

# STUDENT LEARNING ASSESSMENT REPORT

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**PROGRAM:** Information Technology (MS)

**SUBMITTED BY:** Diane Murphy

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## EXECUTIVE SUMMARY

### Program description from the Course Catalog:

Marymount's information technology program offers advanced study to prepare individuals for leadership roles in the IT industry, whether managing enterprise infrastructure, designing computer systems with current systems 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 dual degree in information technology and the MBA, a variety of electives, a research or project option, a global experience, 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:

- 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 technology, cybersecurity, data management, open source software, natural language processing (NLP), human computer interaction, technology for health care, and other areas. Adjunct faculty work in the field in areas such as requirements analysis, cybercrime, hardware design, software development, database management, cybersecurity, and operations management for government and business.

Upon successful completion of the information technology program, students will be able to

- 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;
- exercise leadership in analyzing, designing, developing, and integrating IT solutions that meet industry-wide standards using system engineering principles;
- manage enterprise-wide information systems to ensure that an organization is competitive in today's global and high performance environment following strong ethical principles;

- use specialized knowledge to obtain skills and, if applicable, certifications in areas such as software development, database and storage technology, cybersecurity, IT governance, and project management;
- 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;
- communicate effectively with others, including technologists and managers in the IT field and users and managers in the business context;
- 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 time-critical projects; and
- 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 relevant to a fast-changing discipline.

List all of the program’s learning outcomes: (regardless of whether or not they are being assessed this year)

Learning Outcome	Year of Last Assessment	Assessed This Year	Year of Next Planned Assessment
<b>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.</b>	2014-15	XX	
Exercise leadership in analyzing, designing, developing, and integrating IT solutions that meet industry-wide standards using system engineering principles	2015-16		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.	2016-17		2019-20
<b>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.</b>	2014-15	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	2015-16		2018-19
<b>Communicate effectively with others, including technologists and managers in the IT field and users and managers in the business context.</b>	2015-16	XX	

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.	2016-17		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.	2016-17		2019-20

**Describe briefly how the program’s outcomes support 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 is also preparing students for the fast-paced IT workplace and 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.

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. Students visited Prague in spring 2018.

**Provide a brief description of the assessment process used including strengths, challenges and planned improvements to the process, and provide evidence of the existence of a culture of continuous improvement based on assessment (*generally not more than two paragraphs, may use bullet points*):**

In the 2017-18 school year, the continued collection of data for the assessment process was generally effective with good participation from the departmental faculty (full-time and part-time). PIE also produced several reports used in this outcomes assessment.

Outcome assessment techniques were discussed early at a department meeting of faculty in the Department of Information Technology, Data Science and Cybersecurity. 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 2017-18 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. 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 with Canvas being the primary data collection vehicle. A graduate assistant was appointed to be the coordinator for data collection and initial data analysis.

**Describe how the program implemented its planned improvements from last year:**

Outcome	Planned Improvement	<p style="text-align: center;"><b>Update</b></p> <p style="text-align: center;"><i>(Indicate when, where, and how planned improvement was completed. If planned improvement was not completed, please provide explanation.)</i></p>
<p>Manage enterprise-wide information systems to ensure that an organization is competitive in today's global and high performance environment following strong ethical principles.</p>	<p>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.</p>	<p>An extra component on ethics was added to IT510, with a strong emphasis on the collection and protection of personally identifiable information (PII) and the growing areas of artificial intelligence and machine learning.</p>
<p>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.</p>	<p>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.</p> <p>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.</p> <p>Also in the Graduating Students Survey, 100% of students were confident in their leadership skills.</p>	<p>As the industry moves towards virtual teams, this is being added to the team activities in various courses.</p>
<p>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.</p>	<p>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.</p>	<p>This section has been explicitly added to IT680, the Capstone Project.</p>

**Provide a response to last year’s University Assessment Committee review of the program’s learning assessment report:**

Comment: In general, the document was given an acceptable category for all elements of the rubric, except the outcomes themselves. Here the importance of ethics was noted and a request to separate it out from management. Also, other methods of measuring lifelong learning were requested.

**Response:**

This is a master’s course in the management of IT and so building ethics into the workplace, making ethical decisions, seems appropriate. We are developing additional case studies to reinforce ethics in the workplace, including in new technologies such as drones, 3D printing, artificial intelligence. Dr. Schaeffer was on sabbatical in Spring 2018 writing a book in this area and will adapt the content to be included in Marymount courses.

