Lawrence Technological University

Assessment Plans with Curriculum Mapping: Graduate Programs

Academic Years: 2019, 2020, 2021

University Assessment Committee

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College of Architecture and Design

BS in Architecture/Master of Architecture

Table 1A: Assessment Plan for the MArch Program (Undergraduate Courses)

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ETHICS	CoAD's MArch Program has defined its supporting Learning Outcomes based on the NAAB 2020 Conditions of Accreditation "Program Criteria" and "Student Criteria" (plus additional NAAB topical sub-criteria). For LTU Undergraduate Ethics: NAAB CoAD SC.2E, Professional Conduct (I scaffolding level) (Typical: Since several courses at various levels contribute to each Learning Outcome above, Bloom's taxonomy information for course-specific Learning Objectives is included under Assessment Strategy details in the Appendix materials.)	For each CoAD Learning Outcome, CoAD has developed a set of scaffolded performance criteria. Level appropriate and course-relevant criteria are distributed to each course in a Canvas Assessment Rubric each semester. Each student is evaluated on each criterion, as "Exceeding Expectations", Meeting Expectations" or "Not Meeting Expectations". Data from all three semesters is compiled into a yearly summary (numeric and graphic) of percentages of Exceeding, Meeting, and Not Meeting for each performance criterion. Performance criteria are reviewed annually to support improvements where needed.	CoAD has established benchmarks for the desired combined percentage of students Meeting/Exceeding Expectations, for each performance criterion (again level-appropriate and course-relevant). A faculty member "Interpreter", designated for each Learning Outcome, evaluates the yearly summary data against the benchmarks, along with commentary from faculty teaching the courses, and reports to the Chair. These reports form the basis of LTU CoAD Assessment Reports. Benchmarks are reviewed annually to support improvements where needed.
LEADERSHIP	Same as above. For LTU Undergraduate Leadership: NAAB CoAD PC.6, Leadership & Collaboration	Same as above.	Same as above.
TEAMWORK	Same as above. For LTU Undergraduate Teamwork: NAAB CoAD PC.6, Leadership & Collaboration	Same as above.	Same as above.
TECHNOLOGY	Same as above. For LTU Undergraduate Technology: NAAB CoAD SC.4A-G: Structural Systems, Environmental Systems, Building Envelope Systems, Materials & Assemblies, Building Services Systems, Building Costs, and Technical Documentation	Same as above.	Same as above.

VISUAL COMMUNICATION	Same as above. For LTU Undergraduate Visual Communication: NAAB CoAD PC.2B Communication & Representation (I & R scaffolding levels)	Same as above.	Same as above.

Table 1B: Assessment Plan for the MArch Program (Graduate Courses)

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE	Same as for Undergraduate Program above. For LTU Graduate Advanced Knowledge: NAAB CoAD PC.5A Research (Methods)	Same as for Undergraduate Program.	Same as for Undergraduate Program.
COMMUNICATION	Same as above. For LTU Graduate Communication: NAAB CoAD PC.5A Research (Communication)	Same as for Undergraduate Program.	Same as for Undergraduate Program.
ETHICS	For LTU Graduate Ethics: NAAB CoAD SC.2E, Professional Conduct (R & E scaffolding level)	Same as for Undergraduate Program.	Same as for Undergraduate Program.
TECHNOLOGY	Same as above. For LTU Graduate Technology: NAAB CoAD PC.2B Communication & Representation (E scaffolding level)	Same as for Undergraduate Program.	Same as for Undergraduate Program.

Table 2: Curriculum Map for the BS Arch/M.Arch

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**		Undergraduate: ETHICS	Undergraduate: LEADERSHIP	Undergraduate: TEAMWORK	Undergraduate: TECHNOLOGY	Undergraduate: VISUAL	Graduate: ADVANCED KNOWLEDGE	Graduate: COMMUNICATION	Graduate: ETHICS	Graduate: TECHNOLOGY
Intro to Design	DES1022		**I**	**I**						
Intro to Vis. Comm.	ARC1213					**I**				(I)
Design Principles	DES1213	(Not used for LTU Assessment)								
Visual Communication	ARC1223					**I**				(I)
Design Methodologies	DES1223						(I)	(I)		
Hist. of Designed Envir. 1	ARC3613	(Not used for LTU Assessment)								
Info. Modeling & Sim.	ARC2813				**I**					
Integrated Design 1	ARC2116	(Not used for LTU Assessment)								
Hist. of Designed Envir. 2	ARC3623	(Not used for LTU Assessment)								
Prototyping & Fabrication	ARC3823	(Not used for LTU Assessment)								
Integrated Design 2	ARC2126					**R**				(R)
Construction Systems 1	ARC2313				**I**					
Basic Structures	ARC2513				**I**					
Integrated Design 3	ARC3116				**I**					
20th Cen. Architecture	ARC4183	(Not used for LTU Assessment)								
Construction Systems 2	ARC2323				**R**					
Intermediate Structures	ARC3513				**R**					
Integrated Design 4	ARC3126	(Not used for LTU Assessment)								
Design Leadership	DES4112	**I**	**I**	**I**					(I)	
Integrated Design 5	ARC4116		**R**	**R**						
Advanced Structures	ARC4543				**E**					
HVAC & Water Systems	ARC3423				**E**					
Acous., Elect., Illum. Sys.	ARC4443				**E**					
Comprehensive Design	ARC4126	(Not used for LTU Assessment)								
Research Methods	ARC5013						**R**	**R**		
Critical Practice	ARC5804		(E)	(E)						
Design Theory	ARC5643	(R)							**R**	
Adv. Design Studio 1	ARC5814					(E)	**E**	**E**		**E**
Thesis 1	ARC6514					(E)	**E**	**E**		**E**
Professional Practice	ARC5913	(E)							**E**	
Ecological Issues	ARC5423	(Not used for LTU Assessment)								
Adv. Design Studio 2	ARC5824					(E)	**E**	**E**		**E**
Thesis 2	ARC6524					(E)	**E**	**E**		**E**

