Lawrence Technological University

Assessment Report

2015-2016 Academic Year

University Assessment Committee

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Executive Summary of 2015-2016 Assessment Report

Assessment of student educational outcomes at Lawrence Technological University is the responsibility of the University Assessment Committee (UAC). The function of the UAC is to advise the Director of Assessment, to plan and carry out assessment of student learning in the academic programs of the University, and to disseminate results of assessment activities to the University and the general public. Committee membership typically accounts for the equivalent of three academic hours of service to the University.

The UAC is chaired by the Director of Assessment (who is a faculty member appointed by the Provost), one member from each academic department, and the Provost (*ex officio*), the Associate Provost and the Coordinator of Institutional Research and Assessment (as non-voting members).

The UAC meets regularly during the academic year (usually 90-minute bi-weekly meetings) to discuss assessment methodology best practices in each program. These meeting help to ensure the vitality of assessment within individual programs. The UAC meets for annual semester planning retreats. The UAC meets with all the University full time faculty, department chairs, program directors and College Deans during the annual University Assessment Day.

All UAC meeting minutes and associated assessment materials are stored on the university learning management system.

The 2015-2016 UAC continued to concentrate on improving the culture of Assessment throughout the university programs. The UAC continued to invest time in the enhancement of alignment between policies and procedures to support the University Educational Learning Outcomes for Undergraduate and Graduate Programs.

This report contains the 2015 Assessment Day presentations (which close-the-loop on the previous year assessment activities), and annual reports from programs for the 2015-2016 academic year. Each program report describes assessment and loop closing activities for the academic year, and assessment plans for the next academic year.

Assessment Committee Mission Statement

The University Faculty Handbook describes the role of the University Assessment Committee in section 6.2.8.

6.2.8.   Assessment Committee

The Assessment Committee coordinates policy and procedures related to both college and University assessment programs. The committee's principal responsibility is to promote improvements in learning through implementation of the University's plan for academic assessment.

The committee is advisory to the Deans' Council, and its members and chairperson are appointed by the Provost.

In order to clarify and to codify this institutional role, the University Assessment Committee adopts the following mission functions:

i.   Advise the Director of Assessment and the Office of the Provost on matters related to the assessment of student learning.

ii.   Devise, coordinate and execute the University's assessment plan.

iii.   Supervise and coordinate assessment activities within departments in order to ensure that all academic programs are comparably assessed and continuously improved as a result of assessment.

iv.   Plan and execute University Assessment Day activities.

v.   Revise the University Educational Learning Outcomes periodically.

vi.   Facilitate communication about assessment initiatives and issues among departments, and between departments and the Office of the Provost.

vii.   The University Assessment Committee's mission can be modified by the committee to ensure continuous improvement and ownership of assessment processes by faculty and administrators.

Assessment Committee Membership Rules

Membership Composition

The Assessment Committee is made up of the following individuals:

> The Director of Assessment (Chair, faculty representative)
> One faculty representative from each academic department.
> The Provost, *ex officio* and non-voting
> The Associate Provost, *ex officio* and non-voting
> The Director of Institutional Research and Academic Planning, *ex officio* and non-voting
> The Director of eLearning Services, *ex officio* and non-voting
> One representative from any other academic program as the Dean of the appropriate College and/or Provost direct.

Chairperson

The Chairperson of the Assessment Committee is the University's Director of Assessment. He/she is a faculty member appointed by the Provost for a three-year term. The term can be extended if mutually agreed upon by the Chair and the Provost.

Committee Members

(1) Each department, and each other program designated by the Provost, names its own representative.
(2) Each department or unit representative serves for a term of three years. In the event of a vacancy during a term, the department or unit will name a representative to serve the unexpired part of the regular term.
(3) Continuous membership as a department or unit representative is limited to two regular terms plus up to two semesters' service in an unexpired term before the first regular term. A member who becomes ineligible because of this limit remains ineligible for three years unless the Provost decides that the department or unit lacks sufficient faculty for a normal rotation.
(4) Renewed terms start in August of each year.
(5) Members will serve 3 years in staggered terms.

> The Chairperson will publish a schedule of expirations of terms in force at the time of adoption of these by-laws.

Rules of Order

(1) A two-thirds majority vote of the voting members of the Assessment Committee is required to change any of the membership rules once this proposal is approved.
(2) Robert's Rules of Order will be followed in other details that may not have been mentioned in the membership rules.

UAC Membership 2015-2016 Academic Year

Chair and Director of Assessment   Sabah Abro

College of Architecture and Design
Architecture   Janice Means
Art and Design   Andy Hanzel

College of Arts and Sciences
Humanities, Social Sciences, and Communication   Sarah Lamers
Mathematics and Computer Science   Chris Cartwright
Natural Sciences   Changgong Zhou

College of Engineering
Biomedical Engineering   Yawen Li
Civil Engineering   John Tocco
Electrical and Computer Engineering   Kun Hua
Engineering Technology   Jerry Cuper
Mechanical Engineering   Andrew Gerhart

College of Management
BSBA, BSIT, MBA, MSIT   Srikant Raghavan

Ex-Officio Members
Associate Provost   James Jolly
Institutional Research and Academic Planning   Steve Bridges
eLearning Services   Richard Bush

UAC Membership 2015-2016 Service and Rotation

Member		Years Served	Year Started	Year Ends
Chair and Director of Assessment	Sabah Abro	3	2013-2014	2015-2016
College of Architecture and Design				
Architecture	Janice Means	3	2013-2014	2015-2016
Art and Design	Andy Hanzel	3	2013-2014	2015-2016
College of Arts and Sciences				
HSSC	Sarah Lamers	4	2012-2013	2015-2016
Mathematics and Computer Science	Chris Cartwright	6	2010-2011	2015-2016
Natural Sciences	Changgong Zhou	3	2013-2014	2015-2016
College of Engineering				
Biomedical Engineering	Yawen Li	6	2010-2011	2015-2016
Civil Engineering	John Tocco	8	2008-2009	2015-2016
Electrical and Computer Engineering	Kun Hua	4	2012-2013	2015-2016
Engineering Technology	Jerry Cuper	3	2013-2014	2015-2016
Mechanical Engineering	Andrew Gerhart	5	2011-2012	2015-2016
College of Management				
BSBA, BSIT, MBA, MSIT	Srikant Raghavan	5	2011-2012	2015-2016

University Educational Goal

The University mission is to develop leaders through innovative and agile programs embracing theory and practice.

The University vision is to be a preeminent university producing leaders with an entrepreneurial spirit and global view.

The University provides a student-centered comprehensive educational experience with technologically focused professional programs.

The University's undergraduate and graduate learning outcomes foster students' intellectual development into knowledgeable professionals, critical thinkers, and ethical leaders.

Undergraduate Learning Outcomes

Discipline-Specific Knowledge	Critical Thinking	Leadership & Ethics

KNOWLEDGE IN DISCIPLINE
"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."

TECHNOLOGY
"LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."

SUSTAINABILITY
"LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."

COMMUNICATION
"LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."

MATHEMATICS
"LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."

READING
"LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."

SCIENTIFIC ANALYSIS
"LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."

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."

TEAMWORK
"LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."

PROFESSIONAL ETHICS
"LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."

Graduate Learning Outcomes

Discipline-Specific Knowledge	Critical Thinking	Leadership & Ethics

"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."

"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."

"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."

"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies."

"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."

2015-2016 Undergraduate Assessment Plan

Undergraduate Learning Outcomes	Assessment Strategy	Responsible Academic Unit	Class Level of Assessment	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual

COMMUNICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	1. Written
	  a. HSSC Core Curriculum writing assessment
	  b. WPE Audit
	2. Oral
	  a. UAC oral presentation rubric
	3. Graphical
	  a. Not yet determined
		1. HSSC
		2. UAC
		3. Not yet determined
			1. 1st and 2nd year core courses; prereq to SSC/LLT 3000-4000 level courses
			2. 4th year capstone projects
			3. Not yet determined
				1. Annual
				2. Every 3 years
				3. Not yet determined
					1. Annual
					2. Every 3 years
					3. Not yet determined

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically."	1. Common final exams in Math courses required for the Major: Calc2, Math Analysis 2, Geometry in Art, Technical Calc 2. Calc 2 PBL Assignments (for real-world problems)	1. MCS 2. MCS	1. 1st and 2nd year courses 2. 2nd year courses	1. Semester 2. Semester	1. Every 2 years 2. Every 2 years

READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Core Curriculum Diagnostic Exam	HSSC	1st & 2nd year Core courses	Annual /ongoing	Every 3 years (f15)
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Direct assessment of student exams, assignments and/or projects (all physics courses).	NS	All	Semester	Annual
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."	1. Leadership survey 2. Portfolio evaluation 3. Impact report	1. Leadership program office and leadership assessment team 2. Leadership program office and LCIC 3. Leadership program office and LCIC	1. All 2. 4th year 3. All	1. Semester 2. Semester 3. Semester	1. Every odd year 2. Every even year 3. Every odd year
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual

2015-2016 Graduate Assessment Plan

Graduate Learning Outcomes	Assessment Strategy	Responsible Academic Unit	Class Level of Assessment	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	To be developed and implemented by graduate program	Graduate program	To be determined by program	Annual	Annual
TECHNOLOGY "LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies."	To be developed and implemented by graduate program	Graduate program	To be determined by program	Annual	Annual
CRITICAL THINKING "LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	To be developed and implemented by graduate program	Graduate program	To be determined by program	Annual	Annual
COMMUNICATION "LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	To be developed and implemented by graduate program	4. Graduate program	To be determined by program	Annual	Annual
LEADERSHIP & ETHICS "LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	To be developed and implemented by graduate program	Graduate program	To be determined by program	Annual	Annual

Assessment Day 2015
September 15, 2015
A200
AGENDA

8:30-9:00 **Continental Breakfast**

9:00-9:20 **Welcome**
Dr. Virinder Moudgil & Dr. Maria Vaz

9:20-9:30 **Introduction & New Template of Program Assessment Report**
Jim Jolly & Andy Gerhart

9:30-9:50 **LTU Assessment and Subcommittees' Reports**
Sabah Abro, Janice Means, Andrew Hanzel, John Tocco

9:50-10:10 **Students Exit Survey**
Steve Bridge

10:10-10:25 **Break**

10:25-11:00 **Rubric Designs and Templates**
Cristi Bell-Huff

11:00- 11:30 **Assessment Requirements for ABET & HLC**
Andy Gerhart

11:30-11:45 **Assessment of Online Program**
Richard Bush

11:45-12:00 **Breakout Sessions**
Sabah Abro & Jim Jolly

12:00-13:00 **Lunch – Cafeteria**

13:15-15-30 **Departmental Breakout Meetings**
(Room Assignments on the back)

Lawrence Technological University Assessment Committee
<Program>
2014-2015 Annual Assessment Report

1. **Assessment Plan <Program Name>**
   Insert a complete and well described common assessment plan matrix with all columns completed including assessment techniques, metrics, and loop closing information. The assessment matrix will be included as Table 1 in the report and should be inserted on landscape pages.

2. **Action Plan (Loop-Closing) for <Program Name>**

   a. **Report on <Previous> Academic Year**
   This section represents the main focus of the annual assessment report and closes the loop on previous year activities that stemmed from evaluation of assessment results. This section would include a brief discussion on the completion (and success) of assessment based action items for the previous academic year. This section should be formatted to include subsections for each program outcome that was assessed during the 2014-2015 year. In other words, if a program listed that an outcome would be assessed in this specific year in the last column (Loop Closing Timeline) in the assessment plan matrix, then that outcome should be addressed in this section.

   Questions for each objective:
   - *Objective/Outcome: What Program Objective/Outcome are you considering?*
   - *Assessment: What assessment tool(s) was applied, by whom, and when?*
   - *Evaluation: What results were analyzed?*
   - *Issue: What issue or concern has been identified based on the evaluation.*
   - *Actions: What actions did you take based on these results? AND/OR What actions will you take based on these results?*
   - *Responsibility: Who is responsible for implementing the plan or tracking the results?*

   b. **Report on Plan for <Current> Academic Year**
   This section will be a brief discussion on the action items for the upcoming academic year based on assessment/evaluation. This section could be the basis for Section 2a content in the following year annual report.

Table 1: Assessment Plan for <PROGRAM NAME>

LTU Undergraduate Learning Outcomes	Supporting Program Learning Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
Discipline-Specific Knowledge					
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.					
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.					
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.					
Critical Thinking					
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of					

This is a sample. Table continues to include all LTU Learning Outcomes.

PLUS

- Add items here that would be "**PLUS**" (something good and positive or something that works well with the current Assessment Report Template). We are not critiquing the Learning Outcomes.

-

-

-

DELTA

- Add items here that would be "**DELTA**" (something you would like to change, doesn't not work well as is, something to be added, something to be deleted). We are not critiquing the Learning Outcomes.

-

-

-

Assessment Day 2015

Tuesday, September 15

Faculty Handbook, Page 54

6.2.8. Assessment Committee

The Assessment Committee coordinates policy and procedures related to both college and University assessment programs. The committee's principal responsibility is to promote improvements in learning through implementation of the University's plan for academic assessment.

The committee is advisory to the Deans' Council, and its members and chairperson are appointed by the Provost.

FOR A FAIR SELECTION EVERYBODY HAS TO TAKE THE SAME EXAM: PLEASE CLIMB THAT TREE
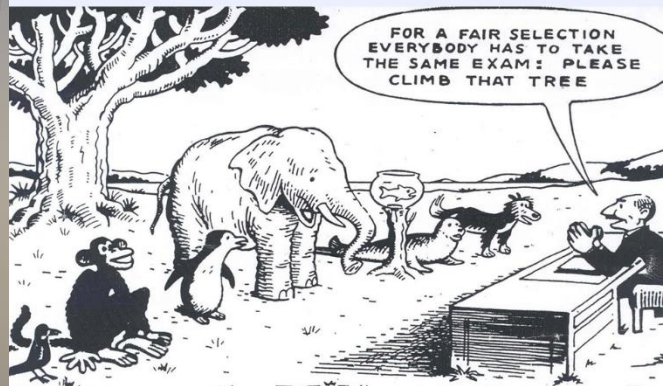
Our Education System

"Every body is a genius,

but if you judge a fish by its ability to climb a tree, it will live its life believing that it is stupid"
Albert Einstein

Undergraduate Learning Outcomes

Discipline-Specific Knowledge

Critical Thinking

Leadership & Ethics

SUSTAINABILITY
"LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."

COMMUNICATION
"LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."

PROFESSIONAL ETHICS
"LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."

What is Assessment?

- An educational philosophy?
- Additional work for faculty?
- A requirement for accreditation?
- An additional way to evaluate students?
- An indirect way to measure faculty performance?

slide8

Why Do Assessment?

Assessment is a process that provides tools to:

- Update course contents
- Enhance delivery methods
- Continuously improve curriculum
- Provide evidence of achieving University Educational Outcomes

LTU Assessment Journey

- Started 15 years ago
- Difficulties existed in drafting a unified assessment plan
- HLC required robust of assessment culture
- Accreditation involved assessment plans and data analysis

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LTU Assessment Today

- Provost Office strongly supports assessment process
- Assessment Day has been observed for the last 14 years
- UAC has been instrumental in creating assessment culture
- Annual Assessment Reports have significantly improved

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Whose responsibility is Assessment…?

- Assessment is not the sole responsibility of UAC
- Department Coordinator is not the sole person responsible for assessment
- All faculty are contributors to assessment

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Assessment is…

a crucial part of today's Higher Education

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Sustainability Assessment

Preliminary Analysis

Sustainability Subcommittee
Professor Janice K. Means, Chair
Dr. Andrew Gerhart
Dr. Kun Hua

Assessment Day
September 15, 2015

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Introduction

A. Purpose & Goal of Sustainability Sub-committee

B. Sustainability-Related LTU Outcomes

C. How sustainability is currently assessed

D. Conclusions & Future Plan of Action

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2015 Assessment Day 09/15/15

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A. Purpose & Goal of Sustainability Sub-committee

1. Identify best practices

2. Determine most effective way to meet goal:
   - by degree program
   - at University level

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2015 Assessment Day 09/15/15

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B. Sustainability-Related LTU Outcomes

Undergraduate Learning Outcome
(Discipline-Specific Knowledge)

- Sustainability: LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.[1]

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[1] Undergraduate Learning Outcomes http://www.ltu.edu/academicsandmajors/ed_goals.asp
2015 Assessment Day 09/15/15

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B. Sustainability-Related LTU Outcomes

Graduate Learning Outcome
(Leadership & Ethics)

- LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.[2]

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[2] Graduate Learning Outcomes http://www.ltu.edu/academicsandmajors/ed_goals.asp#tab2
2015 Assessment Day 09/15/15

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C. How sustainability is currently assessed

- **Architecture**

Assessment of sustainability is based on the NAAB student performance criteria. Specific assignments from HVAC & Water Systems and Acoustics, Electricity, & Illumination courses are assessed using a rubric.

- **Design**

Sustainability is assessed by mapping onto the NASAD outcomes. Specific student design projects are assessed using a rubric.

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C. How sustainability is currently assessed

- **Mechanical Engineering**

Environmental sustainability is assessed in the Capstone Project; this practice is being reconsidered as the data is less meaningful. Economic sustainability is assessed by applying a rubric to the operational cost of designs.*

- **Civil Engineering**

Capstone Projects are used to assess social and environmental sustainability; advisory board indicated it is satisfied with this practice.

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* Data from a survey given in LDR courses could be used to assess social sustainability for any program.
2015 Assessment Day 09/15/15

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C. How sustainability is currently assessed

- **Biomedical Engineering**

One Key Performance Indicator (KPI), in support of ABET Student outcomes, is somewhat related to sustainability: Examine realistic constraints related to the proposed solution. The Senior design sequence and a junior level course BME 4113 (Medical Device Design) is used to assess this KPI.

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C. How sustainability is currently assessed

- **Natural Sciences**

For all majors (Biology, Physics and Chemistry), awareness of sustainability issue is raised in the course introductions to projects; and for relevant Capstone projects, sustainability is assessed, but there is no

specific rubric.

At course level, some biology courses specifically assess environmental sustainability.

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2015 Assessment Day 09/15/15

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C. How sustainability is currently assessed

- **Engineering Technology**

Capstone Projects are used for assessment of sustainability, but there is no formal rubric.

- **Humanities, Social Sciences, and Communications**

To date sustainability has not been assessed. Two of four programs in the process of designing rubrics.

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2015 Assessment Day 09/15/15

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C. How sustainability is currently assessed

- **Electrical/ Computer Engineering**

Sustainability is not explicitly addressed in assessment as the department has had difficulty mapping ABET outcomes onto the LTU sustainability outcome.

- **Math and Computer Science**

Sustainability has not been assessed in the past.

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D. Conclusions & Future Plan of Action

Conclusions:

- Wide range in assessment of sustainability between programs
- Need to identify best practices
- Additional analysis required

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D. Conclusions & Future Plan of Action

Plan of Action:

- Review 2014-2015 Assessment Reports in detail and **specifically** relate sustainability University outcomes to actual assessment

- Make recommendations on where assessment should be done—at program level or at university level

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Questions?

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Graphical Design Sub-Committee Report Out

Sub-Committee Members:
- Andrew Hanzel (chair)
- Yawen Li
- Kun Hua

Graphical Communication

Graphical Communication is the third leg in the three-part University Outcomes category referred to in the aggregate as Communication.

Communication: LTU graduates will demonstrate professional standards in written, oral and *graphical* communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.

Effective graphical communication is an important aspect of overall presentation communication and several factors are important whether the item is to be orally presented or passively submitted (report/resume').

For our purposes, we will consider the 'communication format' to include most all Latin (English, German, Italian) and Greek-based (Greek, Russian, Serbian) alphabets, though there are about 20 individual pure ones in use world-wide, 30 if you include alphabets used only for religious purposes. This number doesn't include other writing systems, like syllabaries (Japanese) alphasyllabies (Hindi), or Logographic writing (Chinese).

Because our student population hails from a diverse range of ethnicities and cultures, it was determined that we should narrow our focus to those popularly used graphic formats in use today.

Now, while we can site various ways to assess graphic usage and application, we thought a generally accepted application of the fundamentals of graphical communication were in order…The following general guidelines are intended as a framework which can be amended with regards to the type of documents or images and certainly in deference to the language orientation of the audience.

This information was gleaned from an excellent publication put out by the Industrial Design students at the University of Cincinnati to help students prepare their portfolios for review and presentation entitled 'Hire Me!'
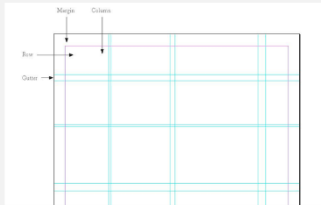
1.) Simplicity is Key:

"Less is more. Your work should be the first thing people see. No crazy logos for your name, use simple, readable fonts, and no outrageous visual punctuation. You want people concentrating on your work and not the graphics that accompany it." - Marnie Meylor, Mayo Clinic

2.) Use a Grid:

Grids are a great way to lay out your content… Having consistent and logical alignments throughout your presentation or portfolio is essential. It's important to stick to your grid. Arbitrary combinations of columns, lines, and rows do not project a logical sequence of information.

3.) Infographics help to get the point across:

When presenting Datasets or complex formulae try using 'Infographics' to describe the essence of the relevant point(s).

3.) Typography:

WHEN IN DOUBT…DONT GET CUTE… Typefaces vary greatly in style and attitude. There is display type, script, hand-rendered type and more, but for the purpose of a presentation or portfolio it is best to stick to simple, clear, legible typefaces.
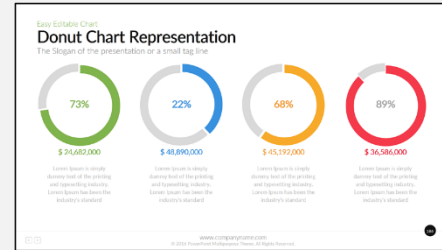
4.) Legibility:

The most important part of text is that it is **readable**. The typeface can be perfect but if you can't read it, perfection doesn't matter. There are many aspects to typography that affect the legibility of your text. First there is the size…make sure the body text is not below 10pt. Next there is the use of white space; you must let the type breathe.

5.) Storytelling:

Throughout history and culture, it has been the way we express our ideas in an appealing, organized manner. Even the most basic of narrative structures use identifiable beginnings, middles and endings.
As we remember from elementary education, **pictures** and **graphics** help the audience to grasp the essence of the story.

2015-2016 Ethics Review; Undergraduate Learning Outcomes

Professional Ethics: LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.

University Assessment
Committee

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2015-2016 Ethics Review; Action Plan

Overall goal: determine whether the assessment of ethics is appropriate at the University level or the program level.

❖ Review relevant courses in each program to identify ethics content
❖ Determine what assessment (if any) is occurring in these courses
❖ Make recommendation on how to proceed (assess at program level or university level)

University Assessment
Committee

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Graduating Student Survey Overview

September 15th, 2015

Presenter: Steve Bridge

The Survey Methodology

❑ Beginning on July 1st 2014 through June 30th 2015 …

❑ …every two weeks…

❑ …newly petitioning graduates were sent an email invitation to participate in the Graduating Student Survey…

❑ …with reminders to non-participants sent monthly and a due date of June 30th 2015.
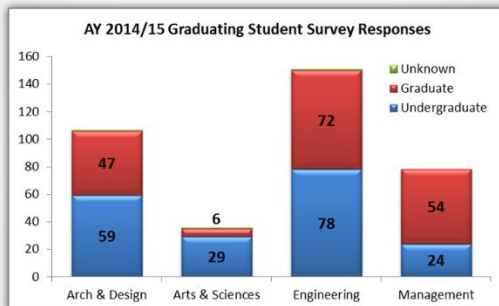
Calendar September 2015

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Phases of the moon: 5 ◑ 13 ● 21 ◐ 27 ○

The Population

AY 2014/15 Graduating Student Survey Responses

Legend: Unknown, Graduate, Undergraduate

	Arch & Design	Arts & Sciences	Engineering	Management
Graduate	47	6	72	54
Undergraduate	59	29	78	24

The Questionnaire

Classification

Please select the semester you are graduating: ○ August, 2015 ○ December, 2015 ○ May, 2016 ○ August, 2016 ○ December, 2016

Please select the College of your primary degree: ○ Architecture and Design ○ Arts & Sciences ○ Engineering ○ Management

Please select the level of the degree you will be receiving: ○ Associate ○ Bachelor ○ Master ○ Doctoral ○ Certificate

What is your primary major? Please select...

Program Content

	Superior	Good	Satisfactory	Poor	Unsatisfactory
How well our programs met your learning objectives:	○	○	○	○	○
Which courses in your major were most valuable and why? Which courses were the least valuable and why?					
What topics/courses/subjects should either be changed or added to your major? Why?					
How well prepared you feel for professional employment:	○	○	○	○	○

Instructional Effectiveness

	Superior	Good	Satisfactory	Poor	Unsatisfactory
Faculty knowledge in their fields of specialization:	○	○	○	○	○
Faculty preparation and organization:	○	○	○	○	○
Faculty responsiveness and timely feedback:	○	○	○	○	○
Faculty interest in teaching:	○	○	○	○	○
Instructional clarity in presenting concepts:	○	○	○	○	○
Please rate the application of coursework to real work situations:	○	○	○	○	○

The Questionnaire

Classification

Please select the semester you are graduating:

Please select the College of your primary degree:

Please select the level of the degree you will be receiving:

What is your primary major?

The Questionnaire

Preparation Self-Assessment

	Superior	Good	Satisfactory	P
Please rate your preparation in computer skills:	○	○	○	
Please rate your preparation in ethical behavior:	○	○	○	
Please rate your preparation in knowledge/appreciation of the humanities:	○	○	○	
Please rate your preparation in interpersonal skills:	○	○	○	
Please rate your preparation in mathematics:	○	○	○	
Please rate your preparation in oral communication:	○	○	○	
Please rate your preparation in problem solving:	○	○	○	
Please rate your preparation in teamwork:	○	○	○	
Please rate your preparation in written communication:	○	○	○	
Please rate your preparation in leadership:	○	○	○	

The Questionnaire

Which courses in your major were most valuable and why? Which courses were the least valuable and why?

What topics/courses/subjects should either be changed or added to your major? Why?

Reporting
Profile Line Comparison Report

Program Content

Preparation Self-Assessment

Instructional Effectiveness

Facilities

Administration

Summary

Reporting
Profile Line Comparison Report

Largest University Variance (blue last year, red this year)

Please rate the classroom facilities at LTU:

Please rate the computer and lab facilities:

Highest University Score

Please rate your preparation in ethical behavior:

Lowest University Score

The materials/books/equipment used:

Reporting
Class Climate Standard Report

Program Content

How well our programs met your learning objectives:
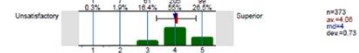
Which courses in your major were most valuable and why? Which courses were the least valuable and why?

- Engineering Management, Project Management, and Quality Engineering Systems were really helpful because they were very relevant to exactly what I was doing at my job.
- There probably should be more courses focusing on marketing and financing, as those are two crucial areas of business that are only really touched on in this program.
- Sustainable construction because that is where architecture is moving and we should have an overview of the opportunities.

Summary & Observations

- Completing this survey was "incentiveless"; these students want to be heard.
- There is "rich" information in the open-ended responses.
- Open-ended responses and scores make the most sense *by college by level*.

- Other reporting options are available.
- Ask for the reports you're interested in from your chair or dean.
- Quantitative results will go to library and be available on the web.

Lawrence Technological University
Assessment Day 2015

Making the ℂ𝔸𝕊𝔼 for Rubrics as Scoring Guides and Assessment Tools

Cristi Bell-Huff
Director of Entrepreneurial
Engineer Design Studios (whew!)

With a little support from John Tocco
Director of…well, nothing, actually

Lawrence Tech.
Engineering

1

Presentation brought to you by the University Assessment Committee

Remember our fearless leader's motto:

Assessment is Possibility ©

Does this tie go with this suit?

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Engineering

2

ℂ𝔸𝕊𝔼: Consistency

❖ Common dimensions facilitate consistent evaluation
❖ Standardized criteria facilitates consistent interpretations

ℂ𝔸𝕊𝔼: Simplification

❖ Expedited assessment and grading of student work
❖ Students rely less on instructors for subjective opinion on expectations

ℂ𝔸𝕊𝔼: Assessment

❖ Recognized and effective direct assessment tool for student work
❖ Can map dimensions to course objectives and student outcomes

ℂ𝔸𝕊𝔼: Expectations

❖ Rubrics are posted (in Blackboard) prior to the assignment
❖ Dimensions are weighted so students understand the evaluation priority

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3

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Engineering

4

The Professor's Lament

I TAUGHT STRIPE HOW TO WHISTLE

I DON'T HEAR HIM WHISTLING

I SAID I TAUGHT HIM. I DIDN'T SAY HE LEARNED IT

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Engineering

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Example: Math Problem Solving

Dimensions	4 points	3 points	2 points	1 point
Solution	90-100% of the steps and solutions have no mathematical errors.	Almost all (85-89%) of the steps and solutions have no mathematical errors	Most (75-84%) of the steps and solutions have no mathematical errors.	More than 75% of the steps and solutions have mathematical errors
Mathematical Work and Notation	Correct terminology and notation are always used, making it easy to understand what was done.	Correct terminology and notation are usually used, making it fairly easy to understand what was done.	Correct terminology and notation are used, but it is sometimes not easy to understand what was done.	There is little use, or a lot of inappropriate use, of terminology and notation.
Neatness and Organization	The work is presented in a neat, clear, organized fashion that is easy to read.	The work is presented in a neat and organized fashion that is usually easy to read.	The work is presented in an organized fashion but may be hard to read at times.	The work appears sloppy and unorganized. It is hard to know what information goes together.

Example: Oral Presentation Checklist

Oral Presentation: Name: _____   Date: _____   Score: _____

Select the box which most describes student performance. Alternatively you can "split the indicators" by using the check boxes before each indicator to evaluate each item individually.

	Exceeds Standard	Meets Standard	Nearly Meets Standards	Does Not Meet Standard	Score
Language Use and Delivery The student communicates ideas effectively	❑ Effectively uses eye contact. ❑ Speaks clearly, effectively and confidently using suitable volume and pace. ❑ Fully engages the audience. ❑ Dresses appropriately. ❑ Selects rich and varied words for context and uses correct grammar.	❑ Maintains eye contact. ❑ Speaks clearly and uses suitable volume and pace. ❑ Takes steps to engage the audience. ❑ Dresses appropriately. ❑ Selects words appropriate for context and uses correct grammar.	❑ Some eye contact, but not maintained. ❑ Speaks clearly and unclearly in different portions. ❑ Occasionally engages audience. ❑ Dresses inappropriately. ❑ Selects words inappropriate for context; uses incorrect grammar.	❑ Uses eye contact ineffectively. ❑ Fails to speak clearly and audibly and uses unsuitable pace. ❑ Does not engage audience. ❑ Dresses inappropriately. ❑ Selects words inappropriate for context; uses incorrect grammar.	
Organization and Preparation The student exhibits logical organization.	❑ Introduces the topic clearly and creatively. ❑ Maintains clear focus on the topic. ❑ Effectively includes smooth transitions to connect key points. ❑ Ends with logical, effective and relevant conclusion.	❑ Introduces the topic clearly. ❑ Maintains focus on the topic. ❑ Include transitions to connect key points. ❑ Ends with coherent conclusion based on evidence.	❑ Introduces the topic. ❑ Somewhat maintains focus on the topic. ❑ Includes some transitions to connect key points. ❑ Ends with a conclusion based on evidence.	❑ Does not clearly introduce the topic. ❑ Does not establish or maintain focus on the topic. ❑ Uses ineffective transitions that rarely connect points. ❑ Ends without a conclusion.	
Content The student explains the process and findings of the project and the resulting learning.	❑ Clearly defines the topic or thesis and its significance. ❑ Supports the thesis and key findings with an analysis of relevant and accurate evidence. ❑ Provides evidence of extensive and valid research with multiple and varied sources. ❑ Provides evidence of complex problem solving and learning stretch. ❑ Combines and evaluates existing ideas to form new insights.	❑ Clearly defines the topic or thesis. ❑ Supports the thesis and key findings with evidence. ❑ Presents evidence of valid research with multiple sources. ❑ Provides evidence of problem solving and learning stretch. ❑ Combines existing ideas to form new insights.	❑ Defines the topic or thesis. ❑ Supports the thesis with evidence. ❑ Presents evidence of research with sources. ❑ Provides some evidence of problem solving and learning stretch. ❑ Combines existing ideas.	❑ Does not clearly define the topic or thesis. ❑ Does not support the thesis with evidence. ❑ Presents little or no evidence of valid research. ❑ Shows little evidence of problem solving and learning stretch. ❑ Shows little evidence of the combination of ideas.	
Questions and Answers	Demonstrates extensive knowledge of the topic by responding confidently, precisely and appropriately to all audience questions and feedback.	Demonstrates knowledge of the topic by responding accurately and appropriately to questions and feedback.	Demonstrates some knowledge of the topic by responding accurately and appropriately to questions and feedback.	Demonstrates incomplete knowledge of the topic by responding inaccurately and inappropriately to questions and feedback.	

Focus: Effective Communication Dimension

	Exceeds Standard	Meets Standard	Nearly Meets Standards	Does Not Meet Standard	Score
Language Use and Delivery The student communicates ideas effectively	❑ Effectively uses eye contact. ❑ Speaks clearly, effectively and confidently using suitable volume and pace. ❑ Fully engages the audience. ❑ Dresses appropriately. ❑ Selects rich and varied words for context and uses correct grammar.	❑ Maintains eye contact. ❑ Speaks clearly and uses suitable volume and pace. ❑ Takes steps to engage the audience. ❑ Dresses appropriately. ❑ Selects words appropriate for context and uses correct grammar.	❑ Some eye contact, but not maintained. ❑ Speaks clearly and unclearly in different portions. ❑ Occasionally engages audience. ❑ Dresses inappropriately. ❑ Selects words inappropriate for context; uses incorrect grammar.	❑ Uses eye contact ineffectively. ❑ Fails to speak clearly and audibly and uses unsuitable pace. ❑ Does not engage audience. ❑ Dresses inappropriately. ❑ Selects words inappropriate for context; uses incorrect grammar.	

Lawrence Tech — Engineering

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Rubric Development Guidelines

❖ Identify assignment and gather samples

❖ Sort student work ("strong,", "average," "weak")

❖ Identify dimensions

❖ Create performance levels

❖ Assign points for each level

Lawrence Tech — Engineering

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Anatomy of a PBL/ACL Rubric

Dimensions/ Points		PERFORMANCE LEVELS/CRITERIA/POINTS			Score
		Does Not Meet Expectations	Meets Expectations	Exceeds Expectations	
WRITING 30 Points	Writing Mechanics 10 Points	Paragraphs/sentences are poorly organized; there are numerous incorrect word choices and errors in grammar, punctuation and spelling; inadequate referencing 0-6 Points	Paragraphs/sentences are generally well-organized; a few incorrect word choices and errors in grammar, punctuation and spelling; adequate referencing 7-8 Points	Most paragraphs/sentences are well-organized; minimal incorrect word choices and errors in grammar, punctuation and spelling; thorough referencing 9-10 Points	
	Graphics 15 Points	Photos, sketches, diagrams, etc. are of poor quality and fail to support the text or the document purpose; little or no labeling 0-10 Points	Photos, sketches, diagrams, etc. are of good quality and adequately support the text and the document purpose; adequate labeling 11-13 Points	Photos, sketches, diagrams, etc. are creative, high quality and strongly support the text and the document purpose; clear and thorough labeling 14-15 Points	
	Formatting/ Organization 5 Points	Formatting is poor; use of sections is illogical and hinders document navigation; lacks a quality header 0-3 Points	Formatting is generally consistent and adequate, sections are logical and generally allow easy navigation; good quality header 4 Points	Formatting is high quality; use of sections is logical and allows easy navigation; high quality header 5 Points	
TECHNICAL 45 Points	Element Discussion 15 Points	Fails to discuss plan elements and provide reasons they are important 0-10 Points	Adequately discusses plan elements and provides sufficient reasons they are important 11-13 Points	Thoroughly discusses plan elements and provides comprehensive reasons they are important 14-15 Points	
	Form Adaptability 15 Points	Form poorly designed with few useful components; form is not adaptable for other clients 0-10 Points	Form design is of adequate quality with generally useful components; form is somewhat adaptable for other clients 11-13 Points	Form design is high quality with mostly useful components; form is easily adaptable for other clients 14-15 Points	
	Asset Examples 15 Points	Fails to describe representative assets to demonstrate form usage 0-10 Points	Adequately describes representative assets to sufficiently demonstrate form usage 11-13 Points	Fully describes representative assets to thoroughly demonstrate form usage 14-15 Points	
ORAL 25 Points	Visual Aids/ Graphics 15 Points	Visual aids and graphics were of poor quality; contributed little to the presentation 0-8 Points	Visual aids and graphics were of adequate quality; contributed positively to the presentation 11-13 Points	Visual aids and graphics were creative and high quality; effectively supported the presentation 14-15 Points	
	Structure/ Presentation 10 Points	Speakers were unprepared and did not engage audience; content was not logically presented 0-6 Points	Speakers were adequately prepared and engaged audience; content was generally presented in a logical manner 7-8 Points	Speakers were well prepared and fully engaged audience; content was logically presented 9-10 Points	
				TOTAL	

Course name

Course objective

Focus: Rubric Header

CONSTRUCTION PROJECT MANAGEMENT 2015-2016

ASSET MANAGEMENT PRACTICUM GRADING RUBRIC

Objective: Discuss the purpose for, and the components of, an asset management program, and generate the framework for an asset management plan.

Students

Assignment title

11

Focus: Dimension Flexibility

Dimensions/Points	
WRITING 30 Points	Writing Mechanics 10 Points
	Graphics 15 Points
	Formatting/Organization 5 Points
TECHNICAL 45 Points	Element Discussion 15 Points
	Form Adaptability 15 Points
	Asset Examples 15 Points
ORAL 25 Points	Visual Aids/Graphics 15 Points
	Structure/Presentation 10 Points

Written Report

Technical Components

Oral Report

Max. Weighted Points

12

Performance level characterization

Focus: Combined Criteria/Scoring

PERFORMANCE LEVELS/CRITERIA/POINTS

Dimensions/Points	Does Not Meet Expectations	Meets Expectations	Exceeds Expectations
TECHNICAL 45 Points — Element Discussion 15 Points	Fails to discuss plan elements and provide reasons they are important 0-10 Points	Adequately discusses plan elements and provides sufficient reasons they are important 11-13 Points	Thoroughly discusses plan elements and provides comprehensive reasons they are important 14-15 Points
Form Adaptability 15 Points	Form poorly designed with few useful components; form is not adaptable for other clients 0-10 Points	Form design is of adequate quality with generally useful components; form is somewhat adaptable for other clients 11-13 Points	Form design is high quality with mostly useful components; form is easily adaptable for other clients 14-15 Points
Asset Examples 15 Points	Fails to describe representative assets to demonstrate form usage 0-10 Points	Adequately describes representative assets to sufficiently demonstrate form usage 11-13 Points	Fully describes representative assets to thoroughly demonstrate form usage 14-15 Points

Maximum Weighted Points

Weighted point range for direct scoring

13

$5 PER QUESTION

2015-2016 Fund Drive Chairman

All proceeds are donated to the *Give the Engineers a Sense of Humor* fund drive

14

DILBERT By Scott Adams

University Objectives.
Program (student) Outcomes.

Never the Twain shall meet?

Andrew L. Gerhart

Lawrence Tech.
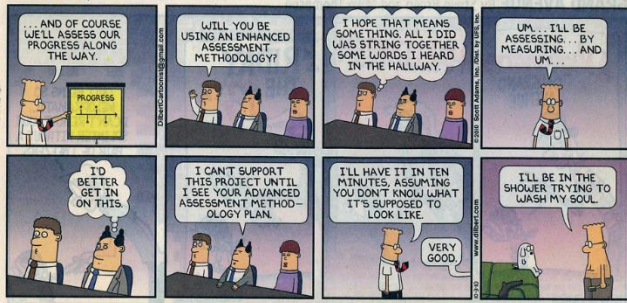
University Goals

Discipline-Specific Knowledge	Critical Thinking	Leadership & Ethics
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	**COMMUNICATION** "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	**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."
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	**MATHEMATICS** "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	**TEAMWORK** "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	**READING** "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	**PROFESSIONAL ETHICS** "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."
	SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields. "	

How Shall the Twain Meet?

Example Program (Student) Outcomes – ABET

To maintain ABET accreditation, Engineering Departments must demonstrate that all of their graduates have the following eleven general skills and abilities:

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs
d) an ability to function on multi-disciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

How Shall the Twain Meet?

How Shall the Twain Meet?

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NAAB → ? → ?

ABET →

KNOWLEDGE IN DISCIPLINE
"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs
d) an ability to function on multi-disciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

KNOWLEDGE IN DISCIPLINE
"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs
d) an ability to function on multi-disciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Mapping Program Outcomes to University Outcomes

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Table 1: Assessment Plan for B.S. Mechanical Engineering

LTU Undergraduate Learning Outcomes	ME ABET Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
Discipline-Specific Knowledge					
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	**?**	FE style questions on final exams in EME3033, EME3133, EME3043	70% of students receive a score of 60% or higher	Fall Semester	Every June
		Rubric used for reports in senior projects sequence.	100% of students will score 40% or higher (raise?)	Every Semester	Every June
		Graded problems based on rubric in EGE2013, EME3013, EME4003, EGE3003, EME3123, EME4013	50% of students receive a score of 70% or higher	Fall (3003, 2013, 4013); Spring (3013, 3123, 4003)	Every June
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	Outcome k	Evaluation of coursework in EGE1102, EME2012, EME3033, EME3133	Identifying assignments to use for each course. In progress.	Every Semester	Every June
	Outcome b	Exam questions on laboratory technique in EME4412	70% of students receive a score of 60% or higher	Every Semester	Every June
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	Outcome h	Evaluation of coursework in EME4222, EME4252 or EME4253	In progress	Every Semester	Every June
	N/A	EME 3023 Manf. Processes (environment and economic - part of project)	Rubric Evaluation by DEMS and IAB. 75% of students will receive a score of 3.5/5 or higher.	Fall Semester	Every June
	N/A	EGE2233(economic - rubric under development)	Rubric for Presentation evaluation (by industry reps, LTU instructor, current working student, alum)	Every semester?	Every June

a) X
b) X
c) X
d) X
e) X
f) X
g) X
h) X
i) X
j) X
k) x

KNOWLEDGE IN DISCIPLINE
"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs
d) an ability to function on multi-disciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Lawrence Tech — One more piece of information

LTU Undergraduate Learning Outcomes	ME ABET Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
Discipline-Specific Knowledge					
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	Outcome a	FE style questions on final exams in EME3033, EME3133, EME3043	70% of students receive a score of 60% or higher	Fall Semester	Every June
	Outcome c	Rubric used for reports in senior projects sequence.	100% of students will score 40% or higher (raise?)	Every Semester	Every June
	Outcome e	Graded problems based on rubric in EGE2013, EME3013, EME4003, EGE3003, EME3123, EME4013	50% of students receive a score of 70% or higher	Fall (3003, 2013, 4013); Spring (3013, 3123, 4003)	Every June

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Lawrence Tech — Do your Program Outcomes Always Map to University Objectives?

Leadership and Ethics					
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.	Outcome h	Third Thursday ME or Entrepreneurial Seminars (with critique) on contemporary engineering topics in EME4212, EME4222 or EME4252, EME4253	Required attendance and completion of critique. Need metric. Assignment on engineering soln impact	Every Semester	Every June
III.4. Lifelong Learning.	Outcome i	Exit Survey Third Thursday ME Seminars (with exit survey) on contemporary engineering topics. Also critique in EME4212, EME4222 on required seminars.	50% will have membership in at least one prof. society. 50% will state two professional goals to achieve in 2-5 years. Required attendance and completion of survey/critique	Once every two years in Spring. Every Semester	Every June Every June
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving	Outcome d	Peer evaluations of teamwork projects in EME4212, EME4222 or EME4252, EME4253	80% of students achieve a score of 70%, 80%, 75% and 75%, respectively, or higher	Every Semester	Every June

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THEORY AND PRACTICE
1932
Possible is everything.
eLearning Services
Assessment of Online Programs

Report Created: 6/13/12

Overview

- eLearning has adopted two quality frameworks:
  - OLC Quality Scorecard
  - Quality Matters
- Helps to ensure alignment with department, college and university assessment and evaluation objectives

Report Created: 6/13/12

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OLC Quality Scorecard

- Measures quality in the administration and support of online programs
- Comprised of 75 quality indicators across nine categories:
  - Institutional Support
  - Technology Support
  - Course Development and Instructional Design
  - Course Structure
  - Teaching and Learning
  - Social and Student Engagement
  - Faculty Support
  - Student Support
  - *Evaluation and Assessment*

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Report Created: 6/13/12

Quality Matters

- Provides a mechanism to consistently evaluate the design of online courses
- We use it to improve design and assessment
- QM leverages eight standards:
  - Course Overview and Introduction
  - Learning Objectives (Competencies)
  - *Assessment and Measurement*
  - Instructional Materials
  - Course Activities and Learner Interaction
  - Course Technology
  - Learner Support
  - Accessibility and Usability

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Report Created: 6/13/12

Combined

- Compliments and aligns with the efforts by departments, colleges and university assessment committees
- Provides us with documentation for accreditation
- Identifies areas and opportunities for improvement
- Highlights key areas where deficiencies may exist; as well as best practices

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Report Created: 6/13/12

Progress To-Date

- We are working with a few faculty on integrating QM into their courses – A&S, MArch and MBA
- We are using the OLC Quality Scorecard to make further improvements

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Report Created: 6/13/12

Annual Assessment Reports 2015-2016

College of Architecture and Design

BA in Architectural Studies/Master of Architecture

1. Assessment Plan and Summary

The 2015-2016 Assessment Plan matrices can be found in Tables 1a and 1b (identical to 2014-2015 plan). The outcomes of the Master of Architecture (M.Arch) degree program are currently related to the 2009 National Architecture Accrediting Board (NAAB) criteria for U.S. architecture schools seeking accreditation. Obtaining an M.Arch degree from an accredited school is essential for the architectural licensing process in any state. A revised 2015-2016 Assessment plan will be upgraded using the 2014 NAAB criteria during AY 2016-2017 and the assessment plan will then be adjusted accordingly.

M.Arch program outcomes support the university graduate and undergraduate learning outcomes as described in Table 1b. Refer to the second column in Table 1b to see the inter-relationship between university learning outcomes and the M.Arch program outcomes as required by NAAB. One NAAB Student Performance Criteria (SPC) has been identified and paired with each University Learning Outcome. Note that either the word "understanding" or "ability" is used in every statement describing each SPC. Both terms are defined here for clarity:

- "Understanding means the assimilation and comprehension of information without necessarily being able to see its full implication."

- "Ability means the skill in using specific information to accomplish a task, in correctly selecting the appropriate information, and in applying it to the solution of a specific problem."[1]

Since the M.Arch program is 'direct entry', both undergraduate and graduate learning outcomes are addressed as they meet both LTU and NAAB assessment criteria. This is also parallel with the NAAB accreditation standards, which only accredits LTU's Master of Architecture degree.   Therefore, classes included in this report represent all classes (1000 - 6000) for the degree. A single course is aligned for assessment at its appropriate level (1000-4000 level for undergraduate and 5000-6000 level for graduate) for each of the paired ULOs and NAAB SPCs. The first part of Table 2 addresses the 10 undergraduate ULOs and the later part, the 5 graduate ULOs. Each ULO has been numbered consecutively for undergraduate (UG-1 through UG-10) and graduate (G-1 through G-5) assessment goals.