**Outcomes Assessment 2017-2018**

**Learning Outcome 1: 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.**

**Assessment Activity**

<b>Outcome Measures</b> <i>Explain how student learning will be measured and indicate whether it is direct or indirect.</i>	<b>Performance Standard</b> <i>Define and explain acceptable level of student performance.</i>	<b>Data Collection</b> <i>Discuss how the data was collected and describe the student population</i>	<b>Analysis</b> <i>1) Describe the analysis process.                      2) Present the findings of the analysis including the numbers participating and deemed acceptable.</i>
Direct: Evaluation of the quality of the final project report as the main deliverable in IT680, the IT Master’s Project.	80% of students in the capstone IT680, IT Master's Project, should receive a value of 72 out of 90 (3 evaluations of 30 points each) for the main deliverable on the project as a measure of their ability to research and solve a complex problem.	Student project reports from Fall 2017, Spring 2018, and Summer 2018 were downloaded from Canvas and evaluated by 2 faculty members and 1 external industry representative using a rubric defined by the department (see Rubric 1).	Each semester, deliverables from the capstone project were downloaded from Canvas and reviewed by two faculty members (the instructor and the faculty subject matter expert) and at least one external member. Each person read and rated each independently according to the rubric in Rubric 1. 10 were evaluated in Fall 2017, 22 in Spring 2018, and 8 in Summer 2018. 41 of the 49 students (83.7%) received a score of 72 or more for their projects.  The standard was met.
Direct: Assessment of ability to develop a database to solve a specific problem.	80% of students achieved greater than 7 on the rubric developed to evaluate database applications (Rubric 2).	In 2017-18, for IT540, Enterprise Data Management and Analysis, each student developed a database to solve a specific business problem.	The number of students were 24 for Fall 2017, 17 for spring 2018, and 3 for summer 2018. Two different instructors taught (one in fall and one in spring and summer) They each had a common exercise that was a database design project. Each instructor assessed the project from the other class using a standard rubric (see Rubric 2).

<b>Outcome Measures</b> <i>Explain how student learning will be measured and indicate whether it is direct or indirect.</i>	<b>Performance Standard</b> <i>Define and explain acceptable level of student performance.</i>	<b>Data Collection</b> <i>Discuss how the data was collected and describe the student population</i>	<b>Analysis</b> <i>1) Describe the analysis process.  2) Present the findings of the analysis including the numbers participating and deemed acceptable.</i>
			36 of 44 (81.8%) of students met the standard 7 on the rubric.  The standard was met.
Indirect: from the Graduating Student Survey, students should be confident that they can apply knowledge and skills to new situations and can solve problems in the field.	By the end of their program, 90% of students should feel competent about their ability to perform well in the workplace, even as the problems and technologies change constantly.	Data was collected from the 2017-18 Graduating Student Survey, conducted by the Office of Planning and Institutional Effectiveness. Responses to 2 questions were evaluated: 1) solve problems in your field using your knowledge and skills, 2) apply knowledge and skills to new situations	91.7% of graduating students who completed the survey (13) felt that they could “apply knowledge and skills to new situations” and 92.3% felt confident that they could “solve problems in your field using your knowledge and skills”.  The standard was met.

**Interpretation of Results**

**Describe the extent to which this learning outcome has been achieved by students** *(Use both direct and indirect measure results):*

All standards were met. Most students were satisfied with their education as reflect in their ability to solve new problems in the eve changing IT field.

**Briefly describe program strengths and opportunities for improvement** relative to assessment of outcome:

The combination of hands-on projects (e.g., the database assignment) and writing assignments (the capstone project) seems to prepare the students well for their management roles in the IT workplace, extending both their technical knowledge and their managerial skills.

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

No major changes are planned based on this assessment although more emphasis will be placed on ethics in the problem-solving process.

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**Learning Outcome 2: 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.**

**Assessment Activity**

<b>Outcome Measures</b> <i>Explain how student learning will be measured and indicate whether it is direct or indirect.</i>	<b>Performance Standard</b> <i>Define and explain acceptable level of student performance.</i>	<b>Data Collection</b> <i>Discuss how the data was collected and describe the student population</i>	<b>Analysis</b> <i>1) Describe the analysis process.                      2) Present the findings of the analysis including the numbers participating and deemed acceptable.</i>
Direct: Students showed confidence in their ability to take and pass a premiere cybersecurity certification such as the CISSP or CEH.	By the end of their program, 80% of students should feel good or adequate about their ability to take one or more of the required certifications in the cybersecurity field, if they had elected for the Cybersecurity Concentration.	The Chair passed out a questionnaire to each of the students at the end of IT535, Advanced Cybersecurity, and asked for their confidence level in each section of the CISSP or CEH certification exams.	23 students took IT535 in Fall 2018, 19 took the course in Spring 8, and 12 in summer 2018 (59 total). Of these, only 11 were in the M.S. in IT program, the remainder were in the M.S. in Cybersecurity program.  9 of the 11 (81.8%) reported that they were very confident or confident that they had the knowledge to pass one or both of the exams.  The standard was met.
Indirect: Number of graduates who have passed certifications (ITIL, PMP, CISSP, CEH etc.) while in the program or shortly after completing the program.	Professional IT certifications were obtained by at least 50% of graduating students with 90 days of graduation.	A Google form survey was conducted for all existing and recently graduated students to determine their current certification status.	All graduating students from fall 2017 and Spring 2018 were surveyed and 25 responses were received. Of these 24 responses, 11 (44%) reported that they held one or more certifications, taken either during their graduate program or immediately afterwards. Another 4 students (16%) had scheduled the exams and were confident they would pass. (Total 60%)  The standard was met.
Direct: Students confidence in their ability to take and pass the PMP certification exam.	80% of IT students who took the project management course, MSC545, are confident in their ability to take and pass the PMI examination within 90 days of completing the course.	The Chair passed out a questionnaire to students in each of the MSC 545 classes. The questionnaire was completed in class. Students were asked for their confidence level in taking the PMP certification exam.	12 students took MSC545 in fall 2017, 23 students in spring 2018, and 14 in Summer 2018. However, only 30 of these 59 students were in the M.S. in IT program, the remainder were in the M.S. in Cybersecurity. Confidence in passing the PMP exam was examined as a result of the survey. 23 people (76.6 %) felt they would take and expected to pass the PMI exam, based on their success in a mock exam given by the professor at the end of the course.  The standard was not met.