Master of Urban Design

Table 1: Assessment Plan for MUD Program

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will demonstrate the formation and application of advanced urban design concepts, principles, and tools through the exploration of the semester long projects in urban and architectural design.	ARC 5714/24 1. Final studio project 2. Exit Interview	1. 80% of students will participate in design studios and effectively communicate the advanced knowledge they have gained in their final studio project/review, which is evaluated by a consensus rubric. 2. 100% of graduates will participate in an exit interview/alumni survey.
COMMUNICATION	Students will gain specific communication skills to become proficient in the visualization of urban environments.	ARC 5742 Urban Design --Methods --final paper	80% of students will present a comprehensive urban design alternatives scenario in graphic (digital) format, evaluated by consensus rubric.
ETHICS	Students will gain exposure to and knowledge of design ethics in a public sector setting and in the context of the North American regulatory environment.	ARC 5332 Design Ethics -- midterm project	80% of students will successfully demonstrate knowledge on their midterm projects evaluated by a consensus rubric.
TECHNOLOGY	Students will demonstrate the ability to use the latest technologies to collect, analyze and represent data.	ARC5752 Quantitative Methods in Urban Design -- midterm project.	80% of students will successfully demonstrate ability on their midterm projects evaluated by a consensus rubric.

Table 2: Curriculum Map for the M.U.D. Program

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **Σ = Emphasize** **F = Formative** **S = Summative**		COMMUNICATION (WRITTEN, ORAL, VISUAL)	ETHICS	KNOWLEDGE	TECHNOLOGY
Quantitative Methods in Urban Design	ARC5752				**I**
Urban Design Methods	ARC5742	**I**			
History of Urban Form	ARC5682		**I**		
Advanced GIS	ARC5673				**R**
GIS Practicum	ARC5672				**E**
Urban Studio 1 or 2	ARC5714/24			**E**	
Introduction to Community Development	ARC5852	**I**			
Adaptive Reuse & Rehabilitation	ARC5812	**I**			
Public Interest Design	ARC5242		**R**		
Design Ethics	ARC5332		**R**		
Current Issues in Urban Design	ARC5743			**E**	

College of Arts and Sciences

MS in Computer Science

Table 1: Assessment Plan with Course Mapping for MS in Computer Science

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	1. Display a thorough understanding of the theoretical concepts and practical uses of computer science in two concentrations. 2. Demonstrate a sufficient depth of knowledge in a substantive area of computer science to pursue advanced practical work in industry	Direct assessment of student assignments Alumni survey	Level 3 on graduate assignment rubric Level 3 on survey rubric
ETHICS	Be lifelong learners who are able to master new topics required to understand and synthesize solutions to novel problems, based on their technical knowledge of computer science and their ability to think critically.	Evaluation of work in ARI5622 ID	70% of students obtain a grade of B or above
COMMUNICATION	Plan, create and integrate oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding.	Direct assessment of student collaborative research projects	Level 3 on project rubric
TECHNOLOGY	Formulate and analyze technical requirements for new or existing projects	Direct assessment of student collaborative research projects	Level 3 on project rubric

Table 2: Curriculum Map for the MSCS Program

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize**		ADVANCED KNOWLEDGE	COMMUNICATION	ETHICS	TECHNOLOGY			
Algorithm Design & Analysis	MCS 5803	**E**						
Theory of Computation	MCS 5243	**E**						
Artificial Intelligence	MCS 5323	**E**						
Intro to Dist. Computing	MCS 5703	**E**						
Collab 1	MCS 7013		**E**	**E**	**E**			
Collab 2	MCS 7033		**E**	**E**	**E**			

College of Engineering

BS/MS in Architectural Engineering (5-Yr Direct Entry)

Table 1: Assessment Plan for Undergraduate/Graduate Program

Undergraduate/Graduate Program Level Assessment Outcomes	Supporting Program Learning Objective (STUDENT OUTCOMES)	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE (Graduate)	9. assess advanced concepts and principles in the solutions of complex problems to develop a mastery in a specialty area of architectural engineering. 1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	- Evaluation of AE Graduate Project, Presentation and Final Report. - Exit Interviews -Direct assessment using deliverables in graduate level classes EAE 5633 and EAE 5613	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
ETHICS (Undergraduate)	4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	- Direct Assessment in EAE 4022, EAE 4032 and EAE 5613. - May use assessment results from EGE 3022. Work in progress.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
LEADERSHIP (Undergraduate)	5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	- Team evaluations from EAE 1081 - Direct assessment in EAE 3024 - Team evaluations and team leader reflections in EAE 4022 and EAE 4032.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
TEAMWORK (Undergraduate)	5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	- Team evaluations from EAE 1081 - Direct assessment in EAE 3024 - Team evaluations and team leader reflections in EAE 4022 and EAE 4032.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
TECHNOLOGY (Under/Graduate)	1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and	- Direct assessment using deliverables in EAE 3113, EAE 3723, EAE 4633, EAE 4243, EAE 4743. - Direct assessment in EAE 4022, EAE 4032, EAE 4613, EAE 4633, ECE 4243 and ECE 4743. - Direct (formative) assessment in EAE 3113 and ECE 3011. Summative assessment in ECE 3424, ECE 4243 and EAE 6013.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.