Program assessment is conducted using assessment tools (column 3 in the Tables 1a and 1b) which include written assignments, test questions and projects related to a required class.

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[1] **http://www.naab.org/accreditation/2004_Conditions_2.aspx**

Table 1A: Assessment Plan for the BA in Architectural Studies Program

LTU Learning Outcomes	Supporting Program Learning Objective and NAAB SPC	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems	NAAB SPC B6 Comprehensive Design - Ability to produce a comprehensive architectural project that demonstrates each student's capacity to make design decisions across scales while integrating the following SPC: A.2, A.4. , A.5. , A.8. A.9., B.2., B.3., B.4., B.5., B.8. and B.9.	For ARC 4126, Each student is assigned to draw and document structural systems and typical wall constructions for the studio course building project demonstrating the use of sustainable technology. Additionally, criteria must be met for structural stability, safety, appropriate load transfer, optimal member sizing, constructability and thermal comfort. Rain-screen principles must also be applied for exterior wall assemblies.	Using Rubric UG-1, average scores of 70-75% should be achieved on this assignment. .	Every semester	Annual
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problem in their disciplines	NAAB SPC B10 Building Envelope Systems – Under-standing of the basic principles involved in the appropriate application of building envelope systems and associated assemblies relative to fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources.	For ARC 4126 Lab, each student is assigned to draw and document structural systems and typical wall constructions for the studio course building project demonstrating the use of sustainable technology. Additionally, criteria must be met for structural stability, safety, appropriate-load transfer, optimal member sizing, constructability and thermal comfort. Rain-screen principles must also be applied for exterior wall assemblies.	Using Rubric UG-2 to assess the development of conventional drawing and documentation standards; common criteria for structural systems- stability, approximate sizing, load transfer, meeting, the building code (IBC) criteria, rain-screen principles, constructability, and thermal properties, average scores of 70-75% should be achieved.	Every semester	Annual
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities	NAAB SPC B3 Sustainability - Ability to design projects that optimize, conserve, or reuse natural and built resources, provide healthful environments for occupants/users, and reduce the environmental impacts of building construction and operations on future generations through means such as carbon-neutral design, bioclimatic design, and energy efficiency.	For ARC 3423, using a test question on embodied energy.	75% of students will be able to rank materials based on their embodied energy. There is no rubric for this metric. Students either can or cannot rank materials based on their embodied energy.	Every semester	Annual

COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphic communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation	NAAB SPC A3 Visual Communication Skills - Ability to use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.	For ARC 2813, teams of 2-3, students will select a significant work of public art at Hart Plaza, and investigate and record its constituent data - not only on-site information, but also within a historical and cultural context. Teams will editorialize their investigation with the three landscape realms of Time, Material & Energy. Visual commu-nication strategies will be used to codify this infor-mation through and deliver specific information. This will manifest in three information maps - one for each landscape realm. Successful students will interpret "map" broadly, and therefore allow for the potential of 3 dimensional constructs.	Using Rubric UG-4, 60% of students will achieve a "B" or better.	Every semester	Annual
MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically	NAAB SPC B9 Structural Systems - Understanding of the basic principles of structural behavior in withstanding gravity and lateral forces and the evolution, range, and appropriate application of contemporary structural systems.	Assess one quantitative problem from each exam for all class sections, for a total of 4 assessments for the Fall semester.	For ARC 4543, student averages for selected test problems using calculations will exceed 75%.	Every semester	Annual
READING LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view	NAAB SPEC A9 Historical Traditions and Global Culture - Understanding of parallel and divergent canons and traditions of architecture, landscape and urban design including examples of indigenous, vernacular, local, regional, national settings from the Eastern, Western, Northern, and Southern hemispheres in terms of their climatic, ecological, technological, socio-economic, public health, and cultural factors.	For ARC 4183, students will write a paper designed to evaluate an assigned reading and relate its content to the topics/issues covered in the course.	100% of students will correctly identify the central thesis of the reading. There is no rubric for this metric. Students can either identify the central thesis or not.	Every semester	Annual

SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields	NAAB SPC A5 Investigative Skills - Ability to gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.	For ARC 2117, *Collect, Conduct, Convey*, asks a student to find an existing drainage condition on campus and analyze it for its relevant and measurable characteristics at both local and regional scales. Students then design and cast a concrete form that intervenes in that condition. The intervention must capture, conduct, and eventually release the water, while transforming it along the way.	Using Rubric UG-7, 75% of the students will score at receive a total score of at least 40 total pts (B-).	Every semester	Annual
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.	NAAB SPC C6 Leadership - Understanding of the techniques and skills architects use to work collaboratively in the building design and construction process and on environmental, social, and aesthetic issues in their communities.	For ARC 4116, Each student will: write a personal leadership manifesto outlining their ideals, beliefs and goals by writing statements about who they are as a professional on the deepest level. In the report, student will answer the following questions: "What does 'design activism' mean to me?" "What value do I place on 'design activism? Is it something an architect should consider a mandatory part of their practice?" "Who or what do I feel is most worthy of advocating for?"	Using Rubric UG-8, 75% of students shall meet or exceed requirements, earning a grade of 'B' or higher.	Every semester	Annual
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions	NAAB SPC C1 Collaboration - Ability to work in collaboration with others and in multidisciplinary teams to successfully complete design projects.	For ARC 2126, students are required to work in groups of two gathering base materials, understanding, and knowledge about the site and client. The information collected, analyzed, and represented will form the primary resource and influence the design in a way that is sensitive to the program, site and client.	Using Rubric UG-9, **70%** of students will achieve 15 or more points related to collaboration out of a total possible of 20 points.	Every semester	Annual

PROFESSIONAL ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions	NAAB SPC C8 Ethics and Professional Judgment - Understanding of the ethical issues involved in the formation of professional judgment regarding social, political and cultural issues in architectural design and practice.	For 4116, each student will write a personal design manifesto, outlining their personal ideals, beliefs and goals by writing statements about who they are as a designer on the deepest level. They will also identify all social, political and cultural issues of key relevance to them as a designer.	Using Rubric UG-10, 75% of students shall meet or exceed requirements earning a grade of 'B' or higher.	Every semester	Annual

Table 1B: Assessment Plan for MArch Program

University Graduate Learning Outcomes	Supporting NAAB Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	NAAB SPC A2 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.	For ARC 5814 and ARC 5824, each student will complete a task in which he or she is required to prepare a graphic presentation of pre-design, programming, and project intentions.	Using Rubric G-1, 70% of students shall earn at least 12 points out of 16 possible points.	ARC 5814: Fall ARC 5824: Spring	Every 2 yrs
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	NAAB SPC A11 Applied Research - Understanding the role of applied research in determining function, form, and systems and their impact on human conditions and behavior.	For ARC 5013, students will prepare a research poster based on a small research experiment to test the hypothesis and research question developed in the class. Research Method(s) must be selected to answer the question(s) and justification for the choice of the method(s) in this situation is required.	Using Rubric G-2.1 and G-2.2, 75% of students are expected to earn a letter grade of B or better.	Summer	Every year
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	NAAB SPC A5 Investigative Skills - Ability to gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.	For ARC 6514, students will each complete a Forum 2 exercise by: selecting one discrete element from the re-search they have begun to accumulate. It should be self-contained and describe: 1) the element under consideration, 2) the exact means of analysis or interpret-tation they are employing against that element, 3) the evidence that they gather or adduce from that means, and 4) the claim relevant to architecture that they assert on the basis of that evidence.	Using Rubric G-3, 90% of students will obtain a minimum of 18 points out of a possible 20 on the analysis of their readings and ultimately 80 points out of 100 on their resulting paper.	Every semester	Every 3 yrs
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	NAAB SPC A1 Communication Skills - Ability to read, write, speak and listen effectively.	For ARC 6833, each student prepares a critical essay documenting and evaluating the design objectives of his or her design project prepared in ADS1 or ADS2.	Using Rubric G-4, 70% of students shall earn at least 12 points out of 16 possible points.	Summer	Every 2 yrs

"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	NAAB SPC C8 Ethics and Professional Judgment - Understanding of the ethical issues involved in the formation of professional judgment regarding social, political and cultural issues in architectural design and practice.	For ARC5643 Students will engage in a written discussion as part of a seminar focused on cultural positions of ethics affecting design.	Using the G-5 rubric, 75% of students shall meet or exceed requirements achieving a high pass.	Every semester	Every 3 yrs

* NAAB 2009 Outcomes:

Realm A: Critical Thinking and Representation:

A.1.   Communication Skills: *Ability to* read, write, speak and listen effectively.

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.   Visual Communication Skills: *Ability to* use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.

A.5.   Investigative Skills: *Ability to* gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.

A.6.   Fundamental Design Skills: *Ability to* effectively use basic architectural and environmental principles in design.

A.11.   Applied Research: *Understanding* the role of applied research in determining function, form, and systems and their impact on human conditions and behavior.

Realm B: Integrated Building Practices, Technical Skills and Knowledge:

B. 3.   Sustainability: *Ability* to design projects that optimize, conserve, or reuse natural and built resources, provide healthful environments for occupants/users, and reduce the environmental impacts of building construction and operations on future generations through means such as carbon-neutral design, bioclimatic design, and energy efficiency.

Realm C: Leadership and Practice:

C. 1.   Collaboration: *Ability* to work in collaboration with others and in multidisciplinary teams to successfully complete design projects.

C. 5.   Practice Management: *Understanding* of the basic principles of architectural practice management such as financial management and business planning, time management, risk management, mediation and arbitration, and recognizing trends that affect practice.

C. 6.   Leadership: *Understanding* of the techniques and skills architects use to work collaboratively in the building design and construction process and on environmental, social, and aesthetic issues in their communities.

C. 7.   Legal Responsibilities: *Understanding* of the architect's responsibility to the public and the client as determined by registration law, building codes and regulations, professional service contracts, zoning and subdivision ordinances, environmental regulation, and historic preservation and accessibility laws.

C. 8.   Ethics and Professional Judgment: *Understanding* of the ethical issues involved in the formation of professional judgment regarding social, political and cultural issues in architectural design and practice.

2. **Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)**

The 2015-2016 Architecture Assessment Plan was set up so that **about one third of all assessments are planned to be addressed for loop closing every year.** The programs scheduled for evaluation for loop closing this year were: UG-3, UG-5, G-2 and G-4. However, no input was provided for G-2 and G-4 by the professors designated with responsibility of assessment for these ULO. "Loop Closing" comments are included in Section 3 of this report.

All assessments made during the 2015-2016 academic year, whether a loop closing year or not, are detailed below by applicable University Learning Objective (ULO). Assessment details follow.

UG-1 Knowledge in Discipline and NAAB SPC B.6 – Comprehensive Design

- Objective/Outcome: For ARC 4126, Each student is assigned to draw and document structural systems and typical wall constructions for the studio course building project demonstrating the use of sustainable technology. Additionally, criteria must be met for structural stability, safety, appropriate-load transfer, optimal member sizing, constructability and thermal comfort. Rain-screen principles must also be applied for exterior wall assemblies.
- Assessment: These assessments were to be done for ARC 4126 students. **No assessments have been submitted.** This was not assessed in SP16, as originally scheduled, due to a change in the professors teaching Comprehensive Design. It was originally assigned to Professors Ash Raghab and Dan Faoro, neither of which taught Comprehensive Design in SP16.
- Current/Future Actions: Responsibility for assessment needs to be reassigned.
- Responsibility: Previously (Professors Dan Faoro and Ash Raghab). Currently, no one is identified for responsibility.
- University/College Support for Objective: The Architecture Chair will reassign assessment responsibilities each year based on the professors teaching the part of this course covering this ULO.

UG-2 Technology and NAAB SPC B.10 – Building Envelope Systems

- Objective/Outcome: For ARC 4126 Lab, each student is assigned to draw and document structural systems and typical wall constructions for the studio course building project demonstrating the use of sustainable technology. Additionally, criteria must be met for structural stability, safety, appropriate load transfer, optimal member sizing, constructability and thermal comfort. Rain-screen principles must also be applied for exterior wall assemblies
- Assessment: These assessments were to be done for ARC 4126 students. **No assessments have been submitted.** This was not assessed in SP16, as originally scheduled, due to a change in the professors teaching Comprehensive Design. It was originally assigned to Professors Ash Raghab and Dan Faoro, neither of which taught Comprehensive Design in SP16.
- Current/Future Actions: Responsibility for assessment needs to be reassigned.
- Responsibility: Previously (Professors Dan Faoro and Ash Raghab). Currently, no one is identified for responsibility.

- University/College Support for Objective: The Architecture Chair will reassign assessment responsibilities each year based on the professors teaching the part of this course covering these ULOs.

UG-3 Sustainability and NAAB SPC B.3 – Sustainability

- Objective/Outcome: Students will demonstrate an ability to rank materials on the basis of their embodied energy.
- Assessment: ARC 3423 students were evaluated on how they answered an exam question related to the ranking of materials by their embodied energy during the SP15 and FA16 semesters.   For SP15, 52.4% of the students (eleven out of twenty-one) and for FA16, 57% (twelve out of twenty-one) correctly answered a question where they had to determine which construction material had the largest embodied energy. This was significantly below the 75% assessment goal.
- Current/Future Actions: This is a designated loop closing year. Details of recommendations for action is found in section 3 of this program's report.
- Responsibility: Professor Janice Means
- University/College Support for Objective: Another professor will need to be assigned responsibility for this ULO since the current assessor is in phased retirement and will not be teaching during the spring 2017 semester.

UG-4 Communication and NAAB SPC A3 – Visual Thinking Skills

- Objective/Outcome:
- Assessment: ARC 2813 students were evaluated on visual classification of data into Time, Material and Energy**. No assessment was reported. The responsible assessor is on sabbatical.**
- Current/Future Actions: None identified.
- Responsibility: Professor Ayodh Kamath
- University/College Support for Objective: Department Chair needs to anticipate ramifications of assessors going on sabbatical and assign backup. This was discussed on the Department Break Out Session of Assessment Day.

UG-5 Mathematics and NAAB SPC B9 - Structural Systems

- Objective/Outcome: Students will demonstrate an understanding of the basic principles of structural systems through their successful application of mathematics in exam problems.
- Assessment: For ARC 4543 students, faculty assessed selected questions per each exam using a scoring rubric one major quantitative math-based analysis problem 25-30 points, and a minimum of three qualitative questions-T/F, Multiple Choice, fill–in the blank. Math problems involved primarily geometry, trigonometry, and algebra problems and may involve simultaneous equations. The Quantitative questions were representative of outcomes of the LTU Undergraduate Mathematical Goal. Mathematical models as applied in standard equations in the courses are related to applied physics applications. Calculus expressions are used in theorem explanations only. Quantitative problems may involve a min of 6-17

separate equations to find results, some involving graphing of values. Data summary results by course are detailed in Tables UG-5A – UG-5C.

Table UG-5A – ARC 2513					
ARC2513 Basic Structures Course:	**Exam 1**	**Exam 2**	**Exam 3**	**Exam 4**	**Ave. Std. Deviation & Std.Dev (%)**
Topic Areas	Statics	Statics	Strgn/Mat	Beams/Cols.	High Value Low Value
Sec. 1 — Qualitative Problem (ave)	77%	68%	71%	70%	Qual. Ave. 71.4%,Std. Dev. 3.87(5.4%)
Fa 15 — Quantitative Problem (ave)	72%	77%	65%	70%	Quant. Ave.70.8% Std. Dev.4.37(5.4%)
Exam Ave.	**76%**	**78%**	**74%**	**72%**	**Exam Ave. 75 Std. Dev 2.58 (3.44%)**
Sec. 2 — Qualitative Problem (ave)	73%	75%	65%	**55%**	Qual. Ave. 67%,Std. Dev. 9.09 (13.6%)
Sp. 15 — Quantitative Problem (ave)	65%	71%	67%	63%	Qunt.Ave.66.5% Std.Dev.3.45 (5.19%)
Exam Ave.	73%	69%	70%	59%	**Exam Ave. 67.8 Std. Dev 6.08 (5.05%)**
Sec.3 — Qualitative Problem (ave)	85%	85%	89%	81%	Qual. Ave. 85%,Std. Dev. 3.27 (3.84%)
Sp 16 — Quantitative Problem (ave)	78%	78%	82%	75%	Qunt.Ave.78.3% Std.Dev.2.87 (3.68%)
Exam Ave.	75.6%	73.6%	74%	67.80%	**Exam Ave. 75.5% Std. Dev3.0 (3.97%)**
Exam Averages for all sections:	**75.6%**	**73.6%**	**74%**	67.80%	**Exam Ave. 72.8% Std. Dev 3.41(4.670)**
Standard Deviation Std. Dev. Ave. 3.9	2.51	3.68	3.27	6.13	Std. Dev. Ave. 3.9

Standard deviation % is low in overall exam scores ranging from 3.44-5.05%, Qual/Quant std. deviation % range is 3.68-13.6 with an ave is. 6.18% and is within an accepted low range. Note the scores do not reflect removal of some low outlier scores. Variation is noted in assessment ques. scores relative to average exam scores.

This year ARC 2513 was renamed and content shifts implemented reducing topics not needed or covered in subsequent courses with content added to reinforce construction topics and methods of system assembly. A lab component was added which introduced direct faculty interaction, team work, and case study investigations of notable structures, and a structural configuration and planning project that repeats and reinforces lecture content subject areas in the latter part of the term, and reinforces studio based classwork.

Table UG-5B – ARC 3513

ARC3513 Intermediate Structures:		Exam 1	Exam 2	Exam 3	Exam 4	Ave. Std. Deviation & Std.Dev (%)	
Topic Areas		**Wood**	**Steel**	**Steel/Con**	**Conc/Mason.**	**High Value**	**Low Value**
Sec. 1	Qualitative Problem (ave)	83%	81%	83%	81%	Qual. Ave. 79.4% , Std. Dev. 2,42 (3%)	
Sp 16	Quantitative Problem (ave)	76%	75%	83%	75%	Qunt. Ave. 80.8% Std. Dev. 4.37 (5.4%)	
	Exam Ave.	**76%**	**74%**	**78%**	**72%**	**Exam Ave. 75 Std. Dev 2.58 (3.44%)**	
Sec. 2	Qualitative Problem (ave)	76%	78%	80%	NA	Qual. Ave. 78% , Std. Dev. 2.0 (2.56%)	
Fa. 15	Quantitative Problem (ave)	80%	80%	82%	NA	Qunt.Ave.79.3% Std. Dev. 1.15 (1.45%)	
	Exam Ave.	**79%**	**79%**	**81%**	**NA**	**Exam Ave. 79.7% Std Dev.1.15 (1.47%)**	
Sec.3	Qualitative Problem (ave)	78%	77%	77%	NA	Qual. Ave. 77.3% ,Std. Dev.0.58 (0.75%)	
Sp 16	Quantitative Problem (ave)	85%	85%	87%	NA	Qunt.Ave.85.7% Std. Dev. 1.15 (1.34%)	
	Exam Ave.	**81%**	**79%**	**78%**	**NA**	**Exam Ave. 79.3% Std Dev.1.53 (1.94**	
Exam Averages for all sections:		**78.7%**	**77.3%**	**79%**	**NA**	**Exam Ave. 78.3% Std. Dev 0.91(4.670)**	
Standard Deviation Mean – all exams		**2.51**	**2. 36**	**1.41**	**NA**	**Std. Dev. Ave. 2.09**	

This year ARC 3513 was offered for the third time and is a condensed version of the prior Structures 2 and Structures 3 courses. Content shifts implemented a significant reduction of topics not needed with new emphasis added to reinforce construction topics and methods of system assembly in lab work. A lab component was added which introduced direct faculty interaction, team work, and case study investigations of notable structures, and a structural configuration and planning project that repeats and reinforces lecture content subject areas in the latter part of the term, and reinforces studio based classwork.

Table UG-5C – ARC 4513

ARC4543 Advanced Structures:		Exam 1	Exam 2	Exam 3	Exam 4	Ave. Std. Deviation & Std.Dev (%)	
Topic Areas		**Wind**	**Seismic**	**Arches**	**Shell Struc.**	**High Value**	**Low Value**
Sec. 1	Qualitative Problem (ave)	73.3%	76l6%	71.1%	70%	Qual. Ave. 72.8% , Std. Dev. 2,91 (4.0%)	
Fa 15	Quantitative Problem (ave)	74%	70%	70%	78%	Qunt.Ave.73% Std. Dev. 3.83 (5.24%)	
	Exam Ave.	**75%**	**77.5%**	**75.8%**	**74%**	**Exam Ave. 75.58% Std Dev.1.48(1.96%)**	
		Wind	**Seismic**	**NA**	**Shells/Arches**		
Sec. 2	Qualitative Problem (ave)	77%	76%	NA	82%	Qual. Ave. 78.3% , Std. Dev. 3.21 (4.1%)	
Fa. 15	Quantitative Problem (ave)	78%	78%	NA	84%	Qunt.Ave.80% Std. Dev. 3.46 (4.33%)	
	Exam Ave.	**72%**	**70%**	**NA**	**84%**	**Exam Ave. 75.3% Std Dev.7.57 (10%)**	

Table UG-5C
(continued)

		Portals	Wind	NA	Shells	
Sec.3	Qualitative Problem (ave)	80%	69%	NA	70.3%	Qual. Ave. 73% , Std. Dev. 6.0 (8.22%)
Sp 16	Quantitative Problem (ave)	81.4%	78%	NA	79.7%	Qunt.Ave.79.7% Std. Dev. 1.7 (3.76%)
	Exam Ave.	**76%**	**73%**	**NA**	**79%**	**Exam Ave. 76% Std Dev.3.0 (3.95%)**
		Wind	**Seismic/Arch**	**NA**	**Shell/Surface**	
Sec.2	**Qualitative Problem (ave)**	**82%**	**80%**	**NA**	**80%**	Qual. Ave. 80.7% , Std. Dev. 1.15 (1.4%)
Sp 16	**Quantitative Problem (ave)**	**73%**	**79%**	**NA**	**79%**	Qunt.Ave.77% Std. Dev. 3.5 (4.54%)
	Exam Ave.	**68%**	**78%**	**NA**	**78%**	**Exam Ave. 74.7% Std Dev.5.87 (7.7%)**
Exam Averages all sections		**73%**	**75.41%**	**NA**	**78.75%**	
Std. Deviation, Mean all exams= 7.84		**4.54**	**4.06**	**9.9**	**4.11**	

Qualitative scores   76.2% , Std.Dev 3.94   **Quantitative scores: 77.43 , std. deviation 3.24**

This year ARC 4543 was offered for the first time as revised with a one credit lab component added to the prior Structures 4 class. Content shifts implemented an expansion of topics not needed with new emphasis added to reinforce construction topics and methods of system assembly in lab work. A lab component was added which introduced direct faculty interaction, team work, and case study investigations of notable structures, and a structural configuration and planning project that repeats and reinforces lecture content subject areas in the latter part of the term, and reinforces studio based classwork.

- Current/Future Actions: See above by course number.
- Responsibility: Professor Daniel Faoro
- University/College Support for Objective: None indicated.

UG-6 Reading and SPC A9 – Historical Traditions and Global Cultures

- Objective/Outcome: LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.
- Assessment: For ARC 4183 (Twentieth Century Architecture and Theory), students were asked to select and read an architectural journal article from a specific time period and then write a paper that answers the following questions:
  - What was the main point of the article?
  - How did the article relate to the issues covered in class?

  For assessment purposes, only the first question was evaluated as a means of determining whether the students were able to demonstrate proficiency in understanding the article's main point. Eighty-four student papers were evaluated during the Fall 2015 and Spring 2016

semesters. Their responses were evaluated as either "Yes" or "No" depending on whether they correctly identified the writing's main point. The success rate was 99% (83 out of 84).
- Current/Future Actions: No issues. Loop closing is scheduled again in three years.
- Responsibility: Professor Dale Gyure
- University/College Support for Objective: None indicated.

UG-7 Scientific Analysis and NAAP SPC A5 – Investigative Skills

- Objective/Outcome: Students will demonstrate their ability to gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.

- Assessment: This assessment was to be done for ARC 2117 students. **No assessment has been submitted.**
- Current/Future Actions: None indicated.
- Responsibility: Professor Peter L. Osler
- University/College Support for Objective: None indicated.

UG-8 Leadership and NAAB SPC C6 – Leadership

- Objective/Outcome: Students will demonstrate an understanding of the techniques and skills architects use to work collaboratively in building design and construction process and on environmental, social and aesthetic issues in their communities.
- Assessment: Each ARC 4116 student was to compose a personal leadership manifesto outlining their ideals, beliefs and goals by writing statements about who they are as a professional on the deepest level. In the report, students answered the following questions:
  - What does 'design activism' mean to me?
  - What value do I place on 'design activism?
  - Is it something an architect should consider a mandatory part of their practice?
  - Who or what do I feel is most worthy of advocating for?

78% of the students in four reporting sections for FA15, SP16, and SP16 met the requirements of the rubric. The objective of 75% satisfaction was met.

Table UG-8

Results for AY 2015-16

Section		# respondents	# satisfied criteria		% satisfied criteria	
Fall 01		12	10		83	
Fall 02		9	6		67	
Spring		11	9		82	
Summer		8	6		75	
Total		40	31		78	

- Current/Future Actions: In AY 2014-15, the baseline year for assessment of learning criteria UG-8, the objective of 75% satisfaction was not met, with only 73% of students meeting the target. In AY 2015-16, improvement (5%) was observed, as demonstrated in the table above. This may be attributed to a number of factors: First, greater consistency in the manner in which faculty used the assigned grading / assessment rubric. Secondly, with a second opportunity to introduce the manifesto assignment to students, instructors were able to point students toward examples of professional position statements that demonstrate appropriate frameworks and techniques for argument construction, and personal expression. Lastly, by requiring early-semester drafts, participating instructors were able to maintain semester-long discussions with students about the development of their positions. It should be noted that not all instructors reported manifesto grades, with one expressing a concern that such an assessment tool was not appropriate for a studio context like the one they maintain.
- Responsibility: Professor Edward Orlowski
- University/College Support for Objective: At this time, the responsible faculty member does not see a specific need for support from the college or university. With the upcoming review of newer NAAB criteria, it may prove wise to introduce this criterion earlier in the curriculum, using the 'three step' assessment model.

UG-9 Collaboration and NAAB SPC C1 – Collaboration

- Objective/Outcome: Students will demonstrate an ability to work in collaboration with others and in multidisciplinary teams to successfully complete design projects.
- Assessment: ARC 2126 students were assigned team research and construction of a design project site. Together they coordinated all tasks of the research and construction in self-organized teams. The faculty observed students' collaborations and supplemented this work with discussions and lectures on the collaborative nature of design and the profession of architecture. The goal was that 70% of students would achieve 15 or more points related to collaboration out of a total possible of 20 points. As noted in the **in Table UG-9**, this goal was exceeded.

Table UG-9

Results for AY 2015-16

Section		# respondents	# satisfied criteria		% satisfied criteria	
Fall 01		No data				
Fall 02		14	12		86%	
Spring		No data				
Summer		No data				
Total		14	12		86%	

- Current/Future Actions: Loop closing is scheduled for SP18.
- Responsibility: Professor Jim Stevens
- University/College Support for Objective: None identified.

UG-10 Professional Ethics and NAAB SPC C8 - Ethics and Professional Judgement

- Objective/Outcome: Students will demonstrate an understanding of ethical issues involved in the formation of professional judgement regarding social, political and cultural issues in architectural design and practice.
- Assessment: Each ARC 4116 student was to compose a personal design manifesto, outlining their personal ideals, beliefs and goals by writing statements about who they are as a designer on the deepest level. They also were asked to identify all social, political and cultural issues of key relevance to them as a designer. 80% of the students in four reporting sections for FA15, SP16, and SP16 met the requirements of the rubric. The objective of 75% satisfaction was met. Table UG-8 details this result.

<table>
<tr><td colspan="6" align="center">Table UG-10</td></tr>
<tr><td colspan="6">Results for AY 201516</td></tr>
<tr><td>Section</td><td></td><td># respondents</td><td># satisfied criteria</td><td></td><td>% satisfied criteria</td><td></td></tr>
<tr><td>Fall 01</td><td></td><td>12</td><td>10</td><td></td><td>83</td><td></td></tr>
<tr><td>Fall 02</td><td></td><td>9</td><td>6</td><td></td><td>67</td><td></td></tr>
<tr><td>Spring</td><td></td><td>11</td><td>9</td><td></td><td>75</td><td></td></tr>
<tr><td>Summer</td><td></td><td>8</td><td>7</td><td></td><td>88</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td></td><td>40</td><td>32</td><td></td><td>80</td><td></td></tr>
</table>

- Current/Future Actions: In AY 2014-15, the baseline year for assessment of learning criteria UG-10, the objective of 75% satisfaction was not met, with only 70% of students meeting the target. In AY 2015-16, a significant improvement (10%) was observed, as demonstrated in the table above. This may be attributed to a number of factors: First, greater consistency in the manner in which faculty used the assigned grading / assessment rubric. Secondly, with a second opportunity to introduce the manifesto assignment to students, instructors were able to point students toward examples of professional position statements that demonstrate appropriate frameworks and techniques for argument construction, and personal expression. Lastly, by requiring early-semester drafts, participating instructors were able to maintain semester-long discussions with students about the development of their positions. It should be noted that not all instructors reported manifesto grades, with one expressing a concern that such an assessment tool was not appropriate for a studio context like the one they maintain.
- Responsibility: Professor Edward Orlowski
- University/College Support for Objective: At this time, the responsible faculty member does not see a specific need for support from the college or university. With the upcoming review of newer NAAB criteria, it may prove wise to introduce this criterion earlier in the curriculum, using the 'three step' assessment model

G-1 and NAAB SPC A2 – Design Thinking

- Objective/Outcome: Students will develop advanced knowledge within their discipline.

- Assessment: This assessment was to be done for ARC5814 students. Each student was asked to complete a design task in which he or she is required to prepare a graphic presentation of pre-design or preliminary design work, including programming and project intentions. This assessment may be for any assignment of the instructor's choice for which this LTU Learning Objective can be reasonably evaluated. The goal was to have at least 70% of the students score at least 12 points out of 16 possible points. Table G-1 demonstrates that the goal was exceeded with 77 % of the students scoring at least 12 points.

Table G-1

Section	Instructor	Total Students in Section	Students with 12 Points+	Section Average Points
1	A	8	5	11.63
2	B	8	5	11.63
3	C	7	7	13.00
4	D	11	9	14.86
5	E	10	7	13.10
6	F	8	7	12/50
7	G	-	-	No Results Available

Summary
    Totals: **52**   **40**

Average Points   **12.8**

Percentage of Students: Objective   **70%**   **Percentage of Students: 12 points or more**   **77%**

- Current/Future Actions: In AY 2015-16, the baseline year for assessment of learning criteria G-1, the objective of 70% satisfaction was met, with 77% of students meeting the target. Based on these results, the faculty will run the assessment protocol again in the spring 2017 to corroborate the baseline results.   Loop closing is scheduled for SP17.
- Responsibility: Professor Martin Schwartz
- University/College Support for Objective: At this time, the current responsible faculty member does not see a specific need for support from the college or university. With the upcoming review of updated NAAB (accreditation) criteria, it may be that changes in course assignment for this Objective or the method of assessment become advisable.

G-2 and NAAB SPC A11 - Applied Research

- Objective/Outcome: Students will prepare a research poster based on a small research experiment to test the hypothesis and research question developed in the class. Research

Method(s) must be selected to answer the question(s) and justification for the choice of the method(s) in this situation is required.

- Assessment: This assessment was to be done for ARC 5013 students. **No assessment has been submitted.**
- Current/Future Actions: None indicated.
- Responsibility: Professor Anirban Adhya
- University/College Support for Objective: None indicated.

G-3 and NAAB SPC A5. – Investigative Skills

- Objective/Outcome: Thesis students will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature. Using Rubric G-3, 90% of students will obtain a minimum of 18 points out of a possible 20 on the analysis of their readings and ultimately 80 points out of 100 on their resulting paper.
- Assessment: During SP16, three ARC 6514 thesis students effectively evaluated and analyzed scholarly literature during the development of their thesis projects. All obtained a minimum of 18 points out of a possible 20 on the analysis of their readings and 80 points out of 100 on the resulting project for the Forum 2 Exercise.
  The new pedagogical scaffolding that was introduced for M.Arch Thesis during the 2014-15 academic year was highly successful. The Thesis Coordinator, Anirban Adhya, and Faculty Advisors, Deirdre Hennebury, Scott Shall, and Ayodh Kamath agreed that the revised thesis standards continue to better reflect the high quality of student work expected within the college.
- Current/Future Actions: Loop closing is scheduled for SP18.
- Responsibility: Professors Anirban Adhya and Deirdre Hennebury
- University/College Support for Objective: Learning Outcomes and NAAB SPCs are not well aligned in terms of evaluation. A larger issue is the very small sample which does not well represent the overall graduate student experience. The cohorts to date have featured 2 students (AY2014-15) and 3 students (AY2015-16). It would be prudent, perhaps, to look to another graduate level course to assess these outcomes.

G-4 and NAAB SPC A1. – Communication Skills

- Objective/Outcome: For ARC 6833, each student prepares a critical essay documenting and evaluating the design objectives of his or her design project prepared in ADS1 or ADS2.
- Assessment: This assessment was to be done for ARC 6833 students. **No assessment was performed.**
- Current/Future Actions: Loop closing was scheduled for SU16
- Responsibility: Professor Martin Schwartz
- University/College Support for Objective: None indicated.

G-5 and NAAB SPC C8 – Applied Research

- Objective/Outcome: LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.
- Assessment: For ARC5643, students will engage in a written discussion as part of a seminar focused on cultural positions of ethics affecting design. The written discussion with be in two parts, first a formal respect to a faculty question and second, a peer discussion around general topics assigned to the seminar. Using the G-5 rubric, 75% of students shall meet or exceed the following requirements:
  - Criteria 1: Students should understand the broader perspective of sustainability, beyond the technical and scientific aspects.
  - Criteria 2: Students should be able to identify how design decisions can have ethical implications.

Student has provided evidence of recognition of personal ideals, beliefs and goals in regards to societal responsibly and the moral principles that define behavior. The student has referenced factors such as sustainability, environmental responsibly, social and environmental justice, and the individual's relationship to themselves, their community and the larger biosphere. The student has discussed some social, political and cultural issues they deem relevant. The student has cited one example of experiences in the course which have influenced / altered their thinking.

In AY 2014-15, with the implementation of the assessment process, the objective of 75% satisfaction was not met in either assessment criterion. In addition, the surprising low number of percentage of the satisfaction total in the baseline year for assessment of learning criteria G-5 lead to course content revisions. With only 67% meeting Criteria 1 (broad concept of sustainability as ethical approach) and 22% meeting Criteria 2 (design as action that affects society), new course material was introduced in the testing period that addresses global issues of ethics, moral reasoning, personal responsibility and historic cultural development in regards to human stewardship, social justice and environmental responsibility.

In AY 2015-16 (Fall), in the first period of assessment (Assignment 13) the objective of 75% satisfaction was not met in Criteria 1 although the second criteria succeed meeting the threshold of 75%. In the second period of assessment (Assignment 14), the question did not pertain to issues of sustainability (null ranking). The second criteria were well addressed, however, with a significant increase in understanding the relationship of design to ethical decisions (390% increase). As a result of this assessment as well as larger pedagogical concerns with the approach to blend intellectual history with moral reasoning and critical thinking, further material was adjusted in the course. In AY 2015-16 (Spring), all criteria met the threshold scoring 80% satisfaction with one exception (Assignment 13, Criteria 1 was 60%). One concern is the relatively low population of the sample which makes small changes in the course appear to have large statistical effects. However, this is a seminar course in the graduate program, so this is representative to a normative population. Table UG-10 details the results.

Table G-5

Results for AY 2015-16

Section	# of students	# satisfied criteria 1	% satisfied criteria	# satisfied criteria 2	% satisfied criteria
SP15	9	6	67%	2	22%
FA15-1	8	4	50%	6	75%
FA15-1	13	-	-	11	86%
SP16-1	5	3	60%	5	100%
SP16-2	5	4	80%	4	80%
Total	40	17		28	

- Current/Future Actions: The next assessment cycle (FA2016) will allow for a better understanding if the changes to content have had an effect on the ability of students to consider the ethical ramifications on a personal, social and environmental level. Overall, there is a clear increase in sensitivity as well as capacity to critically reason outcomes in regards to the issue assessed. Loop closing was scheduled for SU17 and every 3 years thereafter, however, due to changes in curriculum, loop closing was performed this year and is discussed in Section 3.
- Responsibility: Professor Philip Plowright
- University/College Support for Objective: None indicated.

3. Assessment Plan for 2016-2017 Academic Year

The programs scheduled for evaluation for loop closing this year were: UG-3, UG-5, G-2 and G-4. Due to changes in the course used for assessing ULO G-5, loop-closing is also discussed in this report. Note that no input was provided for G-2 and G-4 assessment nor loop closing.

The Architecture Department will be remapping the planned adaptation of the 2014 NAAB SPC's on to the ULO. Unfortunately, this remapping has not yet been performed. Therefore, no changes have been made to the plan for AY 2015-2016. The new 2016-2017 Assessment Plan will be submitted separately once it is finished.

Results and recommendations for AY 2016-2017 follow by ULO.

UG-3 Sustainability and NAAB SPC B.3 – Sustainability

- Objective/Outcome: Students will demonstrate an ability to rank materials on the basis of their embodied energy with 75% correctly answering a test question on embodied energy.
- Actions: ARC 3423 students were evaluated over a three-year period. During the first two years of assessment, the assessment goal was exceeded. However, for AY 2015-2016, less than 60% of the students answered correctly for a question where they had to determine which construction material had the largest embodied energy. A new collaborative exercise will be developed to provide additional learning opportunities for the students on embodied energy. Additionally, since the professor assigned to this ULO is taking phased retirement, the Department Chair will need to reassign responsibility for SP17.

UG-5 Mathematics and NAAB SPC B9 - Structural Systems

- Objective/Outcome: Students will demonstrate an understanding of the basic principles of structural systems through their successful application of mathematics in exam problems.
- Actions: This was the third and final (loop closing year). Full time faculty assess all classes and the adjuncts were asked to assess one half of their classes at a minimum. The dedicated and committed adjunct faculty however exceeded this minimum requirement.
- Exam content from all faculty was reviewed for consistency and content.
- Constraining and consolidating material has been an effort for Intermediate Structures faculty and reduced the depth of material covered in the past. We are not sure this can be understood related to NCARB exam performance as more time is needed before current students can sit for the exam. Regarding our NAAB accreditation, we will wait six years before another program review will take place.
- The coordinator has adjusted his exam content to include more varying levels of difficulty in questions, dispersing topics to more questions, and to provide more opportunities for 'deep learning' questions and encouraged adj. faculty to follow suit.
- Exam scoring average scores and key question scoring is similar overall with some increase in scores evident in Intermediate Structures when compared to Basic Structures. This can be explained by the fact that Basic Structures faculty do not pass poor students. Advanced Structures exam scores show little change compared to Intermediate Structures exam scores.
- Exam questions in upper level classes tend to be more methodological with fewer opportunities to vary questions from homework. When a small variation in a question is introduced, there often is a drop in performance.
- The Coordinator thinks that the new addition of Lab type instruction and assignments should be the focus in course assessment in the next three years to better gage the outcomes of Lab assignment course changes recently made.
- Average scores do not reflect removal of low scoring outlier scores, e.g. 34-40 which drops scores for Basic Structures classes.
- The Coordinator has already updated the Assessment topics to the new NAAB 2014 accreditation criteria. Our recent accreditation (2013) found no concerns with our courses, and LTU graduate performance on NCARB exams is slightly above average locally and nationwide (2012). Changes in-progress include substantial topic updates of course lectures, inclusion of more visual demonstrations of structural systems, and summary questions at the end of lectures. Overall, the exam grades and assessed questions have scores in the 70's or above with scores increasing in upper division classes, with low standard deviation ranges of 3%-6%. In the past year there are some outliers in Advanced Structures courses in the last

two exams and sections 'curving grades'. These issues will be addressed. Content in exams and classes is generally consistent based on exam reviews.
- **Course Modification Curricular Changes 2013-2016:**
(1) ARC2513: -*Revised* -Course Revisions: this is the third year the classes were renamed and content shifts implemented reducing topics not needed or covered in subsequent courses with new content added to reinforce construction topics and methods of system assembly. A lab component was added to provide direct faculty interaction, team work, and case studies of notable structures, and a structural configuration and planning project that repeats and reinforces lecture content subject areas in the latter part of the term, and reinforces studio based classwork.
(2) **ARC3513-** *New* **-Course Revisions:** In the third year the course was offered and is a condensed version of the prior Structures 2 and Structures 3 courses. Content shifts included a significant reduction of topics not needed with new emphasis to reinforce construction topics and methods of system assembly in lab work. A lab component was added which introduced direct faculty interaction, team work, and case studies of notable structures, and structural configuration and planning projects that repeat and reinforces lecture content subject areas, and reinforces NCARB requirements for national licensure and is linked to studio based classwork.
(3) **ARC4543 -*Revised* -Course Revisions:** In the third year the course was offered as revised with a one credit lab component added to the prior Structures 4 class. Content shifts implemented an expansion of topics with new emphasis added to update for current lateral loading codes, reinforce construction topics and methods of system assembly in lab work. A lab component was added which introduced direct faculty interaction, team work, and case study investigations of notable structures, and more developed structural configuration and planning projects that reinforces lecture content subject areas in the latter part of the term, aids in preparations for the final exam, and reinforces studio based classwork.
- **University Coordination:** -The Course Coordinator, Prof. Daniel Faoro also represented the College of Architecture and Design on the Math Task Force chaired by Patrick Nelson for AY 2015-2016. Prof. Faoro summarized feedback and concerns regarding math aptitude of our students -including those faculty teaching structures classes for Prof. Nelson.
- **Assessment Activity for Current Year:** The data collected and actions taken have resulted in all the possible changes and evidence deemed useful in the last three years. It is determined that there is no need to continue on with this Assessment procedure. The next three years will be devoted to developing scoring rubrics based on the 2014 NAAB SPC outcomes with comparative studies of the data collection of scoring in classes. This will serve to lead us to meeting future accreditation, and to examine if the course lab format is meeting intended outcomes.

G-2 and NAAB SPC A11 - Applied Research

- Objective/Outcome: Students will prepare a research poster based on a small research experiment to test the hypothesis and research question developed in the class. Research Method(s) must be selected to answer the question(s) and justification for the choice of the method(s) in this situation is required.
- Actions: None indicated. **Neither a yearly assessment nor loop closing were performed.** (Responsibility: Professor Anirban Adhya.) Note that due to changes within this relatively new course, it became apparent that the assigned ULO was not a good fit. The Architecture

Department Associate Chair (Professor Martin Schwartz) will assign this ULO to another course and responsible faculty member.

G-4 and NAAB SPC A1. – Communication Skills

- Objective/Outcome: For ARC 6833, each student prepares a critical essay documenting and evaluating the design objectives of his or her design project prepared in ADS1 or ADS2.
- Actions: None indicated. **Neither a yearly assessment nor loop closing were performed.** (Responsibility: Professor Martin Schwartz.) No explanation was provided as to why the assessment was not performed.

G-5 and NAAB SPC C8 – Applied Research

- Objective/Outcome: LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics. The assessment goal of 75% success was met and exceeded.
- Actions: While the assessment goal was exceeded, the apprehension of some studio faculty must be taken into consideration. To attempt to address this, and move toward more consistent student success, the 'manifesto' assignment was renamed 'position statement', and was migrated to the ID5 lab component beginning in the 2016-17 academic year. This decision was made after evaluating the opportunity to bring a greater degree of coordination to the lab component, which would allow a greater level of autonomy to the studio component, while still meeting all required learning objectives. It was recognized that the ID5 lab would best function as a series of experiences that expose students to the multiple ways designers dialogue with each other, and the public. Through discussions with ID5 lab faculty, the following core lab objectives were outlined:
  (1) Demonstrate processes for discerning the needs of a particular community and the ability to assess these needs ('threats' and 'threads')
  (2) Demonstrate the ability to act as a translator (verbal and visual) to other and allied design professionals, as well as to diverse members of the public.
  (3) Demonstrate strategic planning for creating community engagement schemes and presentation methodologies (verbal, written, and graphic)
  (4) Demonstrate self-awareness; bias, insular language, ethics and leadership.

  Furthermore, the following common outcome was determined to meet objective #4: "Written declaration of student's standpoints regarding leadership and professional ethics." With this in mind, it seemed logical to make the position statement a required and coordinated lab assignment.

  Therefore, in the upcoming three-year loop-closing cycle, the ID5 coordinator and faculty will undertake the following assessment activities:
  A. Continue to consistently apply the position statement assignment and rubric in the ID5 lab component, and track results to verify student success.
  B. Investigate alternative methods to re-integrate ethics assessment into the studio component, if needed.

Master of Urban Design

1. Assessment Plan and Summary

See Table 1 for the 2015-2016 Assessment Plan for the Master of Urban Design Program. This program started with the first cohort of students enrolled in courses in FA10. The M.U.D. is a post baccalaureate Urban Design degree program with no professional accrediting body. Therefore, learning objectives and outcomes are developed and evaluated internally by the M.U.D. Faculty Curriculum Committee, the Chair of Architecture, the Deans, and ultimately, the Office of the Provost. The M.U.D. program is designed to develop advanced knowledge, skills, abilities, and experience in the growing field of healthy and sustainable urbanism. Graduates with a degree in Urban Design can pursue careers as designers, planners, city managers, and policy makers in the public, private, and non-governmental organization sectors.

Table 1: Assessment Plan for m.U.D. Program

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Students will demonstrate the formation and application of advanced urban design concepts, principles, and tools through the exploration of the semester long projects in urban and architectural design.	ARC 5714/24 Final studio project Exit Interview	80% of students will participate in design studios and effectively communicate the advanced knowledge they have gained in their final studio project/review, which is evaluated by a consensus rubric	Exit interview conducted with each student who petitions to graduate	Every 3 yrs
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Students will demonstrate the ability to use the latest technologies to collect, analyze and represent data.	ARC5752 Quantitative Methods in Urban Design -- midterm project	80% of students will successfully demonstrate ability on their midterm projects evaluated by a consensus rubric	Annual	Every 2 years
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Students will understand diverse and emergent theories on 'sustainability' and demonstrate knowledge of how issues of sustainability translate to the scale, scope, complexity and governance models of the city, its urbanized region and associated ecosystem.	ARC5693 Sustainable Urbanism- final paper	80% of students will contribute, in their final paper, their own definition of 'sustainable urbanism' to the discipline and literature evaluated by a consensus rubric	Annual	Every 2 years
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Students will gain specific communication skills to become proficient in the visualization of urban environments.	ARC 5742 Urban Design Methods-final paper	80% of students will present a comprehensive urban design alternatives scenario in graphic (digital) format	Annual	Every 2 years
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Students will gain exposure to, and knowledge of, principles and practices of urban design in a public sector setting and in the context of the North American regulatory environment.	ARC 5912 Principles and Practices of Urban Design [Practicum] --internship performance Professional Advisory Board meetings	80% of students will receive positive evaluation by outside professionals (acting as internship supervisor)	Annual	Every 2 years

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)

All cohorts, except for two graduate ULOs, are too small to be meaningful due to the infancy of this program. Therefore, only two graduate ULO assessments are addressed below.   Note that assessments were made during this academic year and will be combined with future data to provide meaningful loop closing.

