

Lawrence Technological University  
Assessment Plans with Curriculum Mapping: Undergraduate Programs  
2018-2019 Academic Year  
University Assessment Committee



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## Core Curriculum

**Table 1: Assessment Plan with Mapped Courses for the Core Curriculum**

Undergraduate University Level Assessment Outcomes	Assessment Strategy	Academic Unit	Courses and Metrics	Administration Timeline	Loop-Closing Timeline
<b>WRITTEN COMMUNICATION</b> “LTU undergraduates who complete the core curriculum will demonstrate professional standards in written communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure.”	5-point course embedded rubric on three Written Communication performance indicators: <u>Style</u> (construct original arguments that they support with evidence), <u>Grammar</u> (produce prose that satisfies conventions of formal, academic writing), <u>Citations</u> (provide citations that fulfill discipline requirements)	HSSC Department	Minimum score of 3 on all performance indicators on final papers in COM1103, LLT1213, LLT1223, SSC2413, SSC2423	Annual Rotation A: COM1103 B: LLT1213/1223 C: SSC2413/2423	A: 2018 B: 2019 C: 2020
<b>ORAL COMMUNICATION</b> “LTU undergraduates who complete the core curriculum will demonstrate effectiveness in oral communication through development of content clearly and articulately.”	5-point course embedded rubric on three Oral Communication performance indicators: <u>Structure</u> (understand the conventions of effective nonverbal communication), <u>Content</u> (understand relevant rhetorical strategies), <u>Delivery</u> (deliver content clearly and articulately)	HSSC Department	Minimum score of 3 on all performance indicators on oral presentation in COM2103	Annual	Annual
<b>CRITICAL THINKING</b> “LTU undergraduates who complete the core curriculum will demonstrate critical thinking skills in reading complex texts and analyzing arguments.”	5-point course embedded rubric on three Critical Thinking performance indicators: <u>Thesis</u> (demonstrate an understanding of historical and aesthetic periods and their impact on human thought), <u>Argument</u> (construct arguments using primary and secondary sources), <u>Course Materials</u> (perform close reading of complex texts)	HSSC Department	Minimum score of 3 on all performance indicators on final papers in COM1103, LLT1213, LLT1223, SSC2413, SSC2423	Annual Rotation A: COM1103 B: LLT1213/1223 C: SSC2413/2423	A: 2018 B: 2019 C: 2020
<b>QUANTITATIVE REASONING</b> “LTU undergraduates who complete the core curriculum will demonstrate Quantitative Reasoning capabilities through applying mathematics and statistical methods to solve problems.”	Direct assessment of three performance indicators using final exam questions: <u>PI-1</u> , Apply arithmetic, algebraic, geometric, technological, or statistical methods to solve problems; <u>PI-2</u> , Represent mathematical concepts verbally, and, where appropriate, symbolically, visually, and numerically; and <u>PI-3</u> , Interpret mathematical models given verbally, or by formulas, graphs, tables, or schematics, and draw inferences from them.	Mathematics + Computer Sciences Department	Score on final exam problems $\geq 70\%$ in MCS1074, MCS1414, MCS1424, and MCS1254	Annual	Annual
<b>SCIENTIFIC ANALYSIS</b> “LTU undergraduates who complete the core curriculum will demonstrate proficiency in principles of science and applying it to solve scientific problems.”	Direct assessment of two performance indicators using selected laboratory assignments: <u>PI-1</u> , Students will apply elements of the scientific method via observation and experimentation; and <u>PI-2</u> , Students will analyze natural sciences concepts and/or problems.	Natural Sciences Department	70% of students scoring 70% or better in BIO2321, PHY2221/2421, and PHY2231/2431	Annual	Annual

## 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 <b>ARC3613/23</b> <b>ARC4813</b> ARC4116 <b>ARC6833</b> <b>ARC5643</b>	Direct Assessment (Rubrics) Class Assignments, examinations, Essays, and class participation. Direct Assessment (Rubrics) Class projects, assignments, examinations, Essays, Papers class participation. <b>(Gyure)</b>	Mean results for assignments, exams  Mean results for assignments.	Annually Fall/Spring as needed Annually Fall/Spring as Needed.	<b>2018-2021</b>
NAAB B.1 Pre-Design, LTU; SA1,,CT1	<b>ARC2116</b> <b>ARC2126</b>	Direct Assessment (rubrics) Soph/Junior level projects. Field projects and case studies Group projects in research <b>(Jones)</b>	Internal & external jury for projects. Mean results for assignments.	Annually Fall/Spring as needed	<b>2019-2022</b>
NAAB B.2 Site Design. LTU: CT1, and SA1, QR1	ARC2116 <b>ARC3126</b>	Direct Assessment (rubrics). Class assignments, examinations, design project work, class participation <b>(Adhya)</b>	Mean results of assignments. Internal & external jury for group projects.	Annually Fall/Spring as needed	<b>2019-2021</b>
NAAB B.3. Codes and Regulations, LTU; CT1, and QR1	ARC2116? <b>ARC2126</b> <b>ARC2313</b> ARC2323 <b>ARC4126 lab</b>	Direct Assessment (rubrics). Cap-stone and senior level projects Field projects and case studies Group projects in research. <b>(Jones/Ward/Faoro)</b>	Internal & external jury for group projects Peer evaluation for group projects	Annually Fall/Spring as needed	<b>2018-2021</b>
NAAB B4. Technical Documentation: (DSTC), (DSG) .	<b>ARC2313</b> ARC2323 <b>ARC3126</b> <b>ARC3823</b>	Direct assessment (rubrics) and Indirect Assessments (IPAL Surveys). Cap-stone and senior level projects. Project CD documents/spec, Field projects and case studies <b>(Ward/Faoro)</b>	Mean Scores on assignment rubrics IPAL surveys - 2017 only	Annually Fall/Spring as needed	<b>2018-2021</b>
NAAB B5. Structural Systems, LTU: QR1, SA1, (DSTC)	<b>ARC2513</b> <b>ARC3116</b> <b>ARC3513</b> <b>ARC4543</b> <b>ARC412lab</b>	Direct Assessment (rubrics). Capstone and senior level lab projects and exams. Faculty: <b>(Faoro/Shih)</b>	Mean Scores on assignment rubrics	Annually Fall/Spring as Needed.	2013-2016 <b>2017-2019</b>
NAAB B6. Environmental Systems . LTU: (CT1), SA1. (QR1).	<b>ARC3126?</b> ARC3423 <b>ARC4443</b> <b>ARC4126lab</b>	Direct Assessment (rubrics).Group assignments, exams. Group projects in design and research Faculty :Inst. <b>(Yeom/Faoro/Jones)</b>	Internal & external jury for group projects Peer evaluation for group projects	Annually Fall/Spring as needed	<b>2019-2021</b>
NAAB B7. Building Envelope Systems and Assemblies	<b>ARC2313/23</b> <b>ARC4126 lab</b>	Direct Assessment (rubrics). Project assignments, exams. Group/individual	Mean results for tests,	Annually Fall/Spring as	<b>2018/21</b>

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

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

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



**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 solve 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, and 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:** 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.

*BFA in Game Art***Table 1: Assessment Plan with Mapped Courses for B.F.A. in Game Art**

LTU Undergraduate Program Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators
<u>TECHNOLOGY</u>	VIII.B.3 X.A.4.a X.A.4.b IX.A.3.a  IX.A.3.b IX.A.3.c  IX.A.3.d  IX.A.3.e  IX.A.3.f IX.A.3.g	Digital Foundations, New Media Digital Foundations, New Media New Media, Senior Project 2 3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2, Senior Project 1, Senior Project 2 3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2 Game Design, Integrated Game Studio I, Integrated Game Studio 2, Senior Project 1, Senior Project 2 Game Design, Integrated Game Studio I, Integrated Game Studio 2, 2D Animation 1, 2D Animation 2 3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2 History of Game Design, Game Design, Senior Seminar 1, Senior Seminar 2 Game Design, Integrated Game Studio I, Integrated Game Studio 2, Intro to Computer Games & Animation	70% of students scoring 80% or better
<u>ETHICS</u>	X.A.3.a  X.A.3.b IX.A.3.e  IX.A.3.f IX.A.3.g technicians, etc.).	3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2, Senior Project 1, Senior Project 2 2D Animation 2, History of Game Design 3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2 History of Game Design, Game Design, Senior Seminar 1, Senior Seminar 2 Game Design, Integrated Game Studio I, Integrated Game Studio 2, Intro to Computer Games & Animation	70% of students receive a score of 70% or higher
<u>LEADERSHIP</u>	IX.A.3.e	3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2	70% of students scoring 80% or better
<u>TEAMWORK</u>	IX.A.3.e  IX.A.3.g	3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2 Game Design, Integrated Game Studio I, Integrated Game Studio 2, Intro to Computer Games & Animation	70% of students scoring 80% or better

<b><u>VISUAL COMMUNICATION</u></b>	VIII.B.2.b	Design Principles, 2D Animation 1	70% of students scoring 80% or better
	IX.A.3.a	3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2, Senior Project 1, Senior Project 2	
	IX.A.3.b	3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2	
	IX.A.3.c	Game Design, Integrated Game Studio I, Integrated Game Studio 2, Senior Project 1, Senior Project 2	
	IX.A.3.d	Game Design, Integrated Game Studio I, Integrated Game Studio 2, 2D Animation 1, 2D Animation 2	
	IX.A.3.e	3D Animation 1, 3D Animation 2, 2D Animation 1, 2D Animation 2, Integrated Game Studio I, Integrated Game Studio 2	
	IX.A.3.f IX.A.3.g	History of Game Design, Game Design, Senior Seminar 1, Senior Seminar 2 Game Design, Integrated Game Studio I, Integrated Game Studio 2, Intro to Computer Games & Animation	

*Note.* N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design curriculum:

### **TECHNOLOGY**

N.A.S.A.D. Outcome **VIII.B.3:** Students must acquire a working knowledge of technologies and equipment applicable to their area(s) of specialization.

N.A.S.A.D. Outcome **X.A.4.a:** *Learn how to learn technology.* Because change will be a constant, students' technological studies and experiences need to prepare them to learn new technologies on an ongoing basis.

N.A.S.A.D. Outcome **X.A.4.b:** *Make critical choices among different technologies.* Through various curricular studies and experiences, students are expected to become critical users of technology, able to match technological choices to specific problems and their respective contexts.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **ETHICS**

N.A.S.A.D. Outcome **X.A.3.a:** Choose and apply research and other methods for understanding potential users' wants, needs, and patterns of behavior

N.A.S.A.D. Outcome **X.A.3.b:** Recognize social, cultural, and perspective differences on scales ranging from individual to global.

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f**: Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g**: Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

#### **LEADERSHIP**

N.A.S.A.D. Outcome **IX.A.3.e**: Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

#### **TEAMWORK**

N.A.S.A.D. Outcome **IX.A.3.e**: Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.g**: Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

#### **VISUAL COMMUNICATION**

N.A.S.A.D. Outcome **VIII.B.2.b**: Develop an understanding of the common elements and vocabulary of art/design and of the interaction of these elements, and be able to employ this knowledge in analysis.

N.A.S.A.D. Outcome **IX.A.3.a**: Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b**: Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c**: Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d**: Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e**: Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f**: Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g**: Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

## BFA in Graphic Design

**Table 1: Assessment Plan with Mapped Courses for B.F.A. in Game Art**

LTU Undergraduate Program Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators
<u>TECHNOLOGY</u>	VIII.B.3 X.A.4.a X.A.4.b X.C.3.e.1 X.C.3.e.2 X.C.3.e.3 X.C.3.e.4	Digital Foundations, New Media Digital Foundations, New Media Digital Foundations, New Media Digital Foundations, New Media Digital Foundations, New Media; New Media, Senior Thesis 2 Digital Foundations; Senior Thesis 2	70% of students scoring 80% or better
<u>ETHICS</u>	X.A.3.a X.A.3.b X.C.3.c.1 X.C.3.c.3 X.C.3.g	New Media, Graphic Design 4 Graphic Design 3, Graphic Design 4 Graphic Design 3, Graphic Design 4 Graphic Design 2; Senior Thesis 2 Digital Foundations, Graphic Design 2	70% of students receive a score of 70% or higher
<u>LEADERSHIP</u>	X.C.3.h	Graphic Design 3, Internship	70% of students scoring 80% or better
<u>TEAMWORK</u>	X.C.3.d X.C.3.h	New Media, Senior Thesis 2 Graphic Design 3, Internship	70% of students scoring 80% or better
<u>VISUAL COMMUNICATION</u>	VIII.B.2.b X.C.3.b.1 X.C.3.b.2 X.C.3.b.3 X.C.3.b.4 X.C.3.b.5 X.C.3.b.6 X.C.3.b.7	Design Principles, Graphic Design 2 Typography 2, Senior Seminar 2 Graphic Design 3; Senior Thesis 2 Graphic Design 1; Graphic Design 4 New Media, Graphic Design 4 Design Principles, Graphic Design 2 Motion Graphics, Video Imaging Motion Graphics, Video Imaging	70% of students scoring 80% or better

*Note.* N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design curriculum:

### TECHNOLOGY

N.A.S.A.D. Outcome **VIII.B.3:** Students must acquire a working knowledge of technologies and equipment applicable to their area(s) of specialization.

N.A.S.A.D. Outcome **X.A.4.a:** *Learn how to learn technology.* Because change will be a constant, students' technological studies and experiences need to prepare them to learn new technologies on an ongoing basis.

N.A.S.A.D. Outcome **X.A.4.b:** *Make critical choices among different technologies.* Through various curricular studies and experiences, students are expected to become critical users of technology, able to match technological choices to specific problems and their respective contexts.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to



produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **ETHICS**

N.A.S.A.D. Outcome **X.A.3.a:** Choose and apply research and other methods for understanding potential users' wants, needs, and patterns of behavior

N.A.S.A.D. Outcome **X.A.3.b:** Recognize social, cultural, and perspective differences on scales ranging from individual to global.

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **LEADERSHIP**

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

### **TEAMWORK**

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **VISUAL COMMUNICATION**

N.A.S.A.D. Outcome **VIII.B.2.b:** Develop an understanding of the common elements and vocabulary of art/design and of the interaction of these elements, and be able to employ this knowledge in analysis.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

## BS in Industrial Design

**Table 1: Assessment Plan with Mapped Courses for BS in Industrial Design**

LTU Undergraduate Program Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators
<u>TECHNOLOGY</u>	VIII.B.3 X.E.3.b	Virtual Visualization 1, Virtual Visualization 2 Rapid Technology, Industrial Design Studio 5-6, Manufacturing Process	70% of students scoring 80% or better
<u>ETHICS</u>	X.E.3.a X.E.3.e X.E.3.c X.E.3.g X.E.3.k	Design Principles Design Methodologies Industrial Design 1-8 Integrated Design con. A, B Intro to Design, Industrial Design History	70% of students receive a score of 70% or higher
<u>LEADERSHIP</u>	X.E.3.j X.E.3.h	Practicum Professional Practice	70% of students scoring 80% or better
<u>TEAMWORK</u>	X.E.3.i	Design Principles, Design Methodologies, Industrial Design 5-6, Integrated Design Concept A, B, Practicum	70% of students scoring 80% or better
<u>VISUAL COMMUNICATION</u>	VIII.B.2.b X.E.3.f	Design Principles, Virtual Visualization 1 Virtual Visualization 2, Rapid Technology, Industrial Design Studio 1-8	70% of students scoring 80% or better

*Note.* N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design curriculum:

### **TECHNOLOGY**

N.A.S.A.D. Outcome **VIII.B.3:** Students must acquire a working knowledge of technologies and equipment applicable to their area(s) of specialization.

N.A.S.A.D. Outcome **X.A.4.a:** *Learn how to learn technology.* Because change will be a constant, students' technological studies and experiences need to prepare them to learn new technologies on an ongoing basis.

N.A.S.A.D. Outcome **X.A.4.b:** *Make critical choices among different technologies.* Through various curricular studies and experiences, students are expected to become critical users of technology, able to match technological choices to specific problems and their respective contexts.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers,

writers, technicians, etc.).

### **ETHICS**

N.A.S.A.D. Outcome **X.A.3.a:** Choose and apply research and other methods for understanding potential users' wants, needs, and patterns of behavior

N.A.S.A.D. Outcome **X.A.3.b:** Recognize social, cultural, and perspective differences on scales ranging from individual to global.