	use engineering judgment to draw conclusions. 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	- Direct assessment in EAE 4022, EAE 4032, ECE 3211,ECE 4743,ECE 4753 and EAE6013.	
VISUAL COMMUNICATION (Under/Graduate)	3. an ability to communicate effectively with a range of audiences.	- Direct assessment in EAE 1081, EAE 3014, EAE 3024, EAE 4022, EAE 4032, EAE 5113, EAE 5623, and EAE 6013.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
ENGINEERING KNOWLEDGE (Undergraduate)	1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	- Direct assessment using deliverables in EAE 3113, EAE 3723, EAE 4633, EAE 4243, EAE 4743.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
EXPERIMENTS (Under/Graduate)	6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	- Direct (formative) assessment in EAE 3113 and ECE 3011. Summative assessment in ECE 3424, ECE 4243 and EAE 6013.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
LIFELONG LEARNING (Under/Graduate)	7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	- Direct assessment in EAE 4022, EAE 4032, ECE 3211, ECE 4743, ECE 4753 and EAE 6013.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
DESIGN (Undergraduate)	2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	- Direct assessment in EAE 4022, EAE 4032, EAE 4613, EAE 4633, ECE 4243 and ECE 4743.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.
INTEGRATION (Under/Graduate)	8. an ability to integrate multiple subdisciplines of architectural engineering in design of building elements that work with architectural layout.	- Direct assessment in EAE 3014, EAE 3024, EAE 4032, EAE 5613 and EAE 5653.	- At the time of writing this report, thresholds are still to be determined by the faculty in Spring 2023.

Table 2: Curriculum Map for the MSArE Program

		Fresh	Junior											Senior									Graduate								
Outcome/KPI	**Level**	EAE 1081	EAE 3014	EAE 3024	EAE 3113	EAE 3613	ECE 3011	ECE 3013	ECE 3211	ECE 3213	ECE 3424	ECE 3523	ECE 3723	EAE 4022	EAE 4032	EAE 4113	EAE 4613	EAE 4623	EAE 4633	EAE 4243	EAE 4743	ECE 4753	EAE 5113	EAE 5123	EAE 5613	EAE 5623	EAE 5633	EAE 5653	EAE 6013	ECE 5283	ECE 5703
(SO1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.																															
1a. Identify complex problem in engineering principles.	**L1**				**X (F)**			**X**		**X**			**X (F)**		**X**	**X**			**X (S)**	**X (S)**	**X (S)**	**X**	**X**	**X**	**X (S)**		**X (S)**		**X**	**X**	**X**
1b. Fomulate, using mathematical and scientifc approaches, complex engineering problem.	**L3**				**X (F)**			**X**		**X**	**X**	**X**	**X (F)**			**X**			**X (S)**	**X (S)**	**X (S)**	**X**	**X**	**X**	**X (S)**		**X (S)**		**X**		**X**
1c. Establish a solution strategy using principles of engineering.	**L3**				**X (F)**			**X**		**X**			**X (F)**		**X**	**X**			**X (S)**	**X (S)**	**X (S)**	**X**			**X (S)**		**X (S)**		**X**		**X**
1d. Solve a complex engineering problem by applying appropriate principles of engineering, science, and mathematics.	**L3**				**X (F)**			**X**		**X**	**X**	**X**	**X (F)**		**X**	**X**			**X (S)**	**X (S)**	**X (S)**	**X**			**X (S)**		**X (S)**				**X**
1e. Examine different solution strategies to architectural engineering problems using numerical models.	**L5**																							**X (F/S)**		**X (F/S)**					
(SO2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.																															
2a. Formulate engineering design solutions that meet specified needs.	**L3**		**X**	**X**										**X (F)**	**X (S)**		**X (S)**		**X (S)**	**X (S)**	**X (S)**	**X**						**X**			**X**
2b. Demonstrate public health, safety and welfare considerations in engineering design solutions.	**L3**													**X (F)**	**X (S)**		**X (F)**		**X (F)**		**X (S)**							**X**			
2c. Demonstrate global impact considerations in evaluating engineering design solutions.	**L3**													**X (F)**	**X (S)**		**X (F)**		**X (F)**												
2d. Conduct assessment of environmental issues as impacted by the engineering design solutions.	**L3**		**X**											**X (F)**	**X (S)**		**X (S)**		**X (S)**												
2e. Consider cultural impact factors caused by the engineering design solutions.	**L2**													**X (F)**	**X (S)**		**X (F)**		**X (F)**												
2f. Demonstrate social impact considerations in evaluating engineering design solutions.	**L3**													**X (F)**	**X (S)**		**X (F)**		**X (F)**												
2g. Analyze economic factors in the engineering design solutions.	**L4**									**X (F)**				**X (F)**	**X (S)**		**X (S)**		**X (S)**	**X (S)**											
(SO3) An ability to communicate effectively with a range of audiences.																															
3a. Employ a logical and articulate written communication based on independent design work.	**L3**	**X (F)**												**X (F)**	**X (S)**							**X (S)**			**X (S)**			**X (S)**			**X**
3b. Utilize a detailed written form to communicate the contents of a professional, inclusive, and collaborative team project.	**L3**	**X (F)**												**X (F)**	**X (S)**							**X (S)**			**X (S)**			**X (S)**			