G-2

- Objective/Outcome: Students will demonstrate ability to use the latest technologies to collect, analyze and represent data
- Assessment: ARC5752 Quantitative Methods in Urban Design – midterm project. 100% (8 of 8 students) successfully demonstrated ability on their midterm projects.
- Current/Future Actions: None indicated.
- Responsibility: Professor Joongsub Kim
- University/College Support for Objective: None indicated.

G-4

- Objective/Outcomes: Students will demonstrate specific communication skills to become proficient in the visualization of urban environments.
- Assessment: ARC5742 Urban Design Methods-final project. 100% (14 of 14 students) presented a comprehensive urban design alternatives scenario in a graphic (digital) format.
- Current/Future Actions: None indicated.
- Responsibility: Professor Joongsub Kim
- University/College Support for Objective: None indicated.

3. Assessment Plan for 2016-2017 Academic Year

The M.U.D. plan used for the 2015-2016 assessment, found in Table 1, will be used for the 2016-2017 academic year.

BFA in Game Art

1. **Assessment Plan and Summary**
   See Table 1 below.

Table 1: Assessment Plan for B.F.A. in Game Art

LTU Undergraduate Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome F N.A.S.A.D. Outcome B	Thesis Project in GAM4514, GAM4524 (Senior Project 1 & 2) Post Mortem Form in GAM3313 (Integrated Game Studio 2) Thesis Book produced in ART4622 (Senior Seminar 2)	70% of students receiving average of "Above Average" or equivalent cumulative score using Review Form for Presentation evaluation 70% of students receiving score of 70% or better	Every Semester	Annual
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome D	Final Research Presentation in ART4612 (Senior Seminar 1) Final Project in ART2813 (Electronic Method Imaging), GAM3143 (3D Animation 2), GAM2123 (2D Animation)	70% of students scoring 70% or better 70% of students receive a score of 70% or higher	Every Semester	Annual
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome C N.A.S.A.D. Outcome E	Grade of Midterm Writing Assignment in ART 4612 (Senior Seminar 1) Evaluation of Coursework in GAM3413 (Game Mechanics) Course Projects in GAM2213 (History of Game Design)	70% of students receive a score of 70% or higher	Every Semester	Annual
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome C	Analytical Journals in GAM2213 (History of Game Design) Final Project in ART3323 (Portfolio Design)	70% of students receive a score of 70% or higher 70% of students receiving average of "Above Average" or equivalent cumulative score using Review Form for Presentation evaluation	Every Semester	Annual

MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome D N.A.S.A.D. Outcome F	Final grade in MCS 1254 Final course project in ART 2813 Completion of 150-hour internship in ART 4922	70% of students receive a score of 70% or higher 70% of students receive a score of 70% or higher 100% of students receive a score of 60% or higher	Every Semester	Annual
READING LTU graduate will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome E	Grade of Final Research presentation in ART 4514 Grade of final paper in ART 4612 and 4622		Every Semester	Annual
SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome E	Final Project in ART 3343	70% of students receive a score of 60% or higher	Every Semester	Annual
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.	N.A.S.A.D. Outcome B	Completion of Leadership sequence (LDR 2001, LDR 3000, LDR 4000)	80% of students receive passing grade in sequence	Every Semester	Annual
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome E	Final course project in GAM 3313 (Integrated Game Studio 2) Successful completion of Thesis Exhibition in GAM 4524 (Senior Project 2)	70% of students receive a score of 70% or higher 70% of students receive a score of 60% or higher	Every Semester	Annual
ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.	N.A.S.A.D. Outcome f	Grade Final Reflective Essay in ART4922	70% of students receive a score of 70% or higher	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)

During 2015-2016 Game Art was reviewed by N.A.S.A.D. and received a very positive response. Work demonstrated throughout Table 1 were considered appropriate and met the expectations of those that reviewed their content.

Outcome A Assessment :
Problem-solving, visual communication and above all prototyping and user testing are at the core of the Game Design discipline. Students are exercising these skills their first year and beyond in project-focused courses like Intro to Games & Animation, Integrated Game Studio and Game Mechanics. Students demonstrated effectiveness in this realm from Freshman to Senior year as each year requires a game project to be proposed (a greenlight pitch), prototyped and user tested by public users.

Outcome B Assessment:
One key component that is desired among these prototypes is the generation of a defined "user experience", taking into account the recognition the user has in regards to the game mechanics, that allows users to form and shape decisions during play. Students engage with a variety of user demographics, resulting in a list of 'needs' to be met by their player base, shaping their own decisions in a design sense. These outcomes are evaluated throughout project-focused courses like Integrated Game Studio, Senior Project, and lecture/writing- oriented courses like History of Game Design. Projects are currently being placed on the digital distribution platform "Steam Greenlight" which requires a successful public vote in order to be validated as an officially distributed product.

Outcome C, D Assessment:
Successful game interfaces and other graphical assets represent an accumulated knowledge of visual organization, composition, information hierarchy, symbols/type/icons and aesthetics.
Game Art students demonstrate these skills through the creation of art assets implemented into the numerous prototypes created throughout the program, showing (as recognized by N.A.S.A.D.) improvement over the years. Inherently, an understanding of tools and technology and their role in the creation of these art assets is reflected as described in Outcome D.

Outcome E, F:
Design choices are fundamentally grounded in an understanding of universal design practices and approaches. Through the study of Game Design History and the research of precedent games and their genres, students have shown a tremendous amount of skill in applying traditional theory and criticism to their assignments. While 'entertainment' is one of the biggest goals of any project undergone, special cases involving user accessibility and usability is always considered. Due to the requirement to release games on a public and digital distribution platform, Outcome F is exercised in a real-world way, requiring all students to treat each design choice as a business choice as well, in order to produce an effective product.

3. Assessment Plan for 2016-2017 Academic Year

Loop closing will continue as indicated in Table 1.

During the 2016-17 AY the Game Art courses and their relationship with the sister program Game Software Development will be reviewed to ensure individual outcomes and course- specific objectives are appropriate for both the N.A.S.A.D. related outcomes and expectations of the current state of the Game-related industry.

Mars Ashton is beginning his tenure-track role, and maintains his role as Director of the program, which will lead to a considerable amount of attention for the program and LTU. The Art and Design department as well as the College of Architecture and Design and the University have already provided ample amounts of support in the form of mentorship, direction, grant- funding and travel budget.

The Game Art studio A221, "The Forge", has nearly been completed and has become an invaluable asset to the program and related programs, offering a rare and sought after benefit to students to Faculty, as benchmarked against the game labs of Michigan State, University of Michigan and the University of Southern California (#1 on Princeton review). The studio will host a number of charitable and development-oriented events such as the Forge Jam, Extra Life, organization events for Art Shop and Anime Club, and a studio space for Infinite Machine and Moebius Gameworks, LLC.

Further integration, clarity and support for the Game Software Development is underway.

a) N.A.S.A.D. Outcome B: The ability to describe and respond to the audiences and contexts which communication solutions must address, including recognition of the physical, cognitive, cultural, and social human factors that shape design decisions.

b) N.A.S.A.D. Outcome C: The ability to create and develop visual form in response to communication problems, including an understanding of principles of visual organization/composition, information hierarchy, symbolic representation, typography, aesthetics, and the construction of meaningfulimages.

c) N.A.S.A.D. Outcome D: An understanding of tools and technology, including their roles in the creation, reproduction, and distribution of visual messages. Relevant tools and technologies include, but are not limited to, drawing, offset printing, photography, and time-based and interactive media (film, video, computer multimedia).

d) N.A.S.A.D. Outcome E: An understanding of design history, theory, and criticism from a variety of perspectives, including those of art history, linguistics, communication and information theory, technology, and the social and cultural use of design objects.

e) N.A.S.A.D. Outcome F: An understanding of basic business practices, including the ability to organize design projects and to work productively as a member of teams.

*Note: Although the nomenclature specifies "Art" in it, N.A.S.A.D. accredits the B.F.A. in Game Art as a design program given that it is focused on applied arts.

BFA in Graphic Design

1. **Assessment Plan and Summary**

See Table 1 below. Listed here is an interpretation of the second column for Table 1:
<u>N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design curriculums:</u>

a) N.A.S.A.D. Outcome A: The ability to conceive and to design visual communications and systems involving various integrations of the elements of professional practice outlined in outcomes B through H

b) N.A.S.A.D. Outcome B: Understanding and use of basic visual communication principles and processes, including but not limited to:

- Understanding of how communication theories, principles, and processes have evolved through history and the ability to use this knowledge to address various types of contemporary problems.
- Understanding of and ability to develop strategies for planning, producing, and disseminating visual communications.
- Functional knowledge of creative approaches, and the analytical ability to make appropriate, purpose-based choices among them, and to use such approaches to identify communication opportunities and generate alternative solutions.
- Ability to plan the design process and construct narratives and scenarios for describing user experiences.
- Fluency in the use of the formal vocabulary and concepts of design—including content, elements, structure, style, and technology—in response to visual communication problems. Studies in critical theory and semiotics are strongly recommended.
- Ability to develop informed considerations of the spatial, temporal, and kinesthetic relationships among form, meaning, and behavior and apply them to the development of various types of visual communication design projects.
- Ability to use typography, images, diagrams, motion, sequencing, color, and other such elements effectively in the contexts of specific design projects.

c) N.A.S.A.D. Outcome C: Ability to incorporate research and findings regarding people and contexts into communication design decision-making, including but not limited to:

- Ability to frame and conduct investigations in terms of people, activities, and their settings, including, but not limited to using appropriate methods for determining people's wants, needs, and patterns of behavior, and developing design responses that respect the social and cultural differences among users of design in local and global contexts.
- Understanding of design at different scales, ranging from components to systems and from artifacts to experiences.
- Ability to exercise critical judgment about the student's own design and the design of others with regard to usefulness, usability, desirability, technological feasibility, economic viability, and sustainability in terms of long-term consequences.

d) N.A.S.A.D. Outcome D: Acquisition of collaborative skills and the ability to work effectively in interdisciplinary or multidisciplinary teams to solve complex problems.

e) N.A.S.A.D. Outcome E: Understanding of and the ability to use technology, including but not limited to:

- Functional understanding of how to continue learning technology, recognizing that technological change is constant.
- Ability to conduct critical evaluations of different technologies in specific design problem contexts, including the placement of technical issues in the service of human-centered priorities and matching relationships between technologies and the people expected to use them.
- Functional capability to shape and create technological tools and systems to address communication problems and further communication goals.
- Ability to recognize and analyze the social, cultural, and economic implications of technology on message creation and production and on human behavior, and to incorporate results into design decisions.

f) N.A.S.A.D. Outcome F: Understanding of and ability to use basic research and analysis procedures and skills, including but not limited to:

- Acquisition of research capabilities and skills such as using databases, asking questions, observing users, and developing prototypes.
- Ability to use analytical tools to construct appropriate visual representations in the execution of research activities.
- Ability to interpret research findings practically and apply them in design development.
- Ability to support design decisions with quantitative and qualitative research findings at various stages of project development and presentation.

g) N.A.S.A.D. Outcome G: Functional knowledge of professional design practices and processes, including but not limited to professional and ethical behaviors and intellectual property issues such as patents, trademarks, and copyrights.

h) N.A.S.A.D. Outcome H: Experience in applying design knowledge and skills beyond the classroom is essential. Opportunities for field research and experience, internships, collaborative programs with professional and industry groups, and international experiences are strongly recommended. Such opportunities to become oriented to the working profession should be supported through strong advising.

Table 1: Assessment Plan for B.F.A. in Graphic Design

LTU Undergraduate Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome F N.A.S.A.D. Outcome B	Review Form of Thesis Show in ART 4524 Review Form in response to ART 3513 Review Form in ART 3523 Thesis Book produced in ART 4622	70% of students receiving average of "Above Average" or equivalent cumulative score using Review Form for Presentation evaluation 70% of students receiving score of 70% or better	Spring Semester Fall Semester Spring Semester	Every third September starting in AY 2013-14
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome D	Final Research presentation in ART 4612 Final course project in ART 2813	70% of students scoring 70% or better 70% of students receive a score of 70% or higher	Fall Semester Every Semester	Every third September starting in AY 2014-15
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	N.A.S.A.D. Outcome B	Grade of mid-term writing assignment (Role of Designer in Society) in ART 4612	70% of students receive a score of 70% or higher	Fall Semester	Every third September starting in AY 2015-16
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome C	Thesis Book produced in ART 4622 Review Form of final oral presentation in ART 4624	70% of students receive a score of 70% or higher 70% of students receiving average of "Above Average" or equivalent cumulative score using Review Form for Presentation evaluation	Spring Semester Spring Semester	Every third September starting in AY 2013-14
MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome D N.A.S.A.D. Outcome F	Final grade in MCS 1254 Final course project in ART 2813 Completion of 150-hour internship in ART 4922	70% of students receive a score of 70% or higher 70% of students receive a score of 70% or higher 100% of students receive a score of 60% or higher	Fall Semester Fall Semester Fall Semester	Every third September starting in AY 2015-16

READING LTU graduate will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome E	Grade of Final Research presentation in ART 4514 Grade of final paper in ART 4612 and 4622			
SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	N.A.S.A.D. Outcome B	Final Project in ART 3343	70% of students receive a score of 60% or higher	Every Semester	Every third September starting in AY 2014-15
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.	N.A.S.A.D. Outcome B	Completion of Leadership sequence (LDR 2001, LDR 3000, LDR 4000)	80% of students receive passing grade in sequence	Every Semester	Every third September starting in AY 2014-15
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome E	Grade of group-based project assigned in ART 4514 Successful completion of Thesis Exhibition in ART 4524	70% of students receive a score of 70% or higher 70% of students receive a score of 60% or higher	Every Fall Every Semester	Every third September starting in AY 2015-16
ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.	N.A.S.A.D. Outcome f	Grade Final Reflective Essay in ART4922	70% of students receive a score of 70% or higher	Every Spring	Every third September starting in AY 2014-15

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)
Loop was closed on the following objectives:

Sustainability

Objective/Outcome: LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.
Assessment: Final grades of student project execution and presentation in ART 4524
Evaluation: 70% of students receive a score of 70% or higher
Issue: Based on final grades, students are demonstrating a general understanding off issues of sustainability.
Current/Future Actions: To develop the understanding and application of these issues, students should be asked to address these considerations through a specific element of their project. The performance indicator should be a graded component of that project. Furthermore, the research that informs this understanding should be human-centered.
Responsibility: Lilian Crum Mathematics (pending grade info)

Objective/Outcome: LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.
Assessment: 70% of students receive a score of 70% or higher
Evaluation: Final grade in MCS 1254
Issue:
Current/Future Actions: Responsibility: Lilian Crum

Teamwork

Objective/Outcome: LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.
Assessment: Grade of group-based project assigned in ART 4514. Successful completion of Thesis Exhibition in ART 4524
Evaluation: 70% of students receive a score of 60% or higher. 70% of students receive a score of 60% or higher. Successful completion of Thesis Exhibition in ART 4524.
Issue: Based on the scores and the successful organization and completion of their Thesis Exhibition, students are demonstrating strong, interdisciplinary teamwork.
Current/Future Actions: Students should continue to be encouraged to collaborate not just on group projects, but on shared professional and educational experiences.
Responsibility: Lilian Crum

3. Assessment Plan for 2016-2017 Academic Year

KNOWLEDGE IN DISCIPLINE

LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.
In Graphic Design Senior Thesis (ART 4524) and Senior Seminar (ART 4622), students develop self-directed projects and a written thesis that are informed by theory and research that demonstrates knowledge in discipline. These courses culminate in a public exhibition of their projects in which industry professionals are invited. For this final exhibition and project critique, industry professionals as well as members of the program's new advisory board will be invited as guest critics, and complete an evaluation form that will be used as a performance indicator.

The written thesis book produced in ART 4622 will also be used to evaluate knowledge in discipline, with the grading criteria revised with input from the advisory board.

COMMUNICATION

LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.

The Communication Subcommittee of the Core Curriculum Task Force developed university- level recommendations that should improve the quality of written communication. Additionally, in an effort to improve the quality written communication, students in all Interaction Design courses that have writing embedded in the curriculum be encouraged to use the Academic Achievement Centre and tools developed by the Communication Subcommittee. The result of these actions should be reflected in the quality of the written thesis for ART 4622, and continue to develop over time. Oral and graphic communication will be assessed by the evaluation form completed by the guest critics for the final review of the thesis exhibition in ART 4524.

READING

LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.

Readings are individually selected and analyzed in in ART 4622, as they relate to each student's particular thesis topic. The ability to interpret the texts and to inform their research will be evaluated by each student's seminar presentation, as well as by their written thesis books.

BS in Industrial Design

1. **Assessment Plan and Summary**
   The primary tool for assessment of the Industrial Design Program is the Project Evaluation Form, a rubric which combines the outcomes identified in NASAD guidelines as essential competencies with both faculty and professional performance assessments. This form replaces the previous ECEO document, has been improved, and is being modified to fit a spreadsheet format which all instructors will be required to use. Its implementation and cadence is outlined in Table 1 below.
   Listed here is an interpretation of the second column for Table 1:

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

   a) N.A.S.A.D. Outcome A: The ability to solve communication problems, including the skills of problem identification, research and information gathering, analysis, generation of alternative solutions, prototyping and user testing, and evaluation of outcomes.

   b) N.A.S.A.D. Outcome B: The ability to describe and respond to the audiences and contexts which communication solutions must address, including recognition of the physical, cognitive, cultural, and social human factors that shape design decisions.

   c) N.A.S.A.D. Outcome C: The ability to create and develop visual form in response to communication problems, including an understanding of principles of visual organization/composition, information hierarchy, symbolic representation, typography, aesthetics, and the construction of meaningful images.

   d) N.A.S.A.D. Outcome D: An understanding of tools and technology, including their roles in the creation, reproduction, and distribution of visual messages. Relevant tools and technologies include, but are not limited to, drawing, offset printing, photography, and time- based and interactive media (film, video, computer multimedia).

   e) N.A.S.A.D. Outcome E: An understanding of design history, theory, and criticism from a variety of perspectives, including those of art history, linguistics, communication and information theory, technology, and the social and cultural use of design objects.

   f) N.A.S.A.D. Outcome F: An understanding of basic business practices, including the ability to organize design projects and to work productively as a member of teams.

   g) N.A.S.A.D. Outcome G: Functional knowledge of professional design practices and processes, including but not limited to ethical behaviors and intellectual property issues such as patents, trademarks, and copyrights.

   h) N.A.S.A.D. outcome H: Knowledge of basic business practices and their relationship to industrial design as well as the ability to investigate and reconcile the needs related to entrepreneurship, marketing, engineering, manufacturing, servicing, and ecological and social responsibility in the process associated with specific design projects.

   i) N.A.S.A.D. Outcome I: Acquisition of collaborative skills and the ability to work effectively in interdisciplinary or multidisciplinary teams.

2. Table 1: Assessment Plan for BS in Industrial Design

LTU Undergraduate Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	Outcome A Outcome E Outcome G	Thesis design project in IDD4516, IDD4526 Evaluation of design project in ATD4513, ATD3616, IDD3326 ECEO evaluation form in IDD3316, ATD3616, IDD3326, ATD3626	70% of students receive a score of 65% or higher 65% 65% average on ECEO form 50% of students receive a score of 70% or higher	Semester	Annual
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	Outcome B Outcome D	ECEO evaluation rubric coursework in IDD2215, IDD3316, IDD4516 Professional critiques and industry assessment of design proposal.	50% of students receive a score of 70% or higher 70% of students receive a score of 75% or higher	Semester	Annual
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	Outcome H	Evaluation of coursework in ATD3616 or IDD4516 using Sustainability rubric against course content. Content included in ATD 4513 coursework	50% of students receive a score of 65% or higher	Semester	Annual
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	Outcome B Outcome F	Evaluation of coursework in each studio: IDD1114, IDD2214, IDD3316, IDD4516 Evaluation of coursework in each studio: IDD1124, IDD2224, IDD3326, IDD4526	70% of students will score 75% or higher on ECEO Form progressively tailored to course level 70% students will score, on ECEO Form, pre-determined performance levels progressively tailored to course level published rubric.	Semester	Annual
MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.	Outcome A Outcome D Outcome E	Coursework in IDD2215 Coursework in IDD2225 Coursework in ATD4513	70% of students receive a score of 55% or higher 70% of students receive a score of 55% or higher 70% of students receive a score of 55% or higher	Semester	Annual

READING LTU graduate will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	Outcome A Outcome E	Coursework in ATD4524 Coursework in IDD372	70% of students receive a score of 65% or higher 70% of students receive a score of 65% or higher	Semester	Annual
SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	Outcome B Outcome E	Coursework in IDD3316 and IDD3326 Coursework in IDD3723	70% of students receive a score of 60% or higher	Semester	Annual
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.	Outcome I Outcome F	Coursework in IDD1113 and IDD1223 Coursework in ATD2832 Student exit interview and Alumni Survey	70% of students receive a score of 60% or higher Job placement ad continued relationship with program	Semester	Annual
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	Outcome B Outcome E	Coursework in IDD1113, and IDD1223 Coursework in ATD3616, and ATD3626	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher	Semester	Annual
ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.	Outcome F	Ethics quiz in ATD4313	70% of students receive a score of 70% or higher	Semester	Annual

2. **Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)**

KNOWLEDGE IN DISCIPLINE:
Assessment: Using the PEF rubric evaluation form, a comprehensive assessment of overall knowledge in the discipline of Industrial Design is possible. This ten section rubric covers most aspects of the discipline from the fundamentals to process to sustainability initiatives. The PEF is used by sponsor and visiting professionals to assess each of the individual projects assigned.
Evaluation: The ten-point scoring rubric is used and results are weighted to the project and course level at hand. Matrices have been compiled to identify specific issues of course content and/or competencies. Overall, stated metrics were met however disparities in specific core performance skills suggest a means by which remedial actions can be taken.
Issue: We've been concerned that students are progressing to 3000 level coursework with deficiencies in certain capabilities which limit the student's ability to succeed going forward.
Actions: It is suggested that we incorporate a 'Portfolio Review' at the end of sophomore year to determine suitability to proceed to 3000 level.
Responsibility: K. Nagara/Portfolio review team
Issue: The raw data of this PEF information is not being captured in a comparative format resulting in some pertinent information being buried in boxes.
Actions: It is recommended that a spreadsheet database be created and maintained by the Program Coordinator. This is being done currently.
Responsibility: Hanzel/Nagara/Anne Dandar

SUSTAINABILITY:
Assessment: Section 10 of the PEF rubric evaluates sustainability knowledge and inclusion.
Evaluation: Because Sustainability is not mandated in the coursework and Adjunct instructors may not promote the tenants of people, planet and profits, it was decided to shift this learning to Professional Practice however, additional focus around self-employment business practices pushed this module out and back to the individual projects where the results are disappointing.
Actions: It is recommended that a 'brief template' be created for all adjunct and sponsoring agencies to enunciate the university position regarding initiatives which need to be incorporated in the pedagogical coursework.
Responsibility: Creation: Hanzel, Nagara, Distribution: Dandar

COMMUNICATION:
Assessment: Section 6 of the PEF rubric evaluates oral written and graphical communication skills and capabilities while sections 2, 7 and 9 also evaluate image creation skills. Individual and Team presentations in Professional Practice also measure communication skills.
Writing skills are really only evaluated in the Writing Competency test as most writing in the design field falls within more advanced research.
Evaluation: Writing skills, within their limited expression, meet the overall metrics of the stated assessment.
Issue: Incorporating a more rigorous research agenda in the Senior Project will require a higher level of writing capability and academic expression not currently evident.
Actions: Incorporation of more written rigor in Capstone-like projects. Need to include a brief template for instructors and sponsors.
Responsibility: Hanzel/Nagara creation, Dandar distribution
Issue: Language and public speaking skills vary widely and are difficult to remedy through Normal coursework.

Actions: Suggest a college/university supported remedial public speaking course as recommended by instructor.
Responsibility: Dean/ Faculty Council

MATHEMATICS
Assessment: Professional Practice Affinity Diagramming research activity, compilation and data Analysis. Coursework scoring.
Evaluation: Instructor scored coursework, metrics were met.
Issue: Prof Practice results were team-based rather than individual.
Actions: Recommend including data analysis in Affinity coursework. Responsibility: Professional Practice Instructor.

READING
Assessment: Professional Practice scoring of required reading book, individual test and team Presentation.
Issue: Reading assignments vary according to instructor.
Actions: Recommend a 'brief template' to include basic tenants of Professional Practice for ID including, Reading, IP law, Teamwork, data acquisition and analysis.
Responsibility: Creation, Hanzel/ Nagara distribution: Dandar

TEAMWORK
Assessment: Professional Practice scoring rubric (DIHIW) and Affinity Diagramming project. Students were evaluated individually and in teams. Team design projects were also assessed.
Evaluation: Instructor scored coursework of three team projects. Metrics were exceeded. Issue: Team-based projects are instructor driven and may not repeat year over year.
Actions: Recommend adding team-based project in Prof Practice coursework.
Responsibility: Professional Practice Instructor.

3. **Assessment Plan for 2016-17 Academic Year**
   Loop-Closing continues for:

   SCIENTIFIC ANALYSIS
   Assessment: Coursework in ATD3616 and ATD3626 Coursework in IDD3723

   ETHICS
   Assessment: Ethics quiz (multiple choice) in ATD4513

   TECHNOLOGY
   Assessment: Using the PEF rubric evaluation form in ATD3616 and ATD3626

   READING
   Assessment: ATD4513 Professional Practice scoring of required reading book, individual test and team Presentations on book content.

   MATHEMATICS
   Assessment: ATD4513 Professional Practice Affinity Diagramming research activity, compilation and data Analysis. Coursework scoring.

   Actions

Because our program comprises many Adjunct and Sponsor instructor/facilitators, it is believed we need to institute basic curricular outlines (into the Syllabus template) to inform said agents/instructors as to the required content expected in the appropriate classes. Most of these can be completed and distributed before the end of the current semester to be included in the remaining coursework. They may include:

A Sustainability 'brief template' be created for all adjunct and sponsoring agencies to enunciate the university position regarding initiatives which need to be incorporated in the pedagogical coursework.

Incorporation of more written rigor in Capstone-like projects. Need to include a 'brief template' for instructors and sponsors.

The addition of a Teamwork project in the Professional Practice Syllabus template.

'New' Assessment Plans
Incorporation of a 'Portfolio Review' at the end of sophomore year to determine suitability to proceed to 3000 level.
Inconsistent oral communication skills/Suggest inclusion of presentation rubric.
Low level of Math inclusion in general coursework/ Recommend including data analysis in research component of coursework.
Responsibility: Nagara/Dandar

Differential in disciplines between ID and Tran PP/Recommend a 'brief template' to include basic tenants of Professional Practice for ID including, Reading, IP law, Teamwork, data acquisition and analysis. Responsibility: Creation, Hanzel/ Nagara distribution: Dandar

BFA in Interaction Design

1. **Assessment Plan and Summary**
   See Table 1 below. Listed here is an interpretation of the second column for Table 1: <u>N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design</u> curriculums:
   <u>N.A.S.A.D. Essential Competencies, Experiences, and Opportunities (ECEO) for design curriculums:</u>

   a) N.A.S.A.D. Outcome A: The ability to conceive and to design visual communications and systems involving various integrations of the elements of professional practice outlined in outcomes B through H
   b) N.A.S.A.D. Outcome B: Understanding and use of basic visual communication principles and processes, including but not limited to:

   - Understanding of how communication theories, principles, and processes have evolved through history and the ability to use this knowledge to address various types of contemporary problems.
   - Understanding of and ability to develop strategies for planning, producing, and disseminating visual communications.
   - Functional knowledge of creative approaches, and the analytical ability to make appropriate, purpose-based choices among them, and to use such approaches to identify communication opportunities and generate alternative solutions.
   - Ability to plan the design process and construct narratives and scenarios for describing user experiences.
   - Fluency in the use of the formal vocabulary and concepts of design—including content, elements, structure, style, and technology—in response to visual communication problems. Studies in critical theory and semiotics are strongly recommended.
   - Ability to develop informed considerations of the spatial, temporal, and kinesthetic relationships among form, meaning, and behavior and apply them to the development of various types of visual communication design projects.
   - Ability to use typography, images, diagrams, motion, sequencing, color, and other such elements effectively in the contexts of specific design projects.

   c) N.A.S.A.D. Outcome C: Ability to incorporate research and findings regarding people and contexts into communication design decision-making, including but not limited to:

   - Ability to frame and conduct investigations in terms of people, activities, and their settings, including, but not limited to using appropriate methods for determining people's wants, needs, and patterns of behavior, and developing design responses that respect the social and cultural differences among users of design in local and global contexts.
   - Understanding of design at different scales, ranging from components to systems and from artifacts to experiences.
   - Ability to exercise critical judgment about the student's own design and the design of others with regard to usefulness, usability, desirability, technological feasibility, economic viability, and sustainability in terms of long-term consequences.

   d) N.A.S.A.D. Outcome D: Acquisition of collaborative skills and the ability to work effectively in interdisciplinary or multidisciplinary teams to solve complex problems.
   e) N.A.S.A.D. Outcome E: Understanding of and the ability to use technology, including but not limited to:

- Functional understanding of how to continue learning technology, recognizing that technological change is constant.
- Ability to conduct critical evaluations of different technologies in specific design problem contexts, including the placement of technical issues in the service of human-centered priorities and matching relationships between technologies and the people expected to use them.
- Functional capability to shape and create technological tools and systems to address communication problems and further communication goals.
- Ability to recognize and analyze the social, cultural, and economic implications of technology on message creation and production and on human behavior, and to incorporate results into design decisions.

f) N.A.S.A.D. Outcome F: Understanding of and ability to use basic research and analysis procedures and skills, including but not limited to:

- Acquisition of research capabilities and skills such as using databases, asking questions, observing users, and developing prototypes.
- Ability to use analytical tools to construct appropriate visual representations in the execution of research activities.
- Ability to interpret research findings practically and apply them in design development.
- Ability to support design decisions with quantitative and qualitative research findings at various stages of project development and presentation.

g) N.A.S.A.D. Outcome G: Functional knowledge of professional design practices and processes, including but not limited to professional and ethical behaviors and intellectual property issues such as patents, trademarks, and copyrights.

h) N.A.S.A.D. Outcome H: Experience in applying design knowledge and skills beyond the classroom is essential. Opportunities for field research and experience, internships, collaborative programs with professional and industry groups, and international experiences are strongly recommended. Such opportunities to become oriented to the working profession should be supported through strong advising.

Table 1: Assessment Plan for B.F.A. in Interaction Design

LTU Undergraduate Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome F N.A.S.A.D. Outcome B	Review Form of Thesis show in ART 4624 Review Form in response to ART 4922 Thesis Book produced in ART 4622	70% of students receiving average of "Above Average" or equivalent cumulative score using Review Form for Presentation evaluation 70% of students receiving score of 70% or better	Spring Semester Fall Semester Spring Semester	Every third September starting in AY 2013-14
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome D	Final Research presentation in ART 4612 Final course project in ART 2813	70% of students scoring 70% or better 70% of students receive a score of 70% or higher	Fall Semester Every Semester	Every third September starting in AY 2014-15
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	N.A.S.A.D. Outcome B	Grade of mid-term writing assignment (Role of Designer in Society) in ART 4612	70% of students receive a score of 70% or higher	Fall Semester	Every third September starting in AY 2015-16
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome C	Thesis Book produced in ART 4622 Review Form of final oral presentation in ART 4624	70% of students receive a score of 70% or higher 70% of students receiving average of "Above Average" or equivalent cumulative score using Review Form for Presentation evaluation	Spring Semester Spring Semester	Every third September starting in AY 2013-14
MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome D N.A.S.A.D. Outcome F	Final grade in MCS 1254 Final course project in ART 2813 Completion of 150-hour internship in ART 4922	70% of students receive a score of 70% or higher 70% of students receive a score of 70% or higher 100% of students receive a score of 60% or higher	Fall Semester Fall Semester Fall Semester	Every third September starting in AY 2015-16

READING LTU graduate will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	N.A.S.A.D. Outcome A N.A.S.A.D. Outcome E	Grade of Final Research presentation in ART 4514 Grade of final paper in ART 4612 and 4622			
SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	N.A.S.A.D. Outcome B	Final Project in ART 3343	70% of students receive a score of 60% or higher	Every Semester	Every third September starting in AY 2014-15
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.	N.A.S.A.D. Outcome B	Completion of Leadership sequence (LDR 2001, LDR 3000, LDR 4000)	80% of students receive passing grade in sequence	Every Semester	Every third September starting in AY 2014-15
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	N.A.S.A.D. Outcome B N.A.S.A.D. Outcome E	Grade of group-based project assigned in ART 4514 Successful completion of Thesis Exhibition in ART 4524	70% of students receive a score of 70% or higher 70% of students receive a score of 60% or higher	Every Fall Every Semester	Every third September starting in AY 2015-16
ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.	N.A.S.A.D. Outcome f	Grade Final Reflective Essay in ART4922	70% of students receive a score of 70% or higher	Every Spring	Every third September starting in AY 2014-15

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)
Sustainability

Loop closing will commence as indicated in Table 1 – and as the B.F.A. in Interaction Design curriculum allows given its relative newness.

Mathematics (pending grade info)
Responsibility: Lilian Crum Teamwork

Loop closing will commence as indicated in Table 1 – and as the B.F.A. in Interaction Design curriculum allows given its relative newness. There were no students in the 2015-2016 ART 4624 to evaluate these results.

Added to Table 1 is successful collaboration across disciplines. Teamwork will also be evaluated by a collaborative project with students in Math and Computer Science in ART 3053.

3. Assessment Plan for 2016-2017 Academic Year
KNOWLEDGE IN DISCIPLINE

LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.
In Interaction Design Senior Thesis (ART 4624) and Senior Seminar (ART 4622), students develop self-directed projects and a written thesis that are informed by theory and research that demonstrates knowledge in discipline. These courses culminate in a public exhibition of their projects. For this final exhibition and project critique, industry professionals as well as members of the program's new advisory board will be invited as guest critics, and complete an evaluation form that will be used as a performance indicator. The written thesis book produced in ART 4622 will also be used to evaluate knowledge in discipline, with the grading criteria revised with input from the advisory board.

COMMUNICATION
LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.

The Communication Subcommittee of the Core Curriculum Task Force developed university- level recommendations that should improve the quality of written communication. Additionally, in an effort to improve the quality written communication, students in all Interaction Design courses that have writing embedded in the curriculum will be encouraged to use the Academic Achievement Centre and the related writing tools developed by the Communication Subcommittee. The result of these actions should reflect stronger written thesis books for ART 4622, and continue to continue to improve as students move through the curriculum. Oral and graphic communication will be assessed by the evaluation form completed by the guest critics for the final review of the thesis exhibition in ART 4524.

READING
LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.

Readings are individually selected and analyzed in in ART 4622, as they relate to each student's particular thesis topic. The ability to interpret the texts and to inform their research will be evaluated by each student's seminar presentation, as well as by their written thesis books.

BS in Interior Architecture

1. **Assessment Plan and Summary**

    See Table 1.

Table 1: Assessment Plan for BS in Interior Architecture

LTU Undergraduate Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	CIDA Standards: ALL ARI 3113_Furniture and Millwork, ARI 3114_Interior Architecture 1, ARI 3123_Inter. Materials, Components, and Textiles, ARI 3124_Interior Architecture 2, ARI 4113_History of Interiors, ARI 4123_Environmental Psychology, ARI 4124_Interior Architecture 3, ARI 4223_Interior Design Practice, ARC 4234_Allied: Interior Design, ARI 4922_Internship	Class Assignments; Examinations; Design Projects; Documentation; Class Participation	Mean Results for Examinations; Internal and External Critique and Evaluation	Semester	Annual
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	CIDA Standards: 12, 13	Class Assignments; Examinations; Design Projects; Documentation; Class Participation	Mean Results for Examinations; Internal and External Critique and Evaluation	Semester	Annual
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	CIDA Standards: 3, 12,13	Class Assignments; Design Projects incorporating Research and Documentation; Class Participation	Mean Results for Examinations; Internal and External Critique and Evaluation	Semester	Annual
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	CIDA Standards: 6, 7	Writing Assignments; Design Projects incorporating a Written and Graphic Analysis with Oral Presentations; Documentation; Class Participation	Mean Results for Exams; Internal and External Critique and Evaluation	Semester	Annual

MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.	CIDA Standards: 9, 12,	Class Assignments; Design Projects incorporating Mathematics of Proportion as it relates to Space and Form with physical models and Process Documentation; Class Participation 13	Mean Results for Exams; Internal and External Critique and Evaluation	Semester	Annual
READING LTU graduate will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	CIDA Standards: 2	Class Assignments; Examinations; Reading Assignments w/ Follow-up discussion; Documentation; Class Participation	Papers; Peer Evaluation for Group Discussions and Participation	Semester	Annual
SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	NA			Semester	Annual
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.	CIDA Standards: 2, 6, 7	Class Assignments; Design Projects; Documentation; Class Participation	Internal and External Critique and Evaluation; Peer Evaluation for Group Projects	Semester	Annual
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	CIDA Standards: 5	Class Assignments; Group Design Projects; Documentation; Class Participation; Capstone Projects	Internal and External Critique and Evaluation; Peer Evaluation for Group Projects	Semester	Annual
ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.	CIDA Standards: 2, 7	Class Assignments; Group Design Projects; Documentation; Class Participation; Capstone Projects	Internal and External Critique and Evaluation; Peer Evaluation for Group Projects	Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)

Our most recent NASAD report for the Bachelor of Interior Architecture program cites the following competencies: From the most recent accreditation visit in April 2016 through NASAD, the visiting team cited the following competencies for Bachelor of Interior Architecture program:

- Status - Seeking Renewal of Plan Approval and Final Approval for Listing

- Title/Content Consistency - Course titles and content appear consistent within the program and were reflected in the three randomly selected transcripts.

- Curriculum - The Interior Architecture curriculum, on the whole, appears to be in compliance with NASAD standards.

- Student Work - The student work showed strong visualization skills, both through digital 2D and 3D modeling and rendered perspectives. There was a variety of work demonstrating growth as students progressed through the program, covering the range of functional knowledge of professional design practices and processes. The work developed a clear communication of goals, objective, research and design development to a broad range of professionals and clients.

- Development of Competencies - The creative work produced by students and the studio environment demonstrated experiences in studio reflective of professional careers in the field. Contemporary issues, and processes were demonstrated in the creative work produced by students. The work demonstrated competence with principles of visual organization, two and three dimensions. The student work demonstrated conceptual understanding, and technical knowledge at a professional entry level.

- Overall Effectiveness - The Interior Architecture program appears to meet NASAD standards.

Objective 1:
- Objective/Outcome: Selected historical and cultural precedent influence will be referenced within student project concept statements and evidence of application will incorporated both verbally and graphically within design projects.
- Assessment: Internal and External Critique and Evaluation; Peer Evaluation for Group Projects Class Assignments; Design Projects; Documentation; Class Participation.
- Evaluation: Analysis of student work and class participation to find evidence that precedent influence was made reference to in both verbal and graphic presentations, and deliberated in class discussions.
- Issue: Most students were able to address historical and cultural precedent influence in class discussions and in verbal and graphic presentations.
- Current/Future Actions: In class discussions of the relevance and importance of precedent influence will continue. Assignments that provide a directive for students to both verbally and graphically address precedent influence are dispersed throughout the interior architecture studio courses and are required to be addressed as part of their final project conclusions.
- Responsibility: Department Chair, Program Director, and faculty.
- University/College Support for Objective: NA

Objective 2:
- Objective/Outcome: Specific instruction on fire suppressions systems will be incorporated into each studio course and understanding and application will be evident graphically within final student projects.

- Assessment: Internal and External Critique and Evaluation; Peer Evaluation for Group Projects Class Assignments; Design Projects; Documentation; Class Participation.
- Evaluation: Analysis of student work and class participation to find evidence that precedent influence was made reference to in both verbal and graphic presentations, and deliberated in class discussions.
- Issue: Most students were able to address historical and cultural precedent influence in class discussions and in verbal and graphic presentations.
- Current/Future Actions: Specific instruction on fire suppressions systems will continue to be incorporated into each studio course and application will be evident graphically within final.
- Responsibility: Department Chair, Program Director, and faculty.
- University/College Support for Objective: NA

3. Assessment Plan for 2016-2017 Academic Year

1) Current Loop-closing actions
- In class discussions of the relevance and importance of precedent influence will continue. Assignments that provide a directive for students to both verbally and graphically address precedent influence are dispersed throughout the interior architecture studio courses and are required to be addressed as part of their final project conclusions.
- Specific instruction on fire suppressions systems will continue to be incorporated into each studio course and application will be evident graphically within
2) Actions that are to commence in the current year:
- Evidence for preparation of the CIDA required mid-accreditation term report is being gathered and assessed in terms as explained in Section 2: Objectives 1 and 2.
3) New assessment plans for the current year
- Objective/Outcome: Writing skills will be more closely addressed through internal and external critique and evaluation. Students are required to write summaries of research and/or descriptions of their work in most course assignments. In professional practice interior designers and architects need to have the ability to provide a rational for their design directions based on program requirements, client specific needs and wishes, and overall design concepts. Well-developed concept statements that embrace both abstract and focused terms are a powerful means of setting up design constraints and guiding the design process.
- Actions: Learning content will be modified to offer additional opportunities to hone writing skills by the assignment of more specific reading assignments and class discussion targeted toward the development of conceptual ideas.

BS in Transportation Design

1. Assessment Plan and Summary

The primary tool for assessment of the Industrial Design Program is the Project Evaluation Form, a rubric which combines the outcomes identified in NASAD guidelines as essential competencies with both faculty and professional performance assessments. This form replaces the previous ECEO document, has been improved, and is being modified to fit a spreadsheet format which all instructors will be required to use. Its implementation and cadence is outlined in Table 1 below.

Listed here is an interpretation of the second column for Table 1:

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

a)   N.A.S.A.D. Outcome A: The ability to solve communication problems, including the skills of problem identification, research and information gathering, analysis, generation of alternative solutions, prototyping and user testing, and evaluation of outcomes.

b)   N.A.S.A.D. Outcome B: The ability to describe and respond to the audiences and contexts which communication solutionsmust address, including recognition of the physical, cognitive, cultural, and social human factors that shape design decisions.

c)   N.A.S.A.D. Outcome C: The ability to create and develop visual form in response to communication problems, including an understanding of principles of visual organization/composition, information hierarchy, symbolic representation, typography, aesthetics, and the construction of meaningful images.

d)   N.A.S.A.D. Outcome D: An understanding of tools and technology, including their roles in the creation, reproduction, and distribution of visual messages. Relevant tools and technologies include, but are not limited to, drawing, offset printing, photography, and time- based and interactive media (film, video, computer multimedia).

e)   N.A.S.A.D. Outcome E: An understanding of design history, theory, and criticism from a variety of perspectives, including those of art history, linguistics, communication and information theory, technology, and the social and cultural use of design objects.

f)   N.A.S.A.D. Outcome F: An understanding of basic business practices, including the ability to organize design projects and to work productively as a member of teams.

g)   N.A.S.A.D. Outcome G: Functional knowledge of professional design practices and processes, including but not limited to ethical behaviors and intellectual property issues such as patents, trademarks, and copyrights.

h)   N.A.S.A.D. outcome H: Knowledge of basic business practices and their relationship to industrial design as well as the ability to investigate and reconcile the needs related to entrepreneurship, marketing, engineering, manufacturing, servicing, and ecological and social responsibility in the process associated with specific design projects.

i)   N.A.S.A.D. Outcome I: Acquisition of collaborative skills and the ability to work effectively in interdisciplinary or multidisciplinary teams.

3. Table 1: Assessment Plan for BS in Transportation Design

LTU Undergraduate Learning Outcomes	N.A.S.A.D./ Program Outcomes	Assessment Tools	Metric/Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	Outcome A Outcome E Outcome G	Thesis design project in IDD4516, IDD4526 ECEO evaluation rubric in IDD3316, ATD3616, IDD3326, ATD3626 Evaluation of course content/grade ATD4513	70% of students receive a score of 65% or higher 65% 65% average on ECEO form 50% of students receive a score of 70% or higher	Semester	Annual
TECHNOLOGY LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	Outcome B Outcome D	ECEO evaluation rubric coursework in IDD2215, IDD3316, IDD4516 Professional critiques and industry assessment of design proposal.	50% of students receive a score of 70% or higher 70% of students receive a score of 75% or higher	Semester	Annual
SUSTAINABILITY LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	Outcome H	Evaluation of coursework in ATD3616 or IDD4516 using Sustainability rubric against course content. Content included in ATD 4513 coursework	50% of students receive a score of 65% or higher	Semester	Annual
COMMUNICATION LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	Outcome B Outcome F	Evaluation of coursework in each studio: IDD1114, IDD2214, IDD3316, IDD4516 Evaluation of coursework in each studio: IDD1124, IDD2224, IDD3326, IDD4526	70% of students will score 75% or higher on ECEO Form progressively tailored to course level 70% students will score, on ECEO Form, pre-determined performance levels progressively tailored to course level published rubric.	Semester	Annual
MATHEMATICS LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely, and reasoning logically.	Outcome A Outcome D Outcome E	Coursework in IDD2215 Coursework in IDD2225 Coursework in ATD4513	70% of students receive a score of 55% or higher 70% of students receive a score of 55% or higher 70% of students receive a score of 55% or higher	Semester	Annual

READING LTU graduate will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	Outcome A Outcome E	Coursework in ATD 4513 Coursework in IDD3723	70% of students receive a score of 65% or higher 70% of students receive a score of 65% or higher	Semester	Annual
SCIENTIFIC ANALYSIS LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	Outcome B Outcome E	Coursework in IDD3316 and IDD3326 Coursework in IDD3723	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher	Semester	Annual
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.	Outcome I Outcome F Outcome G	Coursework in IDD1113 and IDD1223 Coursework in ATD2832 Coursework in ATD 3616 and ATD 3626 Student Exit Interview and Alumni Survey Alumni and Professional post grad contact	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher Job Placement and continued professional relationship with ID Program/University through professional organizations.	Semester	Annual
TEAMWORK LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	Outcome H Outcome I	Coursework and Team Rubric score in ATD4513 Coursework in ATD3616, and ATD3626	70% of students receive a score of 60% or higher in teamwork 70% of students receive a score of 60% or higher	Semester	Annual
ETHICS LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions.	Outcome G	Ethics quiz (multiple choice) in ATD4513	70% of students will achieve a score of 70% or higher	Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)

a.) KNOWLEDGE IN DISCIPLINE:
Assessment: Using the PEF rubric evaluation form, a comprehensive assessment of overall knowledge in the discipline of Transportation Design is possible. This ten section rubric covers most aspects of the discipline from the fundamentals to process to sustainability initiatives. The PEF is used by sponsor and visiting professionals to assess each of the individual projects assigned.
Evaluation: The ten-point scoring rubric is used and results are weighted to the project and course level at hand. Matrices have been compiled to identify specific issues of course content and/or competencies. Overall, stated metrics were met however disparities in specific core performance skills suggest a means by which remedial actions can be taken.
Issue: We've been concerned that students are progressing to 3000 level coursework with deficiencies in certain capabilities which limit the students ability to succeed going forward.
Actions: It is suggested that we incorporate a 'Portfolio Review' at the end of sophomore year to determine suitability to proceed to 3000 level.
Responsibility: K. Nagara/Portfolio review team
Issue: The raw data of this PEF information is not being captured in a comparative format resulting in some pertinent information being buried in boxes.
Actions: It is recommended that a spreadsheet database be created and maintained by the Program Coordinator.
This is being done currently.
Responsibility: Hanzel/Nagara/Anne Dandar

b.) SUSTAINABILITY:
Assessment: Section 10 of the PEF rubric evaluates sustainability knowledge and inclusion.
Evaluation: Because Sustainability is not mandated in all coursework and Adjunct instructors may not promote the tenants of people, planet and profits, it was decided to shift this learning to Professional Practice however, additional focus around self-employment business practices pushed this module out and back to the individual projects where the results are disappointing.
Actions: It is recommended that a 'brief template' be created for all adjunct and sponsoring agencies to enunciate the university position regarding initiatives which need to be incorporated in the pedagogical coursework.
Responsibility: Creation: Hanzel, Nagara, Distribution: Dandar

c.)COMMUNICATION:
Assessment: Section 6 of the PEF rubric evaluates oral written and graphical communication skills and capabilities while sections 2, 7 and 9 also evaluate image creation skills. Individual and Team presentations in Professional Practice also measure communication skills. Writing skills are really only evaluated in the Writing Competency test as most writing in the design field falls within more advanced research activities.
Evaluation: Writing skills, within their limited expression, meet the overall metrics of the stated assessment.
Issue: Incorporating a more rigorous research agenda in the Senior Project will require a higher level of writing capability and academic expression not currently evident.
Actions: Incorporation of more written rigor in Capstone-like projects. Need to include a brief template for instructors and sponsors. Responsibility: Hanzel/Nagara creation, Dandar distribution
Issue: Language and public speaking skills vary widely and are difficult to remedy through normal coursework evaluation.
Actions: Suggest an oral presentation rubric incorporated into project evaluation skills assessment
Responsibility: Hanzel/dist.Dandar

d.) **MATHEMATICS**
Assessment: ATD4513 Professional Practice Affinity Diagramming research activity, compilation and data Analysis. Coursework scoring.
Evaluation: Instructor scored coursework, metrics were marginally met.
Issue: Prof Practice results were team-based rather than individual.
Actions: Recommend including data analysis in product research coursework. Responsibility: Hanzel/Nagara.

e.) READING
Assessment: Professional Practice scoring of required reading book, individual test and team Presentation.
Issue: Reading assignments vary according to instructor.
Actions: Recommend a 'brief template' to include basic tenants of Professional Practice for Trans related research including, IP law, Teamwork, data acquisition and analysis.
Responsibility: Creation, Hanzel/ Nagara distribution: Dandar

f.) **TEAMWORK**
Assessment: Professional Practice scoring rubric (DIHIW) and Affinity Diagramming project. Students were evaluated individually and in teams. Team design projects were also assessed.
Evaluation: Instructor scored coursework of three team projects. Metrics were exceeded.
Issue: Team-based projects are instructor driven and may not repeat year over year.
Actions: Recommend adding team-based project in Prof Practice coursework.
Responsibility: Professional Practice Instructor.

