the 20016-17 Graduating Student Survey, conducted by the Office of Institutional Effectiveness. Data was reviewed for the individual question Apply knowledge and skills to new situations.	80% of students rated themselves as good or excellent in this category, 13% greater than in the previous outcomes assessment. New situations often require new learning and so we have used this measure to indicate their ability to learn new knowledge. This outcome was met.
Direct: From the IT680, IT Masters Project, ability of students to perform an effective literature review in the IT field.	80% of students received a 2 or 3 on the rubric evaluation for the literature review and the project retrospective (see rubric 2) (10% increase in the measure from the last assessment).	Data was collected from the review conducted in Outcome 1, item 2 and was extracted from the more general performance assessment.	80% of students received a 2 or 3 on the assessment of these 2 items. The standard for the outcome was met.

Interpretation of Results

Extent this learning outcome has been achieved by students *(Use both direct and indirect measure results)***:**

Life-long learning is a difficult outcome to measure: our approach is to ensure that our graduate students have the knowledge and experience to understand the need for continuous learning in the IT field as it constantly changes. In a partnership with the IT library representative, Mason Yang, we ensure that all students know how to find new materials and can interpret them appropriately. We point them to tools such as the Gartner Hype Cycle to ensure they understand the new drivers in the IT field and use classroom assignments and papers to discuss the impact of these changes in an IT career.

This outcome was met in all three of the higher assessment measures, but only barely. There was, however, significant improvement from the 2013-14 assessment. two of the measures and partially met in the third.

Program strengths and opportunities for improvement relative to assessment of outcome:

As noted in the previous assessment, IT is a fast-moving field and there is definitely a constant barrage of new information as the industry grows in new directions. Today, it is such things the Internet of Things, DevOps, digital transformation approaches, and cybersecurity to name a few. These are covered to in the program at the discretion of the faculty, but as we must add new concepts as new areas arise and ensure students understand how to find relevant information. The Graduating Students Survey does indicates that 100% of students see the importance of lifelong learning and are open to new experiences.

Discuss planned curricular or program improvements for this year based on assessment of outcome:

Library and Learning Services is a frequent addition to several of the research-intensive classes. We will add a session for them in IT680, the IT Capstone course, on lifelong learning in the IT field. This was recommended in the last assessment but was not explicitly implemented.

GRADUATE CURRICULUM MAP

Degree Program: M.S. in Information Technology Year: 2016-17

Program Outcomes:

Program Outcome	Critical Reading[1]	Written Communication	Oral Communication /Persuasive Argument	Identification, Investigation, and Application of Theory and Principles of the Discipline	Scholarly Presentation and the Use Resource Materials
Identify and solve complex problems in business and society using information technology, including the application and management of complex systems of hardware, software, networks, databases, and computer security.	**XX**	**XX**	**XX**	**XX**	**XX**
Exercise leadership in analyzing, designing, developing, and integrating IT solutions that meet industry-wide standards using system engineering principles.	**XX**	**XX**	**XX**	**XX**	
Manage enterprise-wide information systems to ensure that an organization is competitive in today's global and high-performance environment following strong ethical principles.	**XX**	**XX**	**XX**	**XX**	**XX**
Use specialized knowledge and skills to obtain skills and, if applicable, certifications in areas such as software development, database and storage technology, computer security, IT governance, and project management.	**XX**	**XX**	**XX**	**XX**	
Optimize the effectiveness of IT in an organization by effective IT governance, development of IT strategic plans, implementation of IT policies, and assurance of ethical awareness of the enterprise use of information	**XX**	**XX**	**XX**	**XX**	**XX**
Communicate effectively with others, including technologists and managers in the IT field and users and managers in the business context.	**XX**		**XX**		

1.

Program Outcome	Critical Reading[1]	Written Communication	Oral Communication /Persuasive Argument	Identification, Investigation, and Application of Theory and Principles of the Discipline	Scholarly Presentation and the Use Resource Materials
Work effectively as a member or as a leader of a cross-disciplinary team in the IT field where teamwork is essential to the success of a time-critical project.	**XX**	**XX**	**XX**	**XX**	
Develop the knowledge and skills required to pursue life-long learning in areas relating to information technology and to adapt to an ever-changing, global technology and business environment through information literacy activities relevant to a fast-changing discipline.	**XX**	**XX**	**XX**	**XX**	**XX**

Curriculum Map:

For each course, indicate which competencies are included using the following key. Please refer to the director of assessment in Planning and Institutional Effectiveness if you need more detailed explanation of the four core competencies.