3c. Effectively communicate engineering solutions in the form of oral presentations to a range of audiences.	**L3**	**X (F)**	**X (F)**	**X (F)**										**X (F)**	**X (S)**							**X (S)**			**X (S)**			**X (S)**			**X**
3d. Utilize clear and concise engineering drawings to describe engineering designs for a range of audiences.	**L3**		**X (F)**	**X (S)**																		**X (S)**			**X (S)**			**X (S)**			**X**
3e. Integrate different forms of effective and persuasive communication to explain research results and draw conclusions.	**L5**																					**X (F/S)**			**X (F/S)**			**X (F/S)**			
(SO4) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.																															
4a. Identify the global, economic, environmental, and societal context of an engineering situation.	**L1**													**X (F)**	**X (S)**									**X (S)**							
4b. Describe ethical and professional responsibilities related to an engineering situation.	**L2**													**X (F)**	**X (S)**					**X**				**X (S)**							
4c. Analyze issues in professional ethics in global, economic, environmental, and societal contexts considering the professional code of ethics.	**L4**													**X (F)**	**X (S)**									**X (S)**							
(SO5) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.																															
5a. Contribute to the establishment of goals and work plans for the team.	**L3**	**X (F)**		**X (F)**										**X (F)**	**X (S)**																
5b. Demonstrate a professional attitude in a collaborative team environment.	**L3**	**X (F)**		**X (F)**										**X (F)**	**X (S)**																
5c. Engage in inclusive team environment.	**L4**	**X (F)**	**X**	**X (F)**										**X (F)**	**X (S)**																
5d. Participate in achieving the team's objectives in a timely manner	**L3**	**X (F)**	**X**	**X (F)**										**X (F)**	**X (S)**																
5e. Develop a professional leadership attitude.	**L3**	**X (F)**		**X (F)**										**X (F)**	**X (S)**																
(SO6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.																															
6a. Develop an experimental plan to collect relevant data and addresses appropriate key variables.	**L3**				**X (F)**		**X (F)**				**X (S)**								**X (S)**									**X (S)**	**X**		
6b. Conduct experimental procedure to measure and acquire data on key variables.	**L3**				**X (F)**		**X (F)**				**X (S)**								**X (S)**									**X (S)**			
6c. Analyze experimental data and interpret results for the experimental model	**L4**				**X (F)**		**X (F)**				**X (S)**								**X (S)**									**X (S)**			
6d. Utilize engineering judgement to explain or justify observed differences between experimental measurements and models.	**L5**				**X (F)**		**X (F)**												**X (S)**									**X (S)**			
6e. Draw conclusions based on experimental observations.	**L4**				**X (F)**		**X (F)**												**X (S)**									**X (S)**			
(SO7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.																															
7a. Aquire relevant new technical information, data, and knowledge from multiple sources for the analysis of an engineering topic.	**L2**						**X**		**X (F)**				**X**		**X (S)**	**X (S)**				**X**	**X (S)**	**X (S)**										
7b. Utilize relevant new technical information, data, and knowledge from multiple sources in the design of engineering systems.	**L3**								**X (F)**						**X (S)**	**X (S)**					**X (S)**	**X (S)**										
7c. Implement emerging technologies and equipment in architectural engineering.	**L3**		**X**	**X**			**X**		**X (F)**				**X (F)**		**X (S)**	**X (S)**					**X (S)**	**X (S)**										
7d. Identify knowledge gaps relevant to a research topic.	**L4**																											**X (S)**			
(SO8) An ability to integrate multiple subdisciplines of architectural engineering in design of building elements that work with architectural layout.																															
8a. Demonstrate the integration of mechanical, structural, electrical and lighting systems with the building architecture.	**L3**		**X (F)**	**X (S)**		**X**								**X**	**X (S)**										**X**							
8b. Demonstrate proficiency in software applications to integrate design and construction phases of various engineering systems.	**L3**		**X (F)**	**X (S)**											**X (S)**																
8c. Analyze system design integration between subdisciplines of architectural engineering to optimize system operation with natural energy sources.	**L4**																							**X (S)**			**X (S)**				
(SO9) Assess advanced concepts and principles in the solutions of complex problems to develop a mastery in a specialty area of architectural engineering.																															
9a. Demonstrate knowledge and academic success in a variety of advanced subjects in a subdiscipline of architectural engineering.	**L3**																														
9b. Through a detailed experimental research project, formulate, solve and synthesize results in studying a question related to an architectural engineering subdiscipline.	**L5**																											**X (S)**			
9c. Select appropriate analytical or experimental investigations to research architectural engineering problems.	**L4**																											**X (S)**			