3.   Assessment Plan for 2016-2017 Academic Year

1.) Assessment/Evaluation commences for:

Scientific Analysis
Assessment: Coursework in ATD3616 and ATD3626 Coursework in IDD3723

Ethics
Assessment: Ethics quiz (multiple choice) in ATD4513

Technology
Assessment: Using the PEF rubric evaluation form in ATD3616 and ATD3626

Reading
Assessment: ATD4513 Professional Practice scoring of required reading book, individual test and team Presentations on book content.

Mathematics
Assessment: ATD4513 Professional Practice Affinity Diagramming research activity, compilation and data Analysis.

2.) Coursework scoring.
Actions: Because our program comprises many Adjunct and Sponsor instructor/facilitators, it is believed we need to institute basic curricular outlines (into the Syllabus template) to inform said agents/instructors as to the required content expected in the appropriate classes. Most of these can be completed and distributed before the end of the current semester to be included in the remaining

coursework. They may include:

A Sustainability 'brief template' be created for all adjunct and sponsoring agencies to enunciate the university position regarding initiatives which need to be incorporated in the pedagogical coursework.

Incorporation of more written rigor in Capstone-like projects. Need to include a 'brief template' for instructors and sponsors.

The addition of a Teamwork project in the Professional Practice Syllabus template.

3.) 'New' Assessment Plans
More rigor is suggested for foundation level Vis Com
Incorporation of a 'Portfolio Review' at the end of sophomore year to determine suitability to proceed to 3000 level.

Inconsistent oral communication skills/Suggest inclusion of Oral skills rubric.

Low level of Math inclusion in analysis/ Recommend including data analysis in Research analysis coursework.
Responsibility: Hanzel/Nagara

Differential in disciplines between ID and Transportation design PP/Recommend a 'brief template' defining major specific content including IP law etc.
Responsibility: Creation, Hanzel/ Nagara distribution: Dandar

College of Arts and Sciences

BA in English and Communication Arts

1. **Assessment Plan and Summary**
   (see Table 1: Assessment Matrix below.)

Table 1: Assessment Plan for B.A. English and Communication Arts

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Students can perform in an exceptional manner in the two internships required in the degree.	Internship reports by on-site supervisors	Satisfactory interviews with supervisors.	Annual	Annual
	Students can identify the distinguishing cultural, historical and social attributes of literary periods and gauge the influence of these attributes on the works at hand.	Papers in Jr.Sr. electives reviewed by industry rep.	Rubric to be developed	Annual	Annual
	Students can write compelling works in more than one of the following genres: poems, short stories, creative non-fiction, novels, screenplays, theatrical drama, television scripts, radio scripts, electronic media, game narrative.	Creative writing portfolio	Rubric scored by outside writer.	Annual	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Students can write and edit technical documents.	Grade in Tech Editing; Rubric scored by graduate students cross-listed in the course	Grade of B and above.	Annual	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."					
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Students can deliver effective oral presentations. Students achieve university-level competency in academic and professional prose styles.	Rubric inSpeech class. Papers in Jr.Sr. electives reviewed by industry rep.	Rubric	Annual	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."					
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Students can identify the distinguishing cultural, historical and social attributes of literary periods and gauge the influence of these attributes on the works at hand.	Papers in Jr.Sr. electives reviewed by industry rep	Rubric	Annual	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."					
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."					
TEAMWORK "LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."					
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."					

2. **Report on 2015-2016 Academic Year and Action Plan (Loop Closing)**

Learning Objective 1: Students can perform in an exceptional manner in the two internships required in the degree.
Assessment: No assessment scheduled for 2015-16
Evaluation: N/A
Issue: N/A
Actions: Program curriculum currently under review by HSSC faculty; next loop closing
       scheduled for Summer 2017
Responsibility: Sara Lamers
University/College Support for Objective: N/A

Learning Objective 2: Graduates can identify the distinguishing cultural, historical and social attributes of literary periods and gauge the influence of these attributes on the works at hand.
Assessment: No assessment scheduled for 2015-16
Evaluation: N/A
Issue: N/A
Actions: Program curriculum currently under by HSSC faculty; next loop closing
       scheduled Summer 2019.
Responsibility: Sara Lamers
University/College Support for Objective: N/A

Learning Objective 3: Students can write compelling works in more than one of the following genres: poems, short stories, creative non-fiction, novels, screenplays, theatrical drama, television scripts, radio scripts, electronic media, game narrative.
Assessment: No assessment scheduled for 2015-16
Evaluation: N/A
Issue: N/A
Actions: Program curriculum currently under review by HSSC faculty; next loop closing
       scheduled Summer 2017
Responsibility: Sara Lamers
University/College Support for Objective: N/A

Learning Objective 4: Students can write and edit technical documents.
Assessment: No assessment scheduled for 2015-16
Evaluation: N/A
Issue: N/A
Actions: Program curriculum currently under review by HSSC faculty; next loop closing
       scheduled for Summer 2018.
Responsibility: Sara Lamers
University/College Support for Objective: N/A

Learning Objective 5: Students achieve university-level competency in academic and professional prose styles.
Assessment: All formal essays of LLT and SSC courses from the Spring 2016 semester were scored via the HSSC Writing Rubric (5 point scale).
Averages of all samples are as follows:
       Thesis: 3.6
       Development: 3.66
       Course Material: 3.66

Citations: 3.71
Style: 4.28
Grammar: 4.04

Evaluation: The threshold of 3.5 in all areas was met. One student, however, fell below the threshold in all areas.

Issue: Students scored high in "lower order" (local) aspects of writing (style, syntax, grammar), but delivered "B" and "C" range work in regards to global, more complex aspects of writing (thesis, development, use of evidence). The sample size is, however, very small due to the program's low enrollment.

Actions: Continue to discuss writing standards and pedagogy with HSSC faculty

Responsibility: Sara Lamers

University/College Support for Objective: N/A

Learning Objective 6: Students can deliver effective oral presentations.

Assessment: No assessment scheduled for 2015-16

Evaluation: N/A

Issue: N/A

Actions: Program curriculum currently under review by HSSC faculty; next loop closing
        scheduled for 2018

Responsibility: Sara Lamers

University/College Support for Objective: N/A

3. **Assessment Plan for 2016-2017**

1) Continue to collect data (formal papers from SSC and LLT courses)

2) Loop-closing of Learning Objectives 1 and 3 (continue to collect data from CRW courses)

3) Develop rubrics as needed (see Table 1)

4) HSSC faculty are currently drafting a proposal for a new degree program (BS in Liberal Arts).
Should it be approved, this degree program will replace the BA in English and Communication Arts and the BS in Humanities degrees. To that end, Learning Objectives and an Assessment plan will be devised by HSSC faculty in the LLT and SSC divisions.

BS in Humanities
  1. Assessment Plan and Summary
  (see Table 1: Assessment Matrix below.)

Table 1: Assessment Plan for BS in Humanities

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Students can analyze with ease challenging literary, philosophical, and historical texts.	Papers from Jr. Sr. Electives scored by outside reader	Grade of B or above	Annual	Annual
	Students can evaluate problems from an interdisciplinary perspective.	Senior Thesis scored by outsider	Grade of B or above	Annual	Annual
	Students can demonstrate creativity in at least one literary genre.	Portfolio scored by outsider	Grade of B or above	Annual	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Students have expertise in using research databases in History, Philosophy, Literature, Social Sciences	Senior Thesis scored by outsider	Grade of B or above	Annual	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."					
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Students can conduct original research. Students can effectively incorporate secondary texts into primary analyses. Students can effectively defend their views in writing and orally.	Senior thesis scored by outsider Public presentation/ oral presentation rubric scored by peer reviewer	Grade of B or above	Annual	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Students can analyze with ease challenging literary, philosophical, and historical texts.	Papers from Jr. Sr. Electives scored by outside reader	Grade of B or above		
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Students can identify the distinguishing cultural, historical and social attributes of literary periods and gauge the influence of these attributes on the works at hand.	Papers in Jr.Sr. electives reviewed by industry rep	Rubric	Annual	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."					
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."					
TEAMWORK "LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."					
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."					

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)

Learning Objective 1: Students can evaluate problems from an interdisciplinary perspective.
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal
Responsibility: HSSC faculty
University/College Support for Objective: n/a

Learning Objective 2: Students can conduct original research. Students can effectively incorporate secondary texts into primary analyses.
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal
Responsibility: HSSC faculty
University/College Support for Objective: n/a

Learning Objective 3: Students have expertise in using research databases in History, Philosophy, Literature, Social Sciences
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal
Responsibility: HSSC faculty
University/College Support for Objective: n/a

Learning Objective 4: Students can evaluate conflicting viewpoints.
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal
Responsibility: HSSC faculty
University/College Support for Objective: n/a

Program Learning Objective 5: Students can analyze with ease challenging literary, philosophical, and historical texts.
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal
Responsibility: HSSC faculty
University/College Support for Objective: n/a

Learning Objective 6: Students can demonstrate creativity in at least one literary genre.
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal

Responsibility: HSSC faculty
University/College Support for Objective: n/a

Learning Objective 7: Students can effectively defend their views in writing and orally.
Assessment: No assessment performed
Evaluation: n/a
Issue: n/a
Actions: Determine when to assess this goal
Responsibility: HSSC faculty
University/College Support for Objective: n/a

3. **Assessment Plan for 2016-2017 Academic Year**
   HSSC faculty are currently drafting a proposal for a new degree program (BS in Liberal Arts). Should it be approved, this degree program will replace the BA in English and Communication Arts and the BS in Humanities degrees. To that end, Learning Objectives and an Assessment plan will be devised by HSSC faculty in the LLT and SSC divisions.

   •

BS in Media Communication

1. **Assessment Plan and Summary**
   See Table 1 below.

Table 1: Assessment Plan for BS in Media Communication

LTU Undergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Graduates will have an in-depth understanding of the scope and purpose of the media industry. Graduates will understand the standards of professional practices within the media industry.	Direct assessment of student assignments in MKT 3013: Principles of Marketing, MCO 3633: Social Media, MCO 4073: Emerging Web Techniques, MCO 1003: Media, Communication and Society	Score 3 on professional practices rubric	Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Graduates will have an industry-standard skill set in production, post-production and new media.	Direct assessment of students video projects in MCO 2003: Intro to Video Production, MCO 3303: Video Editing, MCO 4073: Advance Field Production	Score 3 on production, post-production and new media rubrics	Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	Direct assessment of leadership portfolios from LDR 3001 and LDR 4001	Score 3 on sustainability rubric	Semester	Annual
COMMUNICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Graduates will possess industry-standard professional skills in writing, presentations, and interpersonal communication.	Direct assessment of student assignments in MCO2543: Writing for Electronic and Print Media, MCO3713: Advanced Writing for Media, and COM2113: Speech HSSC writing assessment, WPE UAC oral presentation assessment	Pass WPE Score 3 on writing / presentation rubrics	Semester	Annual

				Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."				Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."				Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."				Semester	Annual
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."				Semester	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."				Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Graduates will understand the impact of their professional decisions on the public and broader global societies.	Direct assessment of assignments in SSC3723: Ethics, MCO 1003: Media,Communication & Society-	C or better in SSC3723 75% or better on Media Ethics exam	Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)

Learning Objective 1a: Graduates will have an in-depth understanding of the scope and purpose
      of the media industry.
Assessment**:** Student work in the following courses:
MCO 3633: Social Media – Developing a Social Media Strategy for an Outside Client Final Assignment
for Detroit Institute for Social Innovation
MCO 4073: Special Topics: Emerging Web Techniques – Web Technologies Final Strategic
Plan/Functionality Spec Assignment
MCO 1003: Media, Communication and Society – Mass Communication: A Critical Approach Exam
MCO 2563: Intro to Broadcast – Director/Technical Director Practical Exam
      MCO 2543: Writing for Electronic & Print Media – News Package/Script Eval.
Evaluation: No loop closing in 2015/2016
Issues: No issues identified
Current/Future Actions: Continue to collect data for loop closing Summer 2017
Responsibility: Jody Gaber, program director
University/College Support for Objective: NA

Learning Objective 1b: Graduates will understand the standards of professional practices within
      the media industry.
Assessment**:** Student work in the following courses:
MCO 3633: Social Media – Developing a Social Media Strategy for an Outside Client Final Assignment
for Detroit Institute for Social Innovation
MCO 4073: Special Topics: Emerging Web Techniques – Web Technologies Final Strategic
Plan/Functionality Spec Assignment
MCO 1003: Media, Communication and Society – Media Economics and the Global Marketplace Exam
MCO 2563: Intro to Broadcast – Director/Technical Director Practical Exam
      MCO 2543: Writing for Electronic & Print Media – Dramatic Script/Video
      Script/Radio Package
Evaluation: No loop closing in 2015/2016
Issues: No issues identified
Current/Future Actions: Continue to collect data for loop closing Summer 2017
Responsibility: Jody Gaber, program director
University/College Support for Objective: NA

Learning Objective 2: Obtain an industry-standard skill set in production, post-production and
      web technology.
Assessment: Student work in the following courses: MCO 2003: Intro to Video Production;
      MCO 3303: Video Editing; MCO 3203: Camera for Broadcast;
      MCO 4073: Special Topics: Adobe for Media (which is now MCO 3623);
      MCO 4073: Special Topics: Emerging Web Techniques (which is now MCO
      3643)
Evaluation: Course specific rubrics were developed for the following classes from Fall
      2015 to Summer 2016. Scores are as follows:
      MCO 2003: Intro to Video – 88% scored 4 or higher as applied to a 5 point rubric. Goal
      met.
      MCO 3303: Video Editing - 80% scored 4 or higher as applied to a 5 point rubric. Goal
      met.
      MCO 3203: Camera for Broadcast - 100% scored 4 or higher as applied to a 5 point
      rubric. Goal met.

MCO 3623: Adobe for Media - 84% scored 4 or higher as applied to a 5 point rubric. Goal met.

MCO 3643: Emerging Web Techniques - 87% scored 4 or higher as applied to a 5 point rubric. Goal met.

Issues: No issues identified

Current/Future Actions: Rubrics for future assessment of Learning Objective 2 need to vary depending on the course. A 5 point rubric may be appropriate for some courses however, more technical courses may require additional points to assess the assignment objectives. Next loop closing in Summer 2019

Responsibility: Jody Gaber, program director

University/College Support for Objective: NA

Learning Objective 3: Utilize acquired media skills to effectively demonstrate an awareness of sustainability concepts. Demonstrate an understanding of sustainability as it relates to the social, economic, and environmental needs of individuals and communities, using course-specific media skills.

Assessment: Student work in the following courses:

MCO 2543: Writing for Electronic & Print Media

MCO 2563: Intro to Broadcast Studio

MCO 3633: Social Media

Evaluation: I was not able to develop appropriate rubrics for the following classes as the topic of sustainability was not relevant or did not enhance the overall objectives of the particular course assignments.

MCO 2543: Writing for Electronic & Print Media

MCO 2563: Intro to Broadcast Studio

MCO 3633: Social Media

Issues: Students chose to focus on other topics even when given the opportunity to discuss sustainability. It does not seem appropriate or productive to force an assignment on the topic of sustainability if this does not help the overall goal of the assignment or course objectives.

Current/Future Actions: Working with instructors to incorporate sustainability projects was not a realistic goal and proved problematic for classes in the BSMC degree program. It would seem that implementing curriculum to include sustainability should be discipline specific to better match a student's chosen major, such as Engineering or Architecture. Perhaps the Assessment Committee can address the topic of revising the Sustainability Learning Outcome to be discipline specific for the next cycle of yearly assessments.

Collect data for Summer 2019 loop closing if it is determined to apply the Sustainability Learning Outcome to the BSMC program.

Responsibility: Jody Gaber, program director

University/College Support for Objective: Input from the University and HSSC would be needed to determine how best to assess sustainability moving forward.

Learning Objective 4: Graduates will possess industry-standard professional skills in writing, presentations, and interpersonal communication.

Assessment: HSSC Writing Assessment; Writing Proficiency Exam; University Assessment Committee Oral Presentation assessment and student work in the following courses:

MCO 2543: Writing for Electronic & Print Media – Composite Scores from all assignments

MCO 3713: Advanced Writing for Media – Composite Scores from all assignments

COM 2113: Speech – Composite scores from all assignments
MCO 3633: Social Media – Developing a Social Media Strategy for an Outside Client
    Assignment
Evaluation: No loop closing in 2015/2016
Issues: No issues identified
Current/Future Actions: Collect data for next loop closing in Summer 2018
Responsibility: Jody Gaber, program director
University/College Support for Objective: NA

Learning Objective 5: Graduates will understand the impact of their professional decisions on the
    public and broader global societies.

    Assessment: Student work in the following courses:
    SSC 3723: Ethics – Composite scores
    MCO 1003: Media Communication & Society – Composite scores
    COM 4963: Communication Law – Composite scores
    Evaluation: No loop closing in 2015/2016
    Issues: NA
    Current/Future Actions: Will continue to collect data for next loop closing Summer 2018
    Responsibility: Jody Gaber, Program Director
  University/College Support for Objective: NA

3. Assessment Plan for 2016-2017 Academic Year

• Examine and revise rubrics as needed (see section 2 above). Meet with instructors prior to each term
to develop course specific rubrics.
• Continue to refine plan for archiving assignments for review.
• Create a portfolio review panel utilizing industry advisors and adjuncts to provide students with
valuable industry standard feedback.
• Develop system for capturing data from external sources for assessing students' progress related to the
various learning objectives.
• Continue to collect and assess data on learning goals 1a and 1b for loop closing Summer 17. •
Continue to collect and assess data on learning goals 4 and 9 for loop closing Summer 18.
• Continue to collect and assess data on learning goals 2, and possibly 3 (if Sustainability is determined
as an assessment to be provided) for loop closing Summer 19.
• Adjust Assessment table as needed

BS in Psychology

1. **Assessment Plan and Summary**
   See Table 1.

Table 1: Assessment Plan for BS in Psychology

LTU Undergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Objective #1: Students will demonstrate knowledge and expertise 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 macro areas of interest. Target courses for each macro area are: 1) PSY 1213, PSY 3633, and PSY 4633 2) PSY 1213, PSY 3213, and PSY 4213 3) PSY 1213, PSY 2113, and PSY 3223 4) PSY 1213 and PSY 3623	Average scores from 100 point scale should be higher than 67%.	Each Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Objective #2: 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%.	Each Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Objective 3: LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.	Scores obtained from the administration of sustainability rubric. Target courses are PSY 2113 Research Methods and PSY 1003 World of the Mind	Two criteria to meet: Average higher than 67%; at least 15% of the students score above 90%	Each Semester	Annual

COMMUNICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Objective 4: LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation.	Assessed by UAC		Each Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Objective 5: LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically.	Assessed by UAC		Each Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Objective 6: LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.	Assessed by UAC		Each Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."	Objective 7: Students will demonstrate critical thinking in the field of psychology and the ability of solving theoretical and applied problems in psychological research.	Score is based on Critical Thinking rubric Target courses: PSY 4922: Senior Research Project 2; PSY 3223: Experimental Psychology Laboratory	Two criteria to meet: Average higher than 67%; at least 15% of the students score above 90%	Each Semester	Annual
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."	Objective 8: 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.	Being assessed by the leadership program Specifically the courses: LDR2000, LDR3000 LDR4000		Each Semester	Annual

				Each Semester	Annual
TEAMWORK "LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Objective 9: LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.				
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Objective 10: 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. See appendix 4. Target course is PSY 2113- Research Methods	Two criteria to meet: 1. Average higher than 67% At least 15% of the students score above 90%	Each Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

<u>**Program Learning Objective #1**</u>: *Knowledge in Discipline:* Students will demonstrate knowledge and expertise in 4 content macro-areas: Clinical Psychology, Neuroscience and Cognition, Experimental Methods and Techniques, and Social Psychology.

> **Assessment:** Scores in specific assignments and tests in target courses as detailed on matrix.
> **Evaluation***:* a 100 points scale was used to score student performance in specific tests and assignments. Average student performance exceeded the minimal goal we targeted: the score of at least two-thirds of the examined students was greater than 67% in each of the 4 categories. The grand average score obtained by merging the four macro-areas score was 82.08%. The average score in each of the four categories: Clinical Psychology: 80.19%, Neuroscience and Cognition: 78.93%, Experimental Methods and Techniques: 84.06%, Social Psychology: 85.15%
> **Issue***:* None.
> **Current/Future Actions***:* Creation of a pre- and post-test designed to measure students gains. Ideally, all students will take this test upon entry into the program, and then will take it again upon completion. Questions will reflect knowledge that is gained from the Psychology core courses.
> **Responsibility***:* Psychology instructors of the target courses for the administration and scoring of tests and assignments. Program director for data analysis and loop closing.
> **University/College Support for Objective:** N/A

<u>**Program Learning Objective #2**</u>: *Technology:* 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.

> **Assessment**: Scores in technology related topics in specific assignments in Experimental Psychology Laboratory and in Research Methods for the Behavioral Sciences.
> **Evaluation**: Average student performance exceeded the minimal goal we targeted: the score of at least two-thirds of the examined students in the target assignments was 85%, which is greater than 67%. The average score within EPL was 82% and within research methods was 88%.
> **Issue**: None.
> **Current/Future Actions:** Implementation of the activities related to the new Virtual Reality Laboratory in the scoring system. Next loop closing scheduled for Fall 2018.
> **Responsibility***:* Psychology instructors of the target courses for the administration and scoring of rubrics. Program director for data analysis and loop closing.
> **University/College Support for Objective:** N/A

<u>**Program Learning Objective 3**</u>: *Sustainability:* LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities.

> **Assessment**: Use of a sustainability survey (adapted from Sustainability Education at UBC: A Student Perspective, Marcus et al., 2009) administered every year in PSY 2113: Research Methods
> **Evaluation**: No loop closing in 2015/2016
> **Issue**: N/A
> **Current/Future Actions**: Next loop closing Fall 2017
> **Responsibility**: Psychology faculty for the scoring and administration. Program director for data analysis and loop closing.
> **University/College Support for Objective:** N/A

Program Learning Objective 4: *Critical Thinking:* Students will demonstrate critical thinking in the field of psychology and the ability of solving theoretical and applied problems in psychological research.

> **Assessment***:* Critical thinking rubric administered in target courses as detailed on the matrix.
> **Evaluation**: No loop closing in 2015/2016
> **Issues:** N/A
> **Current/Future Actions**: Next loop closing Fall 2017
> **Responsibility**: Psychology faculty for the scoring and administration. Program director for data analysis and loop closing.
> **University/College Support for Objective:** N/A

Program Learning Objective 5: *Ethics*: Students will demonstrate the ability to follow the APA ethics code in the treatment of human and nonhuman participants in the design, data collection, interpretation, and dissemination of psychological research.

> **Assessment***:* Students are tested on a battery of multiple choice, matching and true/false questions on topics related to Ethics in psychological research in the Research Methods course.
> **Evaluation:** No loop closing in 2015/2016
> **Issues:** N/A
> **Current/Future Actions**: Next loop closing Fall 2017
> **Responsibility:** Psychology faculty for the scoring and administration. Program director for data analysis and loop closing.
> **University/College Support for Objective:** N/A

3. **Assessment Plan for 2016-2016 Academic Year**

   a. Creation of a pre- and post-test measure students' knowledge and discipline. Students will take this test upon entry into the program, and upon completion.
   b. Learning objectives 3, 7 will be assessed in the Fall 2017 semester.
   c. Learning objectives 1, 2 will be assessed in the Fall 2018 semester.

MS in Technical and Professional Communication

1. **Assessment Plan and Summary**

   See Table 1.

Table 1: Assessment Plan for MS in Technical and Professional Communication

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	1) Design, produce, and evaluate the various types of technical and professional communication required by diverse audiences.	Graduate Exit Survey	4 or better average on the Graduate Exit Survey	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	2) Gain insight into the current research methodologies applicable to the fields of technical and professional communication	Research Rubric applied to Semester Project in COM6453	2 or better average on the Research Rubric	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	3) Apply major rhetorical theories of technical and professional discourse to a variety of communication environments	Final Project in COM6443, Rhetoric of Technical Communication	B or better on Final Project	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	4) Use verbal, visual, analytical, and digital skills to create and enhance communication in professional environments. 5) Master presentation techniques that are adaptable to multiple audiences	Written Communication Rubric applied to COM7203 Practicum Project Oral Communication Rubric applied to COM6553 Semester project	2 or better average on the Written Rubric 2 or better average on the Oral Communicatio n Rubric	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	6) Apply emerging electronic technologies and other media to the creation of various publications and presentations	Exit Survey	4 or better average on the Exit Survey	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop-Closing)
Learning Objective 1: <u>Design, produce, and evaluate the various types of technical and professional communication required by diverse audiences</u>
Assessment: Graduate Exit Survey
Evaluation: No loop closing in 2015-16
Issue: No issues were identified.
Actions: Next loop closing summer, 2017.
Responsibility: Corinne Stavish, program director

Learning Objective 2: <u>Gain insight into the current research methodologies applicable to the fields of technical and professional communication</u>
Assessment: Research rubric applied to Semester Project in COM6453
Evaluation:
- In the area of Conventional Form—including primary and secondary sources, documenting sources with correct style—the two students had an **average of 2.5** on a scale of 3.
- In the area of Clarity and Coherence—balancing research and using sources correctly and meaningfully— the two students had an **average of 2.5** on a scale of 3.
- In the area of Content—relating research meaningfully to the topic, supplementing the information appropriately, including a complete literature review; providing a central research question that is answered in the documentation— the two students had an **average of 2.5** on a scale of 3.

Issues: No issues identified: the threshold of 2 was met.
Actions: COM6453 will be offered next in the spring of 2017. Loop closing scheduled for Summer 2017
Responsibility: Corinne Stavish, program director

Learning Objective 3: <u>Apply major rhetorical theories of technical and professional discourse to a variety of communication environments</u>
Assessment: Rhetoric Rubric applied to Final Project in COM6443, Rhetoric of Technical Communication
Evaluation: No loop closing in 2015-16.
Issues: None identified.
Actions: Next loop closing will be completed Summer 2018. COM6443 will be offered in fall, 2016.
Responsibility: Corinne Stavish, program director

Learning Objective 4: <u>Use verbal, visual, analytical, and digital skills to create and enhance communication in professional environments</u>
Assessment: Written Communication Rubric applied to COM7203 Practicum Project **Evaluation:**
- In the area of Conventional Form—error free mechanics, effective formatting, and reliable and accurate sources with correct style—the three students had an average of 2.16 on a scale of 3.
- In the area of Clarity and Coherence—fluent and concise writing, logical organization and audience adaptation— the three students had an average of 2.16 on a scale of 3.
- In the area of Content—excellent style, organization, content, and publishable quality— the three students had an average of 2.16 on a scale of 3.

Issues: On a 3.0 scale, the students' overall average was 2.16, which is better than the threshold of 2, but still lower than we want. It is exactly the average of the 2015 Practicum reports.
Actions: Continue to have all instructors in the program aware of the need to work on the students' writing skills; Next loop closing will be summer 2017
Responsibility: Corinne Stavish, program director

Learning Objective 5: Master presentation techniques that are adaptable to multiple audiences
Assessment: Oral Communication Rubric applied to COM6553 Semester project
Evaluation: No loop closing.
Issues: No issues identified.
Actions: Next loop closing will be Summer 2017
Responsibility: Corinne Stavish, program director

Learning Objective 6: Apply emerging electronic technologies and other media to the creation of various publications and presentations
Assessment: Graduate Exit Survey
Evaluation: The five students who graduated in 2015 and 2016 rated their ability to apply emerging electronic technologies and other media to the creation of various publications and presentations at 4.2 on a 5-point scale.
Issues: No issues identified.
Actions: Next loop closing summer 2018.
Responsibility: Corinne Stavish, program director

3. **Assessment Plan for 2016-2017 Academic Year**

-   Continue to work on writing skills: We are making progress in this area with individual students. There are a few students in the Program who have writing skills that need further attention. We continue to work on those and are using the tutors in the AAC more than might be expected in a graduate program. The instructors are aware of the students' needs and continue to work on written skills.
-   Discuss what types of writing courses might be introduced in the program: We discussed and are considering introducing a course in writing documentation, usability and instructions manuals. So far, we do not have the student demand. However, we have more students interested in taking Proposal Writing and Technical Editing, so we are offering those courses more frequently**.**
-   Administer Exit Survey
-   Close loop on learning goals 2, 4, 6
-   Continue to have all instructors in the program aware of the need to work on the students' writing skills.
-   Administer Written Communication Rubric
-   Administer Oral Communication Rubric
-   Close loop on learning goals 1, 3, 5

BS in Mathematics

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for BS in Mathematics

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	*a) Apply* knowledge of mathematics appropriate to a problem. (1) b) *Analyze* a problem, and *identify* and *define* the mathematical techniques appropriate to its solution. (2) c) *Use* current and established techniques, skills, and tools necessary for applying mathematics. (8)	Direct assessment of standard questions on final exams in three MCS core courses (Math)	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the three courses)	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Design, implement, and evaluate a mathematical model that satisfies specified requirements (3)	Direct assessment of three MCS core courses (Math)	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Recognize the need for and engage in life-long learning, continuing professional development and adapt to changes in the field. (7)	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	*Communicate* mathematical ideas and models effectively to a range of audiences both orally and in written form. (5)	a) Direct Assessment of Senior Project oral and written reports b) WPE	a) 75% of Senior Projects receive Level 3 out of 4 on BOTH oral report rubric and written report rubric b) 100% pass WPE (the WPE is a graduation requirement at LTU)	Every Semester	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Analyze a problem, and identify and define the mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on final exams in three MCS core courses (Math)	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the three courses)	Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	*Communicate* mathematical ideas and models effectively to a range of audiences both orally and in written form. (5)	Direct assessment in SSC2413, SSC2423, LLT1213, LLT1223 and LLT/SSC Jr/Sr Elective	Use metrics provided by HSSC Department	Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Analyze a problem, and identify and define the mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on final exams in CHM1213, CHM1223, PHY2413, PHY2423, BIO1213, and BIO1223	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the six courses)	Every Semester	Annual
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."	Analyze the local and global impact of models on individuals, organizations, and society. (6)	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	*Function* effectively on teams to accomplish a common goal, including performing leadership tasks. (4)	a) Alumni Survey b) MCS1414 and MCS1424 Lab Surveys	a) 75% of students achieve Level 3 (out of 4) on Survey Rubric b) a) 75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	*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)*	a) Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

- Objective/Outcome: Apply knowledge of mathematics appropriate to a problem. (1)
- Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414
- Evaluation: In only one of the three sections of Calculus 1 was the target of an average of 70% hit on at least half of the nine course objectives. In Calculus 2, only 2 of the 14 objectives hit the 70% target. In Calculus 3, only one section achieved 70% average or better in half of the course objectives.
- Issue: In Calculus 1, the weakest areas are related rates, optimization, Fundamental Theorem of Calculus, and applied problems. In Calculus 2, the weakest areas are series convergence tests and series approximations. In Calculus 3, the weakest areas were vector function and applications of vectors, and line integrals and their applications.
- Current/Future Actions: Three of the course objectives of Calculus 1 are probably better assessed through the Lab than through Final questions, so Lab questions will be used to assess some Calculus 1 objectives. Fourteen course objectives is probably too many for Calculus 2, so some objectives may be merged or less important ones deleted. The topics of most difficulty in Calculus 1 are the applied problems. One section did significantly better than the other two on these types of problems, so this instructor will be surveyed to see if they have special strategies for story problems. The topics of most difficulty in both Calculus 2 and 3 are given at the end of the semester, and often there is not enough time to cover these topics in depth so that students have them mastered by the Final Exam. Some topics from Calculus 2 and 3 have been shifted to Calculus 1 beginning Fall 2016, so hopefully this will pay dividends in allowing some additional time for the end of the semester topics in Calculus 2 and 3.
- Responsibility: MCS1414, MCS1424 and MCS2414 = Na Yu, Calculus Coordinator
- University/College Support for Objective: The ratio of full-time to part-time faculty is much higher for Mathematics than for Computer Science, and the task of assessing the core Math curriculum is much more feasible than for the Computer Science assessment which has much more limited resources.

- Objective/Outcome: Analyze a problem, and identify and define the mathematical techniques appropriate to its solution. (2)
- Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414
- Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1414, MCS1424, and MCS2414.
- Issue: This objective might be more effectively assessed using problem based learning assignments or projects.
- Current/Future Actions: Problem solving analysis techniques will be assessed using PBL problems and projects starting Spring 2017.
- Responsibility: MCS1414, MCS1424 and MCS2414 = Na Yu, Calculus Coordinator
- University/College Support for Objective: Some Math faculty have not yet been trained in PBL techniques and some sections do not already require projects. This training and support might be provided via funds from the KEEN grant.

- Objective/Outcome: Design, implement, and evaluate a mathematical model that satisfies specified requirements (3)
- Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414
- Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1414, MCS1424, and MCS2414.
- Issue: This objective can be most effectively assessed in the MCS3523 Mathematical Modeling course offered Spring 2017.
- Current/Future Actions: Data will be collected in MCS3523 to assess this objective
- Responsibility: MCS3523= Na Yu, Mathematical Modeling Instructor

- •University/College Support for Objective: Sufficient support for this task is already allocated.

- •Objective/Outcome: Use current and established techniques, skills, and tools necessary for applying mathematics. (8)
- •Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414
- •Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1414, MCS1424, and MCS2414.
- •Issue: This objective relates to the use of technology in Calculus 1, 2, and 3. The use of technology varies among sections and where technology is used evidence has so far not been systematically gathered to assess this objective. Rather than Final Exam questions, this objective is more effectively assessed via the Calculus 1 and 2 Labs which require Maple software for selected weeks, and may also be assessed in Calculus 1, 2, and 3 via technology assignments where they are given.
- •Current/Future Actions: More data will be collected from MCS1414, MCS1424 and MCS2414 regarding the use of technology in the Calculus sequence.
- •Responsibility: MCS1414, MCS1424 and MCS2414 = Na Yu, Calculus Coordinator
- •University/College Support for Objective: The use of technology is not widespread amongst the Calculus curriculum, and many instructors may benefit from training in the use of Maple software and other technology. The previous coordinator of the use of technology in Mathematics is now on phased retirement, and a successor is needed to continue this effort.

3. Assessment Plan for 2016-2017 Academic Year

1) Loop-closing actions for 2016-7.
   - •Close the loop on related rates, optimization, and Fundamental Theorem of Calculus student performance from 2015-6 in Calculus 1 (objective #1)
   - •Collect data from Calculus 1 and 2 Labs for course objectives not covered on the Final
   - •Allocate more time for Series topics in Calculus 2
   - •Reduce the number of course objectives in Calculus 2
   - •Allocate more time for Line Integrals in Calculus 3
   - •Collect data from PBL problems and projects in Calculus 1, 2, and 3 to assess the problem solving objective (#2)
   - •Collect data in MCS2523 in Spring 2017 to assess the mathematical modeling objective (#3)
   - •Collect data from technology assignments in Calculus 1, 2, and 3 to assess the use of technology objective (#8)

2) There are 9 program outcomes for the BS in Mathematics. Four of these outcomes (#1, 2, 3, and 8) were assessed in 2015-6. Four more outcomes will be assessed in 2016-7 (#4, 6, 7, and 9) and the remaining outcome will be assessed in 2017-8. All 9 program outcomes will be assessed over a three year cycle.

Curriculum mapping as suggested by Dr. Gloria Rogers (from Assessment Day) will be done Fall 2016 to ensure that all program outcomes are covered in the curriculum.

Beginning Fall 2016, performance indicators are needed for all outcomes and these performance indicators need to be mapped to curricular activities.

Standard Syllabi will be developed Fall 2016 for MCS2423 Differential Equations, MCS3403 Probability and Statistics, and MCS3863 Linear Algebra

Pilot assessment will begin in Spring 2017 for MCS2423, MCS3403, and MCS3863; full assessment in these three courses will begin Fall 2017

3) New assessment plans for the current year
  • Relevant data needs to be collected; "less is more" according to Gloria Rogers- need to identify specific items to track and limit number of data items collected, beginning Fall 2016
  • Data collected needs to be systematic: common type of assessment needs to be done across courses that have multiple sections (too much variance in data collected in the past)
  • Template needs to be created and sent out to all instructors teaching sections of a given course so that assessment is common among different sections of the same course (and so that common assessment is done from semester to semester in all courses)

  • Objective/Outcome: Function effectively on teams to accomplish a common goal, including performing leadership tasks. (4)
  • Actions: Collect and evaluate data from the Alumni Survey

  • Objective/Outcome: Analyze the local and global impact of models on individuals, organizations, and society. (6)
  • Actions: Collect and evaluate data from the Alumni Survey

  • Objective/Outcome: Recognize the need for and engage in life-long learning, continuing professional development and adapt to changes in the field. (7)
  • Actions: Collect and evaluate data from the Alumni Survey

  • Objective/Outcome: 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)
  • Actions: Collect and evaluate data from the Alumni Survey

BS in Computer Science

1. Assessment Plan and Summary

Table 1: Assessment Plan for BS in Computer Science

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "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 computing and mathematics appropriate to the discipline. (1) Display a complete understanding of a computer language (syntax, semantics and terminology), develop and debug complex code. (10) Apply current techniques, skills, and tools necessary for computing practice. (8)	Direct assessment of standard questions on final exams in MCS1514 and MCS2514 core courses (CS)	Need metrics and indicators	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Design, implement, and evaluate a computer-based system, process, component, or program to meet its specified requirements. (3)	Direct Assessment of Senior Project oral and written reports	75% of Senior Projects receive Level 3 out of 4 on BOTH oral report rubric and written report rubric	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Recognize the need for and engage in continuing professional development [and learn new technologies] and adapt to changes in the field. (7)	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	*Plan, create and integrate* oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding. *(5)*	Direct assessment of Senior Project oral and written reports WPE	Level 3 on oral and written rubrics Pass WPE	Every Semester	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Analyze a problem, and identify and define the computing requirements appropriate to its solution. (1)	Direct assessment of standard questions on final exams in three MCS core courses (Math)	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the three courses)	Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Plan, create and integrate oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding. (5)	Direct assessment in SSC2413, SSC2423, LLT1213, LLT1223 and LLT/SSC Jr/Sr Elective	Use metrics provided by HSSC Department	Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Analyze a problem, and identify and define the computing requirements appropriate to its solution. (2)	Direct assessment of standard questions on final exams in CHM1213, CHM1223, PHY2413, PHY2423, BIO1213, and BIO1223	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the six courses)	Every Semester	Annual
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."	Analyze the local and global impact of computing on individuals, organizations, and society. (6)	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Function effectively on teams to accomplish a common goal. (4)	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	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)	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

- •Objective/Outcome: Apply knowledge of computing and mathematics appropriate to the discipline. (1)
- •Assessment: Direct assessment of standard questions on final exams in MCS1514 and MCS2514
- •Evaluation: Average score on Computer Science 2 Finals exceeded 70% goal on only two of the 14 course objectives. Average score on Computer Science 1 Finals exceeded 70% goal on only one of the 7 course objectives.
- •Issue: In Computer Science 2, there are too many objectives. Some of these can be merged, or less important ones omitted. In both courses, reasons for performance on the final need to be determined and issues identified.
- •Current/Future Actions: Modify course objectives for Computer Science 2. Have a closing the loop meeting for Computer Science 1 and 2.
- •Responsibility: MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- •University/College Support for Objective: More full-time faculty are needed in Computer Science to teach MCS1514 and MCS2514.

- •Objective/Outcome: Analyze a problem, and identify and define the computing requirements appropriate to its solution. (2)
- •Assessment: Direct assessment of standard questions on final exams in MCS1514, MCS2514
- •Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1514 and MCS2514.
- •Issue: This objective might be more effectively assessed on programming assignments from MCS1514 and MCS2514.
- •Current/Future Actions: Identify programming assignments in MCS1514 and MCS2514 that relate to this objective.
- •Responsibility: MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- • University/College Support for Objective: More full-time faculty are needed in Computer Science to share the task of assessment.

Objective/Outcome: Apply current techniques, skills, and tools necessary for computing practice. (8)
- •Assessment: Direct assessment of standard questions on final exams in MCS1514, MCS2514
- •Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1514 and MCS2514.
- •Issue: This objective might be more effectively assessed on projects from MCS1514 and MCS2514.
- •Current/Future Actions: Identify projects in MCS1514 and MCS2514 that relate to this objective.
- •Responsibility: MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- • University/College Support for Objective: More full-time faculty are needed in Computer Science for curriculum development.

- •Objective/Outcome: Display a complete understanding of a computer language (syntax, semantics and terminology), develop and debug complex code. (10)
- •Assessment: Direct assessment of standard questions on final exams in MCS1514, MCS2514
- •Evaluation: Average score on Computer Science 2 Finals exceeded 70% goal on only two of the 14 course objectives. Average score on Computer Science 1 Finals exceeded 70% goal on only one of the 7 course objectives.
- •Issue: This objective needs to be reworded. Complete understanding of a computer language is unlikely to occur in one or even two courses, and is not easy to measure using the Final Exam. This objective might be more effectively assessed using either programming assignments or projects.
- •Current/Future Actions: Identify projects and programming assignments that require developing and debugging complex code.

•Responsibility: MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
•University/College Support for Objective: More full-time faculty are needed in Computer Science to create projects that require students to develop and debug complex code.

3. Assessment Plan for 2016-2017 Academic Year

1) Loop-closing actions for 2016-7:
•Modify course objectives for Computer Science 2.
•Have a closing the loop meeting for Computer Science 1 and 2 for the application of computer knowledge objective (#1)
•Identify programming assignments in MCS1514 and MCS2514 that relate to the analysis of computing requirements objective (#2)
•Identify projects in MCS1514 and MCS2514 that relate to the application of current techniques objective (#8)
•Identify projects and programming assignments that require developing and debugging complex code. (#10)

2) There are 10 program outcomes for the BS in Computer Science. Four of these outcomes (#1, 2, 8 and 10) were assessed in 2015-6. Four more outcomes will be assessed in 2016-7 (#4, 6, 7, and 9) and the remaining two outcomes will be assessed in 2017-8. All 10 program outcomes will be assessed over a three year cycle.

Curriculum mapping as suggested by Dr. Gloria Rogers (from Assessment Day) will be done Fall 2016 to ensure that all program outcomes are covered in the curriculum.

Beginning Fall 2016, performance indicators are needed for all outcomes and these performance indicators need to be mapped to curricular activities.