### **Interpretation of Results**

**Describe the extent to which this learning outcomes has been achieved by students** (*Use both direct and indirect measure results*):

Two of the three measures were met. There was generally less confidence in passing the project management exam than the other more technical certifications.

**Briefly describe program strengths and opportunities for improvement relative to assessment of outcome:**

A mock exam is given in the MSC 545 course. However, not enough feedback is given to students on how to improve their knowledge and skills.

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

Students will be given more feedback and given the opportunity to retake a mock exam.

**Learning Outcome 3: Communicate effectively with others, including technologists and managers in the IT field and users and managers in the business context.**

**Assessment Activity**

<b>Outcome Measures</b> <i>Explain how student learning will be measured and indicate whether it is direct or indirect.</i>	<b>Performance Standard</b> <i>Define and explain acceptable level of student performance.</i>	<b>Data Collection</b> <i>Discuss how the data was collected and describe the student population</i>	<b>Analysis</b> <i>1) Describe the analysis process. 2) Present the findings of the analysis including the numbers participating and deemed acceptable.</i>
<p>Direct: Evaluation of communication activities in the requirements definition process of the project in IT510, Requirements Analysis, which is a group project. The process focuses on communication to a non-technical audience such as a business person.</p>	<p>Students rate 70% of the team members as effective or very effective in the communication process on the project in IT510, Requirements Analysis. 8 out of 10 on the rubric (Rubric 3) is considered as effective as this is the first course in the program and students do not know each other.</p>	<p>A questionnaire is given as a confidential evaluation by the student of the team as a whole and each member of the team to assess the communication skills of the team members.</p>	<p>There were 20 students in Fall 2017, 10 students in Spring 2018 and 3 people in Summer 2018 (Total 33) 11 individuals rated their team or at least one of their team members as ineffective or only partially effective in their communications in team work leaving 22 with a positive feeling about their team and its members (66.6 %).</p> <p>The most common complaint was collaborative writing efforts. Too many people left their assignments to the last minute thus minimizing the group revision process.</p> <p>The standard was NOT met.</p>
<p>Indirect: From the Graduating Student Survey, confidence by the graduating students in their ability to give effective presentations and prepare effective written reports</p>	<p>80% of students should feel good or adequate about their written and oral skills on graduating from the program.</p>	<p>Data was collected from the 2017-18 Graduating Student Survey, conducted by the Office of Planning and Institutional Effectiveness in response to the following questions: Develop a coherent written argument Deliver a coherent oral presentation</p>	<p>19 individuals responded to the survey.</p> <p>92.3 % of graduating students felt that they could develop a coherent written argument and the same number felt that they can deliver a coherent oral presentation.</p> <p>This standard was met.</p>
<p>Direct: Performance on a report and presentation in a high-level course towards the end of the program</p>	<p>80% of students should get at least 21 out of 28 in the final report and presentation in the IT Governance and Strategy (IT610) course using Rubric 4</p>	<p>The department chair and one other IT professor read the reports and attended the class presentations. Each student was rated the students using the rubric 4. The students were</p>	<p>9 of 10 (90 %) of student received 21 or more on the assigned rubric.</p> <p>The standard was met.</p>

<b>Outcome Measures</b> <i>Explain how student learning will be measured and indicate whether it is direct or indirect.</i>	<b>Performance Standard</b> <i>Define and explain acceptable level of student performance.</i>	<b>Data Collection</b> <i>Discuss how the data was collected and describe the student population</i>	<b>Analysis</b> <i>1) Describe the analysis process. 2) Present the findings of the analysis including the numbers participating and deemed acceptable.</i>
		randomly chosen based on their scheduled time to present.	

**Interpretation of Results**

**Describe the extent to which this learning outcomes has been achieved by students** *(Use both direct and indirect measure results):*

Two of the three measures were met and it was obvious that communication skills improved through the program. The first semester did present some problems.

**Briefly describe program strengths and opportunities for improvement relative to assessment of outcome:**

There are many opportunities to practice oral and written communication skills throughout the M.S. IT program and this was evidenced by the quality of the written and oral presentations in the IT610 (IT Governance and Strategy) course. However, the first semester needs to be improved.

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

The instructor will instigate a more formal draft and review process for the requirements process to enable students to more fully participate in the deliverable review process.

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