MS in Automotive Engineering

Table 1: Assessment Plan with Mapped Courses for MSAE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Graduate students will analyze, evaluate, and/or develop advanced knowledge in specialized areas in their discipline.	Final oral presentation or written report in EME6373 (Powertrain Systems 1). Use the "Project Elements" rubrics.	75% of the students will score 85% or better.
ETHICS	Graduate students will recognize ethical expectations for dissemination of engineering work and evaluate ethical issues relevant to the impact of advancing technology in their discipline	Mandatory attendance at a minimum of three seminars per semester: EME5XX0 (M.E. Graduate Seminar) Students must submit a one page summary of each seminar. Use the "Graduate Seminar" rubric.	80% of the students will score 85% or better.
COMMUNICATION	Graduate students will analyze, evaluate and create communication consistent with their discipline.	Final oral project presentation in EME5573 (Automotive HVAC 1). Use the "Oral Presentation Evaluation" rubric.	80% of students will score 85% or better.
TECHNOLOGY	Graduate students will analyze, evaluate and/or create technologies consistent with their discipline.	"Understeer Gradient" project in EME5433 (Vehicle Dynamics 1). Use the "Analyze & Interpret" rubric.	80% of the students will score 85% or better.

Master of Civil Engineering/MS in Civil Engineering

Table 1: Assessment Plan with Mapped Courses for the MCE/MSCE Program

Graduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE	(a) *Analyze* a possible solution to a complex problem, question, or issue relevant to civil engineering (b) *Develop* an appropriate design alternative for a complex civil engineering project that considers realistic requirements and constraints. (c) *Integrate* solutions to complex problems that involve multiple specialty areas appropriate to the practice of civil engineering. (d) *Integrate* advanced concepts and principles into the solutions of complex problems in a specialty area appropriate to the practice of civil engineering.	-Direct assessment of assignments or exams in ECE 6743, ECE 5703, ECE 5473, ECE 5523, and ECE 5813. -Evaluation of Thesis and Graduate Project Reports using a rubric.	80% should reach the highest expected achievement level defined in Section 1 for each outcome based on CEBOK3.
COMMUNICATION	(e) *Analyze* effective and persuasive communication to technical and nontechnical audiences.	- Oral Presentation rubrics in various classes per department brochure. - Evaluation of Thesis and Graduate Project Reports using a rubric.	80% should average meet expectations for oral and graphical content
ETHICS	(b) Develop an appropriate design alternative for a complex civil engineering project that considers realistic requirements and constraints. (d) Integrate advanced concepts and principles into the solutions of complex problems in a specialty area appropriate to the practice of civil engineering. (f) Develop new experimental methods and/or integrate the results of multiple experiments for the solution of civil engineering problems.	-Direct assessment of assignments or exams in ECE 6743, ECE 5703, ECE 5433, ECE 5523, and ECE 5813. -Evaluation of Thesis and Graduate Project Reports using a rubric.	80% should reach the highest expected achievement for each outcome based on CEBOK3.
TECHNOLOGY	(d) Integrate advanced concepts and principles into the solutions of complex problems in a specialty area appropriate to the practice of civil engineering. (f) Develop new experimental methods and/or integrate the results of multiple experiments for the solution of civil engineering problems.	-Direct assessment of assignments or exams in ECE 6743, ECE 5703, ECE 5433, ECE 5523, and ECE 5813. -Evaluation of Thesis and Graduate Project Reports using a rubric.	80% should reach the highest expected achievement for each outcome based on CEBOK3.

Table 2: Curriculum Map for the Master of Science in Civil Engineering

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**		ADVANCED KNOWEDLGE	COMMUNICAITON	ETHICS	TECHNOLOGY
ECE5323	Environmental Cleanup				
ECE5333	Air Pollution Control				
ECE5343	Advanced Environmental Engineering				
ECE5353	Environmental Management				
ECE5363	Surface Water Quality Management				
ECE6313	Industrial Water and Wastewater Treatment				
ECE5413	Shallow and Deep Foundation Design				
ECE5423	Geoenvironmental Engineering				
ECE5433	Ground Improvement Methods				
ECE5443	Designing with Geosynthetics				
ECE5473	Earth Retaining Structures	R (S)	R (S)	R (S)	R (S)
ECE6413	Engineering Properties of Soils				
ECE6423	Geotechnical Earthquake Engineering				
ECE5703	Design of Timber Structures	R (S)	R (S)	R (S)	R (S)
ECE5713	Analysis and Design of Prestressed Concrete				
ECE5723	Advanced Analysis and Design of Structures				
ECE5733	Structural Masonry Design				
ECE5753	Advanced Concrete Design				
ECE5763	Advanced Comp. Materials				
ECE5773	Advanced Steel Design				
ECE5783	Bridge Design I				
ECE6723	Structural Design and Analysis for Fire Safety				
ECE6733	Finite Element Analysis for Struct. Engineering				
ECE6743	Structural Dynamics	R (S)	R (S)	R (S)	R (S)
ECE5813	Pavement Analysis and Performance	R (S)	R (S)	R (S)	R (S)
ECE5823	Pavement Management Systems				

ECE5833	Traffic Engineering				
ECE5843	Highway Safety Engineering				
ECE5853	Airport Pavement Design and Management				
ECE5523	River Engineering				
ECE5533	Coastal Engineering				
ECE5543	Design of Stormwater Management Systems				
ECE5553	Ports and Harbors Engineering				
ECE5593	Special Topics in Hydraulic Engineering				
ECE6513	Groundwater Modeling				
ECE5103	Applied Geographic Information Systems				
ECE5113	Sustainable Construction Practices				
ECE6053	Graduate Project				
ECE6083	Thesis II	R (S)	R (S)	R (S)	R (S)
ECE6113	Concrete Engineering				

Master of Construction Engineering Management

Table 1: Assessment Plan for Master of Construction Engineering Management Program

Graduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE	(a) *Integrate* components into a complete project management plan for a complex civil engineering project c) *Develop* practices and requirements to achieve sustainable performance of complex civil engineering projects from a systems perspective.	Direct assessment of assignments or exams in courses listed below: Fall: ECE 5113 Spring: ECE 5223 and ECE 5233 Summer: ECE 5273	80% should reach the highest expected achievement for each outcome based on CEBOK3.
COMMUNICATION	(b) *Analyze* effective and persuasive communication to technical and nontechnical audiences.	Direct assessment of assignments or exams in courses listed below. Oral presentations that are available. Fall: ECE 5113 Spring: ECE 5223 and ECE 5233 Summer: ECE 5273	80% should reach the highest expected achievement based on CEBOK3. 80% should average meet expectations for oral and graphical content
ETHICS	d) Integrate professional responsibilities relevant to the practice of civil engineering, including safety, legal issues, licensure, credentialing, and innovation. e) Analyze ethical dilemmas to determine possible courses of action	Direct assessment of assignments or exams in courses listed below: Fall: ECE 5113 Spring: ECE 5223 and ECE 5233 Summer: ECE 5273	80% should reach the highest expected achievement for each outcome based on CEBOK3.
TECHNOLOGY	(a) Integrate components into a complete project management plan for a complex civil engineering project c) Develop practices and requirements to achieve sustainable performance of complex civil engineering projects from a systems perspective..	Direct assessment of assignments or exams in courses listed below: Fall: ECE 5113 Spring: ECE 5223 and ECE 5233 Summer: ECE 5273	80% should reach the highest expected achievement for each outcome based on CEBOK3.

