Lawrence Technological University

Assessment Plans with Curriculum Mapping: Graduate Programs

2018-2019 Academic Year

University Assessment Committee

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College of Architecture and Design

BS in Architecture/Master of Architecture

Table 1: Assessment Plan for the BS Arch/M.Arch. Graduate classes (red) Primary■ Secondary ■

NAAB 2014 SPC's and LTU Undergraduate (UG) and Graduate Learning Goals	Classes	Assessment Strategy	Metrics	Administration Timeline	Loop-Closing Timeline
NAAB A1. Professional Communication Skills. LTU, (WC 1), OC1 and (CGR)	ARC1012 **ARC2126** **ARC4813**	Direct Assessment (rubrics).Class Assignments, examinations, design project work, documentation, project presentations **(Jones)/ (Ward)**	Mean results for tests Internal & external jury for projects	Annually Fall/Spring as needed	**2018/2020**
NAAB A2. Design Thinking Skills (DSTC, DSE), (EGR)	ARC1012 ARC3116 ARC4116 ARC5814/24 ART1113/23	Direct Assessment (rubrics).Class Assignments, design project work, documentation, class participation.	Mean results for tests Internal & external jury for projects	Annually Fall/Spring as needed	2020-2022
NAAB A.3 Investigative Skills. LTU, CT1, SA1, (AKGR)	ARC2116 ARC5013 ARC5814/24	Direct Assessments(rubrics); projects, analysis studies, assignments, report writing	Mean results on assignments	Annually Fall/Spring as needed	2020-2022
NAAB A4. Architectural Design Skills, LTU: (DSTC) (AKGR)	ARC2116 ARC5804 ART113/33	Direct Assessment (Rubrics).Class Assignments, examinations, design project work, documentation, and class participation.	Mean results for tests, assignments. Internal & Int/Ext. jury for projects	Annually Fall/Spring as needed	2021-2023
NAAB A5. Ordering Skills, LTU ;(DSTC), (DSE), (DSG),	ARC1012 ARC1213 ARC2116 **ARC3126** ART1113/33	Direct Assessment (Rubrics).Class Assignments, examinations, design project work, class participation **(Adhya)**	Mean results for tests Internal & external jury for projects	Annually Fall/Spring as needed	**2019-2021**
NAAB A6. Use of Precedents, LTU: (CT1),	ARC2116 **ARC2323** **ARC3126**	Direct Assessment (Rubrics Class Assignments, examinations, design project work, class participation, cap-stone projects Group projects in research **(Adhya/Ward)**	Mean results for tests Internal & external jury for projects	Annually Fall/Spring as needed	**2019-2021**

NAAB A7. History and Global Culture. LTU WC1 & CT1 NAAB A.8 Cultural Diversity and Social Equity. LTU:CT1 & (EGR)	ARC1012 **ARC36**13/**23** **ARC4813** **ARC4813** ARC4116 ARC6833 ARC5643	Direct Assessment (Rubrics) Class Assignments, examinations, Essays, and class participation. Direct Assessment (Rubrics) Class projects, assignments, examinations, Essays, Papers class participation. **(Gyure)**	Mean results for assignments, exams Mean results for assignments.	Annually Fall/Spring as needed Annually Fall/Spring as Needed.	**2018-2021**
NAAB B.1 Pre-Design, LTU; SA1,,CT1	ARC2116 **ARC2126**	Direct Assessment (rubrics) Soph/Junior level projects. Field projects and case studies Group projects in research **(Jones)**	Internal & external jury for projects. Mean results for assignments.	Annually Fall/Spring as needed	**2019-2022**
NAAB B.2 Site Design. LTU: CT1, and SA1, QR1	ARC2116 **ARC3126**	Direct Assessment (rubrics). Class assignments, examinations, design project work, class participation (**Adhya)**	Mean results of assign-ments. Internal & external jury for group projects.	Annually Fall/Spring as needed	**2019-2021**
NAAB B.3. Codes and Regulations, LTU; CT1, and QR1	ARC2116? **ARC2126** **ARC2313** ARC2323 **ARC4126 lab**	Direct Assessment (rubrics). Cap-stone and senior level projects Field projects and case studies Group projects in research. **(Jones/Ward/Faoro)**	Internal & external jury for group projects Peer evaluation for group projects	Annually Fall/Spring as needed	**2018-2021**
NAAB B4. Technical Documentation: (DSTC), (DSG) .	**ARC2313** ARC2323 **ARC3126** ARC3823	Direct assessment (rubrics) and Indirect Assessments (IPAL Surveys). Cap-stone and senior level projects. Project CD documents/spec, Field projects and case studies (**Ward/Faoro)**	Mean Scores on assignment rubrics IPAL surveys - 2017 only	Annually Fall/Spring as needed	**2018-2021**
NAAB B5. Structural Systems, LTU: QR1, SA1, (DSTC)	**ARC2513** ARC3116 **ARC3513** **ARC4543** **ARC412lab**	Direct Assessment (rubrics). Capstone and senior level lab projects and exams. Faculty: (**Faoro/Shih**)	Mean Scores on assignment rubrics	Annually Fall/Spring as Needed.	2013-2016 **2017-2019**
NAAB B6. Environmental Systems . LTU: (CT1), SA1. (QR1).	**ARC3126**? ARC3423 **ARC4443** **ARC4126lab**	Direct Assessment (rubrics).Group assignments, exams. Group projects in design and research Faculty :Inst. (**Yeom/Faoro/Jones)**	Internal & external jury for group projects Peer evaluation for group projects	Annually Fall/Spring as needed	**2019-2021**
NAAB B7. Building Envelope Systems and Assemblies	**ARC2313**/23 **ARC4126 lab**	Direct Assessment (rubrics). Project assignments, exams. Group/individual	Mean results for tests,	Annually Fall/Spring as	**2018/21**