Level of instruction: F-foundational, A-advanced, M-mastery

Assessment: PR-project, P-paper, E-exam, O-oral presentation, I-internship, OT-other (explain briefly)

Required Course	Critical Reading[1]		Written Communication		Oral Communication/Persuasive Argument		Identification, Investigation, and Application of Theory and Principles of the Discipline		Scholarly Presentation and Use of Resource Materials	
	Level	Assess	Level	Assess	Level	Assess	Level	Assess	Level	Assess
IT500*	**A**	**E**	**A**	**PR**					**A**	**PR**
IT505*	**A**	**E**	**A**	**PR, E**	**A**	**O**	**M**	**P**	**A**	**P**
IT510	**F**	**E**	**F**	**P**	**F**	**O**	**F**	**P**	**F**	**P**
IT515			**F**	**OT (cases)**			**F**	**OT (Cases)**		
IT520	**F**	**P, D**	**F**	**P**	**F**	**O**	**F**	**P**	**I**	**O**
IT530	**F**	**P, D**	**F**	**PO**	**F**	**O**	**A**	**P**	**I**	**P**

IT535*	**A**	**P**	**A**	**P**	**A**	**O**	**M**	**P**	**I**	**P**
IT537*	**A**	**P**	**A**	**P**	**A**	**O**	**A**	**P**		
IT540	**A**	**P**	**A**	**P**	**A**	**O**	**A**	**P**	**A**	**P**
IT545*	**A**	**P**	**A**	**P**	**A**	**O**	**M**	**P**	**M**	**P**
IT547*	**F**	**P**	**A**	**P**	**F**	**O**	**A**	**P**		
IT550	**M**	**P**	**M**	**P**	**A**	**O**	**M**	**P**	**M**	**P**
IT552*	**F**	**P**	**A**	**P**	**F**	**O**	**A**	**P**	**A**	**P**
IT557*	**A**	**P, D**	**A**	**P**			**A**	**PR**		
IT560*	**A**	**P, D**	**A**	**P**	**A**	**P**				
IT565*	**A**	**PR**	**A**	**PR**	**A**	**O**	**M**	**PR**	**M**	**PR**
IT567*	**M**	**P, D, O**	**M**	**P**	**M**	**O**	**A**	**P**		
IT570*	**A**	**P**	**A**	**P**	**A**	**O**	**M**	**P**	**A**	**P**
IT575*	**A**	**PR**	**A**	**PR**	**A**	**O**	**A**	**P**	**A**	**P**
IT577*	**M**	**P, O**	**M**	**P**	**A**	**O**	**M**	**P**		
IT580*	**A**	**P**	**M**	**P, D**	**M**	**O**	**A**	**P**		
IT585*	**A**	**P**	**M**	**P, D**	**M**	**O**	**A**	**P**		
IT587*	**A**	**P**	**A**	**P**	**A**	**P**				
IT590**	**M**	**P or PR**	**M**	**P or PR**	**M**	**O**	**M**	**P or PR**	**M**	**P or PR**
IT610	**M**	**P**	**M**	**P**	**M**	**O**	**M**	**O**	**M**	**O**
IT670*	**F**	**P, PR**	**F**	**PR**	**M**	**O**	**M**	**PR**		
IT680	**M**	**PR**	**M**	**PR**	**M**	**O**	**M**	**PR**	**M**	**PR**

MSC515			**F**	**OT (cases)**			**F**	**OT (Cases)**		
MSC545*	**A**	**P**	**A**	**P**	**A**	**O**	**A**	**P**		
MSC550*	**A**	**PR**	**A**	**PR**	**A**	**O**				
MSC555*	**A**	**P**	**M**	**P**	**A**	**O**	**A**	**PR**		

- *** COURSE IN CONCENTRATION OR ELECTIVE**
- **** MAY DIFFR FROM COURSE TO COURSE**