Table 2: Curriculum Map for the Master of Construction Engineering Management Program

		2022-2023				2023-2024			
LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**		ADVANCED KNOWEDLGE	COMMUNICAITON	ETHICS	TECHNOLOGY	ADVANCED KNOWEDLGE	COMMUNICAITON	ETHICS	TECHNOLOGY
Sustainable Const. Pract.	ECE5113	R (S)	R (S)	R (S)	R (S)				
Tech. of Prj. Plan. + Cont.	ECE5223	R (S)	R (S)	R (S)	R (S)				
Const. Safety Management	ECE5263					R (S)	R (S)	R (S)	R (S)
Conceptual Estimating	ECE5283					R (S)	R (S)	R (S)	R (S)
Const. Quality Man.	ECE5203					R (S)	R (S)	R (S)	R (S)
Prin. of Design-Build	ECE5213					R (S)	R (S)	R (S)	R (S)
Adv. Const. Tec. and Met.	ECE5233	R (S)	R (S)	R (S)	R (S)				
Fund. of Const. Acc.	ECE5243								
Infrastructure Asset Man.	ECE5253								
Construction Law	ECE5273	R (S)	R (S)	R (S)	R (S)				
Risk Management	ECE6223								
Issues in Int. Eng. Man.	ECE6213					R (S)	R (S)	R (S)	R (S)

MS in Electrical and Computer Engineering

Table 1: Assessment Plan with Mapped Courses for the MSECE Program

Graduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE	A. Intellectual curiosity B. Research & scientific approach C. Graduate research report D. Graduate research presentation	EEE5444 Digital Communications EE5654 Digital Signal Processing	70%/70%
COMMUNICATION	A. Produce a publishable document exhibiting MS-level depth/complexity founded on established theory and incorporating suitable background references B. Prepare and deliver graduate level technical talk	EEE5924 Vehicular Communication Systems EEE6144 Smart Grid Communications EEE5924 Vehicular Communication Systems EEE6144 Smart Grid Communications	70%/70%
ETHICS	A. Giving proper credit B. Giving/accepting criticism	EEE5534 Digital Control. EEE5444 Digital Communications	70%/70%.
TECHNOLOGY	A. Apply methods (e.g. simulation, prototyping, numerical solution) or technical tools (e.g. MATLAB, SPICE, VHDL or other programming languages) to make decisions B. Make technologically sound decisions with accurate results, prediction, capability and considerations of future improvement	EEE5924 Vehicular Communication Systems EEE6144 Smart Grid Communications EEE5444 Digital Communications EEE5654 Digital Signal Processing EEE5924 Computer Architecture EEE5924 Vehicular Communication Systems EEE6144 Smart Grid Communications	70%/70%

Table 2: Curriculum Map for MSECE

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**		ADVANCED KNOWLEDGE	COMMUNICATION	ETHICS	TECHNOLOGY
Digital Control	EEE5534		**I(S)**	**E(S)**	**R(F, S)**
Vehicular Communication Systems	EEE5924		**E(F, S)**		**E(F, S)**
Smart Grid Communications	EEE6144		**E(F, S)**		**E(F, S)**
Digital Communications	EEE5444	**E(S)**		**R(S)**	**E(S)**
Digital Signal Processing	EEE5654	**E(S)**			**E(S)**
Computer Architecture	EEE5924				**E(F, S)**

Master of Engineering Management

Table 1: Assessment Plan with Mapped Courses for the MEM Program

LTU Graduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics / Indicators	Administration Timeline	Loop-Closing Timeline
LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.	Understand and solve engineering management problems by selecting and applying appropriate management techniques and tools	Course project evaluation rubric for the course projects of advanced engineering management in supply chain management and enterprise productivity	75% of students receive a score of 70% or higher	Annual	3-year cycle
LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies.	Utilization of Excel, Word, PPT, CANAVAS in coursework and projects Utilization of Minitab in Supply Chain Mgt., Eng. Mgt. & Tech. Mgt. Courses	Software usage evaluation rubric for the selected course projects and assignment contents (EEM 6803, EEM 6753, EEM 6763, EMS 7613.	75% of students receive a score of 70% or higher	Annual	3-year cycle
LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature.	Identify and critically review the scholarly literature relevant to core course projects.	Evaluate scholarly paper review and literature review section of the course projects (EEM 6803, EEM 6753, EEM 6763, EMS 7613	75% of students receive a score of 70% or higher	Annual	3-year cycle
LTU graduates will communicate effectively using written, oral, graphical, and digital formats.	Demonstrate the communication ability to write and present through course project presentations and reports	Project presentation and project written report evaluation rubric	70% of students receive a score of 70% or higher	Annual	3-year cycle
LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.	Analyze and assess these issues	Course project evaluation rubric on ethics / sustainability and Advanced Knowledge	70% of students receive a score of 60% or higher	Annual	3-year cycle

MS in Engineering Quality (formerly MSET)

Table 1: Assessment Plan with Mapped Courses for MSEQ

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	1.Apply advanced knowledge of different technologies	TME6343: Current Issues in Technology TEE6333: Wireless Communication Technology EEE5923: Electric Machines and Transformers	85% of students will score 80% or better on final exam
ETHICS	5.Develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics	Exit Survey	85% of students will score 80% or better on final exam
COMMUNICATION	4.Communicate effectively using written, oral, graphical, and digital formats	TIE5343: Engineering Project Management EEM6583: Enterprise Productivity	85% of students will score 80% or better on final exam
TECHNOLOGY	2. Analyze and interpret information and make decisions using the latest techniques and technologies	TIE5013: Technometrics TME5343: Engineering Project Management	85% of students will score 80% or better on final exam

MS in Industrial Engineering

Table 1: Assessment Plan with Mapped Courses for MSIE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Understand and solve industrial engineering problems by selecting and applying appropriate techniques and tools	Course project evaluation rubric for the course projects of advanced optimization techniques, quality control and simulation	75% score of 3 or higher on 5 point scale.
ETHICS	Analyze and assess ethical issues.	Course project evaluation rubric on ethics / sustainability	75% score of 3 or higher on 5 point scale
COMMUNICATION	Demonstrate the communication ability to write and present through course project presentations and reports	Project presentation and project written report evaluation rubric	75% score of 3 or higher on 5 point scale.
TECHNOLOGY	Utilization of Excel, Word, PPT, Bb in coursework Utilization of Minitab in QC and Simulation Courses Utilization of ARENA Software in Eng. Sys. Simulation Course Utilization of Lindo / Lingo / Solver Software for Optimization	Software usage evaluation rubric for the selected course projects and assignment contents (EME 5603, EME 6403, EME 6653)	75% score of 3 or higher on 5 point scale.