LTU DS1-2, SA1, (DSTC)	ARC4126lab n	projects in design, and research.. Faculty : (**Ward/Faoro.)**	assignments. Internal & Int/Ext. jury for projects	needed	
NAAB B.8 Building Materials and Assemblies LTU , (SA1), (DSTC)	**ARC2313**/23 ARC3116 **ARC4126 lab**	Direct Assessment (rubrics) Exams, assignments projects and case studies **(Ward/Faoro)**	Internal & external jury for group projects Peer evaluation	Annually Fall/Spring as needed	**2018/21**
NAAB B.9 Building Service Systems: QR1, SA1, DSTC	**ARC2313**/23 **ARC4443** **ARC4126 lab**	Direct Assessment (rubrics). Exams, assignments field projects / case studies**. (Ward/Faoro/Yeom**)	Mean results for exams/assignments, and projects.	Annually Fall/Spring as needed	**2019-2021**
NAAB B10. Financial Considerations QR1 DSL, AKGR	**ARC2323** **ARC5423**	Direct Assessment (rubrics) of assignments Senior level projects. Field projects and case studies Group projects in research (**Ward/Yeom**)	Mean results for exams/assignments, and projects.	Annually Fall/Spring as needed	**2019-2021**
NAAB C1. Research. LTU, (QR1) , (SA1). WC1, DSTC, AKGR, AKE, AKC, TGR	ARC2116 ARC5013 ARC5814/24 ARC5913 **ARC4126**	Direct Assessment (rubrics). Class assignments, examinations, design project work, documentation, and capstone project**. (Faoro**)	Mean results for tests Internal & external jury for projects	.Annually Fall/Spring as needed	**2018-2020**
NAAB C2. Integrated Evalua-tions & Decision-Making Design Process, LTU:DSE, DST (AKGR) (CGR)	**ARC3126** ARC5814/24 **ARC4126**	Direct Assessment (rubrics). Class Assignments, examinations, design project work, documentation, class participation, capstone project. **(Faoro/Adhya)**	Mean results for tests, assignments. Internal & external jury for projects	Annually Fall/Spring as needed	**2018/2020**
NAAB C3. Integrated Design.	ARC3116 **ARC4126**	Direct Assessment (rubrics). Class Assignments, examinations, design project work, documentation, class participation, capstone projects. **(Faoro)**	Mean results for tests, assignments. Internal & external jury for projects	Annually Fall/Spring as needed	**2018/2020**
NAAB D.1 Stakeholder Roles in Architecture,	**ARC3126** **ARC5913**	Direct Assessment (rubrics). Class Assignments, examinations, design project work, documentation, class participation. **(Ward/Adhya)**	Internal & external jury for projects	Annually Fall/Spring as needed	**2018-2021**
NAAB D2. Project Management,	**ARC5913**	Class Assignments, examinations, design project work, class participation. **(Ward)**	CoAD core curriculum courses	Annually Fall/Spring as needed	**2018-2021**

NAAB D3. Business Management. LTU: (WC1), (ERG) , (CGR)	ARC2313 **ARC5913**	Class Assignments, examinations, design project work, class participation. Group projects in research. **(Ward)**	Mean results for tests Internal & external jury for projects.	Annually Fall/Spring as needed	**2018-2021**
NAAB D4. Legal Responsibilities. LTU (CT1) (EGR), (CGR)	**ARC3126** **ARC5913**	Class Assignments, examinations, design project work, class participation, cap-stone projects Group projects in research **(Ward/Adhya)**	Mean results for tests Internal & external jury for projects	Annually Fall/Spring as needed	**2018-2021**
NAAB D5. Professional Conduct. LTU: DSL, DSE, ERG	ARC3126 **ARC5913** ARC5824 ARC5804	Class Assignments, examinations, design project work, class participation, senior level projects Group projects in research. **(Ward)**	Mean results for tests Internal & external jury for projects	Annually Fall/Spring as needed	**2018-2021**

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

Semester	**BS Arch**	Freshman	Fall	Spring		Sophmore	Fall	Spring		Junior	Fall					Senior	Fall			Spring			**M.Arch**	Summer	Fall		Spring		Summer	
Course	ARC1012	ARC1213	ART1113	ARC1223	ART1123	ARC2813	ARC2116	ARC3823	ARC2126	ARC3613	SSC2413	ARC3116	ARC2513	Arc2313	ARC2323	ARC3126	ARC3513	ARC3623	DES4112	ARC4116	ARC4543	ARC3423	ARC4123	ARC4126	ARC4443	ARC5804	ARC5013	ARC5643	ARC5814	ARC5913	ARC5824	ARC5423	ARC6833
NAAB 2014 Criteria	Art and Design Aware	Visual Com 1	Basic Design 1	Visual Com 2	Basic Design 2	Visual Com 3	Integrated Design 1	Visual Com 4	Integrated Design 2	Hist of the Design Env 1	Found of Amer Exp	Integrated Design 3	Basic Structures	Construction Sys 1	Construction Sys 2	Integrated Design 4	Interm Structures	Hist of the Design Env 2	Design Leadership	Integrated Design 5	Advanced Structures	HVAC and Water System	20th Century Arch	Comprehensive Design	Acou/Elec/Illum Syst	Critical Practice Studio	Research Methods	Design Theory	Adv Design Studio 1	Prof Practice 1	Adv Design Studio 2	Ecological Issues	Portfolio Practice
A1		R		R																			R						I				E
A2	R		I		I																								R		E		
A3							R																				R		E		E		
A4			I		I		R																			E							
A5	R	I	I	R	I		R									E																	
A6							I				R			R	R	E																	
A7	I									R								R					I										
A8										R								R		E								E		E			
B1							I		R							R																	
B2							R																										
B3							I		R			I		I							R			E									
B4												I		R	R									R									
B5												I	R				R				E			R									
B6												R												R									
B7												R		R	R							R		R	R								
B8												I												R									
B9																								R									
B10																														E		E	