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **LEADERSHIP**

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

### **TEAMWORK**

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **VISUAL COMMUNICATION**

N.A.S.A.D. Outcome **VIII.B.2.b:** Develop an understanding of the common elements and vocabulary of art/design and of the interaction of these elements, and be able to employ this knowledge in analysis.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

**Bachelor of Interior Architecture****Table 1: Assessment Plan for the BIA**

<b>NAAB 2014 SPC's and LTU Undergraduate (UG) and Graduate Learning Goals</b>	<b>Classes</b>	<b>Assessment Strategy</b>	<b>Metrics</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
NAAB A1. Professional Communication Skills. LTU, (WC 1), OC1 and (CGR)	ARC1213/23 ARI3114 ARI4113 ARI3124 ARI4134 ARI4234	Direct Assessment (rubrics).Class Assignments, examinations, design project work, documentation, project presentations	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018/2020
NAAB A2. Design Thinking Skills (DSTC, DSE), (EGR)	ARC1012 ART1113 ARI3114 ARI3124 ARI4234	Direct Assessment (rubrics).Class Assignments, design project work, documentation, class participation.	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2020-2022
NAAB A.3 Investigative Skills. LTU, CT1, SA1, (AKGR)	ARI3113/4 ARI3124 ARI4123 ARI4234	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)	ART1113 ARI3113/4 ARI3124 ARI4992 ARI4234	Direct Assessment (Rubrics).Class Assignments, examinations, design project work, documentation, and class participation.	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2021-2023
NAAB A5. Ordering Skills, LTU ;(DSTC), (DSE), (DSG),	ARC1012 ART1113 ARC1213/23 ARI3124 ARI4992 ARI4234	Direct Assessment (Rubrics).Class Assignments, examinations, design project work, class participation	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2019-2021
NAAB A6. Use of Precedents, LTU: (CT1),	ARC2313 ARI3114 ARI3124 ARI4992 ARI4234	Direct Assessment (Rubrics Class Assignments, examinations, design project work, class participation, cap-stone projects Group projects in research	Mean results. 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 ARC3613/23 ARI3114 ARI3123 ARI4113 ARI4134 ARI4223 ARI4234	Direct Assessment (Rubrics) Class Assignments, examinations, Essays, and class participation.	Mean results for assignments, exams	Annually Fall/Spring as needed Annually Fall/Spring as Needed.	2018-2021
NAAB B.1 Pre-Design, LTU; SA1, CT1	ARC2126 ARI3114 ARI4992	Direct Assessment (rubrics) Soph/Junior level projects. Field projects and case studies Group projects in research	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	ARI3114	Direct Assessment (rubrics). Class assignments, examinations, design project work, class participation	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2019-2021
NAAB B.3. Codes and Regulations, LTU; CT1, and QR1	ARC2126 ARC2313 ARC3116 ARI3123/4 ARI4134 ARI4143	Direct Assessment (rubrics). Cap-stone and senior level projects Field projects and case studies Group projects in research.	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 ARI3114 ARC3116	Direct assessment (rubrics) and Indirect Assessments (IPAL Surveys). Cap-stone and senior level projects. Project CD documents/spec, Field projects and case studies	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 ARI3114 ARI4134	Direct Assessment (rubrics). Capstone and senior level lab projects and exams.	Mean Scores on assignment rubrics	Annually Fall/Spring as Needed.	2013-2016 2017-2019
NAAB B6. Environmental Systems . LTU: (CT1), SA1. (QR1).	ARC3116 ARC3423 ARC4443 ARI3114 ARI4143	Direct Assessment (rubrics). Group assignments, exams. Group projects in design and research	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 LTU DS1-2, SA1, (DSTC)	ARC2313 ARC3116 ARC3423 ARC4443	Direct Assessment (rubrics). Project assignments, exams. Group/individual projects in design, and research..	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018/21

NAAB B.8 Building Materials and Assemblies LTU , (SA1), (DSTC)	ARC2313 ARC3116 ARI3113/4 ARI3123 ARI4134	Direct Assessment (rubrics) Exams, assignments projects and case studies	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 ARC4443	Direct Assessment (rubrics). Exams, assignments field projects / case studies.	Mean results for exams, assignments, and projects.	Annually Fall/Spring as needed	2019-2021
NAAB B10. Financial Considerations QR1 DSL, <b>AKGR</b>	ARC2323 ARI3123	Direct Assessment (rubrics) of assignments Senior level projects. Field projects and case studies Group projects in research	Mean results for exams, assignments, and projects.	Annually Fall/Spring as needed	2019-2021
NAAB C1. Research. LTU, ( QR1) , (SA1). WC1, DSTC, <b>AKGR, AKE, AKC, TGR</b>	ARI3114	Direct Assessment (rubrics). Class assignments, examinations, design project work, documentation, and capstone project.	Mean results. Internal & external jury for projects	.Annually Fall/Spring as needed	2018-2020
NAAB C2. Integrated Evalua-tions & Decision- Making Design Process, LTU:DSE, DST ( <b>AKGR</b> ) ( <b>CGR</b> )	ARC3116 ARI3114	Direct Assessment (rubrics). Class Assignments, examinations, design project work, documentation, class participation, capstone project.	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018/2020
NAAB C3. Integrated Design.	ARC3116 ARI3114	Direct Assessment (rubrics). Class Assignments, examinations, design project work, documentation, class participation, capstone projects.	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018/2020
NAAB D.1 Stakeholder Roles in Architecture,		Direct Assessment (rubrics). Class Assignments, examinations, design project work, documentation, class participation.	Internal & external jury for projects	Annually Fall/Spring as needed	2018-2021
NAAB D2. Project Management,	ARI3114	Class Assignments, examinations, design project work, class participation.	CoAD core curriculum courses	Annually Fall/Spring as needed	2018-2021
NAAB D3. Business Management. LTU: (WC1), ( <b>ERG</b> ) , ( <b>CGR</b> )	ARC2313 ARI3114	Class Assignments, examinations, design project work, class participation. Group projects in research.	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018-2021
NAAB D4. Legal Responsibilities. LTU (CT1) ( <b>EGR</b> ), ( <b>CGR</b> )	ARI4134 ARI4143	Class Assignments, examinations, design project work, class participation, cap-stone projects Group projects in research	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018-2021

NAAB D5. Professional Conduct. LTU: DSL, DSE, <b>ERG</b>	ARI3114 DES4112	Class Assignments, examinations, design project work, class participation, senior level projects Group projects in research.	Mean results. Internal & external jury for projects	Annually Fall/Spring as needed	2018-2021
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Table 2: Curriculum Map for the BIA

	NAAB Criteria	Course	Semester
	CIDA Criteria		
	College Composition	COM1103	Freshman
	Art + Design Awareness	ARC1012	Fall
	Vis Comm 1	ARC1213	
	Basic Design 1	ART1113	
	Precalculus	MSC1074	
	Foundations of Am Exp	SSC2413	Spring
	Tech and Prof Comm	COM2103	
	World Masterpieces 1	LLT1213	
	Vis Comm 2	ARC1223	
	Basic Design 2	ART1133	
	Graphic Design 1	ART2523	Sophomore
	History of Designed Env 1	ARC3613	Fall
	Visual Communication 3	ARC2813	
	Interior Architecture 1	ARI3114	
	College Physics 1	PHY2213	
	College Physics Lab 1	PHY2221	
	Development of Am Exp	SSC2423	Spring
	History of Designed Env 2	ARC 3623	
	Integrated Design 2	ARC2126	
	College Physics 2	PHY2223	
	College Physics Lab 2	PHY2231	
A1	S5, S9		R
A2	S7, S8, S11		R
A3	S7, S11		I
A4	S7, S11		I
A5	S11	R	I
A6	S7, S8, S11		I
A7	S4, S10	I	
A8	S4, S6		R
B1	S7, S8		I
B2	S7		I
B3	S16		R
B4	S15		I
B5	S15		I
B6	S14		I
B7			
B8	S13, S14		I
B9	S15		
B10	S13		



Table 2: Curriculum Map for the BIA (continued)

NAAB Criteria		Course		Semester
CIDA Criteria				
A1	S5, S9	Writing Proficiency Exam	COM3000	Junior
A2	S7, S8, S11	History of Interiors	ARI4113	Fall
A3	S7, S11	Construction Systems 1	ARC2313	
A4	S7, S11	Integrated Design 3	ARC3116	
A5	S11	Furniture + Millwork	ARI3113	
A6	S7, S8, S11	Basic Structures	ARC2513	
A7	S4, S10	World Masterpieces 2	LLT1223	Spring
A8	S4, S6	Environmental Psych	ARI4123	
B1	S7, S8	Interior Materials	ARI3123	
B2	S7	Interior Architecture 2	ARI3124	
B3	S16	Acoust, Elec, Illum	ARC4443	
B4	S15	Interior Design Practice	ARI4223	Senior
B5	S15	Internship Studies	ARI4992	Fall
B6	S14	Design Leadership	DES4112	
		Allied Interior Design	ARI4234	
		Advanced Lighting	ARI4143	
		HVAC + Water Systems	ARC3423	
		Elective	CoAD	Spring
		Elective	LLT/PSY/SSC4xxx	
		History Elective	CoAD	
		Elective	LLT/MSC/PSY/SSC4xxx	
		Interior Architecture 3	ARI4134	

B7				R	R						R					R				
B8	S13, S14				I	I				R					R					E
B9	S15																			
B10	S13									R										
C1	S8, S11																			
C2	S8				R															
C3	S8, S15				R															
D1	S6																			
D2	S6																			
D3	S6																			
D4	S6															R				R
D5	S6													I						
	S12					I				R	R					R				E
WC1			R		I						R					R				R
OC1			R			R			R	R	R		R	R		R	R			R
CT1				I							R					R				R
QR1				R	I		R			I								R		
SA1				R			R				R							R		
DSTC					I		R				R	R				R		R		R
DSC											R									
DSE													R		I					
DSL															I					
DST											R					R				
DSG				E																
EGR						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, and 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:** Graduate students will analyze, evaluate and/or create technologies consistent with their discipline.

### **NAAB 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.

## **CIDA Criteria (w/Mapped NAAB)**

### **SECTION I. PROGRAM IDENTITY AND CONTEXT**

**Standard 1. Program Identity and Curriculum:** the interior design program provides a professional-level education that prepares graduates for entry-level practice and advanced study. The program has a mission, educational philosophy, and goals appropriate for its context. The program engages in on-going assessment and planning ensuring the curriculum and resources are structured to achieve its goals. The public is able to access understandable and reliable information about the program.

**Standard 2. Faculty and Administration:** the interior design program has an effective administrative structure, as well as adequate and appropriate faculty and administrative staff to successfully lead and deliver the program.

**Standard 3. Learning Environment and Resources:** the interior design program has adequate facilities and resources to achieve program goals.

### **SECTION II. KNOWLEDGE ACQUISITION AND APPLICATION**

**Standard 4. Global Context:** interior designers have a global view and consider social, cultural, economic, and ecological contexts in all aspects of their work.

**A.7 History + 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, cultural, 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

**Standard 5. Collaboration:** interior designers collaborate and also participate in interdisciplinary teams.

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.

**Standard 6. Business Practices and Professionalism:** interior designers understand the principles and processes that define the profession and the value of interior design to society.

A.8 Cultural Diversity + 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

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.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.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.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 NCARB Rules of Conduct and the AIA Code of Ethics in defining professional conduct.

**Standard 7. Human-Centered Design:** interior designers apply knowledge of human experience and behavior to designing the built environment.

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.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.

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.

**Standard 8. Design Process:** interior designers employ all aspects of the design process to creatively solve a design problem.

A.4 Architectural Design Skills: ability to effectively use basic formal, organization 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.

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.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.



C.1 Research: understanding of the theoretical and applied research methodologies and practices used during the design process.

**Standard 9. Communication:** interior designers are effective communicators.

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.

**Standard 10. History:** interior designers apply knowledge of history of interiors, architecture, decorative arts, art, and related theories when solving design problems.

A.7 History + 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, cultural, ecological, and technological factors.

**Standard 11. Design Elements and Principles:** interior designers apply elements and principles of design.

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, organization and environmental principles and the capacity of each to inform two- and three-dimensional design.

**Standard 12. Light and Color:** interior designers apply the principles and theories of light and color effectively in relation to environmental impact and human wellbeing.

No NAAB criteria

**Standard 13. Products and Materials:** interior designers complete design solutions that integrate furnishings, products, materials and finishes.

B.8 Building Materials + 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.

**Standard 14. Environmental Systems and Comfort:** interior designers use the principles of acoustics, thermal comfort, and indoor air quality in relation to environmental impact and human wellbeing.

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.

**Standard 15. Construction:** interior designers understand interior construction and its interrelationship with base building construction and systems.

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.

**Standard 16. Regulations and Guidelines:** interior designers apply laws, codes, standards, and guidelines that impact human experience of interior spaces.

B.3 Codes + 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

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.

## BS in Transportation Design

**Table 1: Assessment Plan with Mapped Courses for BS in Transportation Design**

LTU Undergraduate Program Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators
<u>TECHNOLOGY</u>	VIII.B.3 X.E.3.b X.E.3.d	Trans Design 1,2 Digital Surface 1,2 Trans Design 5,6, Rapid Technology, Trans Design 8, Manufacturing Process	70% of students scoring 80% or better
<u>ETHICS</u>	X.E.3.a X.E.3.e X.E.3.c X.E.3.g X.E.3.h X.E.3.k	Trans Design 1-8 Integrated Design con. A, B Intro to Design Industrial Design History Foundations of the Amer. Experience Devel of the Amer. Exper. World Masterpieces 1,2, Professional Practice Practicum	70% of students receive a score of 70% or higher
<u>LEADERSHIP</u>	X.E.3.j	Practicum (160 hrs)	70% of students scoring 80% or better
<u>TEAMWORK</u>	X.E.3.i	Trans Design 1-8, Integrated Design Concept A, B, Practicum	70% of students scoring 80% or better
<u>VISUAL COMMUNICATION</u>	VIII.B.2.b X.E.3.f	Design Principles, Tech & Prof Communications Trans Design 1-8	70% of students scoring 80% or better

*Note.* N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design curriculum:

### **TECHNOLOGY**

N.A.S.A.D. Outcome **VIII.B.3:** Students must acquire a working knowledge of technologies and equipment applicable to their area(s) of specialization.

N.A.S.A.D. Outcome **X.A.4.a:** *Learn how to learn technology.* Because change will be a constant, students' technological studies and experiences need to prepare them to learn new technologies on an ongoing basis.

N.A.S.A.D. Outcome **X.A.4.b:** *Make critical choices among different technologies.* Through various curricular studies and experiences, students are expected to become critical users of technology, able to match technological choices to specific problems and their respective contexts.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and

critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **ETHICS**

N.A.S.A.D. Outcome **X.A.3.a:** Choose and apply research and other methods for understanding potential users' wants, needs, and patterns of behavior

N.A.S.A.D. Outcome **X.A.3.b:** Recognize social, cultural, and perspective differences on scales ranging from individual to global.

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **LEADERSHIP**

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

### **TEAMWORK**

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

### **VISUAL COMMUNICATION**

N.A.S.A.D. Outcome **VIII.B.2.b:** Develop an understanding of the common elements and vocabulary of art/design and of the interaction of these elements, and be able to employ this knowledge in analysis.

N.A.S.A.D. Outcome **IX.A.3.a:** Knowledge and skills in the use of basic principles, concepts, tools, techniques, procedures, and technologies sufficient to produce animation art from concept to a finished product that communicates ideas and/or stories to a viewer or to an audience.

N.A.S.A.D. Outcome **IX.A.3.b:** Knowledge of the principles of animation, including its visual, spatial, sound, motion, and temporal elements and features, and how these elements are combined in the development of animation art.

N.A.S.A.D. Outcome **IX.A.3.c:** Functional understanding of and ability to use narrative, nonnarrative, and other information/language structures (e.g., linear, non-linear, thematic, cinematic, interactive, etc.) to organize content in time-based media.

N.A.S.A.D. Outcome **IX.A.3.d:** Ability to use concepts and processes for the development, coordination, and completion of animation art (examples include, but are not limited, to concept, visual, and character development; the use of scenarios and personas; and storyboarding, flowcharting, and layout).

N.A.S.A.D. Outcome **IX.A.3.e:** Functional understanding and ability to use the characteristics and capabilities of various animation methods and technologies in creative and project development contexts (examples include, but are not limited to, stop motion, traditional animation, 2D Digital, 3D Digital, etc.).

N.A.S.A.D. Outcome **IX.A.3.f:** Functional knowledge of the history of animation, its artistic and technological evolution, and an understanding of basic aesthetic and critical theory.

N.A.S.A.D. Outcome **IX.A.3.g:** Ability to collaborate and communicate with all members of teams at multiple stages of animation project development and in associated production processes (examples may include, but are not limited to, work with background artists, layout artists, title artists, lighters, riggers, production managers, writers, technicians, etc.).

## College of Arts and Sciences

*BS in Chemistry and Environmental Chemistry***Table 1: Assessment Plan with Mapped Courses for BS in Chemistry and Environmental Chemistry**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	Students must individually and successfully use instrumentation and chemical literature available in the department to analyze unknown substances and synthesized organic or inorganic compounds.	<p>Direct assessment of coursework using a lab report rubric in CHM 4632 (Instrumental Analysis Lab), CHM 4541 (Advanced Spectroscopy Lab), and CHM 3463 (Advanced Synthesis Lab).</p> <p>Course objectives surveys in CHM 4632 (Instrumental Analysis Lab), CHM 4541 (Advanced Spectroscopy Lab), and CHM 3463 (Advanced Synthesis Lab).</p>	<p>80% of students will receive a “qualified” designation.</p> <p>80% of students will feel “confident” or “very confident” overall regarding their mastery of the course objectives.</p>
<u>ETHICS &amp; LEADERSHIP</u>	Students will be able to evaluate the impact of scientific practices and findings on society.	Evaluation of senior project proposal using a rubric in PSC 3001 (Introduction to Senior Projects in Science). Students will consider sustainability and green chemistry issues relevant to their proposed senior project.	80% of students will perform at a “satisfactory” or “superior” level.
<u>TEAMWORK</u>	Students will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions toward solving chemistry-related problems.	<p>Team evaluation by instructor and team self-evaluation in CHM 3441 (Physical Chemistry 2 Lab), CHM 3411 (Biochemistry 1 Lab), and CHM 3463 (Advanced Synthesis Lab). A Likert scale of satisfaction will be used.</p> <p>Ethics case study assignment in PSC 3001, in which students will analyze an ethics-related situation and characterize and reflect upon the scientific misconduct involved.</p>	80% of students will feel “always satisfied” or “frequently satisfied” regarding the contributions of their peers. The instructor will feel “always satisfied” or “frequently satisfied” 80% of the time regarding student contributions.
<u>VISUAL COMMUNICATION</u>	Students will demonstrate professional standards in chemistry through graphical communication.	<p>Direct assessment of research project posters using a rubric in CHM 3411 (Biochemistry 1 Laboratory).</p> <p>Direct assessment of student project reports using a rubric in CHM 4001 (Computational Chemistry 2).</p>	80% of students will perform at a “satisfactory” or “superior” level based on rubrics.