Standard Syllabi will be developed Fall 2016 for MCS1142 Introduction to C, MCS2523 Discrete Math, and MCS4623 Software Engineering

Pilot assessment will begin in Spring 2017 for MCS1142, MCS2523, and MCS4623; full assessment in these three courses will begin Fall 2017

3) New assessment plans for the current year

Relevant data needs to be collected; "less is more" according to Gloria Rogers- need to identify specific items to track and limit number of data items collected, beginning Fall 2016
• Data collected needs to be systematic: common type of assessment needs to be done across courses that have multiple sections (too much variance in data collected in the past)
• Template needs to be created and sent out to all instructors teaching sections of a given course so that assessment is common among different sections of the same course (and so that common assessment is done from semester to semester in all courses)

•Objective/Outcome: Function effectively on teams to accomplish a common goal. (4)
•Actions: Collect and evaluate data from the Alumni Survey

•Objective/Outcome: Analyze the local and global impact of computing on individuals, organizations, and society. (6)
•Actions: Collect and evaluate data from the Alumni Survey

•Objective/Outcome: Recognize the need for and engage in continuing professional development [and learn new technologies] and adapt to changes in the field. (7)
•Actions: Collect and evaluate data from the Alumni Survey

•Objective/Outcome: 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)
•Actions: Collect and evaluate data from the Alumni Survey

BS in Mathematics and Computer Science

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for BS in Mathematics and Computer Science

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "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 computing and mathematics appropriate to a problem. *(1)*	Direct assessment of standard questions on final exams in three MCS core courses (Math OR CS)	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the three courses)	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	a) *Display* a complete understanding of a computer language ((syntax, semantics and terminology), *develop* and *debug* complex code. *(10)* b) *Apply* current and established techniques, skills, and tools necessary for applying mathematics and computing practice. *(8)*	a) Direct assessment of three MCS core courses (Computer Science courses) b) Direct assessment of three MCS core courses (Math OR CS)	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (same metric for both a) and b))	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	*Recognize* the need for and an ability to engage in continuing professional development [and learn new technologies] and adapt to changes in the field. *(7)*	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	*Plan, create and integrate* oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding. *(5)*	a) Direct Assessment of Senior Project oral and written reports b) WPE	a) 75% of Senior Projects receive Level 3 out of 4 on BOTH oral report rubric and written report rubric b) 100% pass WPE (the WPE is a graduation requirement at LTU)	Every Semester	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	*Design, implement,* and *evaluate* a mathematical model, computer-based system, process, component, or program to meet its specified requirements *(3)*	Direct assessment of standard questions on final exams in three MCS core courses	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the three courses)	Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	*Plan, create and integrate* oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding. *(5)*	Direct assessment in SSC2413, SSC2423, LLT1213, LLT1223 and LLT/SSC Jr/Sr Elective	Use metrics provided by HSSC Department	Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	*Analyze* a problem, and *identify* and *define* the computing requirements and mathematical techniques appropriate to its solution. *(2)*	Direct assessment of standard questions on final exams in CHM1213, CHM1223, PHY2413, PHY2423, BIO1213, and BIO1223	75% of students score 70% or higher on final exam questions mapped to Course Learning Objectives (Metric for each of the six courses)	Every Semester	Annual
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."	*Analyze* the local and global impact of computing and models on individuals, organizations, and society. *(6)*	Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Function effectively on teams to accomplish a common goal, including performing leadership tasks (4)	a) Alumni Survey b) MCS1414 and MCS1424 Lab Surveys	a) 75% of students achieve Level 3 (out of 4) on Survey Rubric b) a) 75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	*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)*	a) Alumni Survey	75% of students achieve Level 3 (out of 4) on Survey Rubric	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

- Objective/Outcome: Apply knowledge of computing and mathematics appropriate to a problem. (1)
- Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414, MCS1514, MCS2514
- Evaluation: In only one of the three sections of Calculus 1 was the target of an average of 70% hit on at least half of the nine course objectives. In Calculus 2, only 2 of the 14 objectives hit the 70% target. In Calculus 3, only one section achieved 70% average or better in half of the course objectives. Average score on Computer Science 2 Finals exceeded 70% goal on only two of the 14 course objectives. Average score on Computer Science 1 Finals exceeded 70% goal on only one of the 7 course objectives.
- Issue: In Calculus 1, the weakest areas are related rates, optimization, Fundamental Theorem of Calculus, and applied problems. In Calculus 2, the weakest areas are series convergence tests and series approximations. In Calculus 3, the weakest areas were vector function and applications of vectors, and line integrals and their applications. In Computer Science 2, there are too many objectives. Some of these can be merged, or less important ones omitted. In both courses, reasons for performance on the final need to be determined and issues identified.
- Current/Future Actions: Three of the course objectives of Calculus 1 are probably better assessed through the Lab than through Final questions, so Lab questions will be used to assess some Calculus 1 objectives. Fourteen course objectives is probably too many for Calculus 2, so some objectives may be merged or less important ones deleted. The topics of most difficulty in Calculus 1 are the applied problems. One section did significantly better than the other two on these types of problems, so this instructor will be surveyed to see if they have special strategies for story problems. The topics of most difficulty in both Calculus 2 and 3 are given at the end of the semester, and often there is not enough time to cover these topics in depth so that students have them mastered by the Final Exam. Some topics from Calculus 2 and 3 have been shifted to Calculus 1 beginning Fall 2016, so hopefully this will pay dividends in allowing some additional time for the end of the semester topics in Calculus 2 and 3. Modify course objectives for Computer Science 2. Have a closing the loop meeting for Computer Science 1 and 2.
- Responsibility: MCS1414, MCS1424 and MCS2414 = Na Yu, Calculus Coordinator; MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- University/College Support for Objective: More full-time faculty are needed in Computer Science to teach MCS1514 and MCS2514.

- Objective/Outcome: Design, implement, and evaluate a mathematical model, computer-based system, process, component, or program to meet its specified requirements (3)
- Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414, MCS1514, MCS2514
- Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1414, MCS1424, and MCS2414. It is not clear that this objective was assessed via the Final Exams in MCS1514 and MCS2514.
- Issue: This mathematical model part of the objective can be most effectively assessed in the MCS3523 Mathematical Modeling course offered Spring 2017. The computer based system part of the objective might be more effectively assessed on programming assignments from MCS1514 and MCS2514.
- Current/Future Actions: Data will be collected in MCS3523 to assess this objective. Identify programming assignments in MCS1514 and MCS2514 that relate to this objective.
- Responsibility: MCS3523= Na Yu, Math Modeling Instructor; MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- University/College Support for Objective: More full-time faculty are needed in Computer Science to share the task of assessment.

- Objective/Outcome: Apply current and established techniques, skills, and tools necessary for applying mathematics and computing practice. (8)
- Assessment: Direct assessment of standard questions on final exams in MCS1414, MCS1424, MCS2414, MCS1514, MCS2514
- Evaluation: It is not clear that this objective was assessed via the Final Exams in MCS1414, MCS1424, and MCS2414. It is not clear that this objective was assessed via the Final Exams in MCS1514 and MCS2514.
- Issue: The mathematics practice part of this objective relates to the use of technology in Calculus 1, 2, and 3. The use of technology varies among sections and where technology is used evidence has so far not been systematically gathered to assess this objective. Rather than Final Exam questions, this objective is more effectively assessed via the Calculus 1 and 2 Labs which require Maple software for selected weeks, and may also be assessed in Calculus 1, 2, and 3 via technology assignments where they are given. The computing practice part of this objective might be more effectively assessed on projects from MCS1514 and MCS2514.
- Current/Future Actions: More data will be collected from MCS1414, MCS1424 and MCS2414 regarding the use of technology in the Calculus sequence. Identify projects in MCS1514 and MCS2514 that relate to this objective.
- Responsibility: MCS1414, MCS1424 and MCS2414 = Na Yu, Calculus Coordinator; MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- University/College Support for Objective: The use of technology is not widespread amongst the Calculus curriculum, and many instructors may benefit from training in the use of Maple software and other technology. The previous coordinator of the use of technology in Mathematics is now on phased retirement, and a successor is needed to continue this effort. More full-time faculty are needed in Computer Science for curriculum development.

- Objective/Outcome: Display a complete understanding of a computer language ((syntax, semantics and terminology), develop and debug complex code. (10)
- Assessment: Direct assessment of standard questions on final exams in MCS1514 and MCS2514
- Evaluation: Average score on Computer Science 2 Finals exceeded 70% goal on only two of the 14 course objectives. Average score on Computer Science 1 Finals exceeded 70% goal on only one of the 7 course objectives.
- Issue: This objective needs to be reworded. Complete understanding of a computer language is unlikely to occur in one or even two courses, and is not easy to measure using the Final Exam. This objective might be more effectively assessed using either programming assignments or projects.
- Current/Future Actions: Identify projects and programming assignments that require developing and debugging complex code.
- Responsibility: MCS1514 and MCS2514 = Computer Science 1 and 2 Coordinators
- University/College Support for Objective: More full-time faculty are needed in Computer Science to create projects that require students to develop and debug complex code.

3. **Assessment Plan for 2016-2017 Academic Year**

1) Loop-closing actions for 2016-7:
- Close the loop on related rates, optimization, and Fundamental Theorem of Calculus student performance from 2015-6 in Calculus 1 (objective #1)
- Collect data from Calculus 1 and 2 Labs for course objectives not covered on the Final
- Allocate more time for Series topics in Calculus 2
- Reduce the number of course objectives in Calculus 2
- Allocate more time for Line Integrals in Calculus 3

•Collect data in MCS2523 in Spring 2017 to assess the mathematical modeling objective (#3)
•Collect data from technology assignments in Calculus 1, 2, and 3 to assess the use of technology
  objective (#8)
•Modify course objectives for Computer Science 2.
•Have a closing the loop meeting for Computer Science 1 and 2 for the application of computer
  knowledge objective (#1)
•Identify programming assignments in MCS1514 and MCS2514 that relate to the analysis of computing
  requirements objective (#3)
•Identify projects in MCS1514 and MCS2514 that relate to the application of current techniques
  objective (#8)
•Identify projects and programming assignments that require developing and debugging complex code.
  (#10)

2) There are 10 program outcomes for the BS in Mathematics and Computer Science. Four of these outcomes (#1, 3, 8 and 10) were assessed in 2015-6. Four more outcomes will be assessed in 2016-7 (#4, 6, 7, and 9) and the remaining two outcomes will be assessed in 2017-8. All 10 programs outcomes will be assessed over a three year cycle.

Curriculum mapping as suggested by Dr. Gloria Rogers (from Assessment Day) will be done Fall 2016 to ensure that all program outcomes are covered in the curriculum.

Beginning Fall 2016, performance indicators are needed for all outcomes and these performance indicators need to be mapped to curricular activities.

Standard Syllabi will be developed Fall 2016 for MCS2423 Differential Equations, MCS3403 Probability and Statistics, MCS3863 Linear Algebra, MCS1142 Introduction to C, MCS2523 Discrete Math, and MCS4623 Software Engineering

Pilot assessment will begin in Spring 2017 for MCS2423, MCS3403, MCS3863, MCS1142, MCS2523, and MCS4623; full assessment in these six courses will begin Fall 2017

3) New assessment plans for the current year

  Relevant data needs to be collected; "less is more" according to Gloria Rogers- need to identify specific
  items to track and limit number of data items collected, beginning Fall 2016
  • Data collected needs to be systematic: common type of assessment needs to be done across courses
  that have multiple sections (too much variance in data collected in the past)
  • Template needs to be created and sent out to all instructors teaching sections of a given course so that
  assessment is common among different sections of the same course (and so that common assessment is
  done from semester to semester in all courses)

•Objective/Outcome: Function effectively on teams to accomplish a common goal, including performing
  leadership tasks (4)
•Actions: Collect and evaluate data from Alumni Survey

•Objective/Outcome: Analyze the local and global impact of computing and models on individuals,
  organizations, and society. (6)
•Actions: Collect and evaluate data from Alumni Survey

•Objective/Outcome: Recognize the need for and an ability to engage in continuing professional development [and learn new technologies] and adapt to changes in the field. (7)
•Actions: Collect and evaluate data from Alumni Survey

•Objective/Outcome: 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)
•Actions: Collect and evaluate data from Alumni Survey

MS in Computer Science

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MS in Computer Science

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	*Display* a thorough understanding of the theoretical concepts and practical uses of computer science in two concentrations. Demonstrate a sufficient depth of knowledge in a substantive area of computer science to pursue advanced practical work in industry	Direct assessment of student assignments Alumni survey	Level 3 on graduate assignment rubric Level 3 on survey rubric	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	*Formulate* and *analyze* technical requirements for new or existing projects	Direct assessment of student collaborative research projects	Level 3 on project rubric	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Be lifelong learners who are able to *master* new topics required to *understand* and *synthesize* solutions to novel problems, based on their technical knowledge of computer science and their ability to *think critically*	Alumni Survey	Level 3 on rubric	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	5. *Plan, create and integrate* oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding.	Direct assessment of student collaborative research projects	Level 3 on project rubric	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	4. Be lifelong learners who are able to *master* new topics required to *understand* and *synthesize* solutions to novel problems, based on their technical knowledge of computer science and their ability to *think critically*	Evaluation of work in ARI5622 ID	70% of students obtain a grade of B or above	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

For 2015-6, the curriculum for the Master of Science in Computer Science was being significantly revised, and the Math/CS department decided to focus efforts in assessment in Computer Science on the undergraduate program and postpone assessment of the graduate program until 2016-7.

3. Assessment Plan for 2016-2017 Academic Year

1) There are no loop-closing actions from 2015-6.
2) The curriculum for the MS in CS is still under revision, and this revision is not expected to be completed until Spring 2017. Assessment of the graduate program will be postponed until 2017-8.
3) New assessment plans for 2016-7 academic year will apply to the undergraduate Computer Science program only. See 3) under Assessment Plan for 2016-7 Academic Year for the BS in CS.

•Objective/Outcome: None to be assessed in 2016-7
•Actions: Assessment of MS in CS curriculum will begin in 2017-8

BS in Chemistry

1. Assessment Plan and Summary

At the end of the 2014-15 academic year, in the process of reviewing the assessment practices in the Natural Sciences Department, we realized that the existing assessment plans for all programs needs substantial update. Therefore, we decided to take the 2015-16 academic to redefine our assessment plans.
In this process, the full time faculty have had several meetings to create the new assessment plans. The last meeting took place at the department breakout session on the assessment day, during which the new assessment plans were finalized. The recommendations from the assessment day presenter were incorporated in the new plans.
In the new plans,

- elements missing in the previous plans are added. In the previous plans, supporting program learning objectives were largely missing. They are all defined in the new plans.
- the list of courses to be assessed is updated. Pedagogy changes and curriculum development in recent years made some course more applicable for assessment purposes, some others less applicable. The course list is updated to reflect the changes. In addition, the formative-summative assessment cycle, one of the recommendations by the presenter, is implemented in the selection of courses to be assessed.
- Some metric/indicators are updated.

Table 1: Assessment Plan for BS in Chemistry

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Students must integrate the core concepts of physical chemistry: quantum mechanics, statistical thermodynamics, thermodynamics, transport, kinetics, and computational chemistry. Students must demonstrate knowledge of quantitative chemical analysis including wet chemical and instrumental techniques. Students must demonstrate knowledge of the structure and function of the four classes of biomolecules: proteins, nucleic acids, carbohydrates, and lipids. Students must demonstrate their ability to draw and name the major classes of organic molecules, explain how they react, how they are characterized, and demonstrate synthetic skills. 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.	ETS National Exam Evaluate exit exam results	60% of graduates score at or above national mean. (4 year running average) Alignment of curriculum with exit exam questions; identification of weak points	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Students must individually and successfully use instrumentation and chemical literature available in the department. Includes analysis of unknown substances, student-synthesized materials, or natural samples.	Direct assessment of coursework w/ lab report rubric in CHM 3392, CHM 4632, CHM 4541, and CHM 3463. Course objectives survey in all CHM 2352, CHM 3463, and CHM 4632.	The designation of qualified/not qualified will be given. 80% will receive a "qualified" designation.	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Students will demonstrate an awareness of sustainability concepts within their chemistry-related senior project proposals.	Evaluation of Senior project proposal with project rubric in PSC 3001. Students will consider sustainability issues. relevant to their project, and document it in their proposal.	80%"satisfactor" or "superior" performance.	Every Semester	Annual

				Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Students will demonstrate professional standards in chemistry through written, oral, and graphical communication.	Direct assessment of student assignments with appropriate rubric CHM 3403. Direct assessment of student assignments with a project/lab report rubrics in CHM 4632. Evaluation of student presentations using oral presentation rubric in CHM 2332, CHM 4912, and 4922.	80% "satisfactory" or "superior" performance based on rubrics	Every Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."		LTU core curriculum.		Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum.		Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."	Students will demonstrate critical thinking and apply analytical and problem-solving skills in chemistry.	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of CHM4632, CHM 3463 or PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in CHM 4632, or CHM 3463 and/or CHM4912/4922.	80% "satisfactory" or "superior" performance by the senior year 80% "satisfactory" or "superior" performance by the senior year	Every Semester	Annual
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."		LTU Leadership Curriculum		Every Semester	Annual

TEAMWORK "LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions towards solving analytic programs.	Instructor and team-self evaluation in CHM 4632, CHM 4541, CHM 3463. Likert scale of satisfaction will be used.	80% of responses with "always satisfied" or "frequently satisfied" to survey which will include peer evaluation.	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Students will demonstrate an understanding of the ethical issues related to chemistry.	Ethics case study assignment or quiz in PSC 3001 in which Students will analyze an ethical situation and characterize and reflect the scientific misconduct involved.	80% "satisfactory" or "superior" performance.	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

Based on the issues identified in the previous year's assessment, we dedicated most of the assessment efforts on updating our assessment plans. Other than that, we applied ETS exams and exit exams to gauge graduating students.

University Learning Outcomes:	"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."
Program Learning Objective:	Evaluate knowledge and expertise gained in their field by meeting outcomes on national ETS field exam. (this is the object from the previous year, and different from the updated one in this document)
Assessment Tool 1:	Evaluation of ETS National Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Only one physics major student graduated in Spring 2015; the running average of the previous four years met the goal. Refer to the assessment plan
Actions 1:	
Responsibility:	Tony Sky -Chairperson of the Natural Science Department with assistance from NS faculty.
Assessment Tool 2:	Evaluation of exit exam results
Issue 1:	Students' feedback indicated that the ETS exam's coverage of some topic areas were wider than our corresponding courses' coverage.
Action 1:	Alignment of curriculum with exit exam questions; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.

3. Assessment Plan for 2016-2017 Academic Year

The last academic year was the year of planning; the current one is the year of execution. The department decided to adopt the Assessment-Evaluation-Change (AEC) cycle, and the 2016-17 academic year initiates the Assessment action.

BS in Environmental Chemistry

1. Assessment Plan and Summary

At the end of the 2014-15 academic year, in the process of reviewing the assessment practices in the Natural Sciences Department, we realized that the existing assessment plans for all programs needs substantial update. Therefore, we decided to take the 2015-16 academic to redefine our assessment plans.

In this process, the full-time faculty have had several meetings to create the new assessment plans. The last meeting took place at the department breakout session on the assessment day, during which the new assessment plans were finalized. The recommendations from the assessment day presenter were incorporated in the new plans.

In the new plans,

- elements missing in the previous plans are added. In the previous plans, supporting program learning objectives were largely missing. They are all defined in the new plans.
- the list of courses to be assessed is updated. Pedagogy changes and curriculum development in recent years made some course more applicable for assessment purposes, some others less applicable. The course list is updated to reflect the changes. In addition, the formative-summative assessment cycle, one of the recommendations by the presenter, is implemented in the selection of courses to be assessed.
- Some metric/indicators are updated.

Table 1: Assessment Plan for BS in Environmental Chemistry

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Students must integrate the core concepts of physical chemistry: quantum mechanics, statistical thermodynamics, thermodynamics, transport, kinetics, and computational chemistry. Students must demonstrate knowledge of quantitative chemical analysis including wet chemical and instrumental techniques. Students must demonstrate knowledge of atmospheric, soil, and water chemistry. Students must demonstrate knowledge of the structure and function of the four classes of biomolecules: proteins, nucleic acids, carbohydrates, and lipids. Students must demonstrate their ability to draw and name the major classes of organic molecules, explain how they react, how they are characterized, and demonstrate synthetic skills. Students must analyze and interpret new information on fundamental topics in inorganic chemistry, such as structures, bonding, and descriptive chemistry of compounds containing main group and transition elements.	ETS National Exam Evaluate exit exam results	60% of graduates score at or above national mean. (4 year running average) Alignment of curriculum with exit exam questions; identification of weak points	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Students must individually and successfully use instrumentation and chemical literature available in the department. Includes analysis of unknown substances, student-synthesized materials, or natural samples.	Direct assessment of coursework w/ lab report rubric in CHM 3392, CHM 4632, CHM 4541, and CHM 3463. Course objectives survey in all CHM 2352, CHM 3463, and CHM 4632.	80% will receive a "qualified" designation 80% "confident" and "very confident" overall of their mastery of the course objectives.	Every Semester	Annual

SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Students will demonstrate an awareness of sustainability concepts within their chemistry-related senior project proposals.	Evaluation of Senior project proposal with project rubric in PSC 3001. Students will consider sustainability issues. relevant to their project, and document it in their proposal.	80% "satisfactory" or "superior" performance.	Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Students will demonstrate professional standards in environmental chemistry through written, oral, and graphical communication.	Direct assessment of student assignments with appropriate rubric CHM 3403. Direct assessment of student assignments with a project/lab report rubrics in CHM 4632. Evaluation of student presentations using oral presentation rubric in CHM 2332, CHM 4912, and 4922.	80% "satisfactory" or "superior" performance based on rubrics	Every Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."		LTU core curriculum.		Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum.		Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."	Students will demonstrate critical thinking and apply analytical and problem-solving skills in chemistry.	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of CHM4632, CHM 3463 or PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in CHM 4632, or CHM 3463 and/or CHM4912/4922.	80% "satisfactory" or "superior" performance by the senior year 80% "satisfactory" or "superior" performance by the senior year	Every Semester	Annual

LEADERSHIP <u>LEADERSHIP</u> "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."	LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions towards solving analytic programs.	Instructor and team-self evaluation in CHM 4632, CHM 4541, CHM 3463. Likert scale of satisfaction will be used.	80% of responses with "always satisfied" or "frequently satisfied" to survey which will include peer evaluation.	Every Semester	Annual
<u>TEAMWORK</u> "LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Students will demonstrate an understanding of the ethical issues related to chemistry.	Ethics case study assignment or quiz in PSC 3001 in which Students will analyze an ethical situation and characterize and reflect the scientific misconduct involved.	80% "satisfactory" or "superior" performance.	Every Semester	Annual
<u>PROFESSIONAL ETHICS</u> "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."		Ethics case study assignment or quiz in PSC 3001	80%"satisfactor" or "superior" performance.	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

Based on the issues identified in the previous year's assessment, we dedicated most of the assessment efforts on updating our assessment plans. Other than that, we applied ETS exams and exit exams to gauge graduating students.

University Learning Outcomes:	"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."
Program Learning Objective:	Evaluate knowledge and expertise gained in their field by meeting outcomes on national ETS field exam. (this is the object from the previous year, and different from the updated one in this document)
Assessment Tool 1:	Evaluation of ETS National Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Only one physics major student graduated in Spring 2015; the running average of the previous four years met the goal. Refer to the assessment plan
Actions 1:	
Responsibility:	Tony Sky -Chairperson of the Natural Science Department with assistance from NS faculty.
Assessment Tool 2:	Evaluation of exit exam results
Issue 1:	Students' feedback indicated that the ETS exam's coverage of some topic areas were wider than our corresponding courses' coverage.
Action 1:	Alignment of curriculum with exit exam questions; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.

3. Assessment Plan for 2016-2017 Academic Year

The last academic year was the year of planning; the current one is the year of execution. The department decided to adopt the Assessment-Evaluation-Change (AEC) cycle, and the 2016-17 academic year initiates the Assessment action.

BS in Molecular and Cell Biology

1. Assessment Plan and Summary

At the end of the 2014-15 academic year, in the process of reviewing the assessment practices in the Natural Sciences Department, we realized that the existing assessment plans for all programs needs substantial update. Therefore, we decided to take the 2015-16 academic to redefine our assessment plans.
In this process, the full time faculty have had several meetings to create the new assessment plans. The last meeting took place at the department breakout session on the assessment day, during which the new assessment plans were finalized. The recommendations from the assessment day presenter were incorporated in the new plans.
In the new plans,

- elements missing in the previous plans are added. In the previous plans, supporting program learning objectives were largely missing. They are all defined in the new plans.
- the list of courses to be assessed is updated. Pedagogy changes and curriculum development in recent years made some course more applicable for assessment purposes, some others less applicable. The course list is updated to reflect the changes. In addition, the formative-summative assessment cycle, one of the recommendations by the presenter, is implemented in the selection of courses to be assessed.
- Some metric/indicators are updated.

Table 1: Assessment Plan for BS in Molecular and Cell Biology

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	LTU MCB graduates will Defend the modern synthesis of evolution and genetics and apply this foundational biological paradigm to biological phenomena Explain the intrinsic relationship between the structure and function in biological systems and be able to predict structure given functional data or vice versa. Defend biological central dogma and summarize the process of the control of gene expression. Compare and contrast the various ways that biological organisms harvest energy and convert it to matter. Explain how living systems are interconnected and apply this knowledge to predict perturbations to these systems.	ETS National Exam (Analytical Skills, Ecology, Population Genetics and Evolution, Molecular Biology and Molecular Genetics, Cellular Structure, Organization, Function and Biochemistry and Cell Energetics) Exit exam results	60% of graduates score at or above national mean. (4 year running average) Alignment of curriculum with exit exam questions; identification of weak points	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	LTU MCB graduates will Apply advanced technologies such as software or instrumentation to practical and/or theoretical problems in molecular cell biology. Have the ability to use modeling and simulation with complex biological systems	Direct assessment of coursework with rubric in BIO 3301 (F), BIO 4103 (S), and BIO 4812 (S) F=formative S=summative Indirect assessment: Course Objectives for upper level courses.	The designation of qualified/not qualified will be given. 80% will receive a "qualified" designation. 80% "confident" and "very confident" overall of their mastery of the objectives.	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	LTU MCB graduates will Evaluate the impact of scientific practices and findings on society.	Evaluation of Senior project proposal with project rubric in PSC 3001. Students will consider sustainability issues relevant to their project, and document it in their proposal. Indirect assessment of course objectives	80% "satisfactory" or "superior" performance.	Every Semester	Annual

COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	LTU MCB graduates will Have the ability to communicate and collaborate with other disciplines	Evaluation of written work including papers and laboratory reports with rubric. Proposals (PSC 3001) and Laboratory reports/Posters (Bio 3201, Bio 2321 and Bio 4812) will be evaluated using rubric, including standards for organization, language, and visual communication (tables/graphs). Evaluation of student presentations using oral rubric (Bio 491X & 492X).	80% "satisfactory" or "superior" performance based on rubrics	Every Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."		LTU core curriculum.		Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum.		Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."	LTU MCB graduates will have the ability to apply the process of science.	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 with rubric Completion of an independent research project or experiment with minimal assistance in BIO 4812 and/or BIO 4912/4922.	80% "satisfactory" or "superior" performance by the senior year 80% "satisfactory" or "superior" performance by the senior year	Every Semester	Annual
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."		LTU Leadership Curriculum		Every Semester	Annual

TEAMWORK "LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	LTU MCB graduates will have the ability to communicate and collaborate with other disciplines	Instructor and team-self evaluation in BIO 3201. Likert scale of satisfaction will be used.	80% of responses with "always satisfied" or "frequently satisfied" to survey which will include peer evaluation.	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	LTU MCB graduates will be able to Evaluate the impact of scientific practices and findings on society.	Ethics case study assignment or quiz in PSC 3001 in which Students will analyze an ethical situation and characterize and reflect the scientific misconduct involved.	80% "satisfactory" or "superior" performance.	Every Semester	Annual

2. Report on 2015-2016 Academic Year ad Action Plan (Loop Closing)

Based on the issues identified in the previous year's assessment, we dedicated most of the assessment efforts on updating our assessment plans. Other than that, we applied ETS exams and exit exams to gauge graduating students.

University Learning Outcomes:	"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."
Program Learning Objective:	Evaluate knowledge and expertise gained in their field by meeting outcomes on national ETS field exam. (this is the object from the previous year, and different from the updated one in this document)
Assessment Tool 1:	Evaluation of ETS National Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Only one physics major student graduated in Spring 2015; the running average of the previous four years met the goal. Refer to the assessment plan
Actions 1:	
Responsibility:	Tony Sky -Chairperson of the Natural Science Department with assistance from NS faculty.
Assessment Tool 2:	Evaluation of exit exam results
Issue 1:	Students' feedback indicated that the ETS exam's coverage of some topic areas were wider than our corresponding courses' coverage.
Action 1:	Alignment of curriculum with exit exam questions; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.

3. Assessment Plan for 2016-2017 Academic Year

The last academic year was the year of planning; the current one is the year of execution. The department decided to adopt the Assessment-Evaluation-Change (AEC) cycle, and the 2016-17 academic year initiates the Assessment action.

BS in Physics

1. **Assessment Plan and Summary**

At the end of the 2014-15 academic year, in the process of reviewing the assessment practices in the Natural Sciences Department, we realized that the existing assessment plans for all programs needs substantial update. Therefore, we decided to take the 2015-16 academic to redefine our assessment plans.
In this process, the full-time faculty have had several meetings to create the new assessment plans. The last meeting took place at the department breakout session on the assessment day, during which the new assessment plans were finalized. The recommendations from the assessment day presenter were incorporated in the new plans.
In the new plans,

- elements missing in the previous plans are added. In the previous plans, supporting program learning objectives were largely missing. They are all defined in the new plans.
- the list of courses to be assessed is updated. Pedagogy changes and curriculum development in recent years made some course more applicable for assessment purposes, some others less applicable. The course list is updated to reflect the changes. In addition, the formative-summative assessment cycle, one of the recommendations by the presenter, is implemented in the selection of courses to be assessed.
- Some metric/indicators are updated.

Table 1: Assessment Plan for BS in Physics

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Mastery of the topic areas of Classical Mechanics, Relativity, EM, Optics/Waves, Thermal Physics, Quantum Mechanics, Atomic	Course learning objective survey (formative assessment) ETS National Exam Exit exam	At least 4 out of 5 Likert scale for learning objectives 60% of graduates score at or above national mean. (4 year running average) 60% of graduates score at or above national mean. (4 year running average)	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Students must individually and successfully use appropriate instrumentation available in the department, such as AFM, SEM to characterize specimen.	Direct assessment of coursework with the rubric in PHY 3661 and PHY 4781. The designation of qualified/not qualified will be given.	At least 80% will receive a "qualified" designation.	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Students will consider their research equipment and resources cost, and the cost to replenish those.	Evaluation of Senior project proposal with project rubric in PSC3001, in which students will consider sustainability issue relevant to their project.	All students receive "satisfactory"	Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Students are aware of the publication standards from common scientific publications and the rubric for their senior projects, 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.	Every Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."		LTU core curriculum.		Every Semester	Annual

READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum.		Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	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 "reasonable" or "unreasonable" will be given. Completion of an independent experiment with minimal assistance in PHY 3661 and PHY 4781.	All students will receive "reasonable". Graded by level of assistance provided. (assistance rubric will be created)	Every Semester	Annual
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."		LTU Leadership Curriculum		Every Semester	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members contributions towards solving analytic programs	Instructor and team-self-evaluation in PHY 2413/2423. Team process check survey will be used. Likert scale of satisfaction will be used.	80% of responses with "always satisfied" or "frequently satisfied" to survey which will include peer evaluation.	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Students will understand ethical responsibilities in physics.	Ethics case study assignment in PSC 3001, in which students will analyze an ethical situation and characterize and reflect the scientific misconduct involved.	Students receive at least "satisfactory" (need to formalize the rubric)	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Based on the issues identified in the previous year's assessment, we dedicated most of the assessment efforts on updating our assessment plans. Other than that, we applied ETS exams and exit exams to gauge graduating students.

University Learning Outcomes:	"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."
Program Learning Objective:	Evaluate knowledge and expertise gained in their field by meeting outcomes on national ETS field exam. (this is the object from the previous year, and different from the updated one in this document)
Assessment Tool 1:	Evaluation of ETS National Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Only one physics major student graduated in Spring 2015; the running average of the previous four years met the goal. Refer to the assessment plan
Actions 1:	
Responsibility:	Tony Sky -Chairperson of the Natural Science Department with assistance from NS faculty.
Assessment Tool 2:	Evaluation of exit exam results
Issue 1:	Students' feedback indicated that the ETS exam's coverage of some topic areas were wider than our corresponding courses' coverage.
Action 1:	Alignment of curriculum with exit exam questions; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.

3. Assessment Plan for 2016-2017 Academic Year

The last academic year was the year of planning; the current one is the year of execution. The department decided to adopt the Assessment-Evaluation-Change (AEC) cycle, and the 2016-17 academic year initiates the Assessment action.

BS in Physics & Computer Science

1. Assessment Plan and Summary

At the end of the 2014-15 academic year, in the process of reviewing the assessment practices in the Natural Sciences Department, we realized that the existing assessment plans for all programs needs substantial update. Therefore, we decided to take the 2015-16 academic to redefine our assessment plans.
In this process, the full-time faculty have had several meetings to create the new assessment plans. The last meeting took place at the department breakout session on the assessment day, during which the new assessment plans were finalized. The recommendations from the assessment day presenter were incorporated in the new plans.
In the new plans,

- elements missing in the previous plans are added. In the previous plans, supporting program learning objectives were largely missing. They are all defined in the new plans.
- the list of courses to be assessed is updated. Pedagogy changes and curriculum development in recent years made some course more applicable for assessment purposes, some others less applicable. The course list is updated to reflect the changes. In addition, the formative-summative assessment cycle, one of the recommendations by the presenter, is implemented in the selection of courses to be assessed.
- Some metric/indicators are updated.

Table 1: Assessment Plan for BS in Physics & Computer Science

LTU Uudergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Mastery of the topic areas of Classical Mechanics, Relativity, EM, Optics/Waves, Thermal Physics, Quantum Mechanics, Atomic	Course learning objective survey (formative assessment) ETS National Exam Exit exam	At least 4 out of 5 Likert scale for learning objectives 60% of graduates score at or above national mean. (4 year running average) 60% of graduates score at or above national mean. (4 year running average)	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Students must individually and successfully use appropriate instrumentation available in the department, such as AFM, SEM to characterize specimen.	Direct assessment of coursework with the rubric in PHY 3661 and PHY 4781. The designation of qualified/not qualified will be given.	At least 80% will receive a "qualified" designation.	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Students will consider their research equipment and resources cost, and the cost to replenish those.	Evaluation of Senior project proposal with project rubric in PSC3001, in which students will consider sustainability issue relevant to their project.	All students receive "satisfactory"	Every Semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Students are aware of the publication standards from common scientific publications and the rubric for their senior projects, 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.	Every Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."		LTU core curriculum.		Every Semester	Annual

READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum.		Every Semester	Annual
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	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 "reasonable" or "unreasonable" will be given. Completion of an independent experiment with minimal assistance in PHY 3661 and PHY 4781.	All students will receive "reasonable". Graded by level of assistance provided. (assistance rubric will be created)	Every Semester	Annual
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."		LTU Leadership Curriculum		Every Semester	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members contributions towards solving analytic programs	Instructor and team-self-evaluation in PHY 2413/2423. Team process check survey will be used. Likert scale of satisfaction will be used.	80% of responses with "always satisfied" or "frequently satisfied" to survey which will include peer evaluation.	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Students will understand ethical responsibilities in physics.	Ethics case study assignment in PSC 3001, in which students will analyze an ethical situation and characterize and reflect the scientific misconduct involved.	Students receive at least "satisfactory" (need to formalize the rubric)	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Based on the issues identified in the previous year's assessment, we dedicated most of the assessment efforts on updating our assessment plans. Other than that, we applied ETS exams and exit exams to gauge graduating students.

University Learning Outcomes:	"LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."
Program Learning Objective:	Evaluate knowledge and expertise gained in their field by meeting outcomes on national ETS field exam. (this is the object from the previous year, and different from the updated one in this document)
Assessment Tool 1:	Evaluation of ETS National Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Only one physics major student graduated in Spring 2015; the running average of the previous four years met the goal. Refer to the assessment plan
Actions 1:	
Responsibility:	Tony Sky -Chairperson of the Natural Science Department with assistance from NS faculty.
Assessment Tool 2:	Evaluation of exit exam results
Issue 1:	Students' feedback indicated that the ETS exam's coverage of some topic areas were wider than our corresponding courses' coverage.
Action 1:	Alignment of curriculum with exit exam questions; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.

3. Assessment Plan for 2016-2017 Academic Year

The last academic year was the year of planning; the current one is the year of execution. The department decided to adopt the Assessment-Evaluation-Change (AEC) cycle, and the 2016-17 academic year initiates the Assessment action.

College of Engineering

BS in Biomedical Engineering

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for Biomedical Engineering Program

LTU Uudergraduate Learning Outcomes	BME ABET Outcomes*	Assessment Tools	Metrics/ Indicators**	Administration Timeline	Loop-Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	a. Apply math. Sci. eng. (L3) b. Design and conduct experiments(L5) c. Design system (L5) e. Solve eng. Problems (L3) l. Apply principles of eng., sci., and math (L3) m. Solve eng. problems at interface of eng. and biology (L3) n. Analyze biomedical systems (L3) o. Making measurement and interpret data from living system (L3)	Direct assessment of student assignments from BME 3103, 4103, 2203, 4203, 4013, 4201, 2101, 3101, 4801, 4013, 4113, 4022, 3703, 4313, 2201. Faculty evaluation of senior design Course objective survey Alumni survey	Green or white flag	Every Semester	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	k. Use techniques and modern eng. Tools (L3) l. Apply principles of eng., sci., and math (L3) m. Solve eng. problems at interface of eng. and biology (L3) n. Analyze biomedical systems (L3) o. Making measurement and interpret data from living system (L3)	Direct assessment of student assignments from BME 3301, 3703, 4113, 4313, 4103, 4801, 2201. Faculty evaluation of senior design Course objective survey Alumni survey	Green or white flag	Every Semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	h. Understand global, economic, environmental and social impact (L3)	Exit Interview Direct assessment of student assignments. Course Objectives	Green or white flag	Every Semester	Annual

COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	g. *Communication*	Faculty evaluation of senior project presentations. Direct assessment of student assignments. Course Objectives WPE	Green or white flag Pass the WPE	Every Semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	a. Apply math, science, and eng. (L3) e. Solve eng. Problems (L3) l. Apply principles of eng., sci., and math (L3) m. Solve eng. problems at interface of eng. and biology (L3) n. Analyze biomedical systems (L3) o. Making measurement and interpret data from living system (L3)	Direct assessment of student assignments from BME 3103, 4103, 2203, 2103, 4203, 4013, 4201, 2101, 3101, 4801, 4113, 4313, 4801, 2201. Faculty evaluation of senior design Course objective survey Alumni survey	Green or white flag	Every Semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum			Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields."	e. Solve eng. Problems (L3) l. Apply principles of eng., sci., and math (L3) m. Solve eng. problems at interface of eng. and biology (L3) n. Analyze biomedical systems (L3) o. Making measurement and interpret data from living system (L3)	Direct assessment of student assignments from BME 4113, 4203, 3703, 4313, 4103, 4801, 2201 Faculty evaluation of senior design Course objective survey Alumni survey	Green or white flag	Every Semester	Annual

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."		LTU Leadership core curriculum			Continuously by University
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	*d. Teams*	Faculty evaluation of senior design Course objective survey Direct assessment of student assignments from BME 1002, 4022 Alumni survey	Green or white flag	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	*f. Professional and ethics*	Direct assessment of student assignments from BME 3002 Exit interviews Course objective survey Alumni survey	4.0 on Level 3	Every Semester	Annual

[1]: The LTU undergraduate learning outcomes are mapped to the BME ABET Outcomes:
   a) an ability to apply knowledge of mathematics, science, and engineering
   b) an ability to design and conduct experiments, as well as to analyze and interpret data
   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
   d) an ability to function on multidisciplinary teams
   e) an ability to identify, formulate, and solve engineering problems
   f) an understanding of professional and ethical responsibility
   g) an ability to communicate effectively
   h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
   i) a recognition of the need for, and an ability to engage in life-long learning
   j) a knowledge of contemporary issues
   k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

l) applying principles of engineering, biology, human physiology, chemistry, calculus-based physics, mathematics (through differential equations), and statistics;

m) solving bio/biomedical engineering problems, including those associated with the interaction between living and non-living systems.

n) analyzing, modeling, designing and realizing bio/biomedical engineering devices, systems, components, or processes

o) making measurements on and interpreting data from living systems

[2]: 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

[3]: 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 2014-2015*.

[4]: 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 2014-2015*.

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Outcome a: *an ability to apply knowledge of mathematics, science, and engineering*
   •*Assessment:* Course objective survey and direct assessment of student work on learning objectives that map key performance indicators in support of Outcome (a).
   •*Evaluation:* Direct assessment results raised Red flag on key performance indicator (KPI) a-1 evaluation in three courses: BME 3103 Intro to Bioinstrumentation and BME 3703 Biotransport. Red flag was raised for KPI a-2 evaluation in BME 3703 Biotransport. Red flag was raised for KPI a-3 evaluation in BME 4203 Intro to MEMS and yellow flag was raised for KPI a-3 evaluation in BME 3101 Bioinstrumentation Lab.
   •*Issue:* Insufficient preparation, lack of confidence and proficiency on difficult concepts involving physics and math in Bioinstrumentation (including Lab) and Biotransport, and insufficient effort from a few students in both Biotransport and Intro to MEMS courses.
   •*Current/Future Actions:* The prereq course for BME 3103 Intro to Bioinstrumentation and BME 3103 Bioinstrumentation Lab, EEE 2123 (Circuits and Electronics) will be changed to a 3 credit hour, 4 contact hour course that includes 8 labs. This change is expected to better prepare students for BME 3103 and BME 3101. The instructor for BME 3703 and BME 4203 will keep incorporating active/collaborative learning methods to motivate students with relatively weak background.
   •*Responsibility:* Mansoor Nasir, Yawen Li
   •*University/College Support for Objective:* NA

Outcome b: *an ability to design and conduct experiments, as well as to analyze and interpret data*
   •*Assessment:* Course objective survey and direct assessment of student work on learning objectives that map key performance indicators in support of Outcome (b).
   •*Evaluation:* Direct assessment results raised yellow flag on KPI b-1 evaluation in BME 4201 MEMS Lab. Yellow flag was also raised for KPI b-2 evaluation in BME 3101 Bioinstrumentation Lab.
   •*Issue:* Insufficient effort from underperforming students in both lab courses.
   •*Current/Future Actions:* The instructor for BME 3101 and BME 4201 will keep motivating underperforming students. The planned changes in EEE 2123 (Circuits and Electronics) mentioned above and the introduction of Arduino kits is also expected to improve student performance in BME 3101.
   •*Responsibility:* Mansoor Nasir, Yawen Li
   •*University/College Support for Objective:* NA

Outcome n: *analyzing, modeling, designing and realizing bio/biomedical engineering devices, systems, components, or processes*
   •*Assessment:* Course objective survey and direct assessment of student work on learning objectives that map key performance indicators in support of Outcome (n).
   •*Evaluation:* Direct assessment results raised Yellow flag on key performance indicator (KPI) n-1 evaluation in BME 3703 Biotransport.
   •*Issue:* Lack of confidence and proficiency on difficult new concepts.
   •*Current/Future Actions:* The instructor will keep incorporating active/collaborative learning methods to motivate students with relatively weak background.
   •*Responsibility:* Yawen Li
   •*University/College Support for Objective:* NA

Eight other programs outcomes (d, e, f, g, h, i, j and k) were reviewed in accordance with the BME program assessment plan and no corrective action is necessary based on evaluation of assessment results.

3. **Assessment Plan for 2016-2017 Academic Year**

The BME faculty agreed on the following assessment plan for the 2016-2017 academic year:

a. Direct assessment

Student Outcome	KPI	Courses
(a) an ability to apply knowledge of mathematics, science, and engineering	a-1 (L3): Implement mathematical algebra, geometry, calculus, probability techniques, differential equations and/or statistics	BME 3303 BME 4313
	a-2 (L3): Apply biology, chemistry, calculus-based physics or human physiology principles	BME 2103 BME 4803
	a-3 (L3): Apply engineering principles to a system, device, or process	BME 4103 BME 4113
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	b-1 (L3): Conduct experimental procedures to measure and record data.	BME 3101 BME 4801
	b-2 (L4): Examine data using appropriate analytical techniques	BME 4201 BME 4801
	b-3 (L3): Compose a scientific hypothesis and test the hypothesis using experimental data	BIO 3201 BME 3301
(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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	c-1 (L3): Use the engineering design process to generate potential solutions to a biomedical need	BME 4013
	c-2 (L4): Examine realistic constraints related to the proposed solution	BME 4113
	c-3 (L3): Implement, test, and demonstrate an engineered solution that meets design specifications	BME 4022

b. **Course learning objective survey**
Indirect assessment using course learning objective survey will be conducted for all required BME courses.

c. **Senior design**
The senior design will be evaluated by both faculty and IAB members. *d. Exit*

interview

Exit interview will be conducted in spring 2017.

BS in Civil Engineering

1. Assessment Plan and Summary

Table 1: Assessment Plan for the Department of Civil Engineering

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators**	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Outcome #8 Problem Solving Outcome #9 Design Outcome #13 Project Management Outcome #14 Breadth in CE Areas Otucome #15 Technical Specialization	Direct assessment of student assignments	Rank 4 on direct assessment rubric; Achievement Level 5 for top tier courses Rank 4 on direct assessment rubric;	Every semester.	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Outcome #15 Technical Specialization	Direct assessment of student assignments.	Rank 4 on direct assessment rubric; Achievement Level 3 for top tier courses Meets Expectations on technical presentation rubrics	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Outcome #10 Sustainability	Direct assessment of student assignments	Rank 4 on direct assessment rubric; Achievement Level 3 for top tier courses	Every semester	Annual

COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Outcome #16 Communication	Advisory Board and faculty evaluation of capstone poster and project presentations Direct assessment of student assignments	*Meets Expectations* on technical presentation rubrics *Rank 4* on direct assessment rubric; Achievement *Level 5* for top tier courses WPE	Every semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Outcome #1 Mathematics	Direct assessment of student assignments	*Rank 4* on direct assessment rubric; Achievement *Level 3* for top tier courses	Every semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."		LTU core curriculum			Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Outcome #8 Problem Recognition and Solving	Direct assessment of student assignments	*Rank 4* on direct assessment rubric; Achievement *Level 4* for top tier courses	Every semester.	Annual
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."	Outcome #20 Leadership Outcome #24 Professional and Ethical Responsibility	Direct assessment of student assignments Fundamentals of Engineering Exam	University Leadership Program *Rank 4* on direct assessment rubric; Achievement *Level 3* for top tier courses Above national average for Carnegie peer institutions	Every semester.	Annual

TEAMWORK "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 student assignments Peer evaluations	*Rank 4* on direct assessment rubric; Achievement *Level 3* for top tier courses Rank 3 on Teamwork Evaluation rubric	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Outcome #24 Professional and ethical responsibility	Direct assessment of student assignments Fundamentals of Engineering Exam	*Rank 4* on direct assessment rubric; Achievement *Level 4* for top tier courses Above national average for Carnegie peer institutions	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

During the 2014-2015 close-the-loop meetings, and at several Department meetings, faculty discussed the results of the assessment of the courses, including the Capstone sequence. Information from Exit Interviews and input from various sources, such as the Advisory Board, were also discussed. Faculty determined that two student outcomes were a serious concern, and a third was of a general concern.

#13 Project Management
Assessment: Direct assessment of ECE4243 Construction Project Management (fka CE Management Practices) and student Capstone projects
Evaluation: Assessment results for ECE4243 indicated a Rank of 2, and poor student deliverables in the Capstone courses, requiring action by faculty
Issue: Students failed to grasp several foundational project management concepts in ECE4243; additionally, the construction engineering (project management) deliverables in the Capstone courses were exceedingly poor
Actions: Several problem-based learning activities were added to the syllabus of ECE4243, as well as the inclusion of additional lecture time for the topics of specific concern. Additional specificity was provided in the memo setting forth the construction engineering subdiscipline requirements for the Capstone. Revising of the rubrics for the Capstone is discussed below in Communications.
Responsibility: J. Tocco

#14 Breadth in Civil Engineering
Assessment: Direct assessment of student Capstone projects
Evaluation: Assessment results, based on Advisory Board member comments, indicate that students fail to address some basic civil engineering requirements in their reports and presentation
Issue: In their reports students failed to include a Phase 1 site investigation report, a civil site plan that includes the locations and pipe sizes of various utilities

Actions: Capstone students will jointly address the issues raised; the construction engineer will conduct a Phase 1 report; the construction engineer will collaborate with the water resources engineer to generate a site plan that includes connection locations for water, sewer and storm water; the construction engineer will collaborate with the transportation engineer to create a maintenance of traffic plan as a component of the logistics management plan
Responsibility: J. Tocco, N. Bandara, E. Yuen, D. Carpenter

#16 Communication
Assessment: Direct assessment of student Capstone projects
Evaluation: Assessment results indicate that students are still underperforming on Capstone writing and oral deliverables
Issue: Based on assessment by faculty and the Civil Engineering Advisory Board, communication in the Capstone, both the oral presentations and the written technical reports, continue to be of concern. Student work product seems to be at the level of a standard engineering course—i.e., the level of achievement does not meet the expectations for a capstone project (culminating design/project management experience).