C1							I									R								R			E		E		E			
C2												R								E				R		R			R		R			
C3												R				R								E										
D1																				I										E				
D2																														E				
D3																														E				
D4																R														E				
D5																			I	R									R	E	R			
WC1	I											I											R							R				
OC1																R	R																	
CT1							I			R								R					R										
QR1									I			I	R	I	R	R	R				E	R		R	R									
SA1							I		I				R	R	R		R				E	R		R	R									
DST C							I					I	R	R	R		R				R	R		R	R									
DSC																																		
DSE																			I	R										E				
DSL																			I	R										E				
DST																																		
DSG		I	R	I	R									E	E																			
AK GR																											E	E		E		E		
EGR																			R								E		E	E	E	E		
CGR																															E			E
TGR																														E	E			

Notes. *All LTU Undergraduate University Level assessment occurs in the core curriculum.*

Key:
I = Introduce, **R** = Reinforce, **E** = Emphasize
University Educational Outcomes
(WC1) 1. Written Communication: LTU graduates will demonstrate professional standards in written communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure.
(OC1) 2. Oral Communication: LTU graduates will demonstrate effectiveness in oral communication through development of content clearly and articulately.
(CT1) 3. Critical Thinking in Humanities: LTU Graduates will demonstrate critical thinking skills in reading complex texts and analyzing arguments.

(QR1) 4. Quantitative Reasoning: LTU graduates will demonstrate Quantitative Reasoning capabilities through applying mathematics and statistical methods to solves problems.
(SA1) 5. Scientific Analysis: LTU graduates will demonstrate proficiency in principles of science and applying it to solve scientific problems.

Discipline-Specific Outcomes
(DSTC) 1.Technology: LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.
(DSE) 2. Ethics: LTU graduates will demonstrate an understanding of ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.
(DSL) 3. Leadership: LTU graduates will demonstrate civic, team, and global leadership skills by identifying a personal leadership philosophy, exhibiting entrepreneurial skills, an becoming agents of positive change.
(DST) 4. Teamwork: LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members contributions.
(DSG) 5. Graphical Communication: LTU graduates will demonstrate a mastery of the graphical communication skills in presenting and reporting professional work.

University-Level Graduate Learning Outcomes:
(AKGR)1. Advanced Knowledge: *Graduate students will analyze, evaluate, and/or develop advanced knowledge in specialized areas via research in their discipline.*
(EGR) 2. Ethics: *Graduate students will evaluate ethical issues, standards, theories and professional practices relevant to leaders in their discipline.*
(CGR) 3. Communication: *Graduate students will analyze, evaluate and create communication consistent with their discipline.*
(TGR) 4. Technology: 4. *Graduate students will analyze, evaluate and/or create technologies consistent with their discipline.*

NAAB 2014 Criteria

II.1.1 Student Performance Criteria (SPC): The NAAB establishes SPC to help accredited degree programs prepare students for the profession while encouraging education practices suited to the individual degree program. The SPC are organized into realms to more easily understand the relationships between each criterion.

Realm A: Critical Thinking and Representation. Graduates from NAAB-accredited programs must be able to build abstract relationships and understand the impact of ideas based on the study and analysis of multiple theoretical, social, political, economic, cultural, and environmental contexts. Graduates must also be able to use a diverse range of skills to think about and convey architectural ideas, including writing, investigating, speaking, drawing, and modeling. Student learning aspirations for this realm include: □ Being broadly educated. □ Valuing lifelong inquisitiveness. □ Communicating graphically in a range of media. □ Assessing evidence. □ Comprehending people, place, and context. □ Recognizing the disparate needs of client, community, and society.

The accredited degree program must demonstrate that each graduate possesses the following:
A.1 Professional Communication Skills: *Ability* to write and speak effectively and use representational media appropriate for both within the profession and with the general public.
A.2 Design Thinking Skills: *Ability* to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test alternative outcomes against relevant criteria and standards.
A.3 Investigative Skills: *Ability* to gather, assess, record, and comparatively evaluate relevant information and performance in order to support conclusions related to a specific project or assignment.
A.4 Architectural Design Skills: *Ability* to effectively use basic formal, organizational and environmental principles and the capacity of each to inform two- and three-dimensional design.

A.5 Ordering Systems: *Ability* to apply the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.
A.6 Use of Precedents: *Ability* to examine and comprehend the fundamental principles present in relevant precedents and to make informed choices about the incorporation of such principles into architecture and urban design projects.
A.7 History and Global Culture: *Understanding* of the parallel and divergent histories of architecture and the cultural norms of a variety of indigenous, vernacular, local, and regional settings in terms of their political, economic, social, ecological, and technological factors.
A.8 Cultural Diversity and Social Equity*: Understanding* of the diverse needs, values, behavioral norms, physical abilities, and social and spatial patterns that characterize different cultures and individuals and the responsibility of the architect to ensure equity of access to sites, buildings, and structures.

Realm B: Building Practices, Technical Skills, and Knowledge. Graduates from NAAB-accredited programs must be able to comprehend the technical aspects of design, systems, and materials and be able to apply that comprehension to architectural solutions. In addition, the impact of such decisions on the environment must be well considered. Student learning aspirations for this realm include; Creating building designs with well-integrated systems. Comprehending constructability. Integrating the principles of environmental stewardship. Conveying technical information accurately