		Evaluation of student presentations using an oral presentation rubric in CHM 4912 (Chemical Sciences Project 1) and CHM 4922 (Chemical Sciences Project 2).	
<u>ORAL AND WRITTEN COMMUNICATION</u>	Students will demonstrate professional standards in chemistry through oral and written communication.	<p>Direct assessment of student projects using a rubric in CHM 3403 (Biochemistry).</p> <p>Direct assessment of student lab reports using a rubric in CHM 4632 (Instrumental Analysis Lab).</p> <p>Evaluation of student oral presentations using a rubric in CHM 2313 (Organic Chemistry 1), CHM 2321 (Organic Chemistry 2 Laboratory), CHM 4912 (Chemical Sciences Project 1), and CHM 4922 (Chemical Sciences Project 2).</p>	80% of students will perform at a “satisfactory” or “superior” level based on rubrics.
<u>SCIENTIFIC ANALYSIS</u>	Students will demonstrate critical thinking and apply analytical and problem-solving skills in chemistry.	Completion of an independent research project with minimal assistance in CHM 4912 (Chemical Sciences Project 1) and CHM 4922 (Chemical Sciences Project 2).	80% of students will perform at a “satisfactory” or “superior” level in the completion of their senior projects.
<u>KNOWLEDGE IN DISCIPLINE</u>	<p>Students must integrate the core concepts of physical chemistry: quantum mechanics, thermodynamics, kinetics, and computational chemistry.</p> <p>Students must demonstrate knowledge of quantitative chemical analysis, including wet chemical and instrumental techniques.</p> <p>Students must demonstrate knowledge of the structure and function of the four classes of biomolecules: proteins, nucleic acids, carbohydrates, and lipids.</p> <p>Students must demonstrate their ability to draw and name the major classes of organic molecules, explain how they react using arrow-pushing mechanisms, and how they are characterized using mass spectrometry, IR spectroscopy, and NMR spectroscopy.</p>	<p>Direct assessment of final exams in CHM 3423 (Physical Chemistry 1) and CHM 3434 (Physical Chemistry 2).</p> <p>Direct assessment of final exam in CHM 2342 (Analytical Chemistry) and CHM 4632 (Instrumental Analysis Lab).</p> <p>Direct assessment of final exam in CHM 3403 (Biochemistry).</p> <p>Direct assessment of final exams in CHM 2313 (Organic Chemistry 1) and CHM 2323 (Organic Chemistry 2).</p>	80% of students will perform at a “satisfactory” or “superior” level.

	Students must analyze and interpret new information on modern topics in inorganic chemistry, such as group theory, ligand field theory, x-ray crystallography, and organometallic chemistry.	Direct assessment of final exams in CHM 3452 (Intermediate Inorganic Chemistry) and CHM 4643 (Advanced Inorganic Chemistry).	
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*BS in Computer Science***Table 1: Assessment Plan with Mapped Courses for BS in Computer Science**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u> Students will use mathematical software such as Matlab to analyze problems (Bloom's 4)	Design, implement, and evaluate a computer-based system, process, component, or program to meet its specified requirements. (3) Recognize the need for and engage in continuing professional development [and learn new technologies] and adapt to changes in the field. (7)	Direct assessment of MCS4833 Sr. Project	Students will achieve level 3 (of 4) on the Technology portion of a Sr. Project rubric
<u>ETHICS</u> a. Students will correctly incorporate and cite material from secondary sources in their writing. (Bloom's 3) b. Students will understand what constitutes original research contributions to the discipline. (Bloom's 4)	Secure employment and/or attend graduate school in their field, drawing on their experiences, both within and outside the major to become responsible citizens and effective professionals. (9)	Direct assessment of MCS4833 Sr. Project	Students will pass an ethics quiz based on an on-line tutorial
<u>LEADERSHIP</u> a. Students will understand theories of leadership germane to the discipline. (Bloom's 2) b. Students will understand the civic responsibilities of researchers. (Bloom's 2)	Analyze the local and global impact of computing on individuals, organizations, and society. (6)	Assessed in MCS4833 Sr. Project by interview with project instructor	Students will achieve a level 3 (of 4) on the Leadership portion of a Sr. Project rubric
<u>TEAMWORK</u> a. Students will demonstrate team-building and collaboration skills (Bloom's 3)	Function effectively in teams to accomplish a common goal, including performing leadership tasks. (4)	Direct assessment of MCS1414 in the Calc Lab	Students will achieve a level 3 (of 4) on the Teamwork portion of a Lab Survey rubric

b. Students will evaluate team members' contributions. (Bloom's 4)			
<u>VISUAL COMMUNICATION</u> Students will use figures or other graphical elements in their projects and other technical reports. (Bloom's 3)	Plan, create and integrate oral, written, and graphical communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding. (5)	Direct assessment of MCS1414 in the Calc Lab	Students will achieve a level 3 (of 4) on the Graphical communication portion of a Lab Survey rubric
<u>KNOWLEDGE IN DISCIPLINE</u> LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	<p>Apply knowledge of computing and mathematics appropriate to the discipline. (1)</p> <p>Display a complete understanding of a computer language (syntax, semantics and terminology), develop and debug complex code. (10)</p> <p>Apply current techniques, skills, and tools necessary for computing practice. (8)</p> <p>Analyze a problem, and identify and define the computing requirements appropriate to its solution. (2)</p>	Direct assessment of standard questions on final exams in MCS1142 and MCS1514 (Fall 2018) and MCS2534 (Spring 2019)	Average score greater than 70% on final exam problems mapped to course objectives



*BS in Mathematics***Table 1: Assessment Plan with Mapped Courses for BS in Mathematics**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<b>TECHNOLOGY</b> Students will use mathematical software such as Matlab to analyze problems (Bloom's 4)	Design, implement, and evaluate a computer-based system, process, component, or program to meet its specified requirements. (3)	Direct assessment of MCS4833 Sr. Project	Students will achieve level 3 (of 4) on the Technology portion of a Sr. Project rubric
<b>ETHICS</b> a. Students will correctly incorporate and cite material from secondary sources in their writing. (Bloom's 3) b. Students will understand what constitutes original research contributions to the discipline. (Bloom's 4)	Secure employment and/or attend graduate school in their field, drawing on their experiences, both within and outside the major to become responsible citizens and effective professionals. (9)	Direct assessment of MCS4833 Sr. Project	Students will pass an ethics quiz based on an on-line tutorial
<b>LEADERSHIP</b> a. Students will understand theories of leadership germane to the discipline. (Bloom's 2) b. Students will understand the civic responsibilities of researchers. (Bloom's 2)	Analyze the local and global impact of computing on individuals, organizations, and society. (6)  Recognize the need for and engage in life-long learning, continuing professional development and adapt to changes in the field. (7)	Assessed in MCS4833 Sr. Project by interview with project instructor	Students will achieve a level 3 (of 4) on the Leadership portion of a Sr. Project rubric
<b>TEAMWORK</b> a. Students will demonstrate team-building and collaboration skills (Bloom's 3) b. Students will evaluate team members' contributions. (Bloom's 4)	Function effectively in teams to accomplish a common goal, including performing leadership tasks. (4)	Direct assessment of MCS1414 in the Calc Lab	Students will achieve a level 3 (of 4) on the Teamwork portion of a Lab Survey rubric

<u>VISUAL COMMUNICATION</u> Students will use figures or other graphical elements in their projects and other technical reports. (Bloom's 3)	Communicate mathematical ideas and models effectively to a range of audiences orally, in writing, and graphically. (5)	Direct assessment of MCS1414 in the Calc Lab	Students will achieve a level 3 (of 4) on the Graphical communication portion of a Lab Survey rubric
<u>KNOWLEDGE IN DISCIPLINE</u> LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	Apply knowledge of mathematics appropriate to a problem. (1)  Analyze a problem, and identify and define the mathematical techniques appropriate to its solution. (2)  Use current and established techniques, skills, and tools necessary for applying mathematics. (8)	Direct assessment of standard questions on final exams in MCS1142 and MCS1514 (Fall 2018) and MCS2534 (Spring 2019)	Average score greater than 70% on final exam problems mapped to course objectives

*BS in Mathematics/Computer Science***Table 1: Assessment Plan with Mapped Courses for BS in Mathematics/Computer Science**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u> Students will use mathematical software such as Matlab to analyze problems (Bloom's 4)	Design, implement, and evaluate a mathematical model, computer-based system, process, component, or program to meet its specified requirements (3)  Recognize the need for and engage in continuing professional development [and learn new technologies] and adapt to changes in the field. (7)	Direct assessment of MCS4833 Sr. Project	Students will achieve level 3 (of 4) on the Technology portion of a Sr. Project rubric
<u>ETHICS</u> a. Students will correctly incorporate and cite material from secondary sources in their writing. (Bloom's 3) b. Students will understand what constitutes original research contributions to the discipline. (Bloom's 4)	Secure employment and/or attend graduate school in their field, drawing on their experiences, both within and outside the major to become responsible citizens and effective professionals. (9)	Direct assessment of MCS4833 Sr. Project	Students will pass an ethics quiz based on an on-line tutorial
<u>LEADERSHIP</u> a. Students will understand theories of leadership germane to the discipline. (Bloom's 2) b. Students will understand the civic responsibilities of researchers. (Bloom's 2)	Analyze the local and global impact of computing on individuals, organizations, and society. (6)	Assessed in MCS4833 Sr. Project by interview with project instructor	Students will achieve a level 3 (of 4) on the Leadership portion of a Sr. Project rubric
<u>TEAMWORK</u> a. Students will demonstrate team-building and collaboration skills (Bloom's 3) b. Students will evaluate team members' contributions. (Bloom's 4)	Function effectively in teams to accomplish a common goal, including performing leadership tasks. (4)	Direct assessment of MCS1414 in the Calc Lab	Students will achieve a level 3 (of 4) on the Teamwork portion of a Lab Survey rubric

<u>VISUAL COMMUNICATION</u> Students will use figures or other graphical elements in their projects and other technical reports. (Bloom's 3)	Plan, create and integrate oral, written, and graphical communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding. (5)	Direct assessment of MCS1414 in the Calc Lab	Students will achieve a level 3 (of 4) on the Graphical communication portion of a Lab Survey rubric
<u>KNOWLEDGE IN DISCIPLINE</u> LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	<p>Apply knowledge of computing and mathematics appropriate to a problem. (1)</p> <p>Display a complete understanding of a computer language (syntax, semantics and terminology), develop and debug complex code. (10)</p> <p>Apply current and established techniques, skills, and tools necessary for applying mathematics and computing practice. (8)</p> <p>Analyze a problem, and identify and define the computing requirements and mathematical techniques appropriate to its solution. (2)</p>	Direct assessment of standard questions on final exams in MCS1142 and MCS1514 (Fall 2018) and MCS2534 (Spring 2019)	Average score greater than 70% on final exam problems mapped to course objectives

*BS in Media Communication***Table 1: Assessment Plan with Mapped Courses for BS in Media Communication**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	Graduates will have an industry-standard skill set in production, post-production and new media.	Student work from: MCO 2003: Intro to Video Production; MCO 3303: Video Editing; MCO 3203: Camera for Broadcast; MCO 3623: Adobe for Media	70% score 4 or higher on 5 point course specific Technology rubric
<u>ETHICS</u>	Graduates will understand the impact of their professional decisions on the public and broader global societies.	MCO 1003: Media, Communication & Society: Combination of Assignment scores from Media Economics in the Global Marketplace exam and Legal Controls and Freedom of Expression exam	70% Score 4 or higher on 5 point rubric
<u>LEADERSHIP</u>	Graduates will develop leadership and teamwork skills through collaboration and engage in ethical dimensions of technology and innovation.	Assignments in COM 1001: Pathways to Research Careers	Success metric determined by rubric specific to Pathways curriculum
<u>TEAMWORK</u>	Graduates will understand the importance of teamwork, diversity, and collaboration to achieve a common goal for the betterment of society.	COM 4001:Pathways Capstone Lab	Success metric determined by rubric specific to Pathways curriculum
<u>COMMUNICATION</u>	Graduates will possess industry-standard professional skills in writing, presentations, and interpersonal communication using Oral, Written, and Visual communication modalities.	Direct assessment of student assignments in MCO 3713: Advanced Writing for Media MCO 3623: Adobe for media	70% Score 4 or higher on Writing, Presentation and Graphical rubrics specific to each class being assessed
<u>KNOWLEDGE IN DISCIPLINE</u>	1a: Graduates will have an in-depth understanding of the scope and purpose of the media industry. 1b: Graduates will understand the standards of professional practices within the media industry.	For both 1a and 1b - Direct assessment of student assignments in MCO 3633: Social Media- Client Strategy Assignment; MCO 1003: Media, Communication and Society- Critical Approach Exam for 1a and Global Marketplace Exam for 1b, MCO 2563: Intro to Broadcast- Director/Tech Director Final, MCO 2543: Writing for Electronic & Print Web News Assignment	70% score 4 or higher on 5 Point Professional Practices rubric

*BS in Molecular and Cell Biology***Table 1: Assessment Plan with Mapped Courses for BS in Molecular and Cell Biology**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	LTU MCB graduates will apply advanced technologies such as software or instrumentation to practical and/or theoretical problems in molecular cell biology.	Direct assessment of coursework with rubric in BIO 3201 (A&P lab) (Formative), and BIO 4812 (Cell Bio lab) (Summative)	80% “satisfactory” or “superior” performance based on rubrics
	LTU MCB graduates will have the ability to use modeling and simulation with complex biological systems.	Direct assessment of coursework with rubric in BIO 4103 (Evolution).	80% “satisfactory” or “superior” performance based on rubrics
<u>ETHICS &amp; LEADERSHIP</u>	LTU MCB graduates will be able to evaluate the impact of scientific practices and findings on society.	Ethics case study assignment in PSC 3001, in which students will analyze an ethics-related situation and characterize and reflect upon the scientific misconduct involved.	80% “satisfactory” or “superior” performance
<u>TEAMWORK</u>	LTU MCB graduates will have the ability to communicate and collaborate with other disciplines.	Team self-evaluation in BIO 3201 (A&P lab). Likert scale of satisfaction will be used.	80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
<u>VISUAL COMMUNICATION</u>	LTU MCB graduates will have the ability to communicate data in a graphical form.	Evaluation of student presentations using oral rubric (Bio 491X & 492X).	80% “satisfactory” or “superior” performance based on rubrics
<u>WRITTEN AND ORAL COMMUNICATION</u>	LTU MCB graduates will have the ability to communicate in written form and orally with biologists, other scientists and also with the non-scientific community.  (Note: Written and Oral Communication is also assessed at the university level through the core curriculum)	Written proposals in PSC 3001 (Intro to Projects) and Laboratory reports/Posters in Bio 3201 (A&P lab), Bio 2321 (Micro Lab) and/or Bio 4812 (Cell Bio Lab) will be evaluated using a rubric. Evaluation of student presentations using oral rubric (Bio 491X & 492X).	80% “satisfactory” or “superior” performance.
<u>SCIENTIFIC ANALYSIS</u>	Students will apply elements of the scientific method via observation and experimentation.  Students will analyze natural sciences concepts and/or problems.	Direct assessment of coursework with rubric in PHY 2221 (College Physics 1 lab) and/or PHY 2231 (College Physics 2 lab) and/or BIO 2321 (Micro lab) (formative) Direct assessment of coursework with rubric in BIO 491x (senior project 1) and/or BIO 492x (senior project 2) (summative)	80% “satisfactory” or “superior” performance