MS in Mechanical Engineering

Table 1: Assessment Plan with Mapped Courses for MS in ME

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Graduate students will analyze, evaluate, and/or develop advanced knowledge in specialized areas in their discipline.	EME5353 Transport Phenomena I EME5223 Advanced Mechanics of Materials OR EME5333 Advanced Dynamics Analysis and evaluation of scholarly literature in specialized areas in Mechanical Engineering, which is scored using a rubric.	80% of students will score 80% or better on technical portions of a common rubric.
ETHICS	Graduate students will recognize ethical expectations for dissemination of engineering work and evaluate ethical issues relevant to the impact of advancing technology in their discipline.	EME6xx0 (under development) Ethics training modules and quiz	All students will complete the required modules
COMMUNICATION	Graduate students will analyze, evaluate and create communication consistent with their discipline.	EME5353 Transport Phenomena I EME5213 Mechanical Vibrations Written report and oral presentation scored using rubrics.	80% of students will score 80% or better on communication portions of a common rubric.
TECHNOLOGY	Graduate students will analyze, evaluate and/or create technologies consistent with their discipline.	EME5363 Transport Phenomena II EME5213 Mechanical Vibrations Analysis and interpretation using an assigned project.	80% of students will score 80% or better on technical portions of a common rubric.

MS in Mechatronics and Robotics Engineering

Table 1: Assessment Plan with Mapped Courses for MSMRE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will learn and apply mechatronic engineering principles and theories.	MRE5323 Exam problem on control system design problem that is scored using a rubric	Using a rubric, 75% of students will score 75% or better on a common control system design problem.
ETHICS	Students will understand the importance of lifelong learning and the professional and ethical responsibilities of the engineering profession.	EME 5323/6183 Mandatory attendance at seminars. Must also submit one page summary of each seminar which is scored using a rubric.	Must attend at least 3 seminars and receive a score of at least 85% for all summaries.
COMMUNICATION	Students will be able to effectively communicate technical information.	MRE 5183/6183 Written report and oral presentation of one of the course projects which is scored using a rubric.	80% of students will score 85% or better for written, oral and graphical communication.
TECHNOLOGY	Students will develop analytical and problem solving skills for mechatronic systems.	MRE 6183 Analysis and interpretation of a peer reviewed technical paper using software which is scored using a rubric.	80% of students will score 85% or better in analysis and interpretation.

PhD in Civil Engineering

Table 1: Assessment Plan for Doctor of Philosophy in Civil Engineering

Graduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Strategy	Metrics/ Indicators
ADVANCED KNOWLEDGE	(a) Assess new experimental methods and/or the results of multiple experiments for the solution of civil engineering problems. (b) Assess advanced concepts and principles in the solutions of complex problems in a specialty area appropriate to the practice of civil engineering.	-Evaluation of Dissertation Proposal and Final Defense using a rubric. -Evaluation of Independent Research Using a Rubric.	85% of graduating students should reach the highest expected achievement level for each outcome as defined in Section 1 based on BOK3.
COMMUNICATION	(c) Integrate different forms of effective and persuasive communication to technical and nontechnical audiences.	-Evaluation of Dissertation Proposal and Final Defense using a rubric	85% of graduating students should reach the highest expected achievement level for each outcome as defined in Section 1 based on BOK3.
ETHICS	(a) Assess new experimental methods and/or the results of multiple experiments for the solution of civil engineering problems. (b) Assess advanced concepts and principles in the solutions of complex problems in a specialty area appropriate to the practice of civil engineering.	-Final defense rubric and exit interview questionnaire.	85% of graduating students should reach the highest expected achievement level for each outcome as defined in Section 1 based on BOK3.
TECHNOLOGY	(a) *Assess* new experimental methods and/or the results of multiple experiments for the solution of civil engineering problems. (b) *Assess* advanced concepts and principles in the solutions of complex problems in a specialty area appropriate to the practice of civil engineering.	-Evaluation of Dissertation Proposal and Final Defense using a rubric. Evaluation of Independent Research Using a Rubric.	85% of graduating students should reach the highest expected achievement level for each outcome as defined in Section 1 based on BOK3.

Table 2: Curriculum Map for the Master of Science in Civil Engineering

		2022-2023			
LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**		ADVANCED KNOWEDLGE	COMMUNICAITON	ETHICS	TECHNOLOGY
ECE7993	Civil Engineering Independent Research	R (S)	R (S)	R (S)	R (S)
DIS8713*	Ph.D in Civil Eng Dissertation	E (S)	E (S)	E (S)	E (S)
DIS8716*	Ph.D in Civil Eng Dissertation	E (S)	E (S)	E (S)	E (S)
DIS8719*	Ph.D in Civil Eng Dissertation	E (S)	E (S)	E (S)	E (S)

*Students collectively take these credits to add up to 36 dissertation credits.
There is no specific number required for each. Students take as many credits each semester that they prefer.