The accredited degree program must demonstrate that each graduate possesses skills in the following areas
B.1 Pre-Design: *Ability* to prepare a comprehensive program for an architectural project that includes an assessment of client and user needs; an inventory of spaces and their requirements; an analysis of site conditions (including existing buildings); a review of the relevant building codes and standards, including relevant Sustainability requirements, and an assessment of their implications for the project; and a definition of site selection and design assessment criteria.
B.2 Site Design: *Ability* to respond to site characteristics, including urban context and developmental patterning, historical fabric, soil, topography, ecology, climate, and building orientation, in the development of a project design.
B.3. Codes and Regulations: *Ability* to design sites, facilities, and systems that are responsive to relevant codes and regulations, and include the principles of life-safety and accessibility standards.
B.4 Technical Documentation: *Ability* to make technically clear drawings, prepare outline specifications, and construct models illustrating and identifying the assembly of materials, systems, and components appropriate for a building design.
B.5 Structural Systems: *Ability* to demonstrate the basic principles of structural systems and their ability to withstand gravitational, seismic, and lateral forces, as well as the selection and application of the appropriate structural system.
B.6 Environmental Systems: *Ability* to demonstrate the principles of environmental systems' design, how design criteria can vary by geographic region, and the tools used for performance assessment. This demonstration must include active and passive heating and cooling, solar geometry, daylighting, natural ventilation, indoor air quality, solar systems, lighting systems, and acoustics.
B.7 Building Envelope Systems and Assemblies: *Understanding* of the basic principles involved in the appropriate selection and application of building envelope systems relative to fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources.
B.8 Building Materials and Assemblies: *Understanding* of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.
B.9 Building Service Systems: *Understanding* of the basic principles and appropriate application and performance of building service systems, including lighting, mechanical, plumbing, electrical, communication, vertical transportation, security, and fire protection systems.
B.10 Financial Considerations: *Understanding* of the fundamentals of building costs, which must include project financing methods and feasibility, construction cost estimating, construction scheduling, operational costs, and life-cycle costs.

Realm C: Integrated Architectural Solutions. Graduates from NAAB-accredited programs must be able to demonstrate that they have the ability to synthesize a wide range of variables into an integrated design solution. Student learning aspirations for this realm include; comprehending the importance of research pursuits to inform the design process. evaluating options and reconciling the implications of design decisions across systems and scales. Synthesizing variables from diverse and complex systems into an integrated architectural solution. responding to environmental stewardship goals across multiple systems for an integrated solution.

The accredited degree program must demonstrate that each graduate possesses skills in the following areas:
C.1 Research: *Understanding* of the theoretical and applied research methodologies and practices used during the design process.
C.2 Integrated Evaluations and Decision-Making Design Process: *Ability* to demonstrate the skills associated with making integrated decisions across multiple systems and variables in the completion of a design project. This demonstration includes problem identification, setting evaluative criteria, analyzing solutions, and predicting the effectiveness of implementation.
C.3 Integrative Design: *Ability* to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental systems, structural systems, and building envelope systems and assemblies.

Realm D: Professional Practice. Graduates from NAAB-accredited programs must understand business principles for the practice of architecture, including management, advocacy, and the need to act legally, ethically, and critically for the good of the client, society, and the public. Student learning aspirations for this realm include; comprehending the business of architecture and construction. Discerning the valuable roles and key players in related disciplines. Understanding a professional code of ethics, as well as legal and professional responsibilities.

The accredited degree program must demonstrate that each graduate possesses skills in the following areas:
D.1 Stakeholder Roles in Architecture: *Understanding* of the relationships among key stakeholders in the design process—client, contractor, architect, user groups, local community—and the architect's role to reconcile stakeholder needs.
D.2 Project Management: *Understanding* of the methods for selecting consultants and assembling teams; identifying work plans, project schedules, and time requirements; and recommending project delivery methods.
D.3 Business Practices: *Understanding* of the basic principles of a firm's business practices, including financial management and business planning, marketing, organization, and entrepreneurship.
D.4 Legal Responsibilities: *Understanding* of the architect's responsibility to the public and the client as determined by regulations and legal considerations involving the practice of architecture and professional service contracts.
D.5 Professional Conduct: *Understanding* of the ethical issues involved in the exercise of professional judgment in architectural design and practice and understanding the role of the NCARB Rules of Conduct and the AIA Code of Ethics in defining professional conduct.

Master of Urban Design

Table 1: Assessment Plan for MUD Program

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
G-1 LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.	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.	Exit interview conducted with each student who petitions to graduate every spring semester.	Every 3 years starting SP14
G-2 LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies.	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.	Each fall semester	Every 2 years starting SP14
G-3 LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature.	Students will understand diverse and emergent issues in urban design and demonstrate knowledge of how current issues in urban design translate to the scale, scope, complexity and governance models of the city, its urbanized region and associated ecosystem.	*ARC5743 Current Issues in Urban Design -- final paper	80% of students will contribute, in their final paper, their own understanding and definitions of at least two current issues in urban design to the discipline and literature evaluated by a consensus rubric.	Each summer semester	Every 2 years starting SU19
G-4 LTU graduates will communicate effectively using written, oral, graphic, and digital formats.	Students will gain specific communi-cation 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.	Each fall semester	Every 2 years starting FA13
G-5 LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and 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.	Each spring semester	Every 2 years starting SP20

Note. *New Courses

Table 2: Curriculum Map for MUD Program

Master of Urban Design Flowchart

Even year (e.g.,Fall 2020)

Semester Courses	Fall **Fall 2020**		Spring **Spring 2021**		Summer **Summer 2021**		Credits
Design Studio	ARC 5714 Urban Studio 1 (hybrid)	4 credits E					4 Credits
Core Theory	ARC 5752 Quantitative Methods in UD (online)	2 credits GIS Cert I	ARC 5682 History of Urban Form (online)	2 credits			4 Credits
Core Practice	ARC 5742 Urban Design Methods (online)	2 credits GIS Cert I	ARC 5673 Advanced GIS (online)	3 credits New crs GIS Cert R	ARC 5672 GIS Practicum (online) ARC 5013 Research Methods (online)	2 credits New crs GIS Cert E 3 credits I	10 Credits
		8 CH		5 CH		5 CH	18 Credits

Odd year (e.g.,Fall 2019)