<u>KNOWLEDGE IN DISCIPLINE</u>	<p>LTU MCB graduates will defend the modern synthesis of evolution and genetics and apply this foundational biological paradigm to biological phenomena.</p> <p>Explain the intrinsic relationship between the structure and function in biological systems and be able to predict structure given functional data or vice versa.</p> <p>Defend biological central dogma and summarize the process of the control of gene expression.</p> <p>Compare and contrast the various ways that biological organisms harvest energy and convert it to matter.</p> <p>Explain how living systems are interconnected and apply this knowledge to predict perturbations to these systems.</p>	<p>Direct assessment of coursework with rubric in BIO 4103 (Evolution)</p> <p>Direct assessment of coursework with rubric in BIO 3203 (A&amp;P A) and/or BIO 3303 (A&amp;P B)</p> <p>Direct assessment of coursework with rubric in BIO 3323 (Genetics) and/or BIO 4813 (Cell Bio)</p> <p>Direct assessment of coursework with rubrics in BIO 2313 (Micro) and/or BIO 2321 (Micro lab)</p> <p>Direct assessment of coursework with rubric in BIO 1223 (Bio 2) and/or BIO 4103 (Evol)</p>	<p>80% “satisfactory” or “superior” performance.</p>
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*BS in Nursing***Table 1: Assessment Plan for BS in Nursing**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	Utilize information management and technology to ensure safe, effective, and high quality care.	Technology rubric in program core courses.	80% “satisfactory” or “superior” performance based on rubrics
<u>ETHICS &amp; LEADERSHIP</u>	Value professional nursing practice reflective of the scope and standards of nursing practice and the code of ethics.  Employ interprofessional collaboration and leadership strategies to improve outcomes for individuals, communities, and systems.	Term paper in NUR 2203 Health Care Policy, Ethics, and Advocacy	80 % of the students will receive a grade of 80% or above
<u>TEAMWORK</u>	Ability to communicate and collaborate with others in teams.	Team self-evaluation and peer-evaluation in program core courses when teamwork occurs.	80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
<u>VISUAL COMMUNICATION</u>	Ability to communicate data in a graphical form.	Evaluation of student presentations using oral rubric (Bio 491X & 492X).	80% “satisfactory” or “superior” performance based on rubrics
<u>KNOWLEDGE IN DISCIPLINE</u>	(a) <i>Integrate</i> knowledge from the humanities and sciences within the context of nursing science. (b) <i>Implement</i> the principles of relationship-based care into patient centered, individualized care imparted within a caring and healing environment. (c) <i>Demonstrate</i> health promotion and disease prevention strategies across diverse settings, lifespan, and vulnerable populations to address health disparities and population health. (d) <i>Examine</i> the impact of policy, finance, and regulatory environments on healthcare.	(a) NUR 2313 Pathophysiology/Pharmacology I (b) NUR 2102 Holistic Nursing: Complementary Therapies (c) NUR 1202 Health Promotion and Clinical Prevention (d) NUR 2203 Health Care Policy, Ethics, and Advocacy	(a) <u>Final Exam</u> : 80 % of the students will receive a grade of 80% or above (b) <u>Group Project</u> : 80 % of the students will receive a grade of 80% or above (c) <u>Family Assessment Paper</u> : 80 % of the students will receive a grade of 80% or above (d) <u>Formal Paper</u> : 80 % of the students will receive a grade of 80% or above



**Table 1: Curriculum Map for BS in Nursing**

<b>Program Objective</b>  <b>Key = Introduced = I Reinforced =R Mastery = M</b>	Integrate knowledge from the humanities and sciences within the context of nursing science.	Implement the principles of relationship-based care (RBC) into patient centered, individualized care imparted within a caring and healing environment.	Demonstrate health promotion and disease prevention strategies across diverse settings, lifespan, and vulnerable populations to address health disparities & pop health	Formulate plans of care designed within the frameworks of clinical reasoning, quality improvement and evidence-based practice.	Utilize information management and technology to ensure safe, effective, and high quality care.	Employ interprofessional collaboration and leadership strategies to improve outcomes for individuals, communities, and systems.	Value professional nursing practice reflective of the scope and standards of nursing practice and the code of ethics.	Examine the impact of policy, finance, and regulatory environments on healthcare
Introduction to Nursing and Social Justice	X I	X I RBC 7 principles	X I AACN Cultural Competency 1 and 4	XI Quality	XI The us of technology	X I Leadership Teamwork (RBC) ANA Standard 10 (collaboration) Teamwork and Collaboration (QSEN) Interprofessional Collaboration Domains	X I ANA Standard 8 Culturally Congruent Practice	X I Resource Driven Practice (RBC)
Holistic Nursing: Comp. Therapies		X I RBC Caring and Healing Environment; PNP			X I AACN Cultural Competency 3			
Health Care Policy, Ethics, and Advocacy		X I RBC PNP Resource Driven Practice	XI Population Health  AACN 1, 4		XI QSEN safety		X I ANA Standard 7 – 8,15	X I QSEN - QI AACN Cultural Competence -4 IPEC-1
Health Promotion and Clinical Prevention	XI Micro and Genetics		X I HP Theory and Interventions		X I AACN Cultural Competency 2		X I ANA Standard 8, 12, 16 -Culturally Congruent -Education -Environmental Health	

<b>Program Objective</b> <b>Key =</b> <b>Introduced = I</b> <b>Reinforced =R</b> <b>Mastery = M</b>	Integrate knowledge from the humanities and sciences within the context of nursing science.	Implement the principles of relationship-based care into patient centered, individualized care imparted within a caring and healing environment.	Demonstrate health promotion and disease prevention strategies across diverse settings, lifespan, and vulnerable populations to address health disparities & population health.	Formulate plans of care designed within the frameworks of clinical reasoning, quality improvement and evidence-based practice.	Utilize information management and technology to ensure safe, effective, and high quality care.	Employ interprofessional collaboration and leadership strategies to improve outcomes for individuals, communities, and systems.	Value professional nursing practice reflective of the scope and standards of nursing practice and the code of ethics.	Examine the impact of policy, finance, and regulatory environments on healthcare
Assessment Across the Lifespan	X I A/P, Patho, PSY	X I Professional nursing practice (RBC)	X I AACN Cultural Competence 1		X I Intro to EMR		X I Standard I Assessment	
Patho/Pharm I and II	X I A/P and Genetics		X I AACN Cultural Competency 1	X I EBP/Research EBP (QSEN)	X I Specific to pharmacology and nursing AACN Cultural 3		X I Standard 13 EBP/Research EBP (QSEN)	
Foundations of Professional Nursing Practice/CC	X I Chemistry, micro, biology, A/P, Patho, nutrition, Social Psychology	X I RBC 7 principles QSEN			X I Safety (QSEN)  AACN Cultural Competency 3	XI QSEN	X I Standard I-6 Nursing Process	
Foundations of Interprofessional Communication and Collaboration	X I Humanities	X I Leadership Teamwork				X I -Leadership/Teamwork -Teamwork and Collaboration (QSEN) Interprofessional Collaboration – IPEC Domain 3 -AACN Cultural Competence 1	X I Standard 7, 8, 9, 10, 11	

<b>Program Objective</b> <b>Key =</b> <b>Introduced = I</b> <b>Reinforced = R</b> <b>Mastery = M</b>	Integrate knowledge from the humanities and sciences within the context of nursing science.	Implement the principles of relationship-based care into patient centered, individualized care imparted within a caring and healing environment.	Demonstrate health promotion and disease prevention strategies across diverse settings, lifespan, and vulnerable populations to address health disparities and pop health	Formulate plans of care designed within the frameworks of clinical reasoning, quality improvement and evidence-based practice.	Utilize information management and technology to ensure safe, effective, and high quality care.	Employ interprofessional collaboration and leadership strategies to improve outcomes for individuals, communities, and systems.	Value professional nursing practice reflective of the scope and standards of nursing practice and the code of ethics.	Examine the impact of policy, finance, and regulatory environments on healthcare
Scholarship as Applied to Evidence Based Practice	XI Statistics			XI Theory and principles  AACN Cultural Competency 2			XI Standard 13 EBP/Research EBP (QSEN)	
Informatics for Professional Nurses					XI Theory and Principles Informatics - QSEN	XI Telehealth	XI ANA Standard 14, 15 Informatics QSEN	
Nursing Care of the Adult with Acute and Chronic Illness (med-surg)	X R Chemistry, micro, biology, A/P, Patho, nutrition, Social Psychology	X R RBC 7 principles  QSEN	X R ANA 1-15	X R QSEN Safety EBP QI	X R	X R QSEN Teamwork	X R ANA Standards I-15	
Mental Health and Illness	X R PSY 2623 Genetics	X R RBC 7 principles  QSEN	X R ANA 1-15	X R QSEN Safety EBP QI	X R	X R QSEN Teamwork	X R ANA Standard I-15	

<b>Program Objective</b>  <b>Key =</b> <b>Introduced = I</b> <b>Reinforced =R</b> <b>Mastery = M</b>	Integrate knowledge from the humanities and sciences within the context of nursing science.	Implement the principles of relationship-based care into patient centered, individualized care imparted within a caring and healing environment.	Demonstrate health promotion and disease prevention strategies across diverse settings, lifespan, and vulnerable populations to address health disparities and population health.	Formulate plans of care designed within the frameworks of clinical reasoning, quality improvement and evidence-based practice.	Utilize information management and technology to ensure safe, effective, and high quality care.	Employ interprofessional collaboration and leadership strategies to improve outcomes for individuals, communities, and systems.	Value professional nursing practice reflective of the scope and standards of nursing practice and the code of ethics.	Examine the impact of policy, finance, and regulatory environments on healthcare
Nursing Care of the Elder Adult with Acute and Chronic Illness (med-surg II)	X R PSY Genetics	X R	X R	X R	X R	X R	X R	X R
Geriatric Theory	X R PSY/Soc Genetics		X I AACN Gero Competency	X I AACN Gero Competency		X I AACN Gero Competency		X I AACN Gero Competency
Nursing Care of the Childbearing Family	X R Genetics	X R	X R	X R	X R	X R	X R	X R

<b>Program Objective</b>  <b>Key =</b> <b>Introduced = I</b> <b>Reinforced =R</b> <b>Mastery = M</b>	Integrate knowledge from the humanities and sciences within the context of nursing science.	Implement the principles of relationship-based care into patient centered, individualized care imparted within a caring and healing environment.	Demonstrate health promotion and disease prevention strategies across diverse settings, lifespan, and vulnerable populations to address health disparities and population health.	Formulate plans of care designed within the frameworks of clinical reasoning, quality improvement and evidence-based practice.	Utilize information management and technology to ensure safe, effective, and high quality care.	Employ interprofessional collaboration and leadership strategies to improve outcomes for individuals, communities, and systems.	Value professional nursing practice reflective of the scope and standards of nursing practice and the code of ethics.	Examine the impact of policy, finance, and regulatory environments on healthcare
Nursing Care of Children and their Families	X R PSY Genetics	X R	X R	X R	X R	X R	X R	X R
Population Health and Epidemiology	X R Genetics	X R	X R	X R	X R AACN Cultural Competency 3	X R	X R AACN Cultural Competency 5	X R
Nursing Leadership for Quality Healthcare within Organizations and Systems		X R		X R	X R AACN Cultural Competency 3	X R Interprofessional Collaboration Domain 4	X R AACN Cultural Competence 4	X R
Nursing Care of Patients with Complex Needs (Theory only)	X R Chemistry, micro, biology, A/P, Patho, nutrition	XR		XR				
Immersion		X M	X M	X M	X M	X M	X M	X M
Capstone Project				X M				

### **Relationship Based Care Principles – Conceptual Framework**

**Caring and healing environment:** The physical environment and the interactions with those delivering care are the immediate context for the patient's experience. The combination of therapeutic relationships and an environment that meets physical needs and comfort, promotes healing.

**Leadership:** Each individual nurse has a leadership role in providing care. Compassionate nursing leadership supports the emergence of caring and compassionate leaders from all levels of the organization.

**Teamwork:** Every individual nurse is accountable for his or her own actions, supports the success of those around them and contributes to the mission of the organization. Commitment to excellent communication and strong collegial relationships creates an environment for great care.

#### **Professional nursing practice:**

Nurses embrace the responsibilities of professional practice: holding to a set of technical and ethical standards, ongoing self-improvement and development, and accountability for autonomy. The six practice roles that describe the nurse in the context of Relationship Based Care are: sentry, guide, healer, collaborator, teacher, and leader.

**Patient care delivery:** Continuity of care is of great value to the patient and supports the relationship between the patient and the nurse. The four elements that define any care delivery system:

1. Nurse/patient relationship and decision-making
2. Work allocation and/or patient assignments
3. Communication between members of the health care team
4. Management of the unit environment

**Resource-driven practice:** A focus on what resources are available and prioritization of what matters most to the patient and family, instead of what resources are lacking, refocuses the care to benefit the patient and the team.

Staffing fluctuations are inevitable in our environment. An empowered approach to prioritized care promotes critical thinking, decision-making and individualization of care.

**Outcomes measurement:** Meaningful data is used to measure the impact of both relationships and care. Patient satisfaction and clinical outcomes data are used to inspire and motivate so that members of the team understand their relationship to the outcomes they influence.

### **ANA Scope and Standards of Practice**

1. Assessment 2. Diagnosis 3. Outcome Identification 4. Planning 5. Implementation 6. Evaluation 7. Ethics
8. Culturally Congruent Practice 9. Communication 10. Collaboration 11. Leadership 12. Education 13. Evidenced Based Practice
14. Quality of Practice 15. Resource Utilization 16. Environmental Health

### **Quality and Safety Education for Nurses (QSEN)**

**Safety - Key Message:** Safe, effective delivery of patient care requires understanding of the complexity of care delivery, the limits of human factors, safety design principles, characteristics of high reliability organizations and patient safety resources.

**Teamwork and Collaboration - Key Message:** Safe, effective, satisfying patient care requires teamwork: collaboration with and communication among members of the team, including the patient and family as active partners.

**Patient Centered Care - Key Message:** The patient and family are in a partnered relationship with their health care provider and are equipped with relevant information, resources, access, and support to fully engage in and/or direct the health care experience as they choose.

**Evidenced Based Practice - Key Message:** Safe, effective delivery of patient care requires the use of nursing practices consistent with the best available knowledge. This includes use of clinical expertise and patient preferences and values, in addition to current best research evidence.

**Health Informatics - Key Message:** Technology is changing how patients manage their own health care needs and how nurses manage patient care. Nurses need new skills to use and contribute to the development of electronic health records, to find and evaluate the relevance of evidence to support clinical decisions, and to use data to solve patient and system problems.

**Quality Improvement - Key Message:** Improving patient care requires a systematic process of defining problems in order to identify potential causes and develop strategies to improve care. This process requires the ability to measure care. We can only improve care if we can measure how well we are doing and compare our performance against others'.

**Core Competencies for Interprofessional Collaborative Practice (Sponsored by Interprofessional Education Collaborative - IPEC)**

**Domains**

1. Values and Ethics for Interprofessional Practice
2. Roles and Responsibilities
3. Interprofessional Communication
4. Teams and Teamwork

*BS in Physics***Table 1: Assessment Plan with Mapped Courses for BS in Physics**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	Students must individually and successfully use appropriate instrumentation available in the department, such as AFM, SEM to characterize specimen.	Direct assessment of coursework with a rubric in PHY 3661 and PHY 4781. Designation of “unsatisfactory”, “satisfactory” and “superior” will be given.	At least 80% of students receive “satisfactory” or “superior”.
<u>ETHICS &amp; LEADERSHIP</u>	Students will be able to evaluate the impact of scientific practices and findings on society.	Ethics case study assignment in PSC 3001, in which students will analyze an ethics-related situation and characterize and reflect upon the scientific misconduct involved.	At least 80% of students perform at a “satisfactory” or “superior” level.
<u>TEAMWORK</u>	LTU MCB graduates will have the ability to communicate and collaborate with other disciplines.	Team self-evaluation in BIO 3201 (A&P lab). Likert scale of satisfaction will be used.	80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
<u>VISUAL COMMUNICATION</u>	Students will use figures or other graphical elements in their senior projects and other technical reports, following appropriate scientific publication standards.	Direct assessment of student assignment with appropriate rubric in courses PHY3661, PHY4781, PHY4912/22. Designation of “unsatisfactory”, “satisfactory” and “superior” will be given. Evaluation of student presentations using oral advanced physics course rubric in PHY4843 and PHY4763. Designation of “unsatisfactory”, “satisfactory” and “superior” will be given.	At least 80% of students receive “satisfactory” or “superior” performance based on rubrics.
<u>WRITTEN AND ORAL COMMUNICATION</u>	Students are aware of the publication standards from common scientific publications; and apply them in their technical reports.	Direct assessment of student assignment with appropriate rubric in courses PHY3661, PHY4781, PHY4912/22. Designation of “unsatisfactory”, “satisfactory” and “superior” will be given. Evaluation of student presentations using oral advance physics course rubric in PHY4843. Designation of “unsatisfactory”, “satisfactory” and “superior” will be given.	At least 80% of students receiving “satisfactory” or “superior” performance based on rubrics.  At least 80% “satisfactory” or “superior” performance based on rubrics.



<u>SCIENTIFIC ANALYSIS</u>	Students will demonstrate critical thinking in overcoming obstacle in theoretical calculation and lab experimentation.	Students' research plan for PHY4912/22 (proposed in PSC3001) will be graded with a rubric. Designation of "satisfactory" or "unsatisfactory" will be given. Completion of an independent experiment with minimal assistance in PHY 3661 and PHY 4781. Designation of "satisfactory" or "unsatisfactory" will be given.	All students will receive "satisfactory". All students will receive at 80% or above based on rubric.
<u>KNOWLEDGE IN DISCIPLINE</u>	Mastery of the topic areas of Classical Mechanics, Relativity, EM, Optics/Waves, Thermal Physics, Quantum Mechanics, Atomic Physics	Course final exam average	At least 80% of students receive a grade of 80% or above.
<u>INDEPENDENT RESEARCH</u>	Students perform an independent open-ended scientific research project.	Senior project rubric	At least 80% of students will receive a grade of 80% or above.