Doctor of Engineering in Mechanical Engineering

Table 1: Assessment Plan for DEME

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will demonstrate a mastery of knowledge and understanding in their chosen sub-discipline specialization within mechanical engineering.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee
ETHICS	Students will understand the importance of lifelong learning and the professional and ethical responsibilities of the engineering profession.	Survey of graduating DEME students	All students must explain the importance of lifelong learning and professional respnosibilities,
COMMUNICATION	Students will be able to effectively document and communicate their research.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee
TECHNOLOGY	Students will be able to identify a topic for research in their chosen sub-discipline specialization within mechanical engineering and formulate a proposal for conducting the research.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee

College of Business and Information Technology

Master of Business Administration

Table 1: Assessment Plan for MBA

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Demonstrate knowledge of core MBA concepts in marketing, management, finance, accounting, and strategic integration.	A comprehensive standardized examination organized into multiple content areas of business knowledge administered to all students in MBA6073.	ETS Major Field Test in MBA. Target scaled score ≥ 1 standard deviation (SD) below the standardized scale mean of the annual comparative data.
ETHICS	(a) Identify the ethical issues implicit in a business situation. (Bloom's 2) (b) Describe and use ethical frameworks application to business situations. (Bloom's 3) (c) Develop a variety of ethical alternatives for resolving or at least addressing a problem in business. (Bloom's 3-4)	Course embedded ethics rubric of assignment in MBA6003, Financial Management; MBA6033, Corporate Finance	Course embedded rubric scored on a 6-point scale, with target mean score = 3.5: 1, 2 = deficient 3, 4 = competent 5, 6 = exemplary
COMMUNICATION	Demonstrate professional-standards in written and oral communication (oral presentations, written essays) by integrating evidence and analysis within a coherent structure. (Bloom's 4)	Course embedded rubric of oral and written presentations in ECN6023, Global Business Economics; MBA6043, Global Leadership	Course embedded rubric scored on a 6-point scale, with target mean score = 3.5: 1, 2 = deficient 3, 4 = competent 5, 6 = exemplary
TECHNOLOGY	(a) Apply technology via media and quality of slides in presentations. (Bloom's 3) (b) Analyze and interpret data using appropriate tools (Bloom's 3)	Course embedded rubric of required oral presentation or online discussion board, and technology rubric in ACC6003, Financial Management; INT6043, Enterprise Information Technology; MBA6043, Global Leadership; MBA6053, Strategic Marketing Management; MBA6063, Operations and Supply Chain Management	Course embedded rubric scored on a 6-point scale, with target mean score = 3.5: 1, 2 = deficient 3, 4 = competent 5, 6 = exemplary

Table 2: Curriculum Map for the MBA Program

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**	Man. Acct. ACC6003	Global Bus Econ ECN6023	Enter Info Tech INT6043	Fin Mgmt MBA6003	Corp Fin (OL) MBA6033	Global Leader (OL) MBA6043	Strat Mkt Mgmt MBA6053	Oper. & Supply Chain Mgmt MBA6063	Global Strat Mgmt Capstone MBA6073
ADVANCED KNOWLEDGE									**E (S)**
ETHICS				**R (F)**	**E (F)**				
WRITTEN/ORAL COMMUNICATION		**R (F)**				**R (F)**			
TECHNOLOGY	**R (F)**		**R (F)**	**R (F)**		**R (F)**	**R (F)**	**R (F)**	

Master of Science in Information Technology

Table 1: Assessment Plan for MSIT

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will demonstrate knowledge of core concepts in information technology.	A comprehensive examination organized into multiple content areas of information technology to all students in INT7593, IT Capstone.	75% of students scoring ≥ 70% on final exam.
ETHICS	(a) Identify the ethical issues implicit in a business situation. (Bloom's 2) (b) Describe and use ethical frameworks application to business situations. (Bloom's 3) (c) Develop a variety of ethical alternatives for resolving or at least addressing a problem in business. (Bloom's 3-4)	Course embedded rubric of required written presentation in INT7223, Enterprise Systems Security	Course embedded rubric scored on a 6-point scale, with target mean score = 3.5: 1, 2 = deficient 3, 4 = competent 5, 6 = exemplary
COMMUNICATION	Demonstrate professional-standards in written and oral communication (oral presentations, written essays) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Course embedded rubric of required oral and written presentations in MBA7063, Project Management; INT6113, Database Models an Administration; INT6123, Systems Analysis and Design	Course embedded rubric scored on a 6-point scale, with target mean score = 3.5: 1, 2 = deficient 3, 4 = competent 5, 6 = exemplary
TECHNOLOGY	(a) Apply technology via media and quality of slides in presentations. (Bloom's 3) (b) Analyze and interpret data using appropriate tools (Bloom's 3)	Course embedded rubric of required oral presentation or online discussion board, and technology rubric in MBA7063, Project Management; INT6113, Database Models an Administration; INT6123, Systems Analysis and Design; INT6143, Enterprise IT Infrastructure.	Course embedded rubric scored on a 6-point scale, with target mean score = 3.5: 1, 2 = deficient 3, 4 = competent 5, 6 = exemplary

Table 2: Curriculum Map for the MSIT Program

LEARNING OUTCOME **I = Introduce** **R = Reinforce** **E = Emphasize** **F = Formative** **S = Summative**	Project Mgmt (OL)	Database Model & Admin (OL)	Systems Anal & Design (OL)	Enter IT Infra-structure	Emerging Tech	Enterprise Systems Security (OL)	Info Tech Integ Capstone
	MBA7063	INT6113	INT6123	INT6143	INT7213	INT7223	INT7593
ADVANCED KNOWLEDGE							**E (S)**
ETHICS						**R (F)**	
WRITTEN/ORAL COMMUNICATION	**R (F)**	**E (F)**	**R (F)**				
TECHNOLOGY	**R (F)**	**R (F)**	**R (F)**	**R (F)**			