Semester Courses	Fall **Fall 2019**		Spring **Spring 2020**		Summer **Summer 2020**		Credits
Design Studio			ARC 5724 Urban Studio 2 (hybrid)	4 credits PID Cert E			4 Credits
Core Theory	ARC 5852 Intro Community Development (online)	2 credits New crs PID Cert I	ARC 5242 Public Interest Design (online) ARC 5332 Design Ethics (online)	2 credits PID Cert R 2 credits PID Cert R	ARC 5743 Current Issues in UD (online)	3 credits E	9 Credits
Core Practice	ARC 5xx2 Adaptive Reuse & Rehab (online)	2 credits PID Cert I					2 Credits
		4 CH		8 CH		3 CH	15 Credits

April 2018

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

College of Engineering

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

Table 1: Assessment Plan for Architectural Engineering Undergraduate Courses

Undergraduate Program Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metric/Indicators
KNOWLEDGE	Outcome (a): an ability to apply knowledge of mathematics, science, and engineering Outcome (c): an ability to design a system, component, or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability Outcome (e): an ability to identify, formulate, and solve engineering problems Outcome (k): an ability to use the techniques, skills, and modem engineering tools necessary for engineering practice;	EAE3014: AEIDS 1, Rubric and design drawings, including plans and sections, illustrating compliance with the criteria. EAE3113: ElecSys1, Final Design Project using assignment rubric EAE3613: MechSys1, Exam 3 questions on Psychometrics); Homework 7 assignment on thermodynamics, and refrigeration cycle EAE4014: AEIDS 2, Rubric, graphic research narrative and calculations for a photo-voltaic system EAE4024: AEIDS 3, Graphic and computational solutions to architectural engineering problems EAE4113: ElecSys2, Homework 2 assignment and Midterm Exam questions EAE4613: MechSys2, Questions from Test 1, Test 2, Final Exam and extra credit assignment EAE4623: Acoustics, Final Project Report ECE4743: Concrete Design, Exam 2 had four problems which dealt with calculations of different design systems ECE4753: Steel Design, Exam 1 questions (Problems 3 and 4) on mathematics and interpolations of the formulas	80% of students receive a score of 80% or higher
TECHNOLOGY	Outcome (b): an ability to design & conduct experiments, as well as to analyze & interpret data Outcome (k): an ability to use the techniques, skills, and modem engineering tools necessary for engineering practice;	Same as Knowledge.	80% of students receive a score of 80% or higher
INTEGRATED BUILDINGS	Outcome (l): an ability to integrate building engineering and architectural systems through collaboration and tools to create high-performing solutions	EAE1081: Intro to AE, Homework #3 – AE Systems Homework #5 – 5-year Study Plan, Homework #6 – BIM, IDE, IDP, Group Project 1,2 & 3; Group Presentation EAE3014: AEIDS 1, Rubric, teams design documents by and individual reports to show integration of design criteria EAE3613: MechSys1, Group Design Project using assignment rubric EAE 4014: AEIDS 2	80% of students receive a score of 80% or higher

Undergraduate Program Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metric/Indicators
		Rubric, teams design documents by and individual reports to show integration of design criteria EAE 4613: MechSys2 Questions from Test 1, Test 2, Final Exam and extra credit assignment	
LEADERSHIP	Outcome (h): the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context Outcome (i): a recognition of the need for, and an ability to engage in, lifelong learning	EAE1081: Intro to AE, Homework #7 – Ghafari Essay; Group Project 1,2 & 3, Group Presentation EAE1093: AE History, Final Exam Essay Questions and City Planning Paper EAE3014: AEIDS 1, Rubric and design drawings demonstrating awareness of water and ash wood and its ecologically appropriate use. EAE3113: ElecSys1, Final Design Project using assignment rubric EAE4014: AEIDS 2, Rubric and design drawings demonstrating awareness of economic sufficiency and social context for an urban assembly building. EAE4113: ElecSys2, Problems from Final Exam EAE4613: MechSys2, Questions from Test 1, Test 2, Final Exam and extra credit assignment ECE4743: Concrete Design, First Exam on analyzing a floor system for moment and shear	80% of students receive a score of 80% or higher
VISUAL COMMUNICATION	Outcome (g): an ability to communicate effectively	EAE1081: Intro to AE, Homework # 1 –Personal Paragraph; Homework #4 – ArE Logo Design; Homework #7 – Ghafari Essay; Group Project 1,2 & 3, Group Presentation EAE1093: AE History, Final Exam Essay Questions and City Planning Paper EAE3014: AEIDS 1, Rubric and a set of design drawings illustrating compliance with the criteria EAE4014: AEIDS 2, Rubric and a set of design drawings illustrating compliance with the criteria EAE4024: AEIDS 3, Peer evaluation form and final report shows the collective work of the teams EAE4613: MechSys2, Questions from Test 1, Test 2, Final Exam and extra credit assignment	80% of students receive a score of 80% or higher
TEAMWORK	Outcome (d): an ability to function on multidisciplinary teams	EAE1081: Intro to AE, Homework #7 – Ghafari Essay, Homework #6 – BIM, IPD, IDE, Group Project 3	80% of students receive a

Undergraduate Program Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metric/Indicators
		EAE4014: AEIDS 2, Rubric and design documents to show application of morphological, optics and electrology content. EAE4024: AEIDS 3, Peer evaluation form and final report shows the collective work of the teams EAE4113: ElecSys2, Project 2 Report EAE4623: Acoustics, Final Project Report	score of 80% or higher
ETHICS	Outcome (f): an understanding of professional and ethical responsibility	EAE1081: Intro to AE: Homework #2 - S.O.A.R.; Group Project 1 and 2 EAE3014: AEIDS 1, Rubric and design drawings that demonstrate supportive human and environmental relationships EAE3613: MechSys1, Exam 1 Essay Question EAE 4014: AEIDS 2, Rubric and design drawings that illustrate compliance with criteria EAE4024: AEIDS 3, Final project demonstrates explanations of engineering based building performance goals	80% of students receive a score of 80% or higher