*BS in Psychology***Table 1: Assessment Plan with Mapped Courses for BS in Psychology**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	Students will demonstrate competence and ability to use appropriate software to produce understandable reports and posters in APA style, including use of statistical analysis software, office dissemination software, and library and internet research databases.	Scores obtained from the administration of technology rubric.  Target courses are PSY 2113 Research Methods and PSY 3223 -Experimental Psychology Lab	Average score should be higher than 67%.
<u>ETHICS</u>	Students will demonstrate knowledge of the APA ethics code in the treatment of patients, and human and non-human subjects in experimental research. Also, students will demonstrate knowledge of the norms related to the respect of the truth in scientific research.	Score is based on the ethics topic of PSY 2113-Research Method course. ;	Two criteria to meet: 1) Average higher than 67% 2) At least 15% of the students score above 90%
<u>LEADERSHIP</u>	Students will develop leadership and teamwork skills through collaboration and engage in ethical dimensions of technology and innovation.	Assignments in COM 1001: Pathways to Research Careers	Success metric determined by rubric specific to Pathways curriculum
<u>TEAMWORK</u>	Graduates will understand the importance of teamwork, diversity, and collaboration to achieve a common goal for the betterment of society.	COM 4001:Pathways Capstone Lab	Success metric determined by rubric specific to Pathways curriculum
<u>COMMUNICATION</u>	Graduates will possess industry-standard professional skills in writing, presentations, and interpersonal communication using Oral, Written, and Visual communication modalities.	Target courses are PSY 2113 Research Methods and PSY 3223 -Experimental Psychology Lab	70% Score 4 or higher on Writing, Presentation and Graphical rubrics specific to each class being assessed
<u>KNOWLEDGE IN DISCIPLINE</u>	Students will demonstrate knowledge and application in 4 content macro-areas: clinical psychology, neuroscience and cognition, experimental methods and techniques and social psychology.	Scores obtained from tests and assignments in the four areas of interest. Target courses for expertise are: 1. Clinical psychology: Introductory psychology, Clinical psychology, Abnormal psychology. 2. Neuroscience and cognition: Introductory psychology, Cognitive psychology, Behavioral neuroscience; 3. Experimental methods and techniques: Introductory Psychology, Research methods, Experimental Psychology Lab; 4. Social psychology: Introductory psychology, Social psychology	Each of the 4 single macro area scores should be higher than 67%.

*BS in Technological Humanities*

**Table 1: Assessment Plan for BS in Technological Humanities**

Undergraduate Program Level Assessment Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators
<u>TECHNOLOGY</u>	Graduates will be able to apply advanced technologies to practical and theoretical problems across disciplines.	Semester projects from: MCS1xx1: Coding Club LLT/SSC4993: Senior Thesis	100% score 4+ on 5pt “Technology” category on HumTech Research Project rubric
<u>ETHICS</u>	Graduates will understand the ethical issues related to their disciplines, and the social consequences of their professional decisions	Semester projects from: COM1001: Pathways to Research COM4001: Pathways Capstone	100% average 4+ on 5pt Pathways Research Project Rubric
<u>LEADERSHIP</u>	Graduates will be able to collaborate across disciplinary fields	Semester projects from: COM1001: Pathways to Research COM4001: Pathways Capstone	100% average 4+ on 5pt Pathways Research Project Rubric
<u>TEAMWORK</u>	Graduates will be able to collaborate across disciplinary fields	Semester projects from: COM1001: Pathways to Research COM4001: Pathways Capstone	100% average 4+ on 5pt Pathways Research Project Rubric
<u>COMMUNICATION</u>	A. Written: Graduates will demonstrate professional writing standards in mechanics, evidentiary and analytical architecture, and editorial process. B. Visual: Graduates will be able to utilize visual media in digital and interpersonal communication contexts.	A. 1. COM3001: WPE 2. Senior Thesis B. Senior Thesis	1. 1. 100% score 23+ on 30pt WPE rubric 2. 100% score 4+ on 5pt “Written Communication” category on HumTech Research Project rubric 2. 100% score 4+ on 5pt “Visual Communication” category on HumTech Research Project rubric
<u>CRITICAL THINKING</u>	Graduates will be able to evaluate competing theories of cultural adaptation to technology change.	Semester projects from: HUM2103: Intro to Hum&Tech LLT4533: Lit Crit and Theory SSC4733: Hist of Technology LLT/SSC4993: Senior Thesis	100% average 4+ on 5pt HumTech Research Project rubric
<u>KNOWLEDGE IN DISCIPLINE</u>	Graduates will develop competencies in diverse humanistic research methodologies, and execute an interdisciplinary research project.	Semester projects from: HUM2103: Intro to Hum&Tech LLT4533: Lit Crit and Theory SSC4733: Hist of Technology LLT/SSC4993: Senior Thesis	100% average 4+ on 5pt HumTech Research 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
<u>KNOWLEDGE</u>	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 modern 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
<u>TECHNOLOGY</u>	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 modern engineering tools necessary for engineering practice;	Same as Knowledge.	80% of students receive a score of 80% or higher
<u>INTEGRATED BUILDINGS</u>	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	
<u>LEADERSHIP</u>	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
<u>VISUAL COMMUNICATION</u>	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
<u>TEAMWORK</u>	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
<u>ETHICS</u>	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
<u>ADVANCED KNOWLEDGE</u>	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.
<u>TECHNOLOGY</u>	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 modern engineering tools necessary for engineering practice;	Same as Advanced Knowledge	80% should reach the highest expected achievement level for each outcome based on BOK2.
<u>COMMUNICATION</u>	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.



<u>ETHICS</u>	<p>Outcome (f): an understanding of professional and ethical responsibility</p> <p>Outcome (h): the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</p> <p>Outcome (i): a recognition of the need for, and an ability to engage in, lifelong learning</p>	<p>EAE5014: AEIDS 4, Professional Presentations with rubric completed by IAB</p> <p>EAE5024: AEIDS 5, Final Report with Supporting Documentation &amp; Calculations, Professional Ethics Essay</p> <p>EAE5123: AdvElecSys, Projects #1, #2 &amp; #3</p> <p>ECE5283: Conceptual Estimating, Final Estimation Project</p> <p>EME5373: Alt. Energy Eng., Homework #1 (Problems #4 &amp; 5); Homework #5 (Problems #1); Special Topic Papers #1 &amp; #2</p> <p>ECE5703: Timber Structures, Final Design Project</p> <p>EME5983: Geothermal, Homework #2, PBL Exercises #1, #2, #3, and Special Topic Paper</p> <p>Graduate Exit Interview</p>	<p>Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2.</p>
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Table 2.2: Curriculum Map

SPRING 2017 ASSESSMENT DATA		COGNATIVE LEVEL (L) MAPPED TO STUDENT OUTCOMES	STUDENT OUTCOMES (SO)											
			Mathematics, Science, Engineering	Experiments, Analyze, Interpret Data	System, Component, Process Constraints	Multi-Disciplinary Teams	Identify, Formulate, Solve Engineering	Professional & Ethical Responsibility	Communicate Effectively	Broad Education, Impact in Global,	Life Long Learning	Contemporary Issues	Modern Engineering Tools for Engineering	Integrated Building
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											
		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

## ***BS in Audio Engineering Technology***

**Table 1: Assessment Plan with Mapped Courses for the BS in Audio Engineering Technology**

<b>Undergraduate Program Level Learning Outcomes</b>	<b>BSAET Outcomes</b>	<b>Assessment Strategy</b>	<b>Metrics/ Indicators**</b>
<b><u>TECHNOLOGY</u></b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 4) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	1 4 2	Assignments in TAS4103, TIE4115 Assignments in TME3113, TEE4224 Assignments in TAS4103, TEE4214	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>ETHICS</u></b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	5	Assignments in EGE3022	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>LEADERSHIP</u></b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	5	Assignments in EGE3022	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>TEAMWORK</u></b> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	5	Assignments in TAS4103, TIE4115	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>VISUAL COMMUNICATION</u></b> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	3	Graphical assignments in TME3333, TAS4103	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives

*BS in Biomedical Engineering***Table 1: Assessment Plan for Biomedical Engineering Program**

Undergraduate Program Level Learning Outcomes	BSAET Outcomes	Assessment Strategy	Metrics/ Indicators**
<u>TECHNOLOGY</u>	a-3 (L3): Apply engineering principles to a system, device, or process k-1 (L3): Employ engineering and science techniques, skills, and tools relevant to biomedical systems m-1 (L2): Describe the challenges associated with interactions between living tissues or cells and engineered devices or materials m-2 (L3): Identify unmet medical needs and propose an engineering solution	Direct assessment of student assignments from BME 4103, BME 4203, BME 4801 Faculty evaluation of senior design BME 4013, BME 4022 Course objective survey Alumni survey	Green or white flag
<u>ETHICS</u>	f-1 (L3): Demonstrate knowledge of the professional code of ethics and government regulations f-2 (L2): Explain the ethical dimensions of a biomedical engineering problem	Direct assessment of student assignments from BME 3002 Faculty evaluation of senior design BME 4013, BME 4022 Course objective survey Alumni survey	Green or white flag
<u>LEADERSHIP</u>	d-3 (L3) Demonstrate effective leadership characteristics	Direct assessment of student assignments from EGE 2123 Faculty evaluation of senior design BME 4013, BME 4022 Course objective survey Alumni survey	Green or white flag
<u>TEAMWORK</u>	d-1 (L3): Demonstrate personal responsibilities in a team d-2 (L3): Share responsibilities and collaborate in a cross-functional team	Direct assessment of student assignments from BME 1002, EGE 2123 Faculty evaluation of senior design BME 4013, BME 4022 Course objective survey Alumni survey	Green or white flag
<u>VISUAL COMMUNICATION</u>	g-1 (L3): Construct and deliver a logical and articulate communication based on independent work g-2 (L4): Create a plan, and document methods, observations, and results of an experiment or a project g-3 (L3): Organize and represent data collected in a clear and concise format that enhances the ability to interpret it	Direct assessment of student assignments from BME 3101, BME 3213 Faculty evaluation of senior design BME 4013, BME 4022 Course objective survey Alumni survey	Green or white flag

<u>KNOWLEDGE IN DISCIPLINE</u>	<p>a-1 (L3): Implement mathematical algebra, geometry, calculus, probability techniques, differential equations and/or statistics</p> <p>a-2 (L3): Apply biology, chemistry, calculus-based physics or human physiology principles</p> <p>b-1 (L3): Conduct experimental procedures to measure and record data.</p> <p>b-2 (L4): Examine data using appropriate analytical techniques</p> <p>b-3 (L3): Compose a scientific hypothesis and test the hypothesis using experimental data</p> <p>c-1 (L3): Use the engineering design process to generate potential solutions to a biomedical need</p> <p>c-2 (L4): Examine realistic constraints related to the proposed solution</p> <p>c-3 (L3): Implement, test, and demonstrate an engineered solution that meets design specifications</p> <p>e-1 (L3): Write a problem statement for a biomedical engineering problem</p> <p>e-2 (L3): Produce a solution to a biomedical engineering problem</p> <p>h-1 (L2): Recognize the contribution of science, technology, engineering and/or mathematics to society</p> <p>i-1 (L3): Collect relevant technical information, data, and ideas from multiple sources</p> <p>i-2 (L2): Recognize opportunities that enhance professional career development</p> <p>j-1 (L2): Explain contemporary issues in biomedical professions</p> <p>j-2 (L2): Describe state-of-the-art and new trends in biomedical engineering</p> <p>n-1 (L3): Analyze or model biomedical problems</p> <p>n-2 (L3): Implement design of biomedical engineering devices, systems, components, or processes</p> <p>o-1 (L3): Conduct investigational protocols and procedures to measure and record signals and data from living systems responding to environmental conditions</p> <p>o-2 (L3): Interpret data and observations from living systems subjected to environmental conditions</p>	<p>Direct assessment of student assignments from BME 1002, BME 3301, BME 3101, BME 3103, BME 3113, BME 3213, BME 3301, BME 3303, BME 3703, BME 4103, BME 4113, BME 4201, BME 4203, BME 4313, BME 4801, BME 4803</p> <p>Faculty evaluation of senior design BME 4013, BME 4022</p> <p>Course objective survey</p> <p>Alumni survey</p>	Green or white flag
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<sup>1</sup>: The target level of attainment is quantified using Bloom's taxonomy:

Level 1 (L1) – Knowledge, Level 2 (L2) – Comprehension, Level 3 (L3) – Application, Level 4 (L4) – Analysis, Level 5 (L5) – Synthesis, Level 6 (L6) - Evaluation

<sup>2</sup>: Each ABET outcome is assessed using a combination of several assessment tools. Each assessment tool may involve evaluation/analysis of multiple courses or other components. Details of this approach can be found in the *BME program annual assessment report 2016-2017*.



- <sup>3</sup>: Each key performance indicator is assessed using an “excellent, Adequate, Minimal, Unsatisfactory” (EAMU) vector. The description and nominal measurement ranges for each level are set as appropriate to the task associated with the key performance indicator. The performance vectors are classified into four categories: “Red flag”, “Yellow flag”, “White flag” and “Green flag” as described below:
- Red flag: Below 2.0 average performance vector and more than 10% of the class demonstrating unsatisfactory performance
  - Yellow flag: Below 2.0 average performance vector and less than 10% of the class demonstrating unsatisfactory performance; or above 2.0 average performance vector and more than 10% of the class demonstrating unsatisfactory performance
  - White flag: Not under Red, Yellow or Green flag classifications
  - Green flag: Above 2.75 average performance vector and no indication of any unsatisfactory performance
- Details of the KPI assessment method can be found in the *BME program annual assessment report 2016-2017*.
- <sup>4</sup>: The 3-year staggered rotation schedule was decided by all BME faculty in order to achieve a more meaningful and sustainable direct assessment process. If assessment on one course shows lower than accepted level of achievement on a particular KPI, it will be re-assessed the following year based on proposed actions for improvement. In the course direct assessment report each instructor produces, a general observation will be made on the overall student achievement of all relevant KPIs to capture any abnormalities.


**Table 2: Updated ABET Outcomes 1-7 Mapping to Biomedical Engineering Program Performance Indicators**

ABET Student Outcome	BME Key Performance Indicator		Former KPI
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	1-a (L3)	Implement mathematical algebra, geometry, calculus, probability techniques, differential equations and/or statistics	a-1
	1-b (L3)	Apply biology, chemistry, calculus-based physics or human physiology principles	a-2
	1-c (L3)	Write a problem statement for a biomedical engineering problem	e-1
	1-d (L3)	Apply engineering principles to a system, device, or process	a-3
	1-e (L4)	Evaluate solutions to a biomedical engineering problem	e-2
	1-f (L3)	Employ techniques, skills and tools relevant to biomedical systems	k-1
(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	2-a (L3)	Use the engineering design process to generate potential solutions to a biomedical need	c-1
	2-b (L3)	Examine realistic constraints related to the proposed solution	c-2
	2-c (L3)	Implement, test, and demonstrate an engineered solution that meets design specifications	c-3
(3) an ability to communicate effectively with a range of audiences	3-a (L3)	Construct and deliver a logical and articulate communication based on independent work	g-1
	3-b (L3)	Create a plan, and document methods, observations, and results of an experiment or a project	g-2
	3-c (L3)	Organize and represent data collected in a clear and concise format that enhances the ability to interpret it	g-3
(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	4-a (L3)	Recognize the contribution of science, technology, engineering and/or mathematics to society	h-1
	4-b (L3)	Demonstrate knowledge of the professional code of ethics and government regulations	f-1
	4-c (L3)	Explain the ethical dimensions of a biomedical engineering problem	f-2
	4-d (L3)	Describe state-of-the-art and new trends in biomedical engineering	j-2
(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	5-a (L3)	Demonstrate personal responsibilities in a team	d-1
	5-b (L3)	Share responsibilities and collaborate in a cross-functional team	d-2
	5-c (L3)	Demonstrate effective leadership characteristics	d-3
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	6-a (L3)	Conduct experimental procedures to measure and record data.	b-1
	6-b (L3)	Examine data using appropriate analytical techniques	b-2
	6-c (L3)	Compose a scientific hypothesis and test the hypothesis using experimental data	b-3
	6-d (L3)	Describe the challenges associated with interactions between living tissues or cells and engineered devices or materials	m-1
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	7-a (L3)	Collect relevant technical information, data, and ideas from multiple sources	i-1
	7-b (L3)	Recognize opportunities that enhance professional career development	i-2

**Table 3: BS in BME Program Assessment Curriculum Map**

Course	Biomedical Engineering Program Key Performance Indicator	1-a (L3)	1-b (L3)	1-c (L3)	1-d (L3)	1-e (L4)	1-f (L3)	2-a (L3)	2-b (L3)	2-c (L3)	3-a (L3)	3-b (L3)	3-c (L3)	4-a (L3)	4-b (L3)	4-c (L3)	4-d (L3)	5-a (L3)	5-b (L3)	5-c (L3)	6-a (L3)	6-b (L3)	6-c (L3)	6-d (L3)	7-a (L3)	7-b (L3)
		Math	Science	Problem statement	Engineering principles	Evaluate solutions	Apply Tools	Engineering design process	Realistic constraints	Engineered solution	Articulate Communication	Document project	Organize data	STEM in society	Regulations	Ethics	State-of-the-art	Team responsibilities	Collaborate	Leadership	Experimental procedures	Analyse data	Scientific hypothesis	Bio-material interactions	Collect information	Recognize opportunities
EGE 1001	Fund. Eng. Design Proj.			I	I	I	I	I	I	I	I	I		I		I	I	I	I	I					I	I
BME 1002	Intro to BME		I	I	I		I	I			I	I	I	I	I		I	I		I	I		I	I	I	I
BME 1201	Graphics Lab						R		R		I	R	R													
BME 1202	Comp. App. Lab	I			R		R				I							I				I				
EGE 2123	Ent. Eng. Design Studio			R	R	R	R	R	R	R	R	R						R	R	R						R
EGE 2013	Statics	R	R		R																					
EGE 3012	Eng. Cost Analysis					R			R						R											
EGE 3022	Lead Prof Dev For Eng.													R	R	R		E	E	E						
EEE 2123	Circuits & Electronics	R	R		R																					
BME 3002	Best Practices										R			E	E	E	R									R
BME 3103	BioInstrum.	E	E										R								R	R		R	R	
BME 3101	BioInstrum. Lab						E						E					R				E	R			
BME 3213	Biomat.		R		R	R					E						E							E	R	
BME 3303	Biomech	E	R		R			R			R			R											R	
BME 3301	Biomech Lab	R	R		E	R	E				R	R	R				R	R			E	E	E		R	
BME 3703	Biotransp	E	R		E	R					R													R		
BME 3113	Wearable Tech Studio			R	R	R	R	E	R	R	E	R		R			E	R	E	R					E	R
BME 4113	Med. Dev Design	R	E	R	E	R	R	E	E	R	R	R		R	E		E				R			E	R	R
BME 4103	Fnd. Med. Imaging			E			R																	E		
BME 4203	MEMS	R	R	E	E	E		R	E	E	R						R								R	R
BME 4201	MEMS Lab				E	R	E	R	R	R		E	E								E	E			R	

BME 4313	Tissue Mech.	E	E			E					R			R	E		E						E	R		
BME 4803	Tissue Eng.		E	E	E	E			E		R			R		E	E						E	R	E	
BME 4801	Tissue Eng. Lab		R	E	E		E						E					R			E	E	E			
BME 4013	Projects I	R	R	E	E	E	E	E	E	R	E	E	E	E	E	R	E	R	R	E	R	R	R	E	E	E
BME 4022	Projects 2	R	R	E	E	E	E	E	E	E	E	E	E	E	E	R	E	E	E	E	E	E	E	E	E	

 Indicates course will be assessed for KPI during 2019-2022

Introduce (I): corresponds to instances where the student outcomes are supported at an introductory level in a course.