Actions: Faculty team advisors and subdiscipline advisors committed to the following:

- Revising the rubrics for the written technical reports at two levels
  - Create criteria that is more specific to the subdiscipline (criteria will address specific topics in that subdiscipline and include less general engineering language)
  - Create criteria that is more specific to the document submitted (criteria will specifically address the requirements of each of the three report submittals, rather than one form for all three reports)
- In the advisor/student subdiscipline meeting prior to the report submittal, the advisor and student will review the rubric to confirm a mutual understanding of the deliverable
- The Capstone Coordinator will develop a rubric for the students to use in their review of the oral presentations; faculty determined that the students must assess their individual presentation performance, as well their teammates' performance
- In a meeting with the Team Advisor, team members must discuss and suggest ways to improve their individual performance and their team's overall performance
  Responsibility: All faculty

3. Assessment Plan for 2016-2017 Academic Year

Follow the assessment plan shown in Table 1.

Master of Civil Engineering/MS in Civil Engineering

1. Assessment Plan and Summary

The student outcomes of the Master of Science in Civil Engineering (MSCE) degree program are listed below (a-f). They have been adopted from the Body of Knowledge 2 (BOK2) promulgated by the American Society of Civil Engineers (ASCE). The outcome titles based on BOK2 are given in parenthesis (e.g. BOK2, Technical Specialization).

      (a)   *Formulate* and solve ill-defined engineering problem appropriate to civil engineering by *selecting* and applying appropriate techniques and tools (BOK2: Problem Recognition and Solving)

      (b)   *Apply* specialized tools or technologies to solve problems in a traditional or emerging specialized technical area appropriate to civil engineering (BOK2, Technical Specialization)

      (c)   *Analyze* a complex system or process in a traditional or emerging specialized technical area appropriate to civil engineering (BOK2, Technical Specialization)

      (d)   *Design* a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering (BOK2, Technical Specialization)

      (e)   *Plan, compose* and *integrate* the verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences (BOK2, Communication)

      (f)   *Evaluate* the design of a complex system or process, or *evaluate* the validity of newly-created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering (BOK2, Technical specialization)

MSCE student outcomes support the university graduate learning outcomes as described in the 2016-2017 assessment plan as summarized in Table 1. Please refer to the second column in Table 1 to see the inter-relationship between the university graduate learning outcomes and the MSCE student outcomes. Program assessment is conducted using the following tools:

Direct Assessment of Courses: Direct assessment of student learning is performed in selected courses. The selected courses cover the different concentrations including transportation, structural, geotechnical, water resources, and environmental. Most courses are offered once in two years with some exceptions.

Presentations: Formal presentations are mandated in some courses of the MSCE program. It is required that students take a minimum amount of courses with formal presentations. Depending on the structure of the course, the presentations are not always carried out (e.g. ECE 5773 went online fall 2016 and no presentation required). A rubric is filled out by the course instructor evaluating the graphical and oral communication skills as well understanding of technical content. The presentations are meant to serve one of the university graduate learning goals. A copy of the rubric used for course presentations is included in the Appendix.

Assessment of Thesis and Graduate Projects: The members of the defense committee for a thesis or graduate project are to provide their evaluations outlining the quality of the thesis or project using the rubric provided to them. The rubric performs assessment of the final presentation and final report. A copy of the rubric is included in the Appendix.

Exit Interviews: The objective of the exit interview is to receive a summative view of what is happening in the department and an indication of overall student satisfaction. The program director conducts exit interviews. The process includes a survey form to be filled out by students regarding

their education at LTU and specific graduate program outcomes. To encourage participation, the program director allows the students to simply use the forms or to use the forms and then conduct a verbal interview. A copy of the exit interview survey is included in the Appendix.

Columns 3-6 in Table 1 represent the plan for the academic year 2016-2017. The results of the assessment of the student outcomes are presented to the department faculty during the annual close loop meeting in the summer. Any actions that need to be taken to improve the graduate curriculum are handled by the Chair and the program director on an annual basis.

Table 1: Assessment Plan for the MCE/MSCE Program

University Graduate Learning Outcomes	Supporting Program Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	(b) *Apply* specialized tools or technologies to solve problems in a traditional or emerging specialized technical area appropriate to civil engineering (d) *Design* a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering	Direct assessment of assignments or exams in ECE 5343, ECE 5773, ECE 5823, ECE 6423, ECE 5473, ECE 5763, ECE 5523 and ECE 5813.	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	(a) *Formulate* and solve ill-defined engineering problem appropriate to civil engineering by *selecting* and applying appropriate techniques and tools (c) *Analyze* a complex system or process in a traditional or emerging specialized technical area appropriate to civil engineering	Direct assessment of assignments or exams in ECE 5343, ECE 5773, ECE 5823, ECE 6423, ECE 5473, ECE 5763, ECE 5523 and ECE 5813.	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	(d) *Design* a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering (f) *Evaluate* the design of a complex system or process, or *evaluate* the validity of newly-created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Direct assessment of assignments or exams in ECE 5343, ECE 5773, ECE 5823, ECE 6423, ECE 5473, ECE 5763, ECE 5523 and ECE 5813. Evaluation of Thesis and Graduate Project Reports using a rubric (only for MSCE).	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	(e) *Plan, compose* and *integrate* the verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences	Direct assessment of assignments or exams in ECE 5343, ECE 5773, ECE 5823, ECE 6423, ECE 5473, ECE 5763, ECE 5523 and ECE 5813. Oral Presentation rubrics in various classes per department brochure. Evaluation of Thesis and Graduate Project Reports using a rubric (only for MSCE).	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual

| "LU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics." | (d) *Design* a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering
(f) *Evaluate* the design of a complex system or process, or *evaluate* the validity of newly-created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering | Exit Interview | Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2. | Each Semester | Annual |

*See section 1 in the report for details on program outcome

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

The assessment activities that were originally planned for the 2015-2016 academic year were not all performed. Below is a summary of the assessment activities performed or in some cases not performed. The list includes the specific outcomes targeted as well as a description of activities planned but not performed.

1. **Direct Assessment in ECE 6743, ECE 5433, and ECE 5713**. *Outcomes (a), (b), (c) and (d)*. The three classes listed are the three that were originally planned to be assessed fall 2015. Most of the assessment was performed during the winter break. However, direct assessment of courses in the MSCE program was not performed spring 2016. Due to the presence of ABET, fall 2016, the program director decided it would not be wise to target faculty with assessment requirements at the graduate level in the spring. After the completion of the six-year ABET cycle, it will be more plausible for the department to focus on assessment at the graduate level as well.

2. **Exit Interviews**. *Outcomes (d) and (f)*. Exit interview survey was sent to all students graduating spring 2016. Only two students responded. The survey was not sent to students graduating fall 2015 by mistake.

3. **Student Class Presentations**. *Outcomes (b), (c) and primarily (e)*. Assessment of student presentations performed for ECE 5433 and ECE 5843. More formal presentations were held in other classes but only two classes targeted for assessment.

4. **Student Thesis/Graduate Project.** *Outcomes (d) and (f)*. Four students completed thesis requirements in last academic year. However, rubrics only kept for three students. Student thesis could be used to assess many student outcomes but only (d) and (f) selected.

Item 1: Direct Assessment in ECE 6743, ECE 5433, and ECE 5713

Direct assessment in the three classes listed above was performed to evaluate Outcomes (a), (b), (c), and (d). Outcome (b) was only assessed in ECE 6743 and will be discussed first. Please refer to last year's assessment report for a description of the evidence used to evaluate each outcome.

Outcome (b) was assessed by reviewing students' performance using Mathcad to solve integration and matrix structural analysis. Their performance was only evaluated using homework assignments. Most students in the class never used Mathcad prior to entering the course. By the end of the term, all students were fluent in Mathcad using most basic functions and some advanced functions including but not limited to; matrices, vectors, integration, derivatives, and graphs. Overall, the results show that 100% of the students achieved the anticipated level for this outcome.

Outcome (a), (c), and (d) were evaluated using all three courses listed above. In general, the results are favorable in ECE 6743 and ECE 5713. In ECE 6743, approximately 75% of students achieved the level anticipated for Outcome (a), approximately 82% of students achieved the level anticipated for Outcome (c) and approximately 75% of the students achieved the level anticipated for Outcome (d). The results were similar for ECE 5713 in which; 85% of students achieved the level anticipated for Outcome (a), approximately 78% of students achieved the level anticipated for Outcome (c) and approximately 78% of the students achieved the level anticipated for Outcome (d). Note that the adjunct teaching ECE 5713 did not perform the assessment. Instead, the program director who is also a

structural engineering professor performed the assessment based on exams handed over. This is not ideal as it is more preferred that the adjuncts in the department perform their own assessment.

The results of the outcomes for ECE 5433 are less favorable. In ECE 5433, approximately 50% of students achieved the level anticipated for all three outcomes. The student performance in the class was subpar and students failed the class as well, which is dissimilar from the students in ECE 6743 and ECE 5713.

Overall, direct assessment needs to be performed more effectively in the future. For two of the classes noted, faculty was ill-prepared to do the assessment and it became a task performed at the end. All faculty needs a plan at the beginning of the semester to execute proper assessment methods.

Item 2: Exit Interviews

In regards to Item 2, messages were sent to all MSCE students graduating in the spring 2016. The program director did not send the exit interview survey during the fall 2015 by error. Two students filled out the survey and the feedback on the specific questions mapped to student outcomes were all favorable. The only negative comments included the following; "the use of more commercial software should be implemented in the curriculum", and the review of one adjunct was negative (per student request, adjunct and comments confidential). Overall, there is limited data to reflect on with respect to exit interviews. However, the results and therefore, assessment of Outcomes (d) and (f) are favorable.

Item 3: Student Class Presentations

In regards to Item 3, formal presentations were performed in multiple classes. However, due to the high amount of students, assessment was limited to two classes which included ECE 5433 and ECE 5813. A copy of the rubric for "Course Presentations" is provided in the Appendix. For the most part, Outcome (e) is assessed using the rubrics. However, Outcomes (b) and (c) are slightly assessed as well. Average scores for each outcome mapped using the rubric is summarized below.

- Outcome (b) Average 7.34 / 10. ☐ Outcome (c) Average 7.72 / 10.
- Outcome (e) Average 7.69 / 10.

Per the rubric, a 7/10 meets expectations. However, the target is to have 80% of graduates meet expectations. Therefore, an average value is not sufficient. However, the faculty have decided that a good estimate to assume 80% of students meet expectations is 8/10. Therefore, the data shows that the students did not obtain this goal in the previous academic year. However, the results are more favorable than the previous year. The department still has a high amount of international students that have performed little or no presentations in the past and a more favorable result is encouraging.

Item 4: Student Thesis/Graduate Project

In regards to Item 4, a total of four students completed a thesis in the previous academic year. No students completed the graduate project. Rubrics to assess the outcomes were only completed for three students. Please see the Appendix for a copy of the rubric. Assessment of the thesis primarily

incorporates Outcomes (e) and (f), although some other student outcomes are also listed on the rubric. Outcomes (e) and (f) are the most important and most frequent outcomes on the rubric. To simplify the results, the average scores on the rubrics for all items mapped to Outcomes (e) and (f) and for all three students were calculated. This includes average scores from multiple evaluators as well (2 for one student, 3 for other two students but each student weighed equally). The results are as follows:

- Outcome (e) Average 8.05 / 10.
- Outcome (f) Average 8.04 / 10.

The target for the outcome is 80% or 8/10. In general, one student often did not meet expectations in multiple categories and one other student often exceeded expectations. However, the sample size is very small and it is dependent on the reviewers' interpretation of the rubric and the defense. Overall, the results are favorable.

3. Assessment Plan for 2016-2017 Academic Year

Similar to last previous year, there was not enough participation from faculty during the year for assessment at the graduate level. This is also the program directors fault. It seems as if the number of graduate student enrollment and the amount of applications will decrease in this academic year which will permit more time to focus on assessment. The faculty has been very concerned about the upcoming (upcoming from when this was written) ABET visit for the BSCE program. In this academic year, the program director must be more diligent in reminding the faculty to perform the assessment tasks as outlined in the 2013-2014 assessment plan for the MSCE program.

The assessment plan is shown in Table 1. In the next academic year, a total of 8 courses will be directly assessed across the five disciplines. This includes ECE 5773 and ECE 5763 from structural engineering, ECE 5343 from environmental engineering, ECE 5523 from water resource engineering, ECE 5823 and ECE 5813 from transportation engineering, and ECE 6423 and ECE 5473 from geotechnical engineering. With the exception of ECE 5523 and ECE 5343, all of these classes are or will be taught by full-time faculty members. This is advantageous as it will allow faculty to firm up the assessment procedures which they can share with adjuncts in their individual concentrations. Primarily, Outcomes (a), (b), (c), and (d) will be assessed using direct assessment. Outcome (d) is the only of the four that will also be assessed using the exit interviews.

Outcome (e) (Plan, compose and integrate the verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences) requires multiple forms of assessment. Oral or verbal and graphical communication skills will be evaluated using rubrics and formal presentations as in previous years. A list of classes that are slated to have formal presentations can be found in the brochure for the MSCE program. However, outcome (e) will also be assessed using direct assessment for primarily written communication. Finally, Outcome (e) will also be assessed using the final presentation and written report (thesis or graduate project) for students completing the thesis option or graduate project option.

As shown in Table 1, there are no specific classes in which Outcome (f) will be assessed. Instead, Outcome (f) will be assessed as part of; the graduate project, as part of the thesis and thesis defense, and during exit interviews. We consider this outcome the highest level and we will anticipate that only students completed or near completion will be able to achieve the expected level of this outcome.

The specific assessment tools used for Outcomes (a-d) in each class are still being deciphered. It is known that Outcome (b) will only be assessed in ECE 5773 and a select spring course to be determined in which specialized technology is used for the class assignments. Specific tools for Outcomes (a, b, c, and d) are still being deciphered but an example is given from the program director for each outcome below; on how assessment will be performed in ECE 5773.

> *Outcome a:* Formulate and solve ill-defined engineering problems
> *Actions:* This outcome will be assessed in all courses listed in Table 1. For instance, in ECE 5773, Problem 3 of Exam 1, Problem 3 of Exam 2, and Problem 8 of the final exam will be assessed. Note: this outcome is slightly assessed for a graduate project/thesis defense as well. A higher sample size over multiple exams allows one to assess development of a student during a semester.

> *Outcome b:* Applied specialized tools and technologies
> *Actions:* This outcome will be assessed in ECE 5773 and a class to be determined spring 2017. For instance, in ECE 5773, students are required to use RISA 3D, a finite element software, to perform a nonlinear analysis following Chapter C or Appendix 7 of AISC 341. Students are also required to perform fiber models using Microsoft Excel. From these topics, there are two specific homework assignments that will be assessed to understand students' ability to apply specialized tools and technologies.

> *Outcome c:* Analyze a complex system or process
> *Actions:* This outcome will be assessed in all courses listed in Table 1. For instance, in ECE 5773, Problem 1 of Exam 1, Problem 1 of Exam 2, and Problem 2 of the final exam will be assessed. As with Outcome (a), a higher sample size over multiple exams allows one to assess development of a student during a semester.

> *Outcome d:* Design a system or process
> *Actions:* This outcome will be assessed in all courses listed in Table 1. For instance, in ECE 5773, Homework 8 which consists of a design project and Exam 2, Problems 4 and 5 will be assessed. The outcome is directly assessed after receiving exit interview responses as shown in Table 1.

The program director is responsible for motivating students to complete the exit interview responses and also for conducting the interview. The lack of participation last year was discouraging (2 students in MSCE). The program director does not want to take high measures such as holding the degree but more motivation is required.

The course coordinators have been asked to develop course purpose documents similar to that used in the department at the undergraduate level. However, several of the documents still need to be developed. The task is somewhat overwhelming due to the number of courses each course coordinator is responsible for.

Master of Construction Engineering Management

1. Assessment Plan and Summary

The student outcomes of the Master of Construction Engineering Management (MCEM) program are listed below (a-e). They have been adopted from the Body of Knowledge 2 (BOK2) promulgated by the American Society of Civil Engineers (ASCE). The outcome titles based on BOK2 are given in parenthesis.

a) *Create* appropriate processes, subsidiary plans and contract documents for incorporation into the project management plan (BOK2: Project Management)

b) *Plan, compose* and *integrate* the verbal, written, virtual and graphical components of a project and communicate them to technical and non-technical audiences (BOK2, Communication)

c) *Apply* techniques to simple public policy problems related to civil engineering projects (BOK2, Public Policy)

d) *Synthesize* case studies, experiences and lessons learned to cultivate professional and ethical conduct (BOK2, Professional and Ethical Responsibility)

e) *Apply* business and public administration concepts and process (BOK2, Business and Public Administration)

Table 1 summarizes the assessment plan for the upcoming academic year, 2016-2017. MCEM student outcomes support the university graduate learning outcomes as described in Table 1. Please refer to the second column in Table 1 to see the inter-relationship between the university graduate learning outcomes and the MCEM student outcomes.

Student assessment is conducted using the following tools:

Direct Assessment: Direct assessment of student learning is performed in selected courses each year. These courses vary from year to year and include all core courses and select "popular" electives (meaning a large amount of students generally take). Electives are generally assessed within a four year period. However, each core course is assessed at a minimum, every two years.

Presentations: Presentations are mandated in various courses. A rubric will be filled out by the course instructor evaluating the graphical and oral communication skills as well as understanding of technical content. The presentations are meant to serve one of the university graduate learning goals related to oral communication skills (copy of rubric in appendix, generic for any class).

Exit Interviews: The exit interview is used to receive a summative view of what is happening in the department and an indication of overall student satisfaction. The program director conducts exit interviews. The process includes a survey form to be filled out by students regarding their education at LTU and specific graduate student outcomes followed by a brief interview by the program director.

Table 1: Assessment Plan for the MCEM Program

University Graduate Learning Outcomes	Supporting Program Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	(a) *Create* appropriate processes, subsidiary plans and contract documents for incorporation into the project management plan (c) *Apply* techniques to simple public policy problems related to civil engineering projects (e) *Apply* business and public administration concepts and process	Direct assessment of assignments or exams in ECE 5113, ECE 5233, ECE 5923, and ECE 5273.	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	(a) *Create* appropriate processes, subsidiary plans and contract documents for incorporation into the project management plan (c) *Apply* techniques to simple public policy problems related to civil engineering projects (e) *Apply* business and public administration concepts and process	Direct assessment of assignments or exams in ECE 5113, ECE 5233, ECE 5923, and ECE 5273.	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	(d) *Synthesize* case studies, experiences and lessons learned to cultivate professional and ethical conduct	Direct assessment of assignments or exams in ECE 5113, ECE 5233, ECE 5923, and ECE 5273.	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	(b) *Plan, compose* and *integrate* the verbal, written, virtual and graphical components of a project and communicate them to technical and non-technical audiences	Direct assessment of assignments or exams in ECE 5113, ECE 5233, ECE 5923, and ECE 5273. Oral Presentation rubrics in ECE5113 and ECE 5273.	80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	(d) *Synthesize* case studies, experiences and lessons learned to cultivate professional and ethical conduct	Exit Interview	Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual

*See section 1 in the report for details on program outcome

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Tools used per the assessment plan of the previous academic year include the following:

1.   Exit Interviews
2.   Direct Assessment of all core classes and ECE 5283
3.   Course Presentations

As stated in this section, the performance of the program director and faculty with respect to assessment activities were subpar in the previous year for reasons described herein. Although more favorable assessment was performed for the MSCE program, inadequate work was performed to assess the MCEM program. The two primary full-time faculty members in charge of last year's assessment had limited time. This includes Professor John Tocco. Professor Tocco has been rigorously involved in assessment activities for the undergraduate program due to the recent ABET visit. Professor Tocco performed some direct assessment of ECE 5213 and ECE 5273 using midterm and final exams. However, oral presentation skills were not assessed.

ECE 5243 (core course) was taught by an adjunct faculty member that has since decided not to continue as an adjunct for LTU. Therefore, he was not asked to perform assessment. The program director would still like to continue to have positive relations with the adjunct in an attempt to teach online courses.

Finally, ECE 5223 and ECE 5113 were taught by Dr. Aslihan Karatas. This was Dr. Karatas first year. Overall, the program director recognized that Dr. Karatas was overwhelmed. A rubric was filled out to evaluate presentations in ECE 5113 which is discussed later.

In summary, the program director felt the last academic year was a bad year to start a thorough assessment program for the MCEM program and better contribution will be expected after the ABET visit. In general, the program director is suggesting a clean slate for the following academic year. The remainder of this section discusses the results of some assessment activities.

In regards to Item 1, email messages were sent to all MCEM students in the spring of 2016. Three students completed the questionnaire including two international students and one local student. The responses from one international student were favorable and the responses from the other were adequate. The responses from the local student were favorable but valuable comments were reported as well. It is difficult to determine appropriate scales for the responses to the questions. However, from the results, it is assumed that 2/3 of the students achieved the levels anticipated for the program. This is less than the target of 80% per Table 1 (and last year's Table 1) but it is a very small sample size.

In regards to Item 2, direct assessment was performed in ECE 5283. In order to perform this, a course purpose document was created with course objectives by the program director. The course was also assessed by the architectural engineering program. Approximately 85% of the students reached the anticipated levels for specific objectives in the course. However, in the MCEM program, certain student outcomes (See Section 1) are linked to specific courses. The program director is in need of working with the construction engineering full-time faculty in the upcoming year to link the outcomes to more specific courses. Therefore, the outcomes may be assessed more properly using the courses that are targeted in a specific year. At the same time, the overall assessment of ECE 5283 was very encouraging.

Direct assessment was performed for ECE 5213, taught fall 2015, using midterm and final exams. Overall, a sample size of 21 was used to assess the midterm and 18 was used to assess the final exam. The entire exams were used to perform the assessment. Overall, the performance in the class was subpar. For the midterm, 13 of 21 students met the expected level of achievement for a graduate level student or 62%. For the final, 6 of 18 students (33%) met the expected level of achievement. It is known that ECE 5213 is one of the two most challenging courses in the MCEM program. In addition, several of the students that did poorly on both exams originated from India. Evidence in the past 2 years has indicated that these students, on average, struggle more than the rest of the student population. Students who graduated years ago performed more efficiently. However, the result is still subpar and the program director needs to find more efficient ways to encourage students to perform favorably during the more challenging courses.

Direct assessment was performed for ECE 5273, taught spring 2016, using midterm and final exams. The assessment was similar to the assessment of ECE 5213. The entire class was analyzed for assessment purposes as was the entire exams. For the midterm, 4 of 11 students met the expected level of achievement for graduate students or 36%. For the final, 6 of 10 students (60%) met the expected level of achievement. Both of these scores are again subpar. Reasons for low scores may be linked to reasons discussed for ECE 5213 as both courses are the most challenging in the MCEM program.

In regards to Item 3, oral presentation rubrics were to be filled out for multiple courses. Only one faculty member provided the presentation rubrics at the end of the semester. This was ECE 5113. However, since the course is also offered as part of the MSCE program, the rubric for the MSCE program was used. A common student outcome for both programs is oral and written communication skills and therefore, the data can be used to assess Student Outcome (b). Considering all students and all four categories noted on the rubric (same as used for MCEM), the average score was 7.78/10 meaning that the average score "meets expectations". In general, two students brought the average scores down significantly. This does not meet the target for the outcome per Table 1 (or last year's Table 1) which states "80% should average meet expectations for oral and graphical content". Even though, the average student meets expectations, average means 50% and the desired number is 80%. The faculty in the department have agreed that rubric evaluation can be quite critical and a good target for the rubrics is 8/10. It simplifies the relationship between the rubrics and the targets and also shows that a higher percentage of students meets the expectations for a specific line item. Based on this evaluation, the results on the oral presentation were slightly inadequate but much improved in comparison to previous academic year and again, the results were significantly brought down by two students.

3. Assessment Plan for 2016-2017 Academic Year

Similar issues stated in last year's assessment report are again an issue discussed in this year's assessment report. Primarily, in order to have continuous improvement in the MCEM program, the program director and faculty must dedicate more time to perform assessment. The faculty appropriately considers the undergraduate program more critical for assessment especially to ensure ABET accreditation. The BSCE is up for accreditation this year. The program director must be more diligent in reminding the faculty to perform the assessment tasks as outlined in the 2013-2014 assessment plan.

After review of the previous academic year, the program director has decided that specific faculty is subjected to a high level of assessment duties. Therefore, the current year will be assessed by targeting

two core classes and two electives. The two core classes that will be assessed include ECE 5113 and ECE 5273 (see Table 1). The two electives that will be assessed are popular electives for graduates to take in the department and are ECE 5233 and ECE 5923 (ECE 5923 is a special topic and course number may change). The two electives are taught by faculty that are accomplished professionals and have been teaching in the department for multiple years. The two core classes are taught by full-time faculty.

Since all students are required to take core classes, only those will be assessed for oral communication skills using formal presentations. The department has decided that it is more appropriate for full-time faculty to have an idea on the expectations for oral communication. This information is also summarized in Table 1. One of these courses is being offered fall 2016 and the other is being offered spring 2017.

The program director is responsible for motivating students to complete the exit interview responses as a minimum and also for conducting the interview. The lack of participation in the last couple years has been discouraging. The program director does not want to take high measures such as holding the degree from students who don't complete the exit interview.

The course coordinators have been asked to develop course purpose documents similar to that used in the department at the undergraduate level. The course purpose documents have only been developed for ECE 5223 and ECE 5283. This will be discussed in upcoming faculty meetings.

PhD in Civil Engineering

1. Assessment Plan and Summary

The student outcomes for the PhD in Civil Engineering program are assessed primarily with research outputs only. PhD students have coursework requirements. However, the assessment of all graduate level civil engineering courses including the 6000 level courses is administered within the MCEM and MSCE programs. The primary components for assessing the PhD program are; (i) independent research (ECE 7993), (ii) proposal examination, (iii) final defense, and (iv) exit interviews. The PhD program is assessed yearly although limited output is often available.

The student outcomes associated with all civil engineering programs have been adopted from the Body of Knowledge 2 (BOK2) promulgated by ASCE. The three student outcomes specifically for the PhD program are shown below (a, b, and c). Outcome titles based on BOK2 are given in parenthesis.

> (a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined realworld need (BOK2: Experiments)

> (b) *Evaluate* a complex system or process, or evaluate the validity of newly-created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering (BOK2, Technical specialization)

> (c) *Plan*, *compose* and *integrate* the verbal, written, virtual, and graphical communication of a project to technical and non-technical audiences (BOK2, Communication)

The PhD student outcomes support the university graduate learning outcomes as described in Table 1 which outlines the assessment plan for the 2016-2017 academic year. Please refer to the second column in Table 1 to see the inter-relationship between the university graduate learning outcomes and the PhD student outcomes. Program assessment is conducted using the following methods:

Independent Research: May not be applicable for all students. It is common for a PhD student to take ECE 7993 CE Independent Research at least once in the first two years as a means to initiate research. These credits are not assessed at the master's level and need to be assessed as part of the PhD program. A rubric is filled out by the instructor in regards to student performance. The results are meant to assess early research capabilities.

Evaluation of Dissertation Research Components (i.e. Proposal Exam and Final Defense): The members of the committee are to provide their evaluations outlining the quality of the proposal as well as the dissertation and final defense using the rubric provided to them. The final defense and written report (dissertation) are the most important elements when evaluating the performance of the student.

Exit Interviews: The objective of the exit interview is to receive a summative view of what is happening in the department and an indication of overall student satisfaction. The program director conducts exit interviews. The process includes a survey form to be filled out by students regarding their education at LTU and specific graduate student outcomes followed by a brief interview by the program director.

The results of the assessment of the student outcomes are to be presented to the department faculty during the annual close loop meeting in summer. However, very minimal results needed to be discussed in the previous year due to the small number of PhD students in the program and since no students have completed the program as discussed in Section 2.

Table 1: Assessment Plan for the PhD in CE Program

University Graduate Learning Outcomes	Supporting Program Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Evaluation of Dissertation Proposal and Final Defense using a rubric Performance in ECE 7993 Independent Research is assessed	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Evaluation of Dissertation Proposal and Final Defense using a rubric Performance in ECE 7993 Independent Research is assessed	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Evaluation of Dissertation Proposal and Final Defense using a rubric Performance in ECE 7993 Independent Research is assessed	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	(c) Plan, compose and integrate the verbal, written, virtual, and graphical communication of a project to technical and non- technical audiences	Evaluation of Dissertation Proposal and Final Defense using a rubric	85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual
"LU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	(a) *Evaluate* the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) *Evaluate* the design of a complex system or process, or evaluate the validity of newly- created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering	Exit Interview	Exit interview survey, 85% of graduating students should reach the highest expected achievement level for each outcome based on BOK2.	Each Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Limited information is available to report from the previous academic year. Only one student completed an independent research course. No students completed the proposal examination, no students completed the dissertation or final defense, and since no students graduated, there have been no exit interviews.

Independent Research, Falah Al-Almery, Instructor: Keith Kowalkowski, Summer 2016 – Student performed favorably with all scores 8 or 9 out of the 10 with the exception of formatting and grammar. The instructor assisted with grammar and format over the course of the semester and with the final report that was delivered. But overall, this was done too repetitively and the PhD student showed limited improvement. In summary, the student provided adequate work for Outcomes (a) and (b) and insufficient work for Outcome (c).

3. Assessment Plan for 2016-2017 Academic Year

The program director will continue to use the same assessment techniques in the following academic year as in the previous academic year. The plan remains the same. Thus far, there is too small of a sample size to deviate from the assessment plan. It is unknown how many students will complete in the next academic year. It is assumed that at least two students will. It is likely that a least 1 student will participate in independent research, probably 2.

In general, the activities of the PhD students have been slow. Some of them continue to work on their dissertation and are taking longer than an average PhD student throughout the country due to a poor academic background. In the last assessment report, it was anticipated that as many as 3 would graduate by spring 2016 which was definitely not the case. Of the current 8 PhD students, 5 are in the stage of currently working on their dissertation and after fall 2016, all 5 will have completed their dissertation credits. However, only one is anticipated to complete by fall 2016 and as many as four could be complete by spring or summer of 2017. A more thorough assessment of the program can be performed after the completion of at least 4 students. Then, all assessment measures over the last three years can be looked at together.

As discussed in last year's assessment report, the department has struggled with some of the initial group of PhD students with respect to English skills, attitude, and their previous education. One student is about halfway complete with dissertation credits and two students are working on course work. The department is in need of new applications of students starting the PhD program as the two students that are currently working on course work are both in structural engineering.

BS in Computer Engineering

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for the BS in Computer Engineering

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	[a] An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations. [b] an ability to design and conduct experiments, as well as to analyze and interpret data. [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.	Direct assessment of student assignments in EEE3125, 3221, 3231, 3233, 4273, 4514 and 4842.	3 out of 5	Every semester.	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	[k] An ability to use the techniques, skills and modern computer engineering tools necessary for engineering practice	Direct assessment of student assignments in EEE3231, 3233, 4842.	3 out of 5	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	[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. [h] The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. [j] A knowledge of contemporary issues	Direct assessment of student assignments in EEE2214, 3124, 3233, 4273, and 4514. IAB evaluation of EEE4842 Senior Project.	3 out of 5	Every semester	Annual

COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	[g] An ability to communicate effectively	Direct assessment of student assignments in EEE1001, 3231, 4514, and 4842. LTU Core Curriculum	3 out of 5 WPE	Every semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	[a] An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations.	Direct assessment of student assignments in EEE3231, 4273, 4514, and 4842.	3 out of 5	Every semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	[g] An ability to communicate effectively [i] a recognition of the need for, and an ability to engage in life-long learning	Direct assessment of student assignments in EEE1001, 2214, 3124, 3231, 4514, and 4842. LTU Core Curriculum			Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	[e] An ability to identify, formulate, and solve computer engineering problems	Direct assessment of student assignments in EEE3233, 4514, and 4842.	3 out of 5	Every semester.	Annual
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."	[h] The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.	IAB evaluation of Senior Projects. LTU Leadership curriculum	3 out of 5	Every semester.	Annual

TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	[d] An ability to function on multidisciplinary teams	Direct assessment of student assignments in EGE1001 and EEE4842.	3 out of 5	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	[f] An understanding of professional and ethical responsibility	Direct assessment of student assignments in EEE1001 and 4842.	3 out of 5	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

In the 2015-2016 academic year, the following highlighted ECE department supporting program learning objectives (f,g,i,j) have been accessed in ECE department, which are chosen from ABET a-k outcomes. We set Metrics and Indicators as 3.0/5.0, but rubrics will be discussed and updated by all ECE faculties each semester, according to previous outcomes.

a) An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations;

b) An ability to design and conduct experiments, as well as to analyze and interpret data.

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;

d) An ability to function on multidisciplinary teams;

e) An ability to identify, formulate, and solve engineering problems;

f) **An understanding of professional and ethical responsibility;**

g) **An ability to communicate effectively;**

h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.

i) **A recognition of the need for, and an ability to engage in life-long learning**

j) **A knowledge of contemporary issues**

k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Several ECE faculty members are involved in evaluating the following outcomes:

Outcome f (Ethics): **An understanding of professional and ethical responsibility**

Assessment:
EEE1001 Intro to ECE and Survey; Evaluation:
   (1) A survey was designed and distributed to one course in each academic year in both fall and spring. Issues:
The instructor for EEE1001 is required to deliver lectures on the various bases for _systems of ethics,_ the reasons for the existence of professional codes of ethics (i.e., why practitioners of a learned profession should be held to a higher standard than the general public) and, the specific content of the IEEE Code of Ethics. These enhancements addressed Outcome f). The survey results indicates that students have an adequate understanding of the attributes and responsibilities of an engineer.
   (2) In EEE 1001 (S16), course assessment results are higher than expectations. Actions: Both survey and EEE 1001 course assessments have shown satisfied results, so no future actions are needed.
Responsibility: Survey Designer, EEE 1001 Instructor

Outcome g (Communication): **an ability to communicate effectively**

Assessment:
EEE1001 Intro to ECE, EEE 3231 Microprocessor Lab, EEE4514 Control Systems and Lab, and EEE 4842 Senior Projects;

Evaluation:
Inadequate evidence level of student attainment (<3/5). In EEE3231 (F15), the grading procedure for this semester does not allow for proper assessment of this SO and needs to be redesigned. In EEE4514 Control Systems and Lab (S16), 3 of 7 experiment report samples did clearly connect design objective with final performance. EEE1001 & EEE4842 are OK.

Issues:
In EEE 3231 (F15), Students are only required to submit lab reports, however, they were evaluated on a basis on whether it was complete and did it work correctly. The grading procedure for this semester does not allow for proper assessment of this SO. In EEE 4842 (F15), most part the senior project teams worked together efficiently and communicated their work effectively to the department committee and audience. In EEE 4514 Control Systems and Lab (S16), 3 of 7 experiment report samples did not clear make connection between design objective and final performance.

Actions:
(1) EEE 3231 needs to be redesigned, and in doing so a proper way to evaluate this criteria needs to be integrated into the curriculum.
(2) Assessment in other courses will be continued.

Responsibility: Richard Chase, Nabih Jaber (Course Coordinators)

Outcome i (Reading): **a recognition of the need for, and an ability to engage in lifelong learning**

Assessment:
EEE 3233 Microprocessor and Survey; Issues :
(1) In EEE 3233 (F15), although the topic was reinforced, the students were not tested on the material and thereby this SO is not available for assessment yet. In the later part of the semester, it will be appropriate to introduce programmer's models of newer architectures and quiz them on it. This will be determined at the end of next semester depending on course pace.
(2) EEE 3233 (S16): In final exam problem number 4 or 5, students are asked to solve a problem they have never seen before, either by interpreting an instruction, or by creating new code for a problem that was not covered in class. By not covering the material in class, students are forced to refer to the device data sheet and interpret machine instructions they have not seen before. This shows them how to handle working with new microcontrollers they may experience outside academia. The majority of students were able to search through the manual and find the information they needed, showing that they knew where and how to get the data. However, most people had problems interpreting the addressing modes and memory addressing.
(3) A survey was designed and distributed to one course in each academic year in both fall and spring. The survey results shows that students have an adequate awareness of the need for life-long learning as well as appropriate resources.

Actions: Stronger emphasis on the data sheet interpretation needs to be discussed in the earlier part of the course EEE 3233. When lectures on instruction sets begin, combine both addressing mode problems and instruction set problems as well to emphasis the fundamentals.

Responsibility: Michael Cloud (Survey Designer) and Richard Chase (Course Coordinator)

Outcome (j) *(Sustainability):* **a recognition of the need for, and an ability to engage in life-long learning**

Assessment:
EEE 4514 Control Systems and Survey (A survey was designed and distributed to one course in each academic year in both fall and spring.);
Evaluation:
(1) During the close-loop of Spring 2016, EEE 4514 Control Systems and Lab was assessed but reviewers did not see any items that addressed this outcome. During the S16 assessment meeting, EEE4514 Control Systems and Lab was assessed but reviewers did not see any items that addressed this outcome.
(2) The survey results show that students have an adequate awareness of the need for lifelong learning as well as appropriate resources. The survey results show that students are aware of broad contemporary issues such as Diversity, Copyright Law, International Collaboration, Privacy, Accessibility, Licensing Law, Globalization, Sustainability, and Governmental Regulation.
Actions: The course coordinator of EEE4514 must communicate clearly the expectations to instructors.

Responsibility: Rick Johnston (TEMP Course Coordinator), Michael Cloud (Survey Designer)

3. Assessment Plan for 2016-2017 Academic Year
In the 2016-2017 academic year the faculty will continue to evaluate the use of various rubrics and summary reporting formats.

The following student outcomes (SO) will be assessed during the 2016-17 academic year -SO **(f) (g) (h) (i)** and **(j)**:

f) An understanding of professional and ethical responsibility;
g) An ability to communicate effectively;
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
i) A recognition of the need for, and an ability to engage in life-long learning
j) A knowledge of contemporary issues

To specifically respond to the comments of this year's ABET visit, we also consider assessing SOs (b) (c) and (k). All student outcomes will be evaluated in accordance with the ECE program assessment plan shown in Table 1. This plan has been modified so that the Program learning outcomes are mapped to the newly adopted LTU Undergraduate Learning Outcomes.

BS in Electrical Engineering

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for the BS in Electrical Engineering

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	[a] An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations. [b] an ability to design and conduct experiments, as well as to analyze and interpret data. [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.	Direct assessment of student assignments in EEE3124, 3221, 3231, 3233, 4273, 4514 and 4822.	3 out of 5	Every semester.	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	[k] An ability to use the techniques, skills and modern computer engineering tools necessary for engineering practice	Direct assessment of student assignments in EEE3231, 3233, 4822.	3 out of 5	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	[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. [h] The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context. [j] A knowledge of contemporary issues	Direct assessment of student assignments in EEE2214, 3124, 3233, 4273, 4514 and 4822. IAB evaluation of Senior Project.	3 out of 5	Every semester	Annual

COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	[g] An ability to communicate effectively	Direct assessment of student assignments in EEE1001, 3231, 4514, and 4822. LTU Core Curriculum	3 out of 5 WPE	Every semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	[a] An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations.	Direct assessment of student assignments in EEE3231, 4273, 4514, and 4822.	3 out of 5	Every semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	[g] An ability to communicate effectively [i] a recognition of the need for, and an ability to engage in life-long learning	Direct assessment of student assignments in EEE1001, 2214, 3124, 3231, 4514, and 4822. LTU Core Curriculum			Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	[e] An ability to identify, formulate, and solve computer engineering problems	Direct assessment of student assignments in EEE3233, 4514, and 4822.	3 out of 5	Every semester.	Annual
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."	[h] The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.	IAB evaluation of Senior Projects. LTU Leadership curriculum	3 out of 5	Every semester.	Annual

TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	[d] An ability to function on multidisciplinary teams	Direct assessment of student assignments in EGE1001 and EEE3221.	3 out of 5	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	[f] An understanding of professional and ethical responsibility	Direct assessment of student assignments in EEE1001 and 4822.	3 out of 5	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

In the 2015-2016 academic year, the following highlighted ECE department supporting program learning objectives f,g,i,j have been accessed in ECE department, which are chosen from ABET a-k outcomes. We set Metrics and Indicators as 3.0/5.0, but rubrics will be discussed and updated by all ECE faculties each semester, according to previous outcomes.

a) An ability to apply knowledge of mathematics, science, and engineering to electrical engineering situations;
b) An ability to design and conduct experiments, as well as to analyze and interpret data.
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;
d) An ability to function on multidisciplinary teams;
e) An ability to identify, formulate, and solve engineering problems;
f) **An understanding of professional and ethical responsibility;**
g) **An ability to communicate effectively;**
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
i) **A recognition of the need for, and an ability to engage in life-long learning**
j) **A knowledge of contemporary issues**
k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Several ECE faculty members are involved in evaluating the following outcomes:

Outcome f (Ethics): **An understanding of professional and ethical responsibility** □
Assessment:
EEE1001 Intro to ECE and Survey;
Evaluation:
(1) A survey was designed and distributed to one course in each academic year in both fall and spring. Students were given a 10 item quiz presenting scenarios that could be faced by a practicing engineer.
(2) The instructor for EEE1001 is required to deliver lectures on the various bases for systems of ethics, the reasons for the existence of professional codes of ethics (i.e., why practitioners of a learned profession should be held to a higher standard than the general public) and, the specific content of the IEEE Code of Ethics. These enhancements addressed Outcome f). The survey results indicates that students have an adequate understanding of the attributes and responsibilities of an engineer.
(3) In EEE 1001 (S16), course assessment results are higher than expectations.
•   Actions: Both survey and EEE 1001 course assessments have shown satisfied results, so no future actions are needed.
•   *Responsibility:* Survey Designer, EEE 1001 Instructor

Outcome g (Communication): **an ability to communicate effectively**
Assessment:
EEE 3231 Microprocessor Lab, EEE 4514 Control Systems and Lab and EEE 4822

Senior Projects;
*   Evaluation:
(1)In EEE 3231 (F15), Students are only required to submit lab reports, however, they were evaluated on a basis on whether it was complete and did it work correctly. The grading procedure for this semester does not allow for proper assessment of this SO.
(2)In EEE 4822 (F15), most part the senior project teams worked together efficiently and communicated their work effectively to the department committee and audience.
(3)In EEE 4514 Control Systems and Lab (S16), 3 of 7 experiment report samples did not clear make connection between design objective and final performance.
*   Actions:
EEE 3231 and 4514 needs to be redesigned, and in doing so a proper way to evaluate this criteria needs to be integrated into the curriculum.

Responsibility: Richard Chase, Nabih Jaber (Course Coordinators)

Outcome i (Reading): a recognition of the need for, and an ability to engage in lifelong learning

*   *Assessment:* Faculty evaluation of EEE 4822 senior projects, EEE3233 Microprocessors, semester design project;
*   Issues :
(1) In EEE 3233 (F15), although the topic was reinforced, the students were not tested on the material and thereby this SO is not available for assessment yet. In the later part of the semester, it will be appropriate to introduce programmer's models of newer architectures and quiz them on it. This will be determined at the end of next semester depending on course pace.
(2) EEE 3233 (S16): In final exam problem number 4 or 5, students are asked to solve a problem they have never seen before, either by interpreting an instruction, or by creating new code for a problem that was not covered in class. By not covering the material in class, students are forced to refer to the device data sheet and interpret machine instructions they have not seen before. This shows them how to handle working with new microcontrollers they may experience outside academia. The majority of students were able to search through the manual and find the information they needed, showing that they knew where and how to get the data. However, most people had problems interpreting the addressing modes and memory addressing.
(3) A survey was designed and distributed to one course in each academic year in both fall and spring. The survey results shows that students have an adequate awareness of the need for life-long learning as well as appropriate resources.

*   Actions: Stronger emphasis on the data sheet interpretation needs to be discussed in the earlier part of the course. When lectures on instruction sets begin, combine both addressing mode problems and instruction set problems as well to emphasis the fundamentals.
*   *Responsibility:* Michael Cloud, Richard Chase (Course Coordinator)

Outcome (j) (Sustainability): a recognition of the need for, and an ability to engage in life-long learning

Assessment:
EEE 4514 Control Systems and Survey (A survey was designed and distributed to one course in each academic year in both fall and spring.);

Evaluation:

(1) During the close-loop of Spring 2016, EEE 4514 Control Systems and Lab was assessed but reviewers did not see any items that addressed this outcome. During the S16 assessment meeting, EEE4514 Control Systems and Lab was assessed but reviewers did not see any items that addressed this outcome.
(2) The survey results show that students have an adequate awareness of the need for lifelong learning as well as appropriate resources. The survey results show that students are aware of broad contemporary issues such as Diversity, Copyright Law, International Collaboration, Privacy, Accessibility, Licensing Law, Globalization, Sustainability, and Governmental Regulation.

Actions: The course coordinator of EEE4514 must communicate clearly the expectations to instructors.
Responsibility: Rick Johnston (TEMP Course Coordinator), Michael Cloud (Survey Designer)

3. Assessment Plan for 2016-2017 Academic Year

In the 2016-2017 academic year the faculty will continue to evaluate the use of various rubrics and summary reporting formats.

The following student outcomes (SO) will be assessed during the 2016-17 academic year -SO **(f) (g) (h) (i)** and **(j)**:

f) An understanding of professional and ethical responsibility;
g) An ability to communicate effectively;
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
i) A recognition of the need for, and an ability to engage in life-long learning
j) A knowledge of contemporary issues

To specifically respond to the comments of this year's ABET visit, we also consider assessing SOs (b) (c) and (k). All student outcomes will be evaluated in accordance with the ECE program assessment plan shown in Table 1. This plan has been modified so that the Program learning outcomes are mapped to the newly adopted LTU Undergraduate Learning Outcomes.

MS in Electrical and Civil Engineering

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MS in ECE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Objective – a	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Objectives – b and c	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Objective – d	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Objective – e	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Objective – f	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

In the 2015-2016 academic year, the following MS-ECE supporting program (a) (b) and (c) [bold items of (a)-(f)]. The relations of LTU outcomes and ECE supporting objectives can be find in Table 1 (Page 4). We set Metrics and Indicators as 3.0/5.0, but rubrics will be discussed and updated by all ECE faculties each semester, according to previous outcomes.