Table 2. Assessment Plan for Architectural Engineering Graduate Courses

Graduate Program Learning Outcomes	Supporting Program Outcomes*	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Outcome (a): an ability to apply knowledge of mathematics, science, and engineering Outcome (j): a knowledge of contemporary issues Outcome (l):an ability to integrate building engineering and architectural systems through collaboration and tools to create high-performing solutions	EAE5014: AEIDS 4, Professional Presentations with rubric completed by IAB EAE5024: AEIDS 5, Final Report with Supporting Documentation & Calculations EAE5113: Adv. Lighting, Final Design Project & Daylighting Experiment EAE5123: AdvElecSys, Homework #4 ECE5283: Conceptual Estimating, Final Estimation Project EME5373: Alt. Energy Eng., Homework #1 (Problem #3); Homework #2; Homework #4; Homework #5 (Problems #4 & #5) EAE5623: Building Controls, Final Design Project ECE5703: Timber Structures, Design Project & Final Exam EME5983: Geothermal, Homework #3	80% should reach the highest expected achievement level for each outcome based on BOK2.
TECHNOLOGY	Outcome (b): an ability to design and conduct experiments, as well as to analyze & interpret data Outcome (c): an ability to design a system, component, or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability Outcome (e): an ability to identify, formulate, and solve engineering problems Outcome (k): an ability to use the techniques, skills, and modem engineering tools necessary for engineering practice;	Same as Advanced Knowledge	80% should reach the highest expected achievement level for each outcome based on BOK2.
COMMUNICATION	Outcome (g): an ability to communicate effectively	EAE5014: AEIDS 4, Professional Presentations with rubric completed by IAB EAE5024: AEIDS 5, Final Report with Supporting Documentation & Calculations EAE5123: AdvElecSys, Projects #1, #2 & #3 ECE5283: Conceptual Estimating, Final Estimation Project EAE5623: Building Controls, Final Design Project ECE5703: Timber Structures, Final Design Project EME 5983: Geothermal, Homework #1, #2, #3; PBL Exercises #1, #2, #3; Special Topics Paper	80% should reach the highest expected achievement level for each outcome based on BOK2.

ETHICS	Outcome (f): an understanding of professional and ethical responsibility Outcome (h): the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context Outcome (i): a recognition of the need for, and an ability to engage in, lifelong learning	EAE5014: AEIDS 4, Professional Presentations with rubric completed by IAB EAE5024: AEIDS 5, Final Report with Supporting Documentation & Calculations, Professional Ethics Essay EAE5123: AdvElecSys, Projects #1, #2 & #3 ECE5283: Conceptual Estimating, Final Estimation Project EME5373: Alt. Energy Eng., Homework #1 (Problems #4 & 5); Homework #5 (Problems #1); Special Topic Papers #1 & #2 ECE5703: Timber Structures, Final Design Project EME5983: Geothermal, Homework #2, PBL Exercises #1, #2, #3, and Special Topic Paper Graduate Exit Interview	Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2.

Table 2.2: Curriculum Map

SPRING 2017 ASSESSMENT DATA		COGNATIVE LEVEL (L) MAPPED TO STUDENT OUTCOMES	STUDENT OUTCOMES (SO)												
			Mathematics, Science, Engineering (a)	*Experiments, Analyze, Interpret Data* (b)	*System, Component, Process Constraints* (c)	*Multi-Disciplinary Teams* (d)	*Identify, Formulate, Solve Engineering* (e)	*Professional & Ethical Responsibility* (f)	*Communicate Effectively* (g)	*Broad Education, Impact in Global,* (h)	*Life Long Learning* (i)	*Contemporary Issues* (j)	*Modern Engineering Tools for Engineering* (k)	*Integrated Building* (l)
LTU CRN	**COURSE**	**HIGHEST (L)**	**SOs ACHIEVED RANKING (R) FROM SUMMARY FORMS**											
3509	EAE 1093: AE History	**L1**							R4	R4				
		L2												
		L3												
		L4												
		L5												
		L6												
3511	EAE 3613: Mech. Sys. 1	L1						**R3**						
		L2		**R3**	**R3**		R4							R4
		L3	R4											
		L4												
		L5												
		L6												
3512	EAE 3016: AEIDS 1	L1												
		L2	R5		R5		R4	R4		R4		R4	R5	R5
		L3							R4					
		L4												
		L5												
		L6												
3072	ECE 5213: Const. Proj. Mgmt.	L1												
		L2												
		L3										**R3**		
		L4					**R3**						**R3**	

SPRING 2017 ASSESSMENT DATA		COGNATIVE LEVEL (L) MAPPED TO STUDENT OUTCOMES	STUDENT OUTCOMES (SO)											
			Mathematics, Science, Engineering (a)	*Experiments, Analyze, Interpret Data* (b)	*System, Component, Process Constraints* (c)	*Multi-Disciplinary Teams* (d)	*Identify, Formulate, Solve Engineering* (e)	*Professional & Ethical Responsibility* (f)	*Communicate Effectively* (g)	*Broad Education, Impact in Global,* (h)	*Life Long Learning* (i)	*Contemporary Issues* (j)	*Modern Engineering Tools for Engineering* (k)	*Integrated Building* (l)
LTU CRN	**COURSE**	**HIGHEST (L)**	**SOs ACHIEVED RANKING (R) FROM SUMMARY FORMS**											
		L5												
		L6												
1050	ECE 4743: Concrete	L1												
		L2												
		L3					R4						R4	
		L4								R4				
		L5			R4									
		L6												
2218	ECE 4753: Steel Design	L1												
		L2												
		L3	**R3**											
		L4			R4		**R3**							
		L5												
		L6												
3513	EAE 4623: Mech. Sys. 2	L1												
		L2			R4		R4		R4		R4	R4		R4
		L3											R4	
		L4												
		L5												
		L6												
3514	EAE 4026: Acoustics	L1												
		L2			R4	R4								
		L3	R4				R4						R4	