Reinforce (R): achieved when a course serves to reinforce the attainment of a student outcome that was supported previously at an introductory level in another course.

Emphasize (E): achieved when a student outcome is supported at a more focused and advanced level.

**Table 4: 2019-2020 Direct Assessment Plan (updated to new ABET 1-7 outcomes)**

<b>SO</b>	<b>KPI</b>		<b>Course</b>	<b>Instructor</b>
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	1-a *a-1	(L3): Implement mathematical algebra, geometry, calculus, probability techniques, differential equations and/or statistics	<b>BME 3703</b> Biotransport	Li (Fall 2019)
	1-b *a-2	(L3): Apply biology, chemistry, calculus-based physics or human physiology principles	<b>BME 4313</b> Tissue Mechanics	Meyer (Spring 2020)
			<b>BME 4803</b> Tissue Eng	Li (Fall 2019)
	1-c *e-1	(L3): Write a problem statement for a biomedical engineering problem	<b>BME 3213</b> Biomaterials	Lancina (Spring 2020)
	1-d *a-3	(L3): Apply engineering principles to a system, device, or process	<b>BME 4203</b> Intro to MEMS	Jiang (Spring 2020)
	1-e *e-2	(L3): Evaluate solutions to a biomedical engineering problem	<b>BME 4103</b> Medical Imaging	Jiang (Fall 2019)
	1-f *k-1	(L3) Employ techniques, skills and tools relevant to biomedical systems	<b>BME 4201</b> MEMS Lab	Li (Spring 2020)
(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	2-a *c-1	(L3): Use the engineering design process to generate potential solutions to a biomedical need	<b>BME 4113</b> Medical Device Design	Jiang (Spring 2020)
	2-b *c-2	(L4): Examine realistic constraints related to the proposed solution	<b>BME 3113</b> Wearable Tech Studio	Meyer (Fall 2019)
	2-c *c-3	(L3): Implement, test, and demonstrate an engineered solution that meets design specifications	<b>BME 4022</b> Senior Projects 2	Lancina (Spring 2020)

Note. \* indicates former KPI prior to ABET SO revision from a-k to 1-7 in 2019

**BS in Civil Engineering****Table 1. Assessment Plan for the BS of Civil Engineering**

<b>LTU Undergraduate Program Level Learning Outcomes</b>	<b>Supporting Civil Engineering Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metric/Indicators</b>
<u><b>TECHNOLOGY</b></u> a. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) b. Design and conduct experiments. (Bloom's 3) c. Analyze and interpret data using appropriate tools (e.g., Excel, MATLAB) (Bloom's 3)	Outcome #15 – Technical Specialization	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 2</i> for subdiscipline terminal courses.
<u><b>ETHICS</b></u> a. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) b. Discern between personal and professional ethical responsibilities (Bloom's 2)	Outcome #24 – Professional and Ethical Responsibility	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.
<u><b>LEADERSHIP</b></u> a. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) b. Explain the difference between leadership and management. (Bloom's 2) c. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	Outcome # 20 - Leadership	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
<u><b>TEAMWORK</b></u> a. LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	Outcome #21 - Teamwork	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement Level 3 for subdiscipline terminal courses.
<u><b>VISUAL COMMUNICATION</b></u> a. Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4).	Outcome # 16 – Communication	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 5</i> for subdiscipline terminal courses.

<b>BSCE Additional Program-Level Outcomes</b>			
No correlative Lawrence Tech University-Level Outcome	Outcome #1 – Mathematics	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #2 – Natural Sciences	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #3 – Humanities	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #4 – Social Sciences	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #5 – Materials Science	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #6 – Mechanics	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #7 – Experiments	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #8 – Problem Recognition and Solving	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.

No correlative Lawrence Tech University-Level Outcome	Outcome #9 – Design	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 5</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #10 – Sustainability	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #11 – Contemporary Issues and Historical Perspectives	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #12 – Risk and Uncertainty	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 3</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #13 – Project Management	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #14 – Breadth in Civil Engineering	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #17 – Public Policy	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 2</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #18 – Business and Public Administration	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 2</i> for subdiscipline terminal courses.



No correlative Lawrence Tech University-Level Outcome	Outcome #19 – Globalization	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 2</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #22 – Attitudes	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 2</i> for subdiscipline terminal courses.
No correlative Lawrence Tech University-Level Outcome	Outcome #23 – Lifelong Learning	Direct assessment of appropriate student work; assignments, tests, projects, etc.	EAMU Vector weighted average of 2.0 or above; Achievement <i>Level 4</i> for subdiscipline terminal courses.

Table 2. Curriculum Map for the BS of Civil Engineering

REQUIRED COURSES	Foundational Outcomes				Technical Outcomes										Professional Outcomes									
	Math (1)	Natural Science (2)	Humanities (3)	Social Sciences (4)	Material Sciences (5)	Mechanics (6)	Experiments (7)	Problem Solving (8)	Design (9)	Sustainability (10)	Cont. Issue & His (11)	Risk & Uncertainty (12)	Project Management (13)	Breadth (14)	Tech Specialization (15)	Communication (16)	Public Policy (17)	Bus. & Public Admin (18)	Globalization (19)	Leadership (20)	Teamwork (21)	Attitudes (22)	Lifelong Learning (23)	Prof & Ethical Resp (24)
1011 CE Perspectives	3	2	2	2	2	2	2	3	3	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2
1013 Surveying	3	2	2	2	2	2	4	3	2	2	2	2	2	4	1	3	2	2	2	2	3	2	2	2
1101 CE Computer Graphics	2	2	2	2	2	2	2	2	1	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2
1102 CE Computer Applications Lab	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
1413 CE Materials	2	3	2	2	3	2	4	3	3	1	1	1	2	2	4	2	2	2	2	2	3	2	2	2
MCS3403 Probability & Statistics	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2
2103 Computer Aided Infrastructure Planning	3	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3013 Mechanics of Materials for CE	3	3	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3213 Construction Engineering	2	2	2	2	1	1	2	2	2	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2
3324 Environmental Engineering 1	3	1	2	2	2	2	3	3	3	2	2	2	2	4	2	4	1	2	2	2	2	2	2	2
3424 Soil Mechanics	2	1	2	2	2	3	4	3	1	2	1	2	2	3	2	4	2	2	2	2	3	2	2	2
3523 Hydromechanics	3	2	2	2	2	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3723 Theory of Structures	3	2	2	2	2	4	2	3	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3823 Transportation Engineering	3	2	2	2	2	3	3	3	3	2	2	2	1	3	2	4	2	2	2	2	3	2	2	2
4022 CE Design Project 1	2	2	2	3	3	3	2	3	4	3	1	3	3	4	2	5	2	2	2	2	3	2	4	2
4032 CE Design Project 2	2	2	2	3	3	3	2	4	5	3	2	2	4	4	2	5	2	2	2	3	3	2	4	2
4051 Ethics and Professional Issues	2	2	3	2	2	2	2	2	2	3	3	2	2	2	4	2	2	2	2	2	2	2	4	4
4243 CE Management Practices	2	2	2	2	2	2	4	2	2	3	2	4	4	2	4	2	2	2	2	2	3	2	2	2
4544 Hydraulic Engineering	3	3	2	2	2	4	4	4	4	3	1	2	4	2	4	2	2	2	2	2	3	2	2	2
4743 Concrete Design	3	2	2	2	2	3	2	4	5	2	2	2	4	2	4	2	2	2	2	2	2	2	2	2
4761 Structural Design Test Lab	3	2	2	2	2	4	4	2	4	2	3	2	4	1	4	2	2	2	2	2	3	2	2	2
ELECTIVE COURSES																								
4263 Cost Estimating	2	2	2	2	2	2	3	2	2	2	2	2	2	4	2	4	2	2	2	2	3	2	2	3
4343 Environmental Engineering 2	3	1	2	2	2	2	4	3	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2
4363 Environmental Engineering Design	2	2	2	2	2	2	4	5	2	2	2	2	2	4	2	2	2	2	2	2	2	2	2	2
4443 Foundation Engineering	2	2	2	2	2	4	2	4	5	2	2	2	2	4	2	4	2	2	2	2	3	2	2	2
4563 Hydrology	3	2	2	2	2	2	2	2	2	1	2	3	2	4	2	2	2	2	2	2	2	2	2	2
4733 Advanced Structural Analysis	3	3	2	2	3	3	4	4	2	2	2	3	2	4	2	2	2	2	2	2	2	2	2	2
4753 Steel Design	3	2	2	2	1	3	4	5	2	2	1	2	2	4	2	2	2	2	2	2	2	2	2	2
4843 Highway Engineering	3	2	2	2	2	2	4	5	2	2	2	2	2	4	2	4	2	2	2	2	3	2	2	3
Required Level of Cognitive Achievement	L3	L3	L3	L3	L3	L4	L4	L4	L5	L3	L3	L3	L4	L4	L2	L5	L2	L2	L2	L3	L3	L2	L4	L4
L1: Knowledge, L2: Comprehension, L3: Application, L4: Analysis, L5: Synthesis, L6: Evaluation																								
Terminal courses for subdiscipline coverage, requiring assessment for CE breadth and technical specialization																								
Courses that are assessed for various outcomes																								
Capstone courses, CE Design 1 and CE Design 2, are assessed together																								
Courses that are assessed for CE design of a system, component or process																								

ABET's New Student Outcomes	ASCE BOK3
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	1. Mathematics 2. Natural Sciences 5. Materials Science 6. Engineering Mechanics 8. Critical Thinking and Problem Solving
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	9. Design 10. Sustainability 11. Engineering Economics
3. an ability to communicate effectively with a range of audiences	16. Communications
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	11. Engineering Economics 24a. Ethical Responsibilities 24b. Professional Responsibilities
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	20. Team Work & Leadership 21. Team Work & Leadership
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	7. Experimental Methods & Data Analysis
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	23. Lifelong Learning
<p>* Additional student outcomes as articulated by the civil engineering program to meet ASCE BOK3. Some of these are implied in the new ABET outcomes (1) through (7)</p> <p><u>Note:</u> ASCE BOK3 has removed the following outcomes (from BOK2):</p>	3. Humanities
	4. Social Sciences
	12. Risk and Uncertainty
	13. Project Management
	14. Breadth in Civil Engineering Areas
	15. Depth in a Civil Engineering Area

17. Public Policy 18. Business & Public Administration 19. Globalization	22. Professional Attitudes
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**BS in Computer Engineering****Table 1: Assessment Plan with Mapped Courses for the BS in Computer Engineering**

<b>LTU Undergraduate Program Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>
<b><u>TECHNOLOGY</u></b> 1. Apply advanced technologies to practical and theoretical problems.(Bloom's 3) 2. Design and conduct experiments.(Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, MATLAB) (Bloom's 3)	Outcome 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Direct assessment of Reports, Presentations and Posters in EEE3231, 3233, 4842.	80% of students receive a score of 70% or higher
<b><u>ETHICS</u></b> 1. Demonstrate critical thinking with respect to ethical dilemmas. (Bloom's 3) 2. Discern between personal and professional ethical responsibilities. (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (Bloom's 2) 4. Predict possible social consequences of engineering/science ethical decisions. (Bloom's 3)	Outcome 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 of student Reports, Presentation and Posters in EEE4822	80% of students receive a score of 70% or higher
<b><u>LEADERSHIP</u></b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	[h] The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.	Direct assessment of student Reports in EEE4822. EEE4424	80% of students receive a score of 70% or higher
<b><u>TEAMWORK</u></b>  	[d] An ability to function on multidisciplinary teams	Direct assessment of student assignments in EGE1001 and EEE4842.	80% of students receive a score of 70% or higher
<b><u>VISUAL COMMUNICATION</u></b> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome 3: an ability to communicate effectively with a range of audiences	Direct assessment of student Reports, Presentations and Posters in EEE4822	80% of students receive a score of 70% or higher

<u>KNOWLEDGE IN DISCIPLINE</u>	<p>[a] An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations.</p> <p>[b] an ability to design and conduct experiments, as well as to analyze and interpret data.</p> <p>[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.</p>	Direct assessment of student assignments in EEE3125, 3221, 3231, 3233, 4273, 4514 and 4842.	80% of students receive a score of 70% or higher
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***BS in Construction Engineering Technology and Management***

**Table 1: Assessment Plan with Mapped Courses for the BS in Construction Engineering Technology and Management**

Undergraduate Program Level Learning Outcomes	ETAC Outcomes	Assessment Strategy	Metrics/ Indicators**
<b><u>TECHNOLOGY</u></b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 4) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	Outcome c, d, e	Assignments in TCE1023, TCE2073, TCE3013, TCE3093, TCE4133, TIE3163, TIE4133, TME3333	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>ETHICS</u></b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	College of Engineering	Assignments in EGE1001, EGE3022	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>LEADERSHIP</u></b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	College of Engineering	Assignments in EGE1001, EGE3022	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>TEAMWORK</u></b> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	Outcome h, i	Assignments in TCE3053, TCE4113, TIE4115, TME4113	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives

<u>VISUAL COMMUNICATION</u> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome a, f	Graphical assignments in TCE2143, TCE4113, TCE4213	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
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***BS in Electrical Engineering*****Table 1: Assessment Plan with Mapped Courses for the BS in Electrical Engineering**

<b>LTU Undergraduate Program Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>
<b><u>TECHNOLOGY</u></b> 1. Apply advanced technologies to practical and theoretical problems.(Bloom's 3) 2. Design and conduct experiments.(Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, MATLAB) (Bloom's 3)	Outcome 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Direct assessment of Reports, Presentations and Posters in EEE3231, 3233, 4842.	80% of students receive a score of 70% or higher
<b><u>ETHICS</u></b> 1. Demonstrate critical thinking with respect to ethical dilemmas. (Bloom's 3) 2. Discern between personal and professional ethical responsibilities. (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (Bloom's 2) 4. Predict possible social consequences of engineering/science ethical decisions. (Bloom's 3)	Outcome 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 of student Reports, Presentation and Posters in EEE4822	80% of students receive a score of 70% or higher
<b><u>LEADERSHIP</u></b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	[h] The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.	Direct assessment of student Reports in EEE4822. EEE4424	80% of students receive a score of 70% or higher
<b><u>TEAMWORK</u></b>	[d] An ability to function on multidisciplinary teams	Direct assessment of student assignments in EGE1001 and EEE4842.	80% of students receive a score of 70% or higher
<b><u>VISUAL COMMUNICATION</u></b> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome 3: an ability to communicate effectively with a range of audiences	Direct assessment of student Reports, Presentations and Posters in EEE4822	80% of students receive a score of 70% or higher

<u>KNOWLEDGE IN DISCIPLINE</u>	<p>[a] An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations.</p> <p>[b] an ability to design and conduct experiments, as well as to analyze and interpret data.</p> <p>[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.</p>	Direct assessment of student assignments in EEE3125, 3221, 3231, 3233, 4273, 4514 and 4842.	80% of students receive a score of 70% or higher
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**BS in Industrial Engineering****Table 1: Assessment Plan for the BS in Industrial Engineering**

<b>Undergraduate Program Level Learning Outcomes</b>	<b>ABET Outcomes</b>	<b>Assessment Strategy</b>	<b>Metrics/ Indicators</b>
<b>TECHNOLOGY</b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	Outcome 1 (an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics) Outcome 2 (an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions)	1. Evaluation of application of technology in EIE 4252 – Senior Project Fundamentals and EME 4253 - Sr. Capstone Project 2. Exam/homework questions on experimental design in operations research, work design, statistical methods for process improvement, simulation and occupational ergonomics courses 3. Exam questions on industrial engineering laboratory technique (new IE Lab course)	1. Checklist to apply technologies, all students use a certain of technologies (which vary by project) 2. 70% of students receive a score of 60% or higher 3. 70% of students receive a score of 60% or higher
<b>ETHICS</b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Homework (or classroom) assignment in EGE 3022 3. Homework assignment in EGE 1001 4. Team classroom assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Grading rubric 4. Evaluation rubric
<b>LEADERSHIP</b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Homework assignment in EGE 3022 3. Team Project rubric in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Evaluation rubric

<u>TEAMWORK</u> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Team assignment in EGE 3022 3. Homework assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Evaluation rubric 3. Grading rubric
<u>VISUAL COMMUNICATION</u> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome 3 (an ability to communicate effectively with a range of audiences)	Graphical assignments from statistical control of process improvement, operations research projects, simulation project reports, work design and measurement projects, human factors projects and sr. capstone project reports. Poster rubric in senior projects courses.	Graphical elements of written rubric: (80% will receive 70%) Projects Posters: 80% of students will score 80% or higher.