MSECE Supporting Program Learning Objectives:
   a) Apply and Develop knowledge of advanced topics in the field of Electrical and Computer Engineering (2015);
   b) Analyze and interpret state of the art information in the field of Electrical and Computer Engineering by using latest techniques and technologies (2015);
   c) Implement latest techniques as a project in the field of Electrical and Computer Engineering (2015);
   d) Read and review literature published in the field of Electrical and Computer Engineering (2016);
   e) Communicate effectively using written, oral, graphical and digital form(2016);
   f) Develop an awareness of professional issues, such as ethics, and lifelong learning by participation in local and national chapters of IEEE and ACM (2016)

MSECE program outcomes support the university graduate learning outcomes as described in Table 1. Please refer to column two in Table 1 to see the inter-relationship between university graduate learning outcomes and the MCE/MSCE program outcomes.
Reviews for Outcomes (a),(b) and (c) in 2015 (odd year):

Outcome a:Knowledge: Apply and Develop knowledge of advanced topics in the field of Electrical and Computer Engineering
   • *Assessment:* Faculty evaluation of assessment night
   • *Evaluation:* Assessment results indicate a 2.87 for the level of achievement on a 5.0 scale, which is lower than expected indicator of 3.0/5.0.
   • *Issue:* Most students could not define and use technical terms well in electrical and computer engineering during their presentations;
   • *Actions:* The graduate instructors will keep refining research project assignment, especially in-class group exercises when covering the topics of solving the real world problems through knowledge of the class.
   • *Responsibility:* Kun Hua

Outcome b:Analysis Analyze and interpret state of the art information in the field of Electrical and Computer Engineering by using latest techniques and technologies;

   • *Assessment:* Faculty evaluation of assessment night presentations
   • *Evaluation:* Assessment results indicate a 2.93 for the level of achievement on a 5.0 scale, which is lower than expected indicator of 3.0/5.0.
   • *Issue:* Most students didn't apply enough mathematic tools to analysis their work. Some students were assigned a topic by instructors and didn't figure out the major idea of the research paper they were presenting. For example, some of them failed to cover

the following issues (1) Why are the proposed techniques valid? (2) How to compare similar techniques? And (3) Why the chose techniques are the 'best'?

- *Actions:* More details of research guidance will be added into the handout of the graduate courses project design. Instructors are suggested to ask these questions to each students when doing the project. Ask students to be clear about what the author(s) did compared with their analysis or verification of what the author(s) did.

- *Responsibility:* Kun Hua

Outcome c:Application Implement latest techniques as a project in the field of Electrical and Computer Engineering;

- *Assessment:* Faculty evaluation of assessment night presentations
- *Evaluation:* Assessment results indicate a 2.53 for the level of achievement on a 5.0 scale, which is higher than expected indicator of 3.0/5.0.
- *Issue:* Some reports are not closely related to Electrical and Computer Engineering; Some students presented papers which have been published before 1985;
- *Actions:*

Instructors will suggested students not only report on what the author(s) did; but also explain: (1) How is the paper related to the course? (2) How did the paper develop experiments/simulations in the course? (3) Students' interests of their own. *Responsibility:* Kun Hua, Philip Olivier

3. Assessment Plan for 2016-2017 Academic Year
Follow plan as shown in Table 1.

MS in Electrical and Computer Engineering

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MS in ECE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Objective – a	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Objectives – b and c	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Objective – d	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Objective – e	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Objective – f	Thesis, Assessment Night	See Appendix	Annual	Every two years starting in 2015

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

In the 2015-2016 academic year, the following MS-ECE supporting program (a) (b) and (c) [bold items of (a)-(f)]. The relations of LTU outcomes and ECE supporting objectives can be find in Table 1 (Page 4). We set Metrics and Indicators as 3.0/5.0, but rubrics will be discussed and updated by all ECE faculties each semester, according to previous outcomes.

(1) MSECE Supporting Program Learning Objectives:

a) Apply and Develop knowledge of advanced topics in the field of Electrical and Computer Engineering (2015);
b) Analyze and interpret state of the art information in the field of Electrical and Computer Engineering by using latest techniques and technologies (2015);
c) Implement latest techniques as a project in the field of Electrical and Computer Engineering (2015);
d) Read and review literature published in the field of Electrical and Computer Engineering (2016);
e) Communicate effectively using written, oral, graphical and digital form(2016);
f) Develop an awareness of professional issues, such as ethics, and lifelong learning by participation in local and national chapters of IEEE and ACM (2016)

MSECE program outcomes support the university graduate learning outcomes as described in Table 1. Please refer to column two in Table 1 to see the inter-relationship between university graduate learning outcomes and the MCE/MSCE program outcomes.

Reviews for Outcomes (a),(b) and (c) in 2015 (odd year):

Outcome a:Knowledge: Apply and Develop knowledge of advanced topics in the field of Electrical and Computer Engineering
  * *Assessment:* Faculty evaluation of assessment night
  * *Evaluation:* Assessment results indicate a 2.87 for the level of achievement on a 5.0 scale, which is lower than expected indicator of 3.0/5.0.
  * *Issue:* Most students could not define and use technical terms well in electrical and computer engineering during their presentations;
  * *Actions:* The graduate instructors will keep refining research project assignment, especially in-class group exercises when covering the topics of solving the real world problems through knowledge of the class.
  * *Responsibility:* Kun Hua

Outcome b:Analysis Analyze and interpret state of the art information in the field of Electrical and Computer Engineering by using latest techniques and technologies;

  * *Assessment:* Faculty evaluation of assessment night presentations
  * *Evaluation:* Assessment results indicate a 2.93 for the level of achievement on a 5.0 scale, which is lower than expected indicator of 3.0/5.0.
  * *Issue:* Most students didn't apply enough mathematic tools to analysis their work. Some students were assigned a topic by instructors and didn't figure out the major idea of the research paper they were presenting. For example, some of them failed to cover

the following issues (1) Why are the proposed techniques valid? (2) How to compare similar techniques? And (3) Why the chose techniques are the 'best'?

- *Actions:* More details of research guidance will be added into the handout of the graduate courses project design. Instructors are suggested to ask these questions to each students when doing the project. Ask students to be clear about what the author(s) did compared with their analysis or verification of what the author(s) did.

- *Responsibility:* Kun Hua

Outcome c:Application Implement latest techniques as a project in the field of Electrical and Computer Engineering;

- *Assessment:* Faculty evaluation of assessment night presentations
- *Evaluation:* Assessment results indicate a 2.53 for the level of achievement on a 5.0 scale, which is higher than expected indicator of 3.0/5.0.
- *Issue:* Some reports are not closely related to Electrical and Computer Engineering; Some students presented papers which have been published before 1985;
- *Actions:*

   Instructors will suggested students not only report on what the author(s) did; but also explain: (1) How is the paper related to the course? (2) How did the paper develop experiments/simulations in the course? (3) Students' interests of their own.
   Responsibility: Kun Hua, Philip Olivier

3. **Assessment Plan for 2016-2017 Academic Year**

Follow assessment plan as shown in Table 1.

BS in Mechanical Engineering

1. Assessment Plan and Summary

See Table 1 below. Listed here is an interpretation of the second column for Table 1:
ABET Criterion 3: B.S. Mechanical Engineering Program Outcomes
Upon successful completion of the B.S.M.E. degree program, the graduate will have
a) an ability to apply knowledge of mathematics, science, and engineering;
b) an ability to design and conduct experiments, as well as to analyze and interpret data;
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;
d) an ability to function on multidisciplinary teams;
e) an ability to identify, formulate, and solve engineering problems;
f) an understanding of professional and ethical responsibility;
g) an ability to communicate effectively;
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues;
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Table 1: Assessment Plan for the BS in Mechanical Engineering

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators**	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Outcome a Outcome c Outcome e	FE style questions on final exams in EME3033, EME3133, EME3043 New Rubric Graded problems based on rubric in EGE2013, EME3013, EME4003, EGE3003, EME3123, EME4013	70% of students receive a score of 60% or higher 100% of students will score 40% or higher. 50% of students receive a score of 70% or higher	Every semester.	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Outcome k Outcome b	Evaluation of application of technology in EME 4212 and EME 4222 Exam questions on laboratory technique in EME4412	In progress. 70% of students receive a score of 60% or higher	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Outcome h N/A N/A	Evaluation of coursework in EME 4212, EME4222, and EME4252 or EME4253 EME 3023 Manf. Processes (environment and economic - part of project) EGE2233 (economic - rubric under development)	In progress Rubric Evaluation by DEMS and IAB (metric goal?) Rubric for Presentation evaluation (by industry reps, LTU instructor, current working student, alum)	Every semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Outcome g	Writing rubric will be used in EME 3043, EME4013 Oral presentation rubric will be used in EME 2011, EME4412 Graphical assignments from Dynamics, Heat Transfer, and Projects 2 reports. Presentations from EME 2011 and EME 4412.	80% of students will score 85% or higher EME4412: 80% of students receive a score of 85% or higher EME2011: 70% of students will receive a score of 70% Elements of written rubric: (80% will receive 80%) Elements of oral rubric: (80% of students will score 80%)?? Elements of new Outcome C Rubric (metric?) Projects Posters rubric being updated.	Every semester	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Outcome a	FE style questions on final exams in EME3033, EME3133, EME3043 Mathematics Dept. will be addressing this outcome too.	70% of students receive a score of 60% or higher	Every semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."					Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Outcome a Outcome b	FE style questions on final exams in EME3033, EME3043, EME3133 Exam questions on laboratory technique in EME4412 Natural Sciences Dept. will be addressing this outcome too.	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher	Every semester.	Annual
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."	Outcome h Outcome i	Third Tuesday ME or Entrepreneurial Seminars (with critique) on contemporary engineering topics in EME4212, EME4222 or EME4252, EME4253 Exit and Alumni Survey (which may be discontinued based on feedback from ABET assessor) Third Thursday ME Seminars (with exit survey) on contemporary engineering topics. Also critique in EME4212, EME4222 on required seminars.	Required attendance and completion of critique. Need metric. Assignment on engineering soln impact TBD Required attendance and completion of survey/critique	Every semester.	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Outcome d	Peer evaluations of teamwork projects in EME4212, EME4222 or EME4252, EME4253 Faculty Advisor meeting in EME4212 or EME4252 with Teamwork eval form Faculty and IAB Teamwork Eval form at final presentation	80% of students achieve a score of 70%, 80%, 75% and 75%, respectively, or higher 60% of students will achieve a score of 60% or higher 60% of students will achieve a score of 60% or higher	Every Semester	Annual

PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Outcome f	Ethics quiz (multiple choice) in EME4222 or EME4253- new quiz coming soon. Ethics case study assignment in EGE2233 Ethics/Integrity statement on final report in EME4212, EME4222 or EME4252, EME4253 (updated for NSPE)	70% of students will achieve a score of 70% or higher ? (new) Need to develop metric	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Background: For the fifth year, the department is using a rigorous data collection and closing-the-loop process. Our Assistant Department Chair, Chris Riedel, oversees our ABET Accreditation process, while Andy Gerhart coordinates our ABET work with the University's outcomes (as the department's University Assessment Committee representative).

Assessment data are collected and analyzed for all outcomes every academic year. (Note that the collection is often split between the Fall and Spring semesters.) Figure 1 below displays the data collection timeline. Note a few changes that have been made over the past four years. First EGE 1012 no longer exists. It has been eliminated from outcome f. The course has been replace by EGE 1001 for outcome i. Also for outcome d, since 2013, teamwork is no longer evaluated by the Industrial Advisory Board (IAB); the IAB has no basis to evaluate a senior project team that has worked together for 16 months at the final presentation. For 2014-2015, a new rubric was identified to evaluate teamwork, and this has been used by the senior project advisors for the past two years.

Each summer (typically in May or June), the entire ME department meets to close-the-loop on all of the data that was collected. While this is over-ambitious and not expected, it has proven to be a relatively simple and quick process that has been successful from 2012 through 2016. The department also convenes for follow-up at the commencement of the academic year, during Assessment Day, and during select department meetings throughout the academic year.

	Assessment Tools/Measures	Application	2011-2012 Fall	2011-2012 Spring	2012-2013 Fall	2012-2013 Spring	2013-2014 Fall	2013-2014 Spring	2014-2015 Fall	2014-2015 Spring	2015-2016 Fall	2015-2016 Spring	2016-2017 Fall	2016-2017 Spring
a	FE type problems on Final Exam	EME3033, EME3133, EME3043	X		X		X		X		X		X	
b	5 questions on Final Exam	EME4412		X		X		X		X		X		X
c	Faculty advisor evaluate written proposals using proposal rubric	EME3011, EME4252	X	X	X	X	X	X	X	X	X	X	X	X
c	Faculty advisor evaluate final reports using final report rubric	EME4212, EME4222, EME4252, EME4253	X	X	X	X	X	X	X	X	X	x	X	X
d	Students evaluate teammates using peer evaluation form/rubric	EME4212, EME4222, EME4252, EME4253	X	X	X	X	X	X	X	X	X	X	X	X
d	Faculty Advisor meeting with team to discuss team functionality	EME4212, EME4252	X	X	X	X	X	X	X	X	X	X	X	X
d	Faculty & IAB evaluation of teamwork at final presentation	EME4222, EME4253	X	X	X	X	X	X	X	X	X	X	X	X
e	Evaluate common final exam problem using problem solving rubric	EGE2013, EGE3003, EME4013	X		X		X		X		X		X	
e	Evaluate common final exam problem using problem solving rubric	EME3013, EME3123, EME4003		X		X		X		X		X		X
f	10 multiple choice ethics questions	EME4222, EME4253			X		X		X		X		X	
f	Case study assignment on ethics	EGE1012			X									
f	Ethics/integrity statement on final report	EME4212, EME4222, EME4252, EME4253	X	X	X	X	X	X	X	X	X	X	X	X
g	Evaluate oral presentations using presentation rubric	EME2011, EME4412	X	X	X	X	X	X	X	X	X	X	X	X
g	Evaluation of technical report writing using writing rubric	EME3043, EME4013		X		X		X		X		X		X
h	Mandatory attendance at seminar series (3 in Fall, 3 in Spring)	EME4212, EME4222, EME4252, EME4253	X	X	X	X	X	X	X	X	X	X	X	X
h	Assignment on how engineering solutions impact global, economic, environmental and societal issues	EME4212, EME4252	X	X	X	X	X	X	X	X	X	X	X	X
h	Discuss sustainability, recyclability, and disposal in final report	EME4222, EME4252, EME4253	X	X	X	X	X	X	X	X	X	X	X	X
i	Number of LTU BSME students that enroll in a graduate program at LTU	Registrar Data			X						X			
i	Number of students enrolled in a graduate program or who attended a short course, workshop, or seminar in the past two years	Alumni Survey					X						X	
i	Statement of current professional organization memberships	Exit Interview		X				X				X		
i	Statement of professional goals and plans for graduate studies	Exit Interview		X				X				X		
i	Discuss professional organizations and membership benefits	EGE1001	X	X	X	X	X	X	X	X	X	X	X	X
j	Identify and discuss a contemporary engineering issue	Exit Interview		X				X				X		
j	Mandatory attendance at seminar series (3 in Fall, 3 in Spring)	EME4212, EME4222, EME4252, EME4253	X	X	X	X	X	X	X	X	X	X	X	X
j	Attend lecture on contemporary engineering issue and write one page paper on the lecture	EME4212, EME4252	X	X	X	X	X	X	X	X	X	X	X	X
k	Fulfilled by passing EGE1102, EME2012, EME3033, EME3214													

Figure 1. – Timeline of BSME Assessment Tools to Evaluate ABET Program Outcomes

During the 2015-2016 Academic Year, the BSME curriculum was mapped to indicate where ABET outcomes were being introduced, reinforced, or emphasized. The results are shown on the following figures. Note that column 2 of Table 1 indicates which ABET Outcomes apply to each University Outcome.

KEY to Figures 2 and 3

- 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.

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 2233 Entrepreneurial Mindset for Engineers	I	I	I	I	I	I	I	I	I	I	I
EGE 3003 Thermodynamics	R	R	R	-	E	-	R	-	-	-	R
EGE 3012 Engineering Cost Analysis	R	I	-	-	R	-	-	-	-	-	R
EME 1011 Foundations of Mech. Eng.	I	I	I	I	I	I	I	I	I	I	I
EME 2011 Materials Lab	R	E	I	R	I	I	R	-	-	-	I
EME 2012 Mechanical Eng. Graphics	I	-	I	-	I	-	-	-	-	-	I
EME 3011 Introduction to Eng. Projects	R	-	R	E	E	R	E	E	-	R	R
EME 3013 Mechanics of Materials	E	I	R	-	R	-	-	-	-	-	R
EME 3023 Manufacturing Processes	R	R	R	-	R	I	R	-	-	-	R
EME 3033 Engineering Numerical Methods	R	-	-	-	-	-	-	-	-	-	E
EME 3043 Dynamics	R	R	R	-	R	I	R	I	-	I	R
EME 3123 Fluid Mechanics	E	R	R	-	E	-	R	-	-	-	E
EME 3133 Kinematics & Dynamics of Machines	E	R	E	-	E	-	-	-	-	-	E
EME 3214 Mechatronics	E	R	R	R	E	-	R	R	R	R	E
EME 4003 Design of Machine Elements	E	R	E	R	E	E	R	R	R	R	R
EME 4013 Heat Transfer	E	-	R	-	E	-	R	-	-	-	R
EME 4212 Engineering Projects 1	E	R	E	E	E	E	E	E	R	E	E
EME 4222 Engineering Projects 2	E	E	E	E	E	E	E	E	E	E	E
EME 4252 Senior Project Fundamentals	E	R	E	E	E	E	E	R	-	R	E
EME 4253 Sr. Capstone Project	E	R	E	E	E	E	E	E	-	R	E
EME 4402 Mechanics Lab	R	E	-	-	-	-	R	-	-	-	E
EME 4412 Thermal Science Lab	R	E	R	E	E	R	E	R	R	R	E

Figure 2. – Mapping of the BSME Engineering Core Classes to the ABET Outcomes

	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	

Figure 3. – ABET Outcome Assessment Mapping

As a general overview to the report on the 2015-2016 Academic Year, selecting and using appropriate rubrics has been difficult. Over the past four years, a few rubrics have proven to be outdated or multiple rubrics were being used by different faculty members for the same outcome (e.g., written reports). While a teamwork rubric is still being finalized, the writing rubric was standardized and put to use by all faculty in 2013-2014. An ME Department Rubrics Committee was formed in Fall 2012 and continues to address issues as they arise. During 2013-2014, a "rubrics folder" has been added to the department Blackboard website so that there is no confusion about which rubric is the most current to be used for assessment. Any other details of changes made to rubrics are noted below in their related outcome section. Following is a summary of our loop-closing meeting. Note that the highlighted portions of Table 1 indicate where changes have/will occurred.

Questions for each objective:
   •*Objective/Outcome:* Knowledge in Discipline
   •*Assessment:* All of those indicated in Table 1
   •*Evaluation:* All
   •*Issue:* Outcome a data from EME 3033 indicates that goals were not met for 2015-2016. The goals have not been met consistently through five cycles, because (1) a change in textbook with questions that were based upon older material, (2) concept questions as opposed to calculation problems, or (3) "all or nothing" grading of a multiple choice quiz. Even after calculation problems were given with students showing their work for 2015-2016, students did not meet the target. For the remaining courses where data are

gathered for outcome a, the metric was met and seems to be a fair representation, although EME 3133 scores have been very high. EME 3133 problems will be checked if needing updated.   The new rubric (for two years) has been working for Outcome c, and the metric has been met. Metric analysis from Outcome e indicates that targets were met. EME 4003 metrics have fluctuated over time, with some students indicating dissatisfaction with the textbook.

- *Current/Future Actions:* EME 3033 and its prerequisite (EGE 1102) will be reviewed. Non FE-style questions may be adopted. In addition, Dr. Fernandez will meet with a committee to investigate the root cause of the problem and recommend changes. EME 3133 problems will be checked if needing updated because of consistently high scores (90%+).   Review EME 4003 exam question and textbook.
- *Responsibility:* Dr. Fernandez will investigate EME 3033. EME 4003 course coordinator will review exam question and textbook.
- *University/College Support for Objective:* N/A.

- *Objective/Outcome:* Technology
- *Assessment:* All of those indicated in Table 1
- *Evaluation:* All
- *Issue:* Outcome k does not have a succinct metric; students passing the courses indicated in the table above was the metric's best measure. ABET approved of this for the past two accreditations reviews, but this measure is for a lower Bloom's Taxonomy. The University outcome is "to apply," and therefore requires a rubric with a measure. During the October 2016 ABET review, our measure was viewed as a weakness. Thus we will use a checklist to measure use of technology in Senior Projects 1 and 2 courses. Outcome b tool continues to work well. The metric had been refined multiple times between 2003 and 2010 and appears to be at the appropriate level. Loop-closing has been occurring every semester and will likely continue that sequence. Finally, it was considered that Prof. Chuck Stewart can assess MATLAB project in EME 3133 (KDM) for further application of using technology. This has been put aside for now based on the above and below actions.
- *Current/Future Actions:* Senior Projects courses 1 and 2 will have a checklist to check which technologies were applied (outcome k). Consider if EME 3133 should also be used as assessment with MATLAB assignment.
- *Responsibility:* Senior projects advisors will collect outcome k data. Dr. Riedel will track results. Dr. Gerhart collects data for outcome b.
- *University/College Support for Objective:* N/A.

- *Objective/Outcome:* Sustainability
- *Assessment:* All of those indicated in Table 1
- *Evaluation:* All
- *Issue:* For the fifth year, sustainability assessment continues to be problematic. We are awaiting results to be analyzed. ABET Outcome h, while useful, is difficult to apply a metric. A classroom session has been added to EME 4212 on sustainability and the students are being asked to elaborate on such in their project reports. The department is still considering what to do with the collected coursework, and a rubric is being pursued. In 2015-2016, only a short paragraph was written by students in senior projects about

environmental sustainability. This did not address social and economic sustainability. The class session properly addresses this, and should now be included in the project reports. For environmental and economic sustainability two assessment tools were added in two separate courses. The instructors (Dr. Ahad and Prof. Reimer) collected data from 2011-2016 but results analysis was not completed. In the past, Dr. Ahad collected data for EME 2033 Manufacturing Process and the students exceeded the target metric. Prof. Reimer has retired and data collection will commence with Prof. Mularoni in EGE 2233. Economic sustainability should be addressed in EGE 2233 and Cost Analysis courses. Cost Analysis was extensively overhauled in 2014-2015 but the professor is no longer with the university. He was to be contacted and a course committee was to convene to determine an assessment plan. This did not occur and there are no plans to do so for 2016-2017.

- *Current/Future Actions:* New section in senior project report on social, economic and environmental sustainability will be assessed. Data collection from Dr. Ahad and Prof. Mularoni should commence.
- *Responsibility:* Senior project advisors will collect data. Dr. Ahad and Prof. Mularoni should collect and assess data for EME 3023 and EGE 2233, respectively. Dr. Riedel tracks results.
- *University/College Support for Objective:* Possibly use LDR 2001 survey data for social sustainability.

- *Objective/Outcome:* Communication
- *Assessment:* All of those indicated in Table 1
- *Evaluation:* All
- *Issue:* EME4412 did not meet target in Spring 16; however 22 of the 43 students in the course were international students (non-native English speaking students). This would account for the target not being met. EME4013 did not meet target - 14 out of the 33 students were non-native English speaking students. Considering the large percentage of international students in EME4412 and EME4013, missing targets by 5-6% is not a concern. Graphical communication assessment began in 2015. The outcome c rubric covers graphical communication. Results from senior project oral presentation visual aids and their posters were to be analyzed in 2015-2016. While data was collected the results were not analyzed.
- *Current/Future Actions:* No changes for written and oral communication. Graphical data needs to be collected and analyzed.
- *Responsibility:* Course instructors will collect and analyze written and oral communication data. Graphical data will be collected and analyzed by senior project advisors. Dr. Gerhart will track "graphical" results.
- *University/College Support for Objective:* N/A.

- *Objective/Outcome:* Mathematics
- *Assessment:* All of those indicated in Table 1
- *Evaluation:* All
- *Issue:* As noted under "Knowledge in Discipline," Outcome a data collection and metric continues to be evaluated for changes. While the department is comfortable that our students are reaching acceptable proficiency in math, we do not have sufficient data to

directly support the mathematics outcome. Nonetheless, without sufficient math skills the engineering problems under assessment could not be solved.

- *Current/Future Actions:* Continue as appropriate.
- *Responsibility:* Course instructors implement the plan. Dr. Riedel tracks the results.
- *University/College Support for Objective:* The Mathematics Department may soon begin a thorough assessment within the math courses.
- *Objective/Outcome:* Reading
- *Assessment:* Not assessed at the department level
- *Evaluation:* N/A
- *Issue:* N/A
- *Current/Future Actions:* N/A
- *Responsibility:* Unknown
- *University/College Support for Objective:* The Humanities and Social Sciences Department has begun assessment of reading, and the ME Department would like this to continue.

- *Objective/Outcome:* Scientific Analysis
- *Assessment:* All of those indicated in Table 1
- *Evaluation:* All
- *Issue:* Outcome a needs further refinement as noted earlier. On the other hand, Outcome b data collection and metric continues to be acceptable as is. The department is comfortable that our students are reaching acceptable proficiency in scientific analysis, or more specifically, the ability to design and conduct experiments as well as to analyze and interpret data.
- *Current/Future Actions:* Continue as appropriate.
- *Responsibility:* Course instructors implement the plan. Dr. Riedel tracks the results.
- *University/College Support for Objective:* The Natural Science Department should have an assessment plan for University Physics and University Chemistry with results available for the ME Department.

- *Objective/Outcome:* Leadership
- *Assessment:* All of those indicated in Table 1
- *Evaluation:* All
- *Issue:* For the most part, the Leadership outcome is being assessed by the Leadership Program Assessment Team (Dr. Gerhart, Assistant Provost Jim Jolly, and Director Brian Craigo). Nonetheless, Outcome h may also address leadership and continues to be investigated by the department. This includes a critique that senior projects students write after attending an "Entrepreneurial Series Lecture" and we are adding our "Third-Tuesday Seminars." Unfortunately the Entrepreneurial Lectures have been discontinued, but they are all on video. These are a viewing assignment for senior projects students. The metric for the critique was to be decided during the summer of 2014, but no final decision has been made. Finally it should be considered to use LDR 3000 and LDR 4000 (portfolios) to assess leadership.
- *Current/Future Actions:* Continue as appropriate. Investigate if outcome h has appropriate leadership assessment.

•*Responsibility:* Leadership Assessment Team continues to collect data. It will be assessed as the need arise (last done in 2015). Senior Projects Advisors will investigate outcome h lecture series assignment.

•*University/College Support for Objective:* Leadership Assessment Team needs to continue as appropriate.

•*Objective/Outcome:* Lifelong Learning

•*Assessment:* All of those indicated in Table 1

•*Evaluation:* All

•*Issue:* Outcome i does not map to the university goals in a meaningful way (i.e., without being forced). The department has therefore added a row to the table. Metrics from Exit Surveys of seniors had been met with one exception in Spring 2016. This may be due to small sample size variation. Also, the question phrasing was changed for 2015-2016 from "do you feel" to "where do you see yourself." (In other words, changed from a yes or no answer to more detailed descriptions.) This question will have further changes. For better return rates (i.e., bigger sample), the exit survey will be administered in EME 4212. In addition, a tool/survey for our "Third-Tuesday Seminars" has not been finalized. Finally, the required seminar attendance and critique assignment may be used for this outcome.

•*Current/Future Actions:* Change exit survey question from "Where do you see yourself professionally…" to "State your professional goals…." Administer exit survey in EME 4212.

•*Responsibility:* Dr. Riedel implements the plan and tracks the results.

•*University/College Support for Objective:* N/A.

•*Objective/Outcome:* Teamwork

•*Assessment:* All of those indicated in Table 1

•*Evaluation:* All

•*Issue:* For outcome d, the students are meeting the recently raised metrics with one exception. In third semester projects (EME 4222, "Projects 2") the low scores are a reflection of a lack of rigor in Projects 1, and some project students lacking substantial contribution in their final semester. It was determined that ~50% of the students are doing the work (which is not atypical in team projects).

•*Current/Future Actions:* Teamwork is being more heavily addressed by the project faculty advisors with harsher penalties for non-participation. 2016-2017 data will be critically analyzed.

•*Responsibility:* Course instructors/advisors implement the plan. Dr. Riedel tracks the results.

•*University/College Support for Objective:* N/A.

•*Objective/Outcome:* Ethics

•*Assessment:* All of those indicated in Table 1

•*Evaluation:* All

•*Issue:* Outcome f results reveal that nearly all students meet the target. While the metric may be too low, that does not solve the issue that 90% to 100% of student meet target.

A new Ethics tool was investigated in 2014 that potentially is more in-depth without obvious answers. It was not. Dr. Riedel, Dr. Yee, and Dr. Gerhart will investigate further and find new questions. Prof. Tocco and Dr. Carpenter may have a new test, and if so, it will be reviewed for possible questions. In addition, an ethics statement could be analyzed on senior projects reports, but this may be an unlikely/unreliable tool and metric. As a trial, a statement made by the students will be included in their report which is related to the Professional Engineering Code of Ethics. Prof. Tocco (of Civil Engineering) has an ethics classroom module that should be implemented in Senior Projects courses (or EGE 2233).
The department is considering college-wide ethics assessment should be performed in EGE 1001 since two class periods (with a written paper) are focused on ethics.

- *Current/Future Actions:* Contact Prof. Tocco and make decision on ethics assignments (quiz and module). Include statement relating project to Professional Engineering Code.
- *Responsibility:* Course instructors implement the plan. Dr. Riedel tracks the results.
- *University/College Support for Objective:* EGE 1001 instructors to send results of ethics assignment. A metric should be developed with an assessment tool.

Other Assessment: ABET outcome j (contemporary issues) is not used in the University Outcomes. We have continued analysis in senior projects, and added Mechatronics course data in 2015-2016. The paper for the assessment tool was having students listen to invited speakers that were part of the Entrepreneurial Lecture series. This lecture series was discontinued in Fall 2014 so it was decided to use EME3214 for assessment. Target was very low in Sp 16. There were three students who plagiarized their paper. In addition, students did not have properly formatted papers and did not fully develop their paper (papers were rather short and lacking details). Actions: Keep assessment in EME3214 but need to make assignment very clear to students with regard to format and content.

3. Assessment Plan for 2016-2017 Academic Year

- *Objective/Outcome:* Knowledge in Discipline
- *Actions:* EME 3033 and its prerequisite (EGE 1102) will be reviewed. Non FE-style questions may be adopted. In addition, Dr. Fernandez will meet with a committee to investigate the root cause of the problem and recommend changes. EME 3133 problems will be checked if needing updated because of consistently high scores (90%+). Review EME 4003 exam question and textbook.

- *Objective/Outcome:* Technology
- *Actions:* Senior Projects courses 1 and 2 will have a checklist to check which technologies were applied (outcome k). Consider if EME 3133 should also be used as assessment with MATLAB assignment.

- *Objective/Outcome:* Sustainability
- *Actions:* New section in senior project report on social, economic and environmental sustainability will be assessed. Data collection from Dr. Ahad and Prof. Mularoni should commence. Cost Analysis course should be included in plan.

- *Objective/Outcome:* Communication

•*Actions:* No changes for written and oral communication. Graphical data needs to be collected and analyzed. (Check also for EME 2011 and EME 3043 for graphical communication in reports.)

•*Objective/Outcome:* Mathematics
•*Actions:* Continue with no changes.

•*Objective/Outcome:* Scientific Analysis
•*Actions:* Continue with no changes.

•*Objective/Outcome:* Leadership
•*Actions:* Investigate if outcome h has appropriate leadership assessment. Otherwise, continue with no changes.

•*Objective/Outcome:* Lifelong Learning
•*Actions:* Change exit survey question from "Where do you see yourself professionally…" to "State your professional goals…." Administer exit survey in EME 4212.

•*Objective/Outcome:* Teamwork
•*Actions:* Teamwork is being more heavily addressed by the project faculty advisors with harsher penalties for non-participation. 2016-2017 data will be critically analyzed.

•*Objective/Outcome:* Ethics
•*Actions:* Contact Prof. Tocco and make decision on ethics assignments (quiz and module). Include report statement relating senior project to Professional Engineering (NSPE) Code.

BS in Industrial Engineering
1. Assessment Plan and Summary
Figure 1 and Table 1 shows the details of the assessment plan for Bachelor of Science in Industrial Engineering (BSIE) program. LTU undergraduate learning outcomes are related to program learning objectives which are ABET program outcomes. Various assessment tools and metric/indicators are used. Table 1 depicts timelines for data collection, analysis and closing the loop. An assessment plan and data collection for selected BSIE courses is given. Some outcomes will be direct assessment and some will have indirect assessment.

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

Figure : Assessment Plan of BSIE Selected Courses

Listed here is an interpretation of the second column for Table 1:

ABET Criterion 3: B.S. Industrial Engineering Program Outcomes

Upon successful completion of the B.S.I.E. degree program, the graduate will have

l) an ability to apply knowledge of mathematics, science, and engineering;

m) an ability to design and conduct experiments, as well as to analyze and interpret data;

n) 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;

o) an ability to function on multidisciplinary teams;

p) an ability to identify, formulate, and solve engineering problems;

q) an understanding of professional and ethical responsibility;

r) an ability to communicate effectively;

s) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;

t) a recognition of the need for, and an ability to engage in life-long learning

u) a knowledge of contemporary issues;

v) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Table 1: Assessment Plan for the BS in Industrial Engineering

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators**	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Outcome a Outcome c Outcome e	Graded problems based on rubric in EIE 3353, EIE 4453, EIE 3043, EIE 3123 Rubric used for reports in senior projects sequence. Graded problems based on rubric in EIE 3043, EIE 3123, EIE 3453, EIE 3753, EIE 4553	70% of students receive a score of 60% or higher 100% of students will score 40% or higher. 50% of students receive a score of 70% or higher	Every semester.	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Outcome k Outcome b	Evaluation of assignments in EIE 3353, EIE 2012, EIE 4013, EIE 3043 Exam questions on human factors	Identifying assignments to use for each course. In progress. 70% of students receive a score of 60% or higher	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Outcome h	Evaluation of coursework in, EIE 4252 or EIE 4253 EIE 4013 (environment and economic - part of project)	In progress Rubric Evaluation by DEMS and IAB (metric goal?)	Every semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Outcome g	Writing rubric will be used in EIE 3043, EIE 3453 and EIE 4013 Oral presentation rubric will be used in EIE 3043, EIE 3453, EIE 3753, EIE 4013 Graphical assignments and presentations from EIE 3043, EIE 3453, EIE 3753, EIE 4013. Presentations from EIE senior design projects.	80% of students will score 85% or higher EME4412: 80% of students receive a score of 85% or higher EME2011: 70% of students will receive a score of 70% Elements of written rubric: (80% will receive 80%) Elements of oral rubric: (80% of students will score 80%)?? Elements of new Outcome C Rubric (metric?) Projects Posters rubric being updated.	Every semester	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Outcome a	Evaluation of coursework in in EIE 3353, EIE 3653, EIE 4453 Mathematics Dept. will be addressing this too.	70% of students receive score of 60% or higher	Every semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."					Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Outcome a Outcome b	Evaluation of coursework in EIE 3043, EIE 3123, EIE 3353, EIE 4453, EIE 3653 Natural Sciences Dept. will be addressing this too.	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher	Every semester.	Annual
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."	Outcome h Outcome i	IE Seminar Series, Third Tuesday ME or Entrepreneurial Seminars (with critique) and / or workshops on contemporary engineering topics in EIE 4252, EIE 4253 Exit Survey IE and Smart Manufacturing Seminar and workshop. Third Thursday ME Seminars (with exit survey) on contemporary engineering topics. Also critique in EIE 4252, EIE4253 on required seminars.	Required attendance and completion of critique. Need metric. Assignment on engineering soln impact 50% will have membership in at least one prof. society. 50% will state two professional goals to achieve in 2-5 years.	Every semester.	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Outcome d	Peer evaluations of teamwork projects in EIE 4252, EIE 4253 Faculty Advisor meeting in EIE 4252 or EIE 4253 with Teamwork evaluation form Faculty Teamwork Evaluation form after final presentation	80% of students achieve a score of 70% or higher 60% of students will achieve a score of 60% or higher 60% of students will achieve a score of 60% or higher	Every Semester	Annual

PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Outcome f	Ethics quiz (multiple choice) in EIE 4252 or EIE 4253 Ethics case study assignment in EIE 4553 Ethics/Integrity statement on final report in EIE 4252, EIE 4253	70% of students will achiev a score of 70% or higher	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

For the first time, a rigorous data are collected for BSIE program. Dr. Ahad Ali, program director of BSIE program is coordinating it. Previously BSIE program shares information and data collection with the ME program due to low enrollment. Now we have a good number of BSIE students. Some data were collected during academic year of 2015-2016 for the following courses: EIE 1011 - Foundations of Industrial Engineering, EIE 3123 - Plant Layout, EIE 3353 Operations Research Techniques, EIE 4013 - Work Design and Measurement, EIE 4553 - Occupational Ergonomics and EIE 4252 - Senior Project Fundamentals. Small sample sizes were used. Some outcomes were measured. However it was not properly linked to A-K of ABET outcomes since ABET version of the Syllabi was not available. Now ABET versions of the syllabi are being added with the specific course outcomes with respect to A-K criteria. In the 2016-2017 academic year, more core courses will be added for basement.

The program name has been changed to BSIE (Bachelor of Science in Industrial Engineering) which will be consistence with other engineering programs at LTU. The program has a new director (Dr. Ahad Ali) from Fall 2015. New pre-fix is added for industrial engineering program course as "EIE". Three new IE courses (EIE 3043 - Production, Planning & Control, EIE 3123 - Plant Layout and EIE 4013 - Work Design and Measurement) are added in the program curriculum. There were four and two credit courses in the program. Four credit courses were revised to 3 credit courses (EIE 3353 - Operations Research Techniques and EIE 4453 - Applied Operations Research) and two credit course is changed to 3 credit course (EIE 4553 - Occupational Ergonomics). A benchmark visit for Wright State University and Kettering University were arranged. LTU has joined as a member of the CIEDAH (Council of Industrial Engineering Department Academic Head). For the first time a student chapter for Institute of Industrial and Systems Engineers (IISE) is established.

- *Objective/Outcome:* Knowledge in Discipline
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* Outcome a data from EIE 3123, EIE 3353, EIE 4013, and EIE 4553 were collected. We have small sample sizes. It indicates that goals were met. Some more and bigger sample sizes will be collected in coming semesters.
- *Responsibility:* Course instructors implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Technology
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* Outcome k was measured for EIE 3353 for LINDO software usage. However other software usages will be measured for other courses.
  Responsibility: Course instructors implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Sustainability
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* Sustainability data was collected however it was integrated with BSME students. Next time the data will be separated for BSIE students.
- *Responsibility:* Course instructors implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Communication
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* Outcome g covers all three forms of communication (written, oral, graphic). A writing rubric was used. All were collected from the project reports and presentation of EIE 3123, EIE 3353, EIE 4013, EIE 4553 and EIE 4252.
- *Responsibility:* Course instructors and senior project advisors; Dr. Ali tracks the results.

- *Objective/Outcome:* Mathematics
- *Assessment:* See Table 2
- *Evaluation:* All (and soon, Mathematics Department)
- *Issue and Actions:* Mathematics outcome was collected from EIE 3353 Operations Research Techniques. It has meet the target mentioned in the assessment plan. Again sample sizes were small. More data will be collected in coming semesters.
- *Responsibility:* Course instructors implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Scientific Analysis
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* Outcome a and Outcome b data are collected for some scientific analysis. More rigorous data will be collected in the academic year of 2016-2017.
- *Responsibility:* Course instructors implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Leadership
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* For the most part, the Leadership outcome is being assessed by the Leadership Program Assessment Team (Dr. Gerhart, Assistant Provost Jim Jolly, and Director Brian Craigo). Nonetheless, Outcome h may also address leadership. This includes a critique of Entrepreneurial Series Lecture, Third-Tuesday Seminars and IE Seminar Series. The metric for the critique was used based on the BSME criteria.
- *Responsibility:* Course instructors implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Lifelong Learning
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* IE Seminar Series, Smart Manufacturing Workshops, and Third Tuesday ME Seminars with be used for lifelong learning criteria. Initial data shows that students can see a broader learning from it.
- *Responsibility:* Course instructors and Dr. Ali implement the plan; Dr. Ali tracks the results.

- *Objective/Outcome:* Teamwork
- *Assessment:* See Table 2
- *Evaluation:* All

- *Issue and Actions:* Senior Design Fundaments project is used to evaluate team performance. We had only one team. It seems, the team worked effectively for the project. More senior design team and course team data will be collected. A new rubric will be used for industrial engineering projects.
- *Responsibility:* Faculty advisors/students implement the plan; Dr. Ali with assistance will find a new rubric and tracks the results.

- *Objective/Outcome:* Ethics
- *Assessment:* See Table 2
- *Evaluation:* All
- *Issue and Actions:* Outcome f was collected from ethics assignment of EIE 4252. It seems nearly all students meet the target. Ethics will be added as part of the foundation of industrial engineering course and evaluated.
- *Responsibility:* Course instructors implement the plan; Dr. Ali tracks the results.

3. Assessment Plan for 2016-2017 Academic Year

•*Objective/Outcome:* Loop closing
•*Actions:* Data will be collected as mentioned in the course assessment planning. It will be evaluated to verify the learning outcome targets

Loop closing for the first time is plan for summer 2016. Following courses will be used for the assessment of the academic year of 2016-2017.

Fall 2016
EIE 2012 Engineering Graphics
EIE 3023 Industrial Manufacturing Processes
EIE 3043 Production, Planning & Control
EIE 4453 Applied Operations Research
EIE 4653 Industrial & Engineering Finance
EIE 4253 Sr. Capstone Project

Spring 2017
EIE 2012 - Engineering Graphics
EIE 3023 - Industrial Manufacturing Processes
EIE 3033 - Engineering Numerical Methods
EIE 1011 - Foundations of Industrial Engineering
EIE 3453 - Statistical Methods for Process Improvement
EIE 3653 - Stochastic Modeling
EIE 3753 - Simulation in System Design

BS in Robotics Engineering

1. **Assessment Plan and Summary**

Table 1 provides a mapping of the university-wide undergraduate learning outcomes to the BSRE program-specific learning outcomes, in addition to the corresponding assessment techniques, metrics, and loop closing information that has been identified to date. The BSRE program learning outcomes, which were adopted from the a through k ABET engineering outcomes are:

a) an ability to apply knowledge of mathematics, science, and engineering,
b) an ability to design and conduct experiments, as well as to analyze and interpret data,
c) an ability to design a robotic system, component, or process to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
d) an ability to function on multidisciplinary teams,
e) an ability to identify, formulate, and solve engineering problems,
f) an understanding of professional and ethical responsibility,
g) an ability to communicate effectively,
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
i) a recognition of the need for, and an ability to engage in life-long learning,
j) a knowledge of contemporary issues, and

an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Table 1: Assessment Plan for the BS in Robotics Engineering

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators**	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Outcome a	FE style questions on final exams in EME3043	70% of students receive a score of 60% or higher	Every semester.	Annual
		FE style questions on final exams in ERE2024 and ERE3024	70% of students receive a score of 60% or higher		
	Outcome c	Rubric used to evaluate final reports in senior projects sequence	100% of teams will score 75% or higher		
		Rubric used to evaluate final reports in ERE4014	80 % of teams will score 70 % or above		
	Outcome e	Graded problems using a rubric in EGE2013 and EME3013	50% of students receive a score of 70% or higher		
		Graded problems using a rubric in ERE3014	60% of students receive a score of 70% or higher		
		Graded problems using a rubric in ERE4014	70% of students receive a score of 70% or higher		
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Outcome k	Term project grade in ERE3114 Rubric to grade take-home MATLAB assignment in ERE4113 Term project grade in ERE2024 Term project grade in ERE3024	Identifying assignments to use for each course. In progress. 70 % of students will score 80 % or above	Every semester	Annual
	Outcome b		75 % of students will score 70 % or above		
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Outcome h	Rubric to score paper in EME4252 Rubric to score entrepreneurial assignment in ERE3024	50 % of students will score 70 % or above	Every semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Outcome g	Writing rubric used for technical paper in EME 3043 Writing rubric used for technical paper in ERE3024 Oral presentation rubric used in ERE4014 Oral presentation rubric used in EME4253	50% of students will score 80% or higher 70% of students will score 80% or higher 70% of students will score 80% or above	Every semester	Annual

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Outcome a	FE style questions on final exams in EME3043 FE style questions on final exams in ERE2024 and ERE3024	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher	Every semester	Annual
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Not assessed in program (Assessed in LTU Core Curriculum)				Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Outcome a Outcome b	FE style questions on final exams in EME3043 FE style questions on final exams in ERE2024 and ERE3024 Term project grade in ERE 2024 Term project grade in ERE 3024	70% of students receive a score of 60% or higher 70% of students receive a score of 60% or higher 70 % of students will score 70 % or above 75 % of students will score 70 % or above	Every semester.	Annual
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."	Outcome h	Third Tuesday ME or Entrepreneurial Seminars (with critique) on contemporary engineering topics in EME4252, EME4253	Required attendance and completion of critique. Need metric.	Every semester.	Annual
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Outcome d	Peer evaluations of teamwork projects in EME4252 and EME4253 Faculty Advisor meeting in EME4252 with Teamwork evaluation form Faculty and IAB teamwork evaluation at final presentation	80% of students achieve a score of 75% or higher 60% of students will achieve a score of 60% or higher 60% of students will achieve a score of 60% or higher	Every Semester	Annual

PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Outcome f	Ethics quiz (multiple choice) in EME4253	70% of students will achieve a score of 70% or higher Need to develop metric	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Assessment data for all program learning objectives is collected and analyzed every academic year as detailed in Table 1. The review of the assessment process and data are performed in two different forums: the yearly Department of Mechanical Engineering close-the-loop meeting, and the yearly Mechatronics and Robotics Curriculum Committee (MRCC) close-the-loop meeting. The MRCC is responsible for reviewing the assessment data from all ERE-coded classes to decide on continuous improvement actions or changes to the assessment plan for the Program. Any major curriculum changes proposed by the committee are passed on to the Department of Mechanical Engineering faculty meetings for approval.

The details of the Department close-the-loop meeting results can be found in the BSME portion of the report. Below is a summary of the MRCC close-the-loop meeting broken down by program outcome.

> ➢ **Outcome a (ERE2024)**: Students met the target for the second year in a row since the solid mechanics curriculum change. (Kfoury) Students demonstrate stronger background in statics and dynamics in the class than previous years.
> ➢ **Outcome a (ERE3024):** The target was not met for this class (first time since assessment started). No action will be taken (could be just anomaly in the data). Wait to see if target will not be met again next cycle.
> ➢ **Outcome b (ERE 2024 and ERE3024):** Students met the target in both classes. Develop a rubric for more consistent evaluation of the specific components of the experiment. This will improve the resolution and possibly the quality of the assessment data.
> ➢ **Outcome c (ERE3014):** Target not met. First cycle of assessment in the class. Only class where projects are individual rather than team based. **Discussion:** heavy workload for the term project and other classes may have contributed to the result since this is an individual project. Students who did not meet the target were missing one of the deliverables or did not have a working prototype at the end of the semester. **Actions:** Less lab assignments during the class. Develop a new oral presentation rubric that focuses more on the design aspects of the project.
> ➢ **Outcome c (ERE4014):** The two teams met the target. Continue with the assessment activity but use the new rubric that will be developed for grading.
> ➢ **Outcome d (ERE3024):** Students met the target (first cycle of assessment in this class). Actions for next cycle: review data for the capstone project sequence to look for improvement in teamwork evaluation, and data in ERE3024 to look for repeatability.
> ➢ **Outcome e (ERE3014 and ERE4014):** Students met the targets in both classes. No action to be taken.
> ➢ **Outcome f:** Need to consider other classes to assess ethics. **Discussion:** EGE 1001 Fundamentals of Engineering Design Projects has module on ethics (module currently graded as homework assignment). Ethics in robotics engineering is discussed informally in ERE2024 Unified Robotics I. Develop formal module and grading rubric as an additional tool to measure the level of attainment of Outcome f.
> ➢ **Outcome g (ERE3024 and ERE4014):** Students met targets for all classes. Data shows students achieving targets at different levels during the program. No actions taken.

- ➤ **Outcome h (ERE3024):** Students met the target in the class. Explore using individual assignments to make it more efficient to assess individual efforts.
- ➤ **Outcome i:** Only one of the two graduates was a member of a professional society. **Discussion:** Change in EGE1001 and EME1011 took effect after the two graduates took the classes. **Actions:** have more targeted talks in EME1011 towards BSRE students, discuss robotics activities in different professional societies, consider requiring students in senior capstone projects to be members of a professional society.
- ➤ **Outcome j:** Both graduates met the target in the exit survey. **Discussion:** Need an alternative for the contemporary issues paper in the projects class. **Actions:** introduce a paper in ERE4014 starting in the fall 2016 semester that discusses contemporary issues in robotics engineering with a rubric for scoring the paper.
- ➤ **Outcome k (ERE3114):** Target was not met in ERE3114. Some students did not submit the MATLAB portion of the project. **Action:** add a direct assessment activity for use of 3D printers and CNC machines in ERE4014.

3. **Assessment Plan for 2016-2017 Academic Year**

Please refer to the BSME section of the report on plans for EME and EGE classes. In addition to items listed in the previous section, a comprehensive review of the assessment plan will be conducted this year following the conclusion of the ABET accreditation process.

MS in Mechanical Engineering
  1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MS in ME

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Students will learn and apply advanced mechanical engineering principles and theories.	EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations I. Common final exam problem which is scored using a rubric.	80% of students will score 85% or better on the common final exam problem	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Students will refine their analytical and problem solving skills.	EME 5363Transport Phenomena II or EME 5153 Applied Thermodynamics and EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations I. Analysis and interpretation, using an assigned design project.	80% of students will score 85% or better in analysis and interpretatio n.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Students will be able to evaluate technical engineering publications.	EME 5353 Transport Phenomena I or EME 5153 Applied Thermodynamics Evaluation of a peer reviewed technical paper which is scored using a rubric.	80% of students will score 85% or better for their overall evaluation.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Students will be able to effectively communicate technical information.	EME 5363Transport Phenomena II or EME 5153 Applied Thermodynamics and EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations I. Written report and oral presentation of a technical paper which is scored using a rubric.	80% of students will score 85% or better for written, oral and graphical communication.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Students will understand the importance of lifelong learning and the professional and ethical responsibilities of the engineering profession.	Survey of graduating MSME students	All students will be able to explain the importance of lifelong learning and professional responsibilities	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Outcome 1: Advanced knowledge in discipline
Assessment: See Table 1
Results: 100% of the students met the target (34/34)
Issues and Actions:
      This objective was assessed for the first time in Spring 2016 in EME 5153, Applied Thermodynamics. A common problem was asked for students to solve in the final exam. Students worked on the problem individually during the exam.

Outcome 2: Analytic and problem-solving skills
Assessment: See Table 1
Results: 72% of the students met the target (25/34)
Issues and Actions:
      This objective was assessed for in Spring 2016 in EME5153 Applied Thermodynamics. Students were assigned a design project, where the analytical and problem solving skills were assessed by using rubrics. This task was assigned as a project which was 15% of their total grade and the students worked in teams of 3 and 4.

Outcome 3: Evaluate technical publications
Assessment: See Table 1.
Results: 87% of the students met the target (27/31)
Issues and Actions:
      This objective was in Spring 2016 in EME 5353Transport Phenomena I. Students were asked to find experimental or computational journal papers on the field of momentum transport phenomena, evaluate and study and discuss the recent advances in this field. This task was assigned as a project which was 15% of their total grade and the students worked in teams of 2 and 3.

Outcome 4: Effective communication-written
Assessment: See Table 1.
Results: 83% of the students met the target (29/35)
Issues and Actions:
      EME5153 Applied Thermodynamics course in Fall 2015 is used to evaluate this outcome. Communication skills in written, were assessed in the same project in the previous outcome 2. Rubrics were used to score the written reports. Reports were graded by the instructor. Due to the class population and time restriction, oral communication skills could not be assessed in this project.

Outcome 4: Effective communication-oral
Assessment: See Table 1.
Results: 100% of the students met the target (35/35)
Issues and Actions:
      EME5153 Applied Thermodynamics course in Fall 2015. Students were assigned a design project, which was 15% of their total grade and the students worked in teams of 3 and 4. Communication skills in oral, were assessed in this project in. Rubrics

were used to score the oral presentation of their reports. Students evaluated each other on the presentations and the instructor had no input on it.

Outcome 5: Lifelong learning, responsibilities
Assessment: See Table 1
Results: Incomplete
Issues and Actions:
Graduate student exit survey has not been deployed yet.

3. Assessment Plan for 2016-2017 Academic Year

The assessment plan will be carried out as planned (see Table 1).
The assessment in the solids track will focus more on the EME 5213 Mechanical Vibrations I and EME5333 Advanced Dynamics, since these courses currently are being taught by a full time faculty. The table is modified accordingly. Also, 5000 level courses can be taken both by seniors in the BSME program and MSME students, next assessment term, the seniors will be excluded from the results. The rubrics will be altered to address the changes in the assessment methodology.

Outcome 1: Advanced knowledge in discipline
Assessment: See Table 1
Issues and Actions:

This objective will be assessed in Fall 2016 in EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations I and in Spring 2017 in EME 5153 Applied Thermodynamics or EME5353 Transport Phenomena I. A common final exam problem will be assigned to the students and scored using rubrics.

Outcome 2: Analytic and problem-solving skills
Assessment: See Table 1
Issues and Actions:

This objective will be assessed in Fall 2016 in EME 5363Transport Phenomena II or EME 5153 Applied Thermodynamics and in Spring 2017 in EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations I.
A design problem will be assigned to the students as a part of their work load.
Detailed rubrics for grading are being developed.

Outcome 3: Evaluate technical publications
Assessment: See Table 1
Issues and Actions:
This objective will be assessed in Spring 2017 in EME 5353Transport Phenomena I a journal paper will be assigned to the students to evaluate and scored using rubrics.

Outcome 4: Effective communication
Assessment: See Table 1
Issues and Actions:

This objective will be assessed in Fall 2016 in EME 5153 Applied Thermodynamics or EME 5363 Transport Phenomena II and in Spring 2017 in EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations I. A design problem or a journal paper will be assigned to the students to analyze and present.

Outcome 5: Lifelong learning, responsibilities
Assessment: See Table 1
Issues and Actions:

The graduating MSME students will be surveyed. The survey will be developed and pursued in Spring 2017.

MS in Mechatronic Systems Engineering
   1. Assessment Plan and Summary

Table 1: Assessment Plan for MS in MSE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Students will learn and apply mechatronic engineering principles and theories.	MSE 5523 or MSE 6313 Common final exam problem which is scored using a rubric.	80% of students will score 85% or better on the common final exam problem.	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Students will develop analytical and problem solving skills for mechatronic systems.	MSE 6183 Analysis and interpretation of a peer reviewed technical paper using software which is scored using a rubric.	80% of students will score 85% or better in analysis and interpretation.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Students will be able to evaluate technical mechatronics engineering publications.	MSE 6183 Evaluation of a peer reviewed technical paper which is scored using a rubric.	Using a rubric, 80% of students will score 85% or better for their overall evaluation.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Students will be able to effectively communicate technical information.	MSE 5183/6183 Written report and oral presentation of one of the course projects which is scored using a rubric.	80% of students will score 85% or better for written, oral and graphical communication.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Students will understand the importance of lifelong learning and the professional and ethical responsibilities of the engineering profession.	EME 5323/6183 Mandatory attendance at seminars. Must also submit one page summary of each seminar which is scored using a rubric.	Must attend at least 3 seminars and receive a score of at least 85% for all summaries.	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Data was collected based on the assessment plan, as modified in 2013.

Outcome 1: Advanced knowledge in discipline
Assessment: See Table 1
Results: Fail at 15.4%
Issues and Actions:

A new, unique exam problem for EME 5323 was developed in Spring 2014 to better assess the new content of the course. The wording of the problem was modified slightly in Spring 2015 to improve readability without changes in content. The same problem was used again in Spring 2016. While the course is taken by MSMSE, MSME, BSME, and BSRE students, results are calculated based only on MSMSE students. Contrary to the assessment plan, MSE 6313 was not developed due to the instructor cancelling his teaching plan. After removing non-MSMSE students and considering the lack of expected MSE 6313 data, the total dataset was only 13 students.

I recommend that data collection continue as-is for another cycle.

Responsibility:

Implementing: James Mynderse, course coordinator
Tracking: James Mynderse, program director

Outcome 2: Analytic and problem-solving skills
Assessment: See Table 1
Results: Fail at 30.8%
Issues and Actions:

Following changes from the previous loop-closing, this objective was assessed in Spring 2014 and Spring 2015 in MSE 6183, a capstone mechatronic design course. As in Outcome 3, results were bimodal; some students attempted all required elements and performed very well while others skipped required elements. Several students made little to no attempt. I believe that combining Outcome 2 and Outcome 3 with a single assignment results in a task which is daunting to students. While it is not unreasonable to expect MS students to read technical literature, very few have been prepared for this task due to their strong industry focus and lack of interest in research.

I recommend that the assessment tool be replaced with assessment of student work in the existing capstone mechatronic design project within MSE 6183.

Responsibility:

Implementing: James Mynderse, course coordinator
Tracking: James Mynderse, program director

Outcome 3: Evaluate technical publications
Assessment: See Table 1
Results: Fail at 38.5%
Issues and Actions:

> Following changes from the previous loop-closing, this objective was assessed in Spring 2014 and Spring 2015 in a capstone mechatronic design course. As in Outcome 2, As in Outcome 3, results were bimodal; some students attempted all required elements and performed very well while others skipped required elements. Several students made little to no attempt. I believe that combining Outcome 2 and Outcome 3 with a single assignment results in a task which is daunting to students.
>
> I recommend that the assessment tool for Outcome 2 be modified which will reduce the complexity of the assignment used for assessment of Outcome 3. Given the difficulty of finding journal articles and conference proceedings at an appropriate level of difficulty for students without research experience, I also recommend that articles from the Dynamic Systems & Control insert within the ASME Mechanical Engineering magazine be considered for future assessment.

Responsibility:

> Implementing: James Mynderse, course coordinator
> Tracking: James Mynderse, program director

Outcome 4: Effective communication
Assessment: See Table 1
Results: Fail at 57.9% (oral), Fail at 71.4% (written)
Issues and Actions:

> During the 2014-2015 academic year, oral communication data was collected in MSE 6183 but not in MSE 5183. This was corrected in the 2015-2016 academic year. Written communication data was collected in all sections. Results are calculated based only on MSMSE students.
>
> Diving deeper into the data, 84% of students performed at 80% or above using the departmental oral presentation evaluation rubric. 79% of students performed at 80% or above when considering only the writing dimensions of written report evaluation rubrics. This is an improvement from the 2012-2014 assessment cycle.
>
> I recommend that data collection continue for another cycle.

Responsibility:

> Implementing: James Mynderse, course coordinator
> Tracking: James Mynderse, program director

Outcome 5: Lifelong learning, responsibilities
Assessment: See Table 1
Results: Incomplete
Issues and Actions:

> During 2014-2015, students enrolled in EME 5323 and MSE 6183 were assigned to attend LTU Research Day and write a summary of one poster or presentation. No students attended. As the event is held during business hours, this proves problematic for working students. As an alternative, during Fall 2015, students

enrolled in MSE 5183 were offered extra credit to attend the President's Symposium; 3 of 13 students attended.

I recommend that attendance at LTU Research Day and the President's Symposium continue to be encouraged, but not used for assessment purposes. I recommend that "professional issues" be assessed using a rubric to evaluate the entrepreneurially minded learning (EML) component of existing projects in MSE 5183 and MSE 6183.

Responsibility:
Implementing: James Mynderse, course coordinator
Tracking: James Mynderse, program director

3. Assessment Plan for 2016-2017 Academic Year

A revised assessment plan based on the recommendations above will be developed in 2016. A new round of data-taking will being in 2016-2017 based on the revised assessment plan. Intermediate results will be available in 2017 with loop closing beginning in 2017-2018.

MS in Automotive Engineering
  1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MS in AE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Demonstrate the ability to understand and analyze a problem by applying science, math and engineering principles to interpret data; to develop advanced knowledge to design mechanical components and systems and to recommend design changes; to verify calculations and support assumptions and recommendations.	Major design problem in EME6353 (Automotive Mechanical Systems), (e.g., brake drum crack; or final drive gear box and axle housing crack.) Use the "Developing Advanced Knowledge" rubric.	75% of the students will score 85% or better.	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Demonstrate the ability to take the collected data, understand them and plot them correctly, producing effective written communication (graphical format); to conduct understeer analysis; to summarize the understeer behavior of various vehicles and compare them insightfully.	"Understeer Gradient" project in EME5433 (Vehicle Dynamics 1). Use the "Analyze & Interpret" rubric.	80% of the students will score 85% of better.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Demonstrate the ability to review and evaluate the literature, to utilize ethical judgment and strong communication skills to contribute to the literature.	Final oral presentation or written report in EME6373 (Powertrain Systems 1). Use the "Oral Presentation Evaluation" or Report" rubrics.	75% of students will score 85% of better.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Demonstrate the ability to produce effective oral communications.	Final oral project presentation in EME6623 (Automotive Control Systems1). Use the "Oral Presentation Evaluation" rubric.	80% of students will score 85% of better.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Understand professional and ethical responsibilities of engineers, the impact of engineering solutions in a global and societal context, be aware of contemporary issues, and recognize the need for life-long learning.	Mandatory attendance at a minimum of three seminars per semester: EME5XX0 (M.E. Graduate Seminar) Students must submit a one page summary of each seminar. Use the "Graduate Seminar" rubric.	80% of the students will score 85% or better.	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

A.
- *Outcome:* LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.
- *Objective:* Demonstrate the ability to understand and analyze a problem by applying science, math and engineering principles to interpret data; to develop advanced knowledge to design mechanical components and systems and to recommend design changes; to verify calculations and support assumptions and recommendations.
- *Assessment:* The assessment tool was the major design problem in EME6353 (Automotive Mechanical Systems). Assessment was done using the "developing advanced knowledge" rubric by Dr. Shan Shih in Spring 2016.
- *Evaluation:* 86% of the students scored 85% or better. Only five of the 37 students were below 84%.
- *Issue:* The metric of "75% of the students will score 85% or better" was met.
- *Actions:* No actions were taken based on the above results.
- *Responsibility:* Dr. Kingman Yee, Director of M.S. Automotive Engineering, is responsible for implementing the plan or tracking the results.

B.
- *Outcome:* LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies.
- *Objective:* Demonstrate the ability to take the collected data, understand them and plot them correctly, producing effective written communication (graphical format); to conduct understeer analysis; to summarize the understeer behavior of various vehicles and compare them insightfully.
- *Assessment:* The assessment tool was the "Understeer Gradient" project in EME5433 (Vehicle Dynamics 1). Assessment was done using the "analyze and interpret information" rubric by Dr. Joe DeRose in Fall 2015.
- *Evaluation:* 46.6% of the students (14 out of 30) scored 85% or better.
- *Issue:* The metric of "80% of the students will score 85% or better " was not met. The quality of students in this class was poor. In the following semester (Spring 2016), 27 out of 34 (79.4%) satisfied the metric which is very close to 80%.
- *Actions:* No actions were taken based on the above results.
- *Responsibility:* Dr. Kingman Yee, Director of M.S. Automotive Engineering, is responsible for implementing the plan or tracking the results.

C.
- *Outcome:* LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature.
- *Objective:* Demonstrate the ability to review and evaluate the literature, to utilize ethical judgment and strong communication skills to contribute to the literature.
- *Assessment:* The assessment tool was the final oral presentation in EME6373 (Powertrain Systems 1). Assessment was done using the "Project Elements" rubric by Dr. Kristofor Norman in Spring 2016.
- *Evaluation:* 90% of the students scored 85% or better.
- *Issue:* The metric of "75% of the students will score 85% or better" was met.
- *Actions:* The admission requirements had been raised for students admitted for Spring 2016. This could explain the improvement from last year. No actions.
- *Responsibility:* Dr. Kingman Yee, Director of M.S. Automotive Engineering, is responsible for implementing the plan or tracking the results.

D.

- *Outcome:* LTU graduates will communicate effectively using written, oral, graphical, and digital formats.
- *Objective:* Demonstrate the ability to produce effective oral communications.
- *Assessment:* Based on the 2013-2014 assessment report, the assessment tool was changed to the final oral project presentation in EME5453 (Vehicle Crashworthiness) instead of EME6623 (Automotive Control Systems 1). Assessment was done using the "oral presentation" rubric by Dr. Pattabhi Sitaram in Fall 2015.
- 82% of the students scored 85% or better.
- *Issue:* The metric of "80% of the students will score 85% or better" was met. Twenty-four out of 34 students scored 85% or better. The results were greatly improved from the 23.8% level of Fall 2014 because Dr. Sitaram explained the rubric and the contents of a good presentation to the students prior to the due dates.
- *Actions:* No actions were taken based on the above results.
- *Responsibility:* Dr. Kingman Yee, Director of M.S. Automotive Engineering, is responsible for implementing the plan or tracking the results.

3. **Assessment Plan for 2016-2017 Academic Year**

During the 2016-2017 academic year, above assessments will continue for the fifth round.

In Fall 2016:

EME5433 (Vehicle Dynamics 1): no changes are planned.

EME5433 (Vehicle Crashworthiness): no changes are planned.

In Spring 2017:

EME6373 (Powertrain Systems 1): no changes are planned.

EME6353 (Automotive Mechanical Systems): no changes are planned.
Closing the loop will be conducted on the following learning outcomes:

A. LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.

C. LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature.

The following activity did not occur: *In Fall 2014 and Spring 2015, in a new course called "M.E. Graduate Seminar", the fifth learning outcome will be assessed for the first time: LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.*

Master of Engineering Management
1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MEM

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Students will learn and apply engineering management principles and theories.	EEM 6803 or EEM 6763 Project presentation and common final exam problem which is scored using a rubric.	80% of students will score 85% or better on the Projects & common final exam problem.	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Students will develop analytical and problem solving skills for engineering management.	EMS 7613, EEM 6753 Analysis and interpretation of a peer reviewed technical paper using software which is scored using a rubric.	80% of students will score 85% or better in analysis and interpretation.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Students will be able to evaluate engineering management publications and prepare technical papers for conferences.	EEM 6763, EEM 6583, EEM 6803 and EMS 6713 Evaluation of a peer reviewed technical papers.	80% of students will score 85% or better for their overall evaluation.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Students will be able to effectively communicate technical information in their field.	Written report and oral presentation of one of the course projects which is scored using a rubric.	80% of students will score 85% or better for written, oral and graphical communication.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Students will understand the importance of lifelong learning and the professional and ethical responsibilities of the engineering profession.	EEM 6763, EEM 6803, EEM 6583 Must present a project dealing with critical issues in industry.	Must orally present their projects to their peers and receive a score of at least 85% in their project	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

The following outcomes measured for EEM 6753 Engineering Supply Management (fall 2015), EMS 7613 Technology Management (Fall 2015) and EEM 6803 (spring 2016).

- LTU graduates will apply and in accordance with their course of study, develop advanced knowledge with their discipline.
- LTU graduates will analyze and interpret information and implement decisions using modern techniques & methodologies
- LTU graduates will evaluate recent scholarly literature and in accordance with their course of study, contribute to the literature.
- LTU graduates will communicate effectively using written, digital, graphical and oral formats.

Course projects are used assessment tool. Results were analyzed used using a scale of 1-10 (1= worst, 10 = best) from each project of each student. 85% students have scored above 8.5 out of 10 scale. There are some improvements in the application of advanced knowledge, literature review, analysis and presentation of projects. International students in the MEM program still need improvement in communication and oral presentation.

3. Assessment Plan for 2016-2017 Academic Year

The courses that are planned for fall 2016: EEM 6803 Engineering Management and EEM 6763 Quality Engineering Systems.

Master of Engineering in Manufacturing Systems
   1.   **Assessment Plan and Summary**

Table 1: Assessment Plan for MEMS

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Demonstrate analytical and problem solving proficiency in application of Mfg. Eng. solutions to Manufacturing problems Understand the roles of Manufacturing Eng. Manager in today's complex manufacturing industry, & define and provide solutions to manufacturing problems..	Administer knowledge tests in MEMS core classes: EME 6203, EME 6403, EME 6703 and EME 6583 Projects, case studies, in-class exercises and oral presentations. Using a "Systems Design" rubric in the EME 6203 course.	80% of the students receive a Score of 85% or higher	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Define and develop lean strategic production plans that will enhance product design quality, productivity and reduce manufacturing costs. Utilize tools such Excel, Word, PPT, Minitab, Arena, and DOE in coursework, and projects	Evaluate in EME 6203, EME 6703, EME 6403, using a "requirements gathering" rubric Exams, projects, case studies, in-class exercises and oral presentations.	75% of the students receive a Score of 80% or higher	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	MEMS students should have the skills to search the literature and summarize the essence of the concepts presented there Course projects and case studies.	Using a "literature search" rubric in EME 6203, EME 6703, EME 6583, Projects and case studies.	80% of the students receive a Score of 85% or higher	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Define, analyze and effectively communicate typical functional Manufacturing Systems and identify how they meet the specific needs of the industry to deliver efficiency and competitive advantage.	Using a "writing" rubric in EME 6583 and EME 6203. Projects, case studies, and in-class exercises and presentations.	75% of the students receive a Score of 80% or higher	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Understand critical ethical, social and sustainability issues in Manufacturing Engineering	Administer a case study and project in EME 6203, EME 6583 & use a "writing" rubric	80% of the students receive a Score of 75% or higher	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

The program curriculum is being absorbed in the MSME program as a concentration in manufacturing. This plan was voted on by the ME faculty and hence the MEMS program is being phased out.   Currently there are only two students in the program and after their graduation (most likely this year) the program will be discontinued.

Due to this condition the sample size for assessment can potentially be either one or at the most two and hence is insufficient for any study. Hence assessment of the MEMS program was not done last year.

3. Assessment Plan for 2016-2017 Academic Year

Follow assessment plan in Table 1.

MS in Industrial Engineering
1. **Assessment Plan and Summary**

Table 1: Assessment Plan for MSIE

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Understand and solve industrial engineering problems by selecting and applying appropriate techniques and tools	Course project evaluation rubric for the course projects of advanced optimization techniques, quality control and simulation	75% score of 3 or higher on 5 point scale.	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Utilization of Excel, Word, PPT, Bb in coursework Utilization of Minitab in QC and Simulation Courses Utilization of ARENA Software in Eng. Sys. Simulation Course Utilization of Lindo / Lingo / Solver Software for Optimization	Software usage evaluation rubric for the selected course projects and assignment contents (EME 5603, EME 6403, EME 6653)	75% score of 3 or higher on 5 point scale.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Identify and critically review the scholarly literature relevant to core course projects.	Evaluate scholarly paper review and literature review section of the course projects (EME 5603,EME 6403, EME 6653)	75% score of 3 or higher on 5 point scale.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Demonstrate the communication ability to write and present through course project presentations and reports	Project presentation and project written report evaluation rubric	75% score of 3 or higher on 5 point scale.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Analyze and assess these issues	Course project evaluation rubric on ethics / sustainability	75% score of 3 or higher on 5 point scale	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

The following outcomes are measured for EIE 6653 Advanced Optimization Techniques (Fall 2015), EMS 5603 Engineering Systems Simulation (Fall 2015), EIE 6663 Applied Stochastic Processes (Spring 2016), EME 5983 Special Topics on Lean Systems (Spring 2016) and EME 6403 Quality Control (Spring 2016).

- LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.
- LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies.
- LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature.
- LTU graduates will communicate effectively using written, oral, graphical, and digital formats.

Course project is used as assessment tool. The results were analyzed using a scale of 1-10 (1-worst, 10-best) from each project for each student. 83% students have scored above 85%. Advanced knowledge, analysis, and literature review outcomes are above the expected goals. Last year oral presentation had some concern. It has been improved, however there is still need some improvement for international students in oral communication. Informal assessment is conducted for sustainability.

3. Assessment Plan for 2016-2017 Academic Year

Three courses are planned for Fall 2016 and two courses for are planned for Spring 2017: EMS 5603 Engineering Systems Simulation, EIE 76653 Advanced Optimization Techniques and EME 5983 Special Topics on Supplier Quality Assurance and for Spring 2016: EMS 6403 Quality Control and one more class based on offering. A formal assessment of lifelong learning and sustainability will be conducted in the academic year of 2016 – 2017.

Doctorate in Mechanical Engineering

1. **Assessment Plan and Summary**

Table 1: Assessment Plan for DEME

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Students will demonstrate a mastery of knowledge and understanding in their chosen sub-discipline specialization within mechanical engineering.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Students will be able to identify a topic for research in their chosen sub-discipline specialization within mechanical engineering and formulate a proposal for conducting the research.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Students will conduct and disseminate independent research which results in new knowledge in their chosen sub- discipline specialization within mechanical engineering.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Students will be able to effectively document and communicate their research.	Dissertation Assess using rubric	All students will receive 85% or higher from dissertation committee	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Students will understand the importance of lifelong learning and the professional and ethical responsibilities of the engineering profession.	Survey of graduating DEME students	All students must explain the importance of lifelong learning and professional respnosibilities,	Every Semester	Annual

2. **Report on 2015-2016 Academic Year and Action Plan (Loop Closing)**

In 2015, the Doctoral Procedures Committee represented by six faculty members in Mechanical Engineering department finalized the rubric for assessing student performance in their dissertation proposal exam. The grading covers eight evaluation items and each has a 1-5 scale as shown below:

1. Needs significant improvement
2. Needs improvement
3. Acceptable
4. Very good
5. Excellent

The rubric for final dissertation defense is very similar, with one additional evaluation item 9 "Publications: Journal or conference publications have resulted or are anticipated from this research". Every single student who had his/her proposal exam or final defense during the past year was assessed using the rubrics and data from all committee members were recorded.

During the past year 2015 Fall – 2016 Summer, there were three DEME students who successfully defended their dissertations and graduated, and one student who passed his proposal exam. Assessment data are shown in Table 2.

Table 2. Final Defense Assessment Data from Fall 2015-Summer 2016

Evaluation Items	Salah Eldeen Alhasia (*Defense*)	John Putrus (*Defense*)	Rafaa Esmaael (*Defense*)	Munther Hermez (*Proposal*)
1. Problem Definition	3.57	4.57	3.75	4.17
2. Literature and Previous Work	3.57	4.14	2.80	3.83
3. Impact of Proposed Research	4.14	4.57	3.40	4.17
4. Solution Approach	3.86	4.00	3.60	4.00
5. Results	3.29	4.07	3.60	3.83
6a. Quality of Written Communication	2.71	4.43	2.80	4.17
6b. Quality of Oral Communication	3.00	3.83	2.60	4.00
7. Critical Thinking	3.71	3.86	4.00	3.67
8. Broader Impact	3.86	4.14	3.25	3.83
9. Publications	4.50	4.50	N/A	N/A
Overall Assessment	3.50	4.00	3.00	4.00

3. **Assessment Plan for 2016-2017 Academic Year**

The 2016-2017 plan will focus on two action items: (1) The Doctoral Procedures Committee will schedule a close-loop meeting to review the current data as well as the learning outcomes they address. Modifications to the assessment plan as well as the rubrics will be proposed based on the discussion. (2) Continue to collect data for all DEME students who defend/propose their dissertations in the next year.

Doctorate in Manufacturing Systems
1. **Assessment Plan and Summary**
   See Table 1. While the assessment plan calls for loop-closing every two years, because the number of students in the program is small (less than 20) and since the program was discontinued in Fall 2015, loop-closing will be done annually. In addition, Learning Objective #1 was originally used only for the Final Defense Exam, however, it has been changed so that both the Proposal Exam and Final Defense Exam are evaluated for attainment of this objective.

Table 1: Assessment Plan for DEMS

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Students will demonstrate a mastery of knowledge and understanding of manufacturing systems.	Dissertation Assess using rubric	Student will receive at least "Acceptable" rating from all committee members	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Students will provide a plan, including the methods/tools, for solving their problem and conducting their research.	Dissertation Assess using rubric	Student will receive at least "Acceptable" rating from all committee members	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Students will conduct and disseminate independent research which results in new knowledge.	Dissertation Assess using rubric	Student will receive at least "Acceptable" rating from all committee members	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Students will be able to effectively document and communicate their work.	Dissertation Assess using rubric	Student will receive at least "Acceptable" rating from all committee members	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Students will understand the importance of lifelong learning and the professional responsibilities of the engineering profession.	Survey of graduating DEMS students	All students will be able to explain the importance of lifelong learning and professional responsibilities	Every Semester	Annual

2. **Report on 2015-2016 Academic Year and Action Plan (Loop Closing)**
    An exit survey for the program was developed last year, however there were no graduates of the program last year so there is no survey data to report.

    Assessment data for this year includes one student who was evaluated on his dissertation proposal (proposal exam) using the ME Department rubric. Results are as follows:

    Learning Objective #1: Students will demonstrate a mastery of knowledge and understanding of manufacturing systems.

    > Student score: 4 Acceptable, 1 Very Good

    The results show that the student met the required metrics (received at least Acceptable from all committee members). There are no issues/concerns at this time.

    Learning Objective #2: Students will provide a plan, including the methods/tools, for solving their problem and conducting their research.

    > Student score: 4 Needs Improvement, 1 Very Good

    Student did not meet the desired metric (receive at least Acceptable from all committee members). Overall, the student passed his proposal exam, however, his discussion of the tools to be used was what the committee felt needed the most improvement in his proposal. Student was given feedback by the individual committee members to help improve his methodology/tools and the student made changes based on the feedback and the committee members were satisfied with the changes.

    Learning Objective #4: Students will be able to effectively document and communicate the results of their research.

    > Student score: 3 Acceptable, 2 Very Good

    The results show that the student met the required metrics (received at least Acceptable from all committee members). There are no issues/concerns at this time.

    An issue that came up last year was the weak communication skills of the international graduate students. This issue is being addressed at the university level with the expected creation of an English Language Institute in the near future. For now, students are being sent to the AAC to have their thesis/dissertation proof-read, which is helping.

3. **Assessment Plan for 2016-2017 Academic Year**

    The rubric appears to be working well - will continue to use it to evaluate the proposal exam and final defense exam.

    An exit survey has been developed and will be used to collect data on graduating students in the future.

With the program having been shut down last fall, we are working with the current students in the program to schedule the classes they need to complete their coursework. In addition, for those who are near completion of their coursework, we are helping them identify a faculty members in the department to begin working on their dissertation proposal.

College of Management

BS in Business Administration

1. Assessment Plan and Summary

In the fall of 2012, The College of Management formed an Assessment Committee. The initial charge to the committee was to develop a plan that assures learning within the context of the mission of the University and the College. Starting with the Mission of the College, the Committee developed learning goals, objectives and rubrics for the BSBA program which were presented to the faculty and approved by them in academic year 2012-2013.

The College of Management Assessment Committee is charged with the development and implementation of a systematic assessment program for the BSBA program. The Committee is responsible for the assessment of the BSBA learning goals adopted by the faculty and oversees the collection of data relating to each learning goal; interprets the results of the data; communicates results to appropriate policy-making committees and administrators; proposes changes in curriculum and pedagogy based on the results; and reviews the effectiveness of such changes. The College Assessment Committee works closely with the University's Assessment Committee.

Program-level assessment addresses the following LTU undergraduate learning outcomes: Knowledge in Discipline, Technology, Sustainability, Communication, Mathematics, Reading, Scientific Analysis, Leadership, Teamwork, and Ethics. Additionally, assessment of Communication, Mathematics, Reading, and Leadership are augmented by assessment tools and metrics from the MCS and HSSC programs.

Figure 1 graphically depicts the continuous improvement process and assurance of learning outcomes assessment process of the BSBA. As shown in Figure 1, AACSB accrediting standards, the University's mission and the School's mission combine to produce assurance of learning program goals and objectives for the BSBA program. Assurance of learning outcomes assessment integrates indirect assessment with direct assessment.

Indirect assessment of the BSBA program involves course review, internal and external surveys, capstone course experience, mid-term and end-of-term student evaluations, and student focus group interviews.

Direct assessment of the BSBA program involves the use of rubric-based course-embedded assessment rubrics via STEPS, a web-based assessment software application used to collect, analyze, document, store and distribute direct assessment data. Course-embedded assessment occurs on a two-year cycle (biennial basis). Rubrics are completed by course instructors and at least one evaluator. Direct assessment also involves the use of a standardized assessment tool, the Educational Testing Service (ETS) Major Field Test (MFT) for Business which is administered to all students who take MGT 4213.

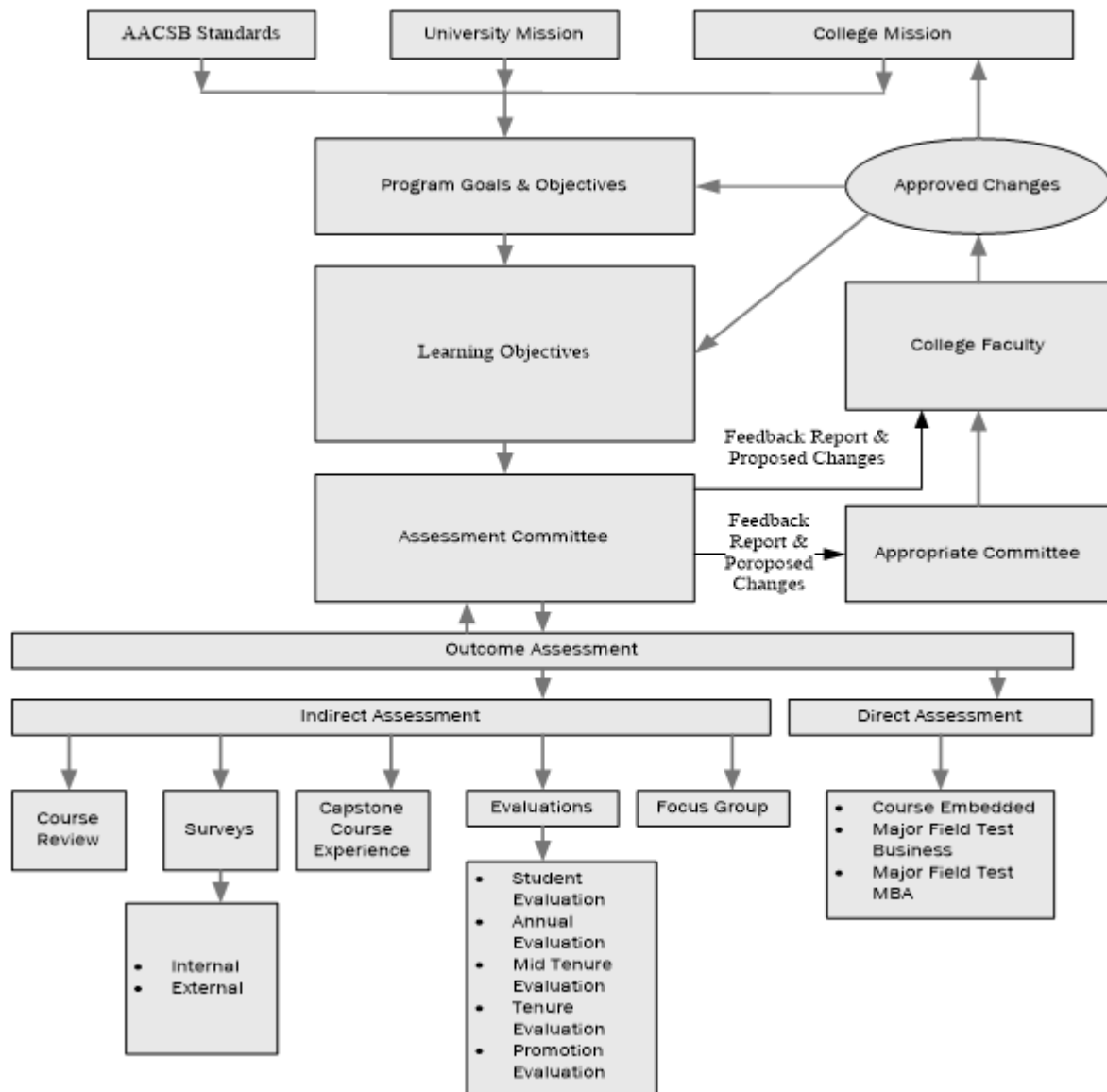Details of the BSBA program assessment plan are shown in Table 1.

Figure 1: Continuous improvement process and outcomes assessment for BSBA

Table 1: Assessment Plan for the BSBA Program

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Knowledge of accounting, economics, management, quantitative business analysis, finance, marketing, and information technology.	Direct assessment using ETS MFT in Business: Assessment Indicators 1, 2, 3, 4, 5, 6, 8.	Mean scores in supporting program learning objectives comparable to mean scores from pool of comparison institutions in Michigan: Andrews University, Baker College, CMU, Cleary, Cornerstone, Davenport, Grand Valley, Kettering, Lake Superior, Madonna.	Every semester.	Annual
		Indirect assessment using focus groups interview.	College focus group interview of graduating seniors.		
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Demonstrate mastery of communication technology: Use of media, Quality of PowerPoint slides.	Direct assessment using course-embedded oral presentation rubric.	80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Knowledge of legal and social environment, and international issues.	Direct assessment using ETS MFT in Business: Assessment Indicators 7, 9.	Mean scores in supporting program learning objectives comparable to mean scores from pool of 10 comparison institutions in Michigan.	Every semester	Annual
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Develop and deliver a compelling oral presentation grounded in relevant information and facts.	Direct assessment using course-embedded oral presentation and written communication skills rubric.	80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual
	Write professional quality documents.	University Writing Proficiency Exam (WPE).	Pass the WPE (graduation requirement of LTU).		

MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Analyze a problem, and identify and define the computing requirements appropriate to its solution.	Direct assessment using final exams in three mathematics courses in LTU core curriculum. Direct assessment using final exam in BSBA core course.	Metrics provided by MSC department. Pass final exam.	Every semester	Continuously by the University
READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluation their analytical architecture from an independent point of view.	Direct assessment using tools selected by the HSSC department in four humanities and social sciences courses in LTU core curriculum. Direct assessment using term paper in BSBA core course.	Metrics provided by HSSC department. 80% of students will score 80% or higher on HR intervention project term paper.	Every semester	Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Identify main problem and key assumptions, evaluate the validity and relevance of data, present feasible solutions.	Direct assessment using course-embedded critical thinking rubric.	80% of students will score 3 or higher on a 6 point scale. .	Every semester.	Annual
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."	Demonstrate civic, team, and global leadership skills by identifying a personal leadership philosophy, exhibiting entrepreneurial skills, and becoming agents of positive change.	Direct assessment using tools selected by the HSSC department in three humanities and social sciences courses in LTU core curriculum. Indirect assessment using focus groups interview.	Metrics provided by HSSC department. College focus group interview of graduating seniors.	Every semester.	Continuously by the University
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Work collectively towards team objectives; demonstrate appropriate group techniques to participate in a team task that results in effective performance.	Direct assessment using course-embedded teamwork rubric.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual

PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Recognize the ethical issues in a business situation; describe and use ethical frameworks applicable to business situations; develop a variety of ethical alternatives for resolving or at least addressing, a problem in business.	Direct assessment using course-embedded ethics rubric.	80% or more scoring 3 or higher on a 6 point scale.	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Summary
Loop-closing for BSBA direct assessment from 2015-2016 occurred in an all faculty meeting led by the COM Assessment Committee on April 1, 2016. Knowledge in Discipline, Sustainability, Communication, and Ethics were addressed. Focus group data from 2015-2016 is being reviewed and processed for loop-closing during the 2016-2017 academic year.

Objective: Knowledge in Discipline, Sustainability
- Assessment: ETS MFT in Business mean scores in supporting program learning objectives comparable to mean scores from pool of comparison institutions in Michigan (see Table 1). Test was administered in Fall 2015 to 6 students.
- Evaluation: The goal for this objective was not met (comparison mean = 150.5, LTU mean = 149.3).
- Issue: Faculty met on April 2016 to address ETS test results.
- Actions: Faculty will announce expectation to students that ETS will be administered when they take MGT 4213. Additionally, workshops will be created and offered to students prior to the test to review specific content areas addressed in the test, especially accounting and finance.
- Responsibility: The COM Assessment Committee will monitor delivery of the ETS workshops in academic year 2016-2017. ETS test will be administered in Fall 2016 and Spring 2017 (see Table 2).

Objective: Technology, Teamwork, Scientific Analysis
- Assessment: Not assessed in 2015-2016.
- Actions: Plan to assess these learning outcomes in 2016-2017.
- Responsibility: The COM Assessment Committee will schedule the assessment of technology and teamwork in academic year 2016-2017 using respective tools and metrics (see Tables 1 and 2.

Objective: Communication
- Assessment: Under 80% of the students scored "3" or better on a 6 point scale using the oral and written communication rubrics.
- Evaluation: The goal for this objective was not met.
- Issue: Faculty met on April 2016 to address the communication assessment (oral and written).
- Actions: Drs. Marx and Stavros created a resource, Writing Professional and Credible Papers, for new students and presented it during the orientation session for these students. The document helps students understand how to write professional and credible papers and avoid plagiarism. This document is also available to all faculty to continue to educate our students on effective written communications. All written assignments must follow APA writing style. Students are instructed on how to use APA style, and also provided with helpful website links. To provide students illustrations of effective writing styles, many faculty now post sample papers from prior semesters with student permission. Students are required to use Safe Assign prior to final submission of papers. Students who lack proficient writing skills must use the services of the Academic Achievement Center (AAC).

Undergraduate students in the Principles of Management course have weekly class dialogues, where they work in teams of two to four students (team work) in addressing management issues/applications from a supervisory position. Students have six short essays that address workplace management and management development issues (written communications). The final assignment includes both a reflective management learning paper (written communications) and a reflective management team presentation (oral communications), where the students work in real-time to develop a collaborative presentation on course learnings and applications. Students address on a weekly basis a variety of ethical issues based on the class readings and topics of the week, and these discussions include how to deal with employee dishonesty, whistleblowing, social media, diversity, employee discrimination, protected employee classes, hiring, evaluating, firing employees, and employee discipline.

In spring 2016, in an attempt to improve public speaking skills of the students, the College hosted a Speechcraft program of Toastmasters International. Speechcraft, which is organized in an 8-module program, afforded the students the opportunity to practice public speaking and communication skills, under the leadership of experienced Toastmasters. The students were required to prepare and present 6 different speeches, write evaluations of fellow student presentations, and participate regularly in extemporaneous speaking over a 10 week period. Some 25 LTU students participated with 20 students completing all requirements. The students learned by doing and gained valuable personal and communication skills of confidence building, gestures, organizing speech material, eye contact, effective feedback and much more, in a friendly supportive environment.

In selected classes, each student is required to make an Action-Observation-Reflection (AOR) presentation on a personal experience that was important to the student as either a leader or as a follower. Students are required to wear appropriate business attire when making this presentation. The presentation must not be more than five minutes, and the student has no podium to hide behind, no slides to read, and no props of any kind. The objective is to communicate with, not talk to, fellow students.
- Responsibility: The COM Assessment Committee will assess ethics in Fall 2016.

Objective: Ethics
- Assessment: Under 80% of the students scored "3" or better on a 6 point scale.
- Evaluation: The goal for this objective was not met.
- Issue: Faculty met on April 2016 to address the ethics assessment.
- Actions: Accounting courses have been redesigned to improve students' ethical skills through developing ethics recognition skills and increasing levels of ethical sensitivity. Ethics principles from accounting regulations and standards are integrated into each chapter lecture, to facilitate students' sensitivity to ethical issues. Using real business cases, instructors coach students on how to look for unethical behaviors and on how to solve the moral issues in a dilemma. Using contemporary business news, accounting students are required to write two-minute papers and conduct group discussions and individual presentations related to ethics.

To help students identify unethical situations, source appropriate frameworks, and viable solutions to address the situations, written assignments for case studies and internet searches are required in selected courses. Students are required to post their work to Blackboard for class interaction and discussion.

- Responsibility: The COM Assessment Committee will assess ethics in Fall 2016.

3. Assessment Plan for 2016-2017 Academic Year

Assessment plan for BSBA for academic year 2016-2017 is shown in Table 2. The outcomes are indicated according to the direct assessment course-embedded rubrics. Course-embedded assessment occurs on a two-year cycle (biennial basis) and is completed by course instructors and at least one evaluator. ETS is administered two times per year (biannual basis) to seniors in the program.

Table 2: Assessment Plan for BSBA for 2016-2017

Course	ETS MFT Business	Oral Presentation Rubric	Written Communication Skills Rubric	Critical Thinking Rubric	Teamwork Rubric	Ethics Rubric
ACC 2013		Spring 2017				Fall 2016
HRM 3023		Spring 2017	Spring 2017		Spring 2017	Fall 2016
MGT 2203			Fall 2016			
MGT 4213	Fall 2016, Spring 2017			Spring 2017		

Interviews of BSBA student focus group will occur in Spring 2017.

BS in Information Technology

1. Assessment Plan and Summary

In the fall of 2012, The College of Management formed an Assessment Committee. The initial charge to the committee was to develop a plan that assures learning within the context of the mission of the University and the College. Starting with the Mission of the College, the Committee developed learning goals, objectives and rubrics for the BSBA program which were presented to the faculty and approved by them in academic year 2012-2013. Beginning in academic year 2015-2016, the BSIT program received an extensive curriculum overhaul resulting in the establishment of core courses that will be assessed for assurance of learning.

The College of Management Assessment Committee is charged with the development and implementation of a systematic assessment program for the BSIT program. The Committee is responsible for the assessment of the BSIT learning goals adopted by the faculty and oversees the collection of data relating to each learning goal; interprets the results of the data; communicates results to appropriate policy-making committees and administrators; proposes changes in curriculum and pedagogy based on the results; and reviews the effectiveness of such changes. The College Assessment Committee works closely with the University's Assessment Committee.

Program-level assessment addresses the following LTU undergraduate learning outcomes: Knowledge in Discipline, Technology, Sustainability, Communication, Mathematics, Reading, Scientific Analysis, Leadership, Teamwork, and Ethics. Additionally, assessment of Communication, Mathematics, Reading, and Leadership are augmented by assessment tools and metrics from the MCS and HSSC programs.

Figure 1 graphically depicts the continuous improvement process and assurance of learning outcomes assessment process of the BSIT. As shown in Figure 1, AACSB accrediting standards, the University's mission and the School's mission combine to produce assurance of learning program goals and objectives for the BSIT program. Assurance of learning outcomes assessment integrates indirect assessment with direct assessment.

Indirect assessment of the BSIT program involves course review, internal and external surveys, capstone course experience, mid-term and end-of-term student evaluations, and student focus group interviews.

Direct assessment of the BSIT program involves the use of rubric-based course-embedded assessment rubrics via STEPS, a web-based assessment software application used to collect, analyze, document, store and distribute direct assessment data. Course-embedded assessment occurs on a two-year cycle (biennial basis). Rubrics are completed by course instructors and at least one evaluator. Direct assessment also involves the use of a standardized assessment tool, the Information and Communication Technology (ICT) assessment from ETS.