SPRING 2017 ASSESSMENT DATA		COGNATIVE LEVEL (L) MAPPED TO STUDENT OUTCOMES	STUDENT OUTCOMES (SO)											
			Mathematics, Science, Engineering (a)	*Experiments, Analyze, Interpret Data* (b)	*System, Component, Process Constraints* (c)	*Multi-Disciplinary Teams* (d)	*Identify, Formulate, Solve Engineering* (e)	*Professional & Ethical Responsibility* (f)	*Communicate Effectively* (g)	*Broad Education, Impact in Global,* (h)	*Life Long Learning* (i)	*Contemporary Issues* (j)	*Modern Engineering Tools for Engineering* (k)	*Integrated Building* (l)
LTU CRN	**COURSE**	**HIGHEST (L)**	**SOs ACHIEVED RANKING (R) FROM SUMMARY FORMS**											
		L4		R4										
		L5												
		L6												
3515	EAE 4026: AEIDS 3	L1												
		L2												
		L3						**R3**				**R3**		
		L4	R4	**R3**	R4	R4	R4		R4	R4			R4	R4
		L5												
		L6												
4703	ECE 5283: Conceptual Estimating	L1												
		L2												
		L3						R4						
		L4			R4		R4		R4	R4		R4	R4	
		L5												
		L6												
4581	ECE 5703: Timber Structures	L1												
		L2												
		L3				R4		R4		R4				
		L4							R5			R4		
		L5	R5		R5		R5						R5	
		L6												
4542	EAE 5623: Building Controls	L1												
		L2												

SPRING 2017 ASSESSMENT DATA		COGNATIVE LEVEL (L) MAPPED TO STUDENT OUTCOMES	STUDENT OUTCOMES (SO)											
			Mathematics, Science, Engineering (a)	*Experiments, Analyze, Interpret Data* (b)	*System, Component, Process Constraints* (c)	*Multi-Disciplinary Teams* (d)	*Identify, Formulate, Solve Engineering* (e)	*Professional & Ethical Responsibility* (f)	*Communicate Effectively* (g)	*Broad Education, Impact in Global,* (h)	*Life Long Learning* (i)	*Contemporary Issues* (j)	*Modern Engineering Tools for Engineering* (k)	*Integrated Building* (l)
LTU CRN	**COURSE**	**HIGHEST (L)**	**SOs ACHIEVED RANKING (R) FROM SUMMARY FORMS**											
		L3	**R3**									R4		
		L4					**R3**		R4					
		L5			**R3**								R4	
		L6												
4543	EAE 5123: Adv. Elec. Sys.	L1												
		L2												
		L3									R4			
		L4			R5		R5		R4	**R3**		R4		
		L5	R5	R4				R5					R5	R4
		L6												
4406	EAE 5024: AEIDS 5	L1												
		L2												
		L3										R5	R5	
		L4	R5				R5	R5						
		L5			R5	R4				R5				
		L6							R4					R5

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	Demonstrate the ability to understand and analyze a problem by applying science, math and engineering principles to interpret data; to develop advanced knowledge to design mechanical components and systems and to recommend design changes; to verify calculations and support assumptions and recommendations.	Major design problem in EME6353 (Automotive Mechanical Systems), (e.g., brake drum crack; or final drive gear box and axle housing crack.) Use the "Developing Advanced Knowledge" rubric.	75% of the students will score 85% or better.
ETHICS	Understand professional and ethical responsibilities of engineers, the impact of engineering solutions in a global and societal context, be aware of contemporary issues, and recognize the need for life-long learning.	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	Demonstrate the ability to produce effective oral communications.	Final oral project presentation in EME6623 (Automotive Control Systems1). Use the "Oral Presentation Evaluation" rubric.	80% of students will score 85% of better.
TECHNOLOGY	Demonstrate the ability to take the collected data, understand them and plot them correctly, producing effective written communication (graphical format); to conduct understeer analysis; to summarize the understeer behavior of various vehicles and compare them insightfully.	"Understeer Gradient" project in EME5433 (Vehicle Dynamics 1). Use the "Analyze & Interpret" rubric.	80% of the students will score 85% of better.

Master of Civil Engineering/MS in Civil Engineering

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

University Graduate Learning Outcomes	Supporting Program Outcomes	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	(a) *Formulate* and *solve* ill-defined engineering problem appropriate to civil engineering by selecting and applying appropriate techniques and tools (c) *Analyze* a complex system or process in a traditional or emerging specialized technical area appropriate to civil engineering (d) *Design* a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering (f) *Evaluate* the design of a complex system or process, or evaluate the validity of newly-created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Direct assessment of assignments or exams in ECE 5713, ECE 5833, ECE 5323, ECE 5473, ECE 5733, ECE 5843, ECE 5543 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 BOK2.
ETHICS	(d) *Design* a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering (f) *Evaluate* the design of a complex system or process, or *evaluate* the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Exit Interview	Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2.
COMMUNICATION	(e) *Plan, compose and integrate* the verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences	Oral Presentation rubrics in various classes per department brochure. Evaluation of Thesis and Graduate Project Reports using a rubric.	80% should reach the highest expected achievement level for each outcome based on BOK2.
TECHNOLOGY	(b) *Apply* specialized tools or technologies to solve problems in a traditional or emerging specialized technical area appropriate to civil engineering	Direct assessment of assignments or exams in ECE 5713, ECE 5833, ECE 5323, ECE 5473, ECE 5733, ECE 5843, ECE 5543 and ECE 5813.	80% should reach the highest expected achievement level for each outcome based on BOK2.