**Table 2: Curriculum Map of BSIE Selected Courses with ABET Outcomes a-k**

	Assessment Tools/Measures	Courses	Semester
a	Evaluate exam problems using problem solving rubrics	EIE 3653, EIE 3123, EIE 3353 EIE 3043, EIE 3453, EIE 4453	Based on course scheduling And graduation
b	Evaluate exam problems using problem solving rubrics	EIE 3753	
c	Faculty advisor evaluate written proposals using proposal rubric	EIE 4252, EIE 4253	
	Faculty advisor evaluate final reports using final report rubric	EIE 4252, EIE 4253	
d	Students evaluate teammates using peer evaluation form/rubric	EIE 4252, EIE 4253	
	Faculty Advisor meeting with team to discuss team functionality	EIE 4252, EIE 4253	
	Faculty & IAB evaluation of teamwork at final presentation	EIE 4252, EIE 4253	
e	Evaluate final exam problem using problem solving rubric	EIE 3043, EIE 3453 EIE 3123, EIE 3753, EIE 4553	
f	10 multiple choice ethics questions	EIE 4252, EIE 4253	
	Case study assignment on ethics	EIE 4013	
	Ethics/integrity statement on final report	EIE 4252, EIE 4253	
g	Evaluate oral presentations using presentation rubric	EIE 3043, EIE 3453 EIE 3753, EIE 4013	
	Evaluation of technical report writing using writing rubric	EIE 3043, EIE 3453 EIE 3753, EIE 4013	
h	Mandatory attendance at seminar series/workshops (3 in Fall, 3 in Spring)	EIE 4252, EIE 4253	
	Assignment on how engineering solutions impact global, economic, environmental and societal issues	EIE 4252, EIE 4253	
	Discuss sustainability in final report	EIE 4252, EIE 4253	
i	Number of LTU BSME students that enroll in a graduate program at LTU	Registrar Data	
	Number of students enrolled in a graduate program or who attended a short course, workshop, or seminar in the past two years	Alumni Survey	
	Statement of current professional organization memberships	Exit Interview	
	Statement of professional goals and plans for graduate studies	Exit Interview	
	Discuss professional organizations and membership benefits	EGE1012	
j	Identify and discuss a contemporary engineering issue	Exit Interview	
	Mandatory attendance at seminar series / Workshops (3 in Fall, 3 in Spring)	EIE 4252, EIE 4253	
	Attend lecture on contemporary engineering issue and write one page paper on the lecture	EIE 4252, EIE 4253	
k	Evaluate technology uses using rubrics	EIE 2012 EIE 3043, EIE 3453 EIE 3753	

**Table 3: Curriculum Map of BSIE Selected Courses with ABET New Outcomes 1-7**

		Tools/Measures	
	Assessment	Courses	Semester
1	Evaluate exam problems using problem solving rubrics	EIE 3123, EIE 3353, EIE 4013, EIE 3043, EIE 3453, EIE 4453	Based on course scheduling and graduation
2	Faculty advisor evaluate written proposals using proposal rubric	EIE 4252, EIE 4253	
	Faculty advisor evaluate final reports using final report rubric	EIE 4252, EIE 4253	
3	Evaluate oral presentations using presentation rubric	EIE 3043, EIE 3453	
	Evaluation of technical report writing using writing rubric	EIE 3753, EIE 4013	
4	10 multiple choice ethics questions	EGE 3022	
	Case study assignment on ethics	EIE 4013	
	Ethics/integrity statement on final report	EIE 4252, EIE 4253	
	Mandatory attendance at seminar series/workshops	EIE 4252, EIE 4253	
	Assignment on how engineering solutions impact global, economic, environmental and societal issues	EIE 4013, EIE 4252, EIE 4253	
5	Students evaluate teammates using peer evaluation form/rubric	EIE 4252, EIE 4253	
	Faculty Advisor meeting with team to discuss team functionality	EIE 4252, EIE 4253	
	Faculty & IAB evaluation of teamwork at final presentation	EIE 4252, EIE 4253	
6	Evaluate exam problems using problem solving rubrics	EIE 3753	
7	Literature review in production planning and control	EIE 3043	
	Evaluate project paper Statistical Methods for Process Improvement	EIE 3453	

**Table 4: Mapping of the BSIE Engineering Core Classes to the ABET Outcomes a-k**

Course	Student Outcomes										
	a	b	c	d	e	f	g	h	i	j	k
EEE 2123 Circuits & Electronics	R	-	-	R	-	R	-	R	-	-	-
EGE 1001 Fund. of Eng. Design Proj.	I	I	I	I	I	I	I	I	I	I	I
EGE 1023 Engineering Materials	I	I	I	I	I	I	I	I	I	I	I
EGE 1102 Engineering Computer Application Lab	I	-	I	-	I	-	-	-	-	-	I
EGE 2013 Statics	E	R	R	-	I	-	-	-	-	-	I
EGE 2123 Entrepreneurial Engineering Design Studio	I	I	I	I	I	I	I	I	I	I	I
EGE 3003 Thermodynamics	R	R	R	-	E	-	R	-	-	-	R
EME 2011 Materials Lab	R	E	I	R	I	I	R	-	-	-	I
EIE 3023 Manufacturing Processes	R	R	R	-	R	I	R	-	-	-	R
EIE 3033 Engineering Numerical Methods	R	-	-	-	-	-	-	-	-	-	E
EIE 1011 - Foundations of Industrial Engineering	I	I	I	I	I	I	I	I	I	I	I
EIE 3043 - Production, Planning & Control	R	I	I	-	I	-	R	I	-	I	I
EIE 3123 - Plant Layout	R	I	I	-	R	-	R	I	-	I	I
EIE 3353 - Operations Research Techniques	E	R	I	-	R	-	R	-	-	-	R
EIE 3453 - Stat Methods for Process	E	R	R	-	R	-	-	-	-	-	R
EIE 3653 - Stochastic Modeling	R	R	R	-	R	I	R	-	-	I	I
EIE 3753 - Simulation in System Design	E	R	R	-	E	I	E	-	R	I	R
EIE 4013 - Work Design and Measurement	R	R	R	-	E	-	R	E	R	-	R
EIE 4252 - Senior Project Fundamentals	E	R	E	E	E	E	E	E	E	R	E
EIE 4253 - Senior Capstone Project	E	R	E	E	E	E	E	E	E	E	E
EIE 4453 - Applied Operations Research	E	E	R	-	E	-	E	R	E	E	E
EIE 4553 - Occupational Ergonomics	R	E	R	-	E	I	E	R	R	E	E
EIE 4653 - Industrial and Engineering Finance	R	R	E	-	R	-	R	-	-	-	R

**Table 5: Mapping of the BSIE Engineering Core Classes to the ABET Outcomes 1-7**

Course Student Outcomes	1	2	3	4	5	6	7
EEE 2123 Circuits & Electronics	R	-	-	R	R	-	-
EGE 1001 Fund. of Eng. Design Proj.	I	I	I	I	I	I	I
EGE 1023 Engineering Materials	I	I	I	I	I	I	I
EGE 1102 Engineering Computer Application Lab	I	I	-	-	-	-	-
EGE 2013 Statics	E	R	-	-	-	R	-
EGE 2123 Entrepreneurial Engineering Design Studio	I	I	I	I	I	I	I
EGE 3003 Thermodynamics	R	R	R	-	-	R	-
EME 2011 Materials Lab	R	I	R	I	R	E	-
EIE 3023 Manufacturing Processes	R	R	R	I	-	R	-
EIE 3033 Engineering Numerical Methods	R	-	-	-	-	-	-
EIE 1011 - Foundations of Industrial Engineering	I	I	I	I	I	I	I
EIE 3043 - Production, Planning & Control	R	I	R	I	-	I	-
EIE 3123 - Plant Layout	R	I	R	I	-	I	-
EIE 3353 - Operations Research Techniques	E	I	R	-	-	R	-
EIE 3453 - Stat Methods for Process	E	R	-	-	-	R	-
EIE 3653 - Stochastic Modeling	R	R	R	I	-	R	-
EIE 3753 - Simulation in System Design	E	R	E	I	-	R	R
EIE 4013 - Work Design and Measurement	R	R	R	R	-	R	R
EIE 4252 - Senior Project Fundamentals	E	E	E	E	E	R	E
EIE 4253 - Senior Capstone Project	E	E	E	E	E	R	E
EIE 4453 - Applied Operations Research	E	R	E	R	-	E	E
EIE 4553 - Occupational Ergonomics	R	R	E	I	-	E	R
EIE 4653 - Industrial and Engineering Finance	R	E	R	-	-	R	-

*Note.* Introduce (I): corresponds to instances where the student outcomes are supported at an introductory level in a course. Reinforce (R): achieved when a course serves to reinforce the attainment of a student outcome that was supported previously at an introductory level in another course. Emphasize (E): achieved when a student outcome is supported at a more focused and advanced level.

***BS in Mechanical Engineering*****Table 1: Assessment Plan for the BS in Mechanical Engineering**

<b>Undergraduate Program Level Learning Outcomes</b>	<b>ABET Outcomes</b>	<b>Assessment Strategy</b>	<b>Metrics/ Indicators</b>
<b>TECHNOLOGY</b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	1. Outcome k (an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice) 2 and 3. Outcome b (an ability to design and conduct experiments, as well as to analyze and interpret data)	1. Evaluation of application of software and technology in EGE 1102, EME 3033, EME 4212, EME 4222, and EME 4253. 2. Exam questions on laboratory technique in EME4412 (may switch to new Measurement Systems course) 3. Exam questions on laboratory technique in EME4412 (may switch to new Measurement Systems course)	1. EGE 1102: 60% of teams will score 60% or higher. EME 3033: 70% of teams will score 70% or higher. Projects: Checklist to apply 7 of 14 technologies (which vary by project) 2. 75% of students receive a score of 70% or higher 3. 75% of students receive a score of 70% or higher
<b>ETHICS</b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	Outcome f (an understanding of professional and ethical responsibility)	1. Homework assignment in EGE 3022 2. Homework (or classroom) assignment in EGE 3022 3. Homework assignment in EGE 1001 4. Team classroom assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Grading rubric 4. Evaluation rubric
<b>LEADERSHIP</b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	Outcome h (the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context)	1. Homework assignment in EGE 3022 2. Homework assignment in EGE 3022 3. Team Project rubric in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Evaluation rubric



<u>TEAMWORK</u> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	Outcome d (an ability to function on multidisciplinary teams)	1. Homework assignment in EGE 3022 2. Team assignment in EGE 3022 3. Homework assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Evaluation rubric 3. Grading rubric
<u>VISUAL COMMUNICATION</u> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome g (an ability to communicate effectively)	Graphical assignments from Dynamics, Heat Transfer. Poster rubric in senior projects courses.	Graphical elements of written rubric: (Dynamics: 50% will receive 80%; Heat Transfer: 80% will receive 80%) Projects Posters: 80% of students will score 80% or higher. (? Under review)



EME 4402 Mechanics Lab	R	E	-	-	-	-	R	-	-	-	E
EME 4412 Thermal Science Lab	R	E	R	E	E	R	E	R	R	R	E

**Table 3: ABET Outcome Assessment Mapping**

	a	b	c	d	e	f	g	h	i	j	k
EGE 1102 Engineering Computer Applications Lab											I
EGE 2103 Statics					I						
EGE 3003 Thermodynamics					R						
EME 2011 Engineering Materials Lab							I				
EME 2012 Mechanical Engineering Graphics											I
EME 3013 Mechanics of Materials					R						
EME 3123 Fluid Mechanics					R						
EME 3033 Engineering Numerical Methods	R										R
EME 3133 Kinematics and Dynamics of Machines	E										
EME 3043 Dynamics	R						R				
EME 3214 Mechatronics										E	E
EME 4003 Design of Machine Elements					E						
EME 4013 Heat Transfer					E		E				
EME 4212 Engineering Projects 1				E				R		R	
EME 4222 Engineering Projects 2			E	E		E					
EME 4252 Senior Project Fundamentals			E	E				R		R	
EME 4253 Senior Capstone Project			E	E		E					
EME 4412 Thermal Science Lab		E					E				
Alumni Survey									x		
Registrar's Data									x		
Exit interview									x	x	

*Note.* Introduce (I): corresponds to instances where the student outcomes are supported at an introductory level in a course. Reinforce (R): achieved when a course serves to reinforce the attainment of a student outcome that was supported previously at an introductory level in another course. Emphasize (E): achieved when a student outcome is supported at a more focused and advanced level.

**Table 4: ABET Student Outcomes Mapping from “a – k” to new “1 – 7”**

Current Student Outcomes (a – k)	Tools	New Student Outcomes (1 – 7)
(a) an ability to apply knowledge of mathematics, science, and engineering  (e) an ability to identify, formulate, and solve engineering problems	<ul style="list-style-type: none"> <li>• FE style problems in Numerical Methods, Kinematics, and Dynamics</li> <li>• Final Exam problem in Statics, Mechanics of Mat., DME, Thermo, Fluids &amp; Heat Transfer</li> </ul>	<b>1.</b> an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics  <i>Complex is defined as having one of the following:</i> <ul style="list-style-type: none"> <li>• involving wide-ranging or conflicting technical issues</li> <li>• having no obvious solution</li> <li>• addressing problems not encompassed by current standards and codes</li> <li>• involving diverse groups of stakeholders</li> <li>• including many component parts or sub-problems</li> <li>• involving multiple disciplines</li> <li>• having significant consequences in a range of contexts.</li> </ul>
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	Final exam questions in Thermal Science Lab	<b>6.</b> an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
(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	Rubric for final report in Competition Projects 2 and ISP B	<b>2.</b> 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
(d) an ability to function on multidisciplinary teams	Teamwork peer evaluation form used in Competition Projects 1 and 2 and ISP A and B	<b>5.</b> 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

<p>(f) an understanding of professional and ethical responsibility</p> <p>(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context</p> <p>(j) a knowledge of contemporary issues</p>	<ul style="list-style-type: none"> <li>• Multiple choice ethics test in Competition Projects 2 and ISP B</li> <li>• Rubric to score paper in Competition Projects 1 and ISP A</li> <li>• Rubric to score paper in Mechatronics</li> </ul>	<p>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</p> <p><i>Consideration/judgement of the impact (risks and trade-offs)</i></p>
<p>(g) an ability to communicate effectively</p>	<ul style="list-style-type: none"> <li>• Oral rubric to score presentation in Thermal Science Lab and Materials Lab</li> <li>• Rubric to score project in Dynamics and Heat Transfer</li> </ul>	<p>3. an ability to communicate effectively with a range of audiences</p> <p><i>Need to determine the range of audiences</i></p>
<p>(i) a recognition of the need for, and an ability to engage in life-long learning</p>	<p>Exit survey of graduating seniors – number of professional memberships and professional goals</p>	<p>7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</p>
<p>(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice</p>	<ul style="list-style-type: none"> <li>• Rubric to score final exam questions in ECAL and Numerical Methods</li> <li>• Rubric to score final report in Competition Projects 1 and 2 and ISP A and B</li> </ul>	<p>Implied in <b>1, 2, and 6</b></p>

**Table 5: ABET Student Outcomes – New Assessment Plan**

New Student Outcomes (1 – 7)	Assessment Method	Timeline
<p>1. an ability to identify, formulate, and solve <i>complex</i> engineering problems by applying principles of engineering, science, and mathematics</p> <p><i>Complex is defined as having one of the following:</i></p> <ul style="list-style-type: none"> <li>• involving wide-ranging or conflicting technical issues</li> <li>• having no obvious solution</li> <li>• addressing problems not encompassed by current standards and codes</li> <li>• involving diverse groups of stakeholders</li> <li>• including many component parts or sub-problems</li> <li>• involving multiple disciplines</li> <li>• having significant consequences in a range of contexts.</li> </ul>	<ul style="list-style-type: none"> <li>• Final exam problem in Statics, Mechanics of Materials, Design of Machine Elements, Thermodynamics, Fluid Mechanics, and Heat Transfer</li> <li>• Evaluate PBL assignment in Design of Machine Elements and/or Fluid Mechanics</li> </ul>	<p>Start Fall 2019</p> <p>Start Spring 2020</p>
<p>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</p>	<ul style="list-style-type: none"> <li>• Rubric for final report in Competition Projects 2 and ISP B</li> <li>• Evaluate student's work in Entrep. Eng. Design Studio</li> </ul>	<p>Start Spring 2020</p> <p>Start Fall 2019</p>
<p>3. an ability to communicate effectively with a range of audiences</p>	<ul style="list-style-type: none"> <li>• Evaluate student's work in COM 2103 Technical &amp; Professional Communication (oral) and COM 1103 College Composition (written)</li> <li>• Rubric to score project in Dynamics and Heat Transfer for graphical communication</li> </ul>	<p>Start Fall 2019</p> <p>Start Fall 2019</p>
<p>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</p>	<ul style="list-style-type: none"> <li>• Evaluate student's work in EGE 3022 Leadership and Professional Development for Engineers</li> </ul>	<p>Start Spring 2020</p>
<p>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</p>	<p>New teamwork evaluation form (not peer evaluation) used in Competition Projects 1 and 2 and ISP A and B</p>	<p>Start Fall 2019</p>
<p>6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</p>	<ul style="list-style-type: none"> <li>• Final exam questions in Thermal Science Lab</li> <li>• Evaluate student's work in EME 3653 Measurement Systems</li> </ul>	<p>Start Fall 2019</p> <p>Start Spring 2020</p>
<p>7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</p>	<ul style="list-style-type: none"> <li>• Evaluate literature survey in Thermodynamics</li> <li>• Evaluate paper in Mechatronics</li> </ul>	<p>Start Fall 2019</p> <p>Start Fall 2019</p>

**Table 6: 2019-2020 Assessment Plan for the BS in Mechanical Engineering**

Undergraduate Program Level Learning Outcomes	ABET Outcomes	Assessment Strategy	Metrics/ Indicators
<b>TECHNOLOGY</b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	Outcome 1 (an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics) Outcome 2 (an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions)	1. Evaluation of application of software and technology in EGE 1102, EME 3033, EME 4212, EME 4222, and EME 4253. 2. Exam questions on laboratory technique in EME4412 (may switch to new Measurement Systems course) 3. Exam questions on laboratory technique in EME4412 (may switch to new Measurement Systems course)	1. EGE 1102: 60% of teams will score 60% or higher. EME 3033: 70% of teams will score 70% or higher. Projects: Checklist to apply 7 of 14 technologies (which vary by project) 2. 75% of students receive a score of 70% or higher 3. 75% of students receive a score of 70% or higher
<b>ETHICS</b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Homework (or classroom) assignment in EGE 3022 3. Homework assignment in EGE 1001 4. Team classroom assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Grading rubric 4. Evaluation rubric
<b>LEADERSHIP</b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Homework assignment in EGE 3022 3. Team Project rubric in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Evaluation rubric



<u>TEAMWORK</u> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Team assignment in EGE 3022 3. Homework assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Evaluation rubric 3. Grading rubric
<u>VISUAL COMMUNICATION</u> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome 3 (an ability to communicate effectively with a range of audiences)	Graphical assignments from Dynamics, Heat Transfer. Poster rubric in senior projects courses.	Graphical elements of written rubric: (Dynamics: 50% will receive 80%; Heat Transfer: 80% will receive 80%) Projects Posters: 80% of students will score 80% or higher. (? Under review)

***BS in Mechanical and Manufacturing Engineering Technology***

**Table 1: Assessment Plan for the BS in Mechanical and Manufacturing Engineering Technology**

Undergraduate Program Level Learning Outcomes	BSMMET Program Criteria	Assessment Strategy	Metrics/ Indicators**
<b><u>TECHNOLOGY</u></b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 4) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	1. Geometric dimension and tolerance; computer aided drafting and design 2. Selection, set-up, and calibration of instrumentation 5. Materials Science, Selections and Strength of Materials 8. Electrical Circuits and Control	Assignments in TEE3103, TEE4193, TEE4214, TEE4224, TIE4115, TIE4193, TIE4214, TME1023, TME4103, TME4113	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>ETHICS</u></b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	College of Engineering	Assignments in EGE1001, EGE3022	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>LEADERSHIP</u></b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	College of Engineering	Assignments in EGE1001, EGE3022	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>TEAMWORK</u></b> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	9. Product Design, Tooling and Assembly	Assignments in TIE3063, TIE3203, TIE4115	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives
<b><u>VISUAL COMMUNICATION</u></b> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	9. Product Design, Tooling and Assembly 10. Statistics, Quality, Continuous Improvement, and Industrial Management	Graphical assignments in TCE2143, TCE4113, TCE4213	At least 70% of students will score 75% on questions designed to directly address each of the course Learning Objectives

**Table 2: Curriculum Map of BSMMET Program****Mapping of BSMMET Program Outcomes to ETAC, ASME and SME Outcomes**

BSMMET Program Criteria	ABET Student's Outcomes											Mechanical Eng. Tech Outcomes								Manuf. Eng. Tech. Outcomes				Supporting Courses*
	a	b	c	d	e	f	g	h	i	j	k	a	b	c	d	e	f	g	h	a	b	c	d	
1. Geometric dimensioning and Tolerancing; computer aided drafting and design	X	X										X								X				<i>TIE4193 GD&amp;T</i> , TME1023 Tech Graphics, TME4113 Design Graphics
2. Selection, set-up, and calibration of instrumentation	X	X			X	X						X												<b>TEE4224</b> Transduces and Instrumentation
3. Engineering Mechanics, Statics and Dynamics			X		X	X							X		X									<b>TME3113</b> Engineering Mechanics
4. Differential and Integral Calculus	X	X												X										MCS2313 Technical Calculus, MCS3324 Applied Calculus & Diff. Eq.
5. Materials Science, Selections and Strength of Materials					X	X		X	X	X		X			X					X				<b>TIE4413</b> Engineering Materials, TIE 4115 Senior Project
6. Manufacturing Processes and Systems			X	X				X	X	X	X	X			X			X	X	X	X	X	X	TME 4413, Lean Manufacturing, <b>TIE 3063</b> Engineering Manufacturing Process, <b>TIE 4193</b> <i>Machininh Processes</i>
7. Thermal Sciences			X		X											X								TME3204 Applied Termal Fluid
8. Electrical Circuits and Control			X	X	X							X						X						TEE3103 DC/AC Curcuts, TEE4214 Embeded Processes
9. Product Design, Tooling & Assembly			X	X					X												X			TIE4115 Senior Project, TME4113 Design Graphics
10. Statistics, Quality, Continuous Improvement, and Industrial Management	X	X			X	X	X		X	X													X	TME3333 Six Sigma 1, TME4343 Six Sigma 2, TIE3203 Tec Project Management
11. Technical Communications, Oral and Written				X	X														X					TIE 3203 Tech Project management, TIE4115 Senior Project, COM2103 Technical Communications, Comm 300 ( writing Profficiency Exam)

***BS in Robotics Engineering*****Table 1: Assessment Plan with Mapped Courses for the BS in Robotics Engineering**

<b>Undergraduate Program Level Learning Outcomes</b>	<b>ABET Outcomes</b>	<b>Assessment Strategy</b>	<b>Metrics/ Indicators</b>
<b>TECHNOLOGY</b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	1. Outcome k (an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice) 2 and 3. Outcome b (an ability to design and conduct experiments, as well as to analyze and interpret data)	1. Term project grade in MRE3114 2. Rubric to grade take-home MATLAB assignment in MRE4113 3. Term project grade in MRE2024, MRE3024	70% of students will score 80% or above
<b>ETHICS</b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	Outcome f (an understanding of professional and ethical responsibility)	Writing rubric used for technical paper in EME3043, MRE3024 Oral presentation rubric used in MRE4014	70% of students will score 80% or above
<b>LEADERSHIP</b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	Outcome h (the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context)	1. Homework assignment in EGE 3022 2. Homework assignment in EGE 3022 3. Team Project rubric in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Evaluation rubric

<u>TEAMWORK</u> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	Outcome d (an ability to function on multidisciplinary teams)	Peer evaluations of teamwork projects in EME4252, EME4253 Teamwork peer evaluation form in MRE3024	80% of students achieve a score of 75% or higher
<u>VISUAL COMMUNICATION</u> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome g (an ability to communicate effectively)	Ethics quiz (multiple choice) in EME4253	70% of students will achieve a score of 70% or higher

**Table 2: New Draft ABET Assessment Plan for the Bachelor of Science in Robotics Engineering Program**

<b>Outcome 1:</b> an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. Complex is defined as having one of the following: <ul style="list-style-type: none"> <li>➤ involving wide-ranging or conflicting technical issues</li> <li>➤ having no obvious solution</li> <li>➤ addressing problems not encompassed by current standards and codes</li> <li>➤ involving diverse groups of stakeholders</li> <li>➤ including many component parts or sub-problems</li> <li>➤ involving multiple disciplines</li> <li>➤ having significant consequences in a range of contexts.</li> </ul>			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
EGE2013 Statics	Common problem on final exam graded using rubric	50% of students will score 70% or above	Fall
EME3013 Mechanics of Materials	Common problem on final exam graded using rubric	50% of students will score 70% or above	Fall
MRE2024 Unified Robotics I	Common problem on final exam	70% of students will score 60% or above	Spring
MRE3014 Unified Robotics II	Common problem on midterm exam graded using rubric	60% of students will score 70% or above	Fall
MRE3024 Unified Robotics III	Common problem on midterm exam	70% of students will score 70% or above	Spring
MRE4014 Unified Robotics IV	Common problem on final exam graded using rubric	70% of students will score 70% or above	Fall
<b>Outcome 2:</b> 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			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
MRE3014 Unified Robotics II	Rubric to evaluate term project report	70% of students will score 70% or above	Fall

MRE4014 Unified Robotics IV	Design Rubric to evaluate term project report	80% of teams will score 70% or above	Fall
MRE4912 Capstone Projects 2	Rubric to evaluate final report	100% of teams will score 65% or above	Spring
<b>Outcome 3:</b> an ability to communicate effectively with a range of audiences			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
EME3043 Dynamics	Rubric to score project for graphical communication		
MRE3014 Unified Robotics II	Writing rubric to evaluate technical paper	70% of students will score 80% or above	Fall
MRE4912 Capstone Projects 2	Oral presentation rubric	80% of students will score 85% or above	Spring
<b>Outcome 4:</b> 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			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
EGE 3022 Leadership and Prof. Develop. for Eng.	TBD	TBD	
MRE3024 Unified Robotics III	Rubric to score entrepreneurial assignment	50% of students will score 70% or above	Spring
<b>Outcome 5:</b> 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			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
MRE3024 Unified Robotics III	Teamwork peer evaluation form	70% of students will score 75% or above	Spring
MRE4902 Capstone Projects 1	Teamwork evaluation form (not peer evaluation)	TBD	Fall
MRE4912 Capstone Projects 2	Teamwork evaluation form (not peer evaluation)	TBD	Spring

<b>Outcome 6:</b> an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
MRE2024 Unified Robotics I	Class term project grade	70% of students will score 70% or above	Spring
MRE3024 Unified Robotics III	Class term project grade	75% of students will score 70% or above	Spring
<b>Outcome 7:</b> an ability to acquire and apply new knowledge as needed, using appropriate learning strategies			
<b>Class</b>	<b>Assessment Tool</b>	<b>Metric/Target</b>	<b>Semester</b>
MRE3014 Unified Robotics II	Evaluate literature review in term project	TBD	Fall
MRE3024 Unified Robotics III	Evaluate literature review in entrepreneurial project	TBD	Spring
MRE4014 Unified Robotics IV	Assignment on contemporary issues in robotics	70% of students will score 60% or above	Fall



**Table 3: Assessment Plan with Mapped Courses for the BS in Robotics Engineering**

Undergraduate Program Level Learning Outcomes	ABET Outcomes	Assessment Strategy	Metrics/ Indicators
<b>TECHNOLOGY</b> 1. Apply advanced technologies to practical and theoretical problems. (Bloom's 3) 2. Design and conduct experiments. (Bloom's 3) 3. Analyze and interpret data using appropriate tools (e.g., Excel, Minitab) (Bloom's 3)	Outcome 6: An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.	Class term project grade in MRE2024 Unified Robotics I Class term project grade in MRE3024 Unified Robotics III	70% of students will score 70% or above 75% of students will score 70% or above
<b>ETHICS</b> 1. Demonstrate critical thinking with respect to ethical dilemmas (Bloom's 3) 2. Discern between personal and professional ethical responsibilities (Bloom's 2) 3. Identify the ethical codes adopted by relevant professional associations. (2) 4. Predict possible social consequences of engineering/science ethical decisions. (3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Homework (or classroom) assignment in EGE 3022 3. Homework assignment in EGE 1001 4. Team classroom assignment in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Grading rubric 4. Evaluation rubric
<b>LEADERSHIP</b> 1. Identify theories, models, and practices as they pertain to a personal style and philosophy of leadership. (Bloom's 1) 2. Explain the difference between leadership and management. (Bloom's 2) 3. Differentiate the characteristics of effective and ineffective leadership. (Bloom's 3)	Outcome 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)	1. Homework assignment in EGE 3022 2. Homework assignment in EGE 3022 3. Team Project rubric in EGE 3022	1. Grading rubric (Metrics TBD) 2. Grading rubric 3. Evaluation rubric
<b>TEAMWORK</b> 1. Discuss various types of conflict and methods of resolution. (Bloom's 2) 2. Practice tools and techniques for team consensus building. (Bloom's 3) 3. Identify and integrate personal team player style in a team setting. (Bloom's 3)	Outcome 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	Teamwork peer evaluation form in MRE3024 Unified Robotics III Teamwork evaluation form (not peer evaluation) in MRE4902 Capstone Projects 1 Teamwork evaluation form (not peer evaluation) in MRE4912 Capstone Projects 2	70% of students will score 75% or above

<u>VISUAL COMMUNICATION</u> Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Outcome 3: An ability to communicate effectively with a range of audiences	Writing rubric used for technical paper in EME3043 Writing rubric used for technical paper in MRE3024 Oral presentation rubric used in MRE4014	50% of students will score 80% or higher 70% of students will score 80% or higher 70% of students will score 70% or above
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## College of Business and Information Technology

### *BS in Business Administration*

**Table 1: Assessment Plan for the BSBA Program**

Undergraduate Program Level Learning Outcomes	Student Outcomes	Assessment Strategy	Metrics/ Indicators
<u>TECHNOLOGY</u>	(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)	Direct assessment of assignment using course embedded rubric in ACC2023, INT2103, MGT2203, MKT2013, FIN3103, HRM 3023, MGT3103, MGT3113	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>ETHICS</u>	(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)	Direct assessment of assignment using course embedded rubric in MGT2203, MKT2013, MGT2113, FIN3103, HRM 3023, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>LEADERSHIP</u>	(a) Explain the difference between leadership and management. (Bloom's 2) (b) Demonstrate effective leadership skills in a team project in terms of motivation, delegation, and conflict resolution. (Bloom's 3)	Direct assessment of assignment using course embedded rubric in MGT2203, MKT2013, HRM3023, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>TEAMWORK</u>	Demonstrate appropriate group techniques to participate in a team task that results in effective performance in terms of attendance, preparation, contribution, participation, and accountability. (Bloom's 3)	Direct assessment of assignment using course embedded rubric in MGT2203, MKT2013, HRM3023, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>VISUAL COMMUNICATION</u>	Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Direct assessment of assignment using course embedded rubric in MKT2013, FIN3103, MGT3103, HRM 3023, MGT3113, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>WRITTEN AND ORAL COMMUNICATION</u>	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)	Direct assessment of assignment using course embedded rubric in MGT2203, MKT2013, HRM3023, MGT3113, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>KNOWLEDGE IN DISCIPLINE</u>	Demonstrate knowledge and ability to apply facts, concepts, theories and analytical methods in core business administration concepts in accounting, economics, management, quantitative business analysis, finance, marketing, legal and social environment, information systems, and international issues.	A comprehensive standardized examination organized into multiple content areas of business knowledge administered to all seniors in MGT4213.	ETS Major Field Test in Business. Target scaled score $\geq 1$ standard deviation (SD) below the standardized scale mean of the annual comparative data.



*BS in Information Technology***Table 1: Assessment Plan for the BSIT Program**

<b>Undergraduate Program Level Learning Outcomes</b>	<b>Student Outcomes</b>	<b>Assessment Strategy</b>	<b>Metrics/ Indicators</b>
<u>TECHNOLOGY</u>	(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)	Direct assessment of assignment using course embedded rubric in INT2103, INT2123, INT2134, MGT2203, INT3203, INT3703, INT3803, MGT3103. MGT3113, INT4203	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>ETHICS</u>	(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)	Direct assessment of assignment using course embedded rubric in INT2103, MGT3103	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>LEADERSHIP</u>	(a) Explain the difference between leadership and management. (Bloom's 2) (b) Demonstrate effective leadership skills in a team project in terms of motivation, delegation, and conflict resolution. (Bloom's 3)	Direct assessment of assignment using course embedded rubric in INT2103, MGT 2203, INT3803, INT4203	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>TEAMWORK</u>	Demonstrate appropriate group techniques to participate in a team task that results in effective performance in terms of attendance, preparation, contribution, participation, and accountability. (Bloom's 3)	Direct assessment of assignment using course embedded rubric in MGT 2203, MKT 2013, HRM 3023, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>VISUAL COMMUNICATION</u>	Demonstrate professional standards in graphical communication (including figures, plots, tables, and posters) by integrating evidence and analysis within a coherent structure. (Bloom's 3 and 4)	Direct assessment of assignment using course embedded rubric in MKT 2013, FIN3103, MGT3103, HRM 3023, MGT3113, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary
<u>WRITTEN AND ORAL COMMUNICATION</u>	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)	Direct assessment of assignment using course embedded rubric in MGT2203, MKT 2013, HRM 3023, MGT3113, MGT4213	Mean score $\geq 3.5$ on 6-point scale course embedded rubric: 1, 2 = deficient; 3, 4 = competent 5, 6 = exemplary