Master of Construction Engineering Management

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

University Graduate Learning Outcomes	Supporting Program Outcomes	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	(a) *Create* appropriate processes, subsidiary plans and contract documents for incorporation into the project management plan (c) *Apply* techniques to simple public policy problems related to civil engineering projects (e) *Apply* business and public administration concepts and process	Direct assessment of assignments or exams in ECE 5263, ECE 5223, ECE 6213, ECE 5273 and ECE 5203.	80% should reach the highest expected achievement level for each outcome based on BOK2.
ETHICS	(d) *Synthesize* case studies, experiences and lessons learned to cultivate professional and ethical conduct	Exit Interview	Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2.
COMMUNICATION	(b) *Plan, compose* and *integrate* the verbal, written, virtual and graphical components of a project and communicate them to technical and non-technical audiences (d) *Synthesize* case studies, experiences and lessons learned to cultivate professional and ethical conduct	Direct assessment of assignments or exams in ECE 5263, ECE 5223, ECE 6213, ECE 5273 and ECE 5203. Oral Presentation rubrics as available.	80% should reach the highest expected achievement level for each outcome based on BOK2.
TECHNOLOGY	(a) *Create* appropriate processes, subsidiary plans and contract documents for incorporation into the project management plan (c) *Apply* techniques to simple public policy problems related to civil engineering projects (e) *Apply* business and public administration concepts and process	Direct assessment of assignments or exams in ECE 5263, ECE 5223, ECE 6213, ECE 5273 and ECE 5203.	80% should reach the highest expected achievement level for each outcome based on BOK2.

MS in Electrical and Computer Engineering

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

University Graduate Learning Outcomes	Supporting Program Outcomes	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will apply, analyze and evaluate advanced knowledge in their discipline through course work and research	Term Project in EEE6144 Smart Grid Communications	80% of students receive a score of 80% or higher
ETHICS	Students will analyze ethical issues, standards, theories and practices relevant to leadership in their discipline	Project in EEE5534 Digital Control Systems	80% of students receive a score of 80% or higher
COMMUNICATION	Students will analyze and create communication documents and presentations	Project in EEE5534 Digital Control Systems Term Project in EEE5924 Vehicular Communication Systems	80% of students receive a score of 80% or higher
TECHNOLOGY	(a) *Create* appropriate processes, subsidiary plans and contract documents for incorporation into the project management plan (c) *Apply* techniques to simple public policy problems related to civil engineering projects (e) *Apply* business and public administration concepts and process	Project in EEE5314 Power electronics; Project in EEE5924 Advanced Computer Architecture; Term Project in EEE5654 Digital Signal Processing	80% of students receive a score of 80% or higher

Master of Engineering Management

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

University Graduate Learning Outcomes	Supporting Program Outcomes	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will learn and apply advanced engineering management principles and theories.	EEM 6753 Engineering Supply Chain management Evaluation of a relevant peer reviewed technical paper which is scored using a rubric.	80% of students will score 85% or better on the Assignment
ETHICS	Students will understand the importance of ethical responsibilities of the engineering profession.	EEM 6763 Quality Engineering Systems Ethics test will be administered	80% of students will score 85% or better on the ethics test
COMMUNICATION	Students will be able to effectively communicate technical information.	EEM 6803 Engineering Management Written report and oral presentation of a peer reviewed paper in management which is scored using a rubric.	80% of students will score 85% or better for written, oral and graphical communication.
TECHNOLOGY	Students will be able to demonstrate the use of modern software and tools to solve problems in the discipline	EEM 7613 Technology Management Analysis and interpretation, using an assigned technology management project.	80% of students will score 85% or better in the application of technology assignment

MS in Engineering Technology

Table 1: Assessment Plan with Mapped Courses for MSET

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 via research in their discipline.	MRE 5323 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	Graduate students will evaluate ethical issues, standards, theories and professional practices relevant to leaders in their discipline.	Options for an assessment tool will be evaluated during AY 2019-2020	
COMMUNICATION	Graduate students will *analyze, evaluate* and create communication consistent with their discipline.	MRE 6183 Evaluation of a peer reviewed technical paper that is scored using a rubric.	Using a rubric, 75% of students will score 75% or better for their overall evaluation.
TECHNOLOGY	Graduate students will analyze, evaluate and *create* communication consistent with their discipline.	MRE 5183, MRE 6183 Written report and oral presentation of course project that is scored using a rubric.	Using rubrics, 75% of students will score 75% or better for written and oral communication.

MS in Mechatronic Systems Engineering

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

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.	MSE 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.	MSE 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 with Mapped Courses for PhD in Civil Engineering

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Evaluation of Dissertation Proposal and Final Defense using a rubric Performance in ECE 7993 Independent Research is assessed	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.
ETHICS	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Exit Interview	Exit interview survey, 85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.
COMMUNICATION	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering (c) *Plan*, compose and integrate the verbal, written, virtual, and graphical communication of a project to technical and non- technical audiences	Evaluation of Dissertation Proposal and Final Defense using a rubric Performance in ECE 7993 Independent Research is assessed	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.
TECHNOLOGY	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Evaluation of Dissertation Proposal and Final Defense using a rubric Performance in ECE 7993 Independent Research is assessed	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.

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

Doctor of Engineering in Manufacturing Systems

Table 1: Assessment Plan for DEMS

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators
ADVANCED KNOWLEDGE	Students will demonstrate a mastery of knowledge and understanding of manufacturing systems.	Dissertation Final Defense Score with a rubric. (item #7)	Student will receive at least "Acceptable" rating from all committee members
ETHICS	Students will understand the importance of lifelong learning and the professional responsibilities of the engineering profession.	Exit survey of graduating DEMS students	All students will be able to explain the importance of lifelong learning and professional responsibilities
COMMUNICATION	Students will be able to effectively document and communicate their work.	Dissertation Final Defense Score with a rubric. (items #2, #6)	Student will receive at least "Acceptable" rating from all committee members
TECHNOLOGY	Students will provide a plan, including the methods/tools, for solving their problem and conducting their research.	Dissertation Final Defense Score with a rubric. (item #4)	Student will receive at least "Acceptable" rating from all committee members

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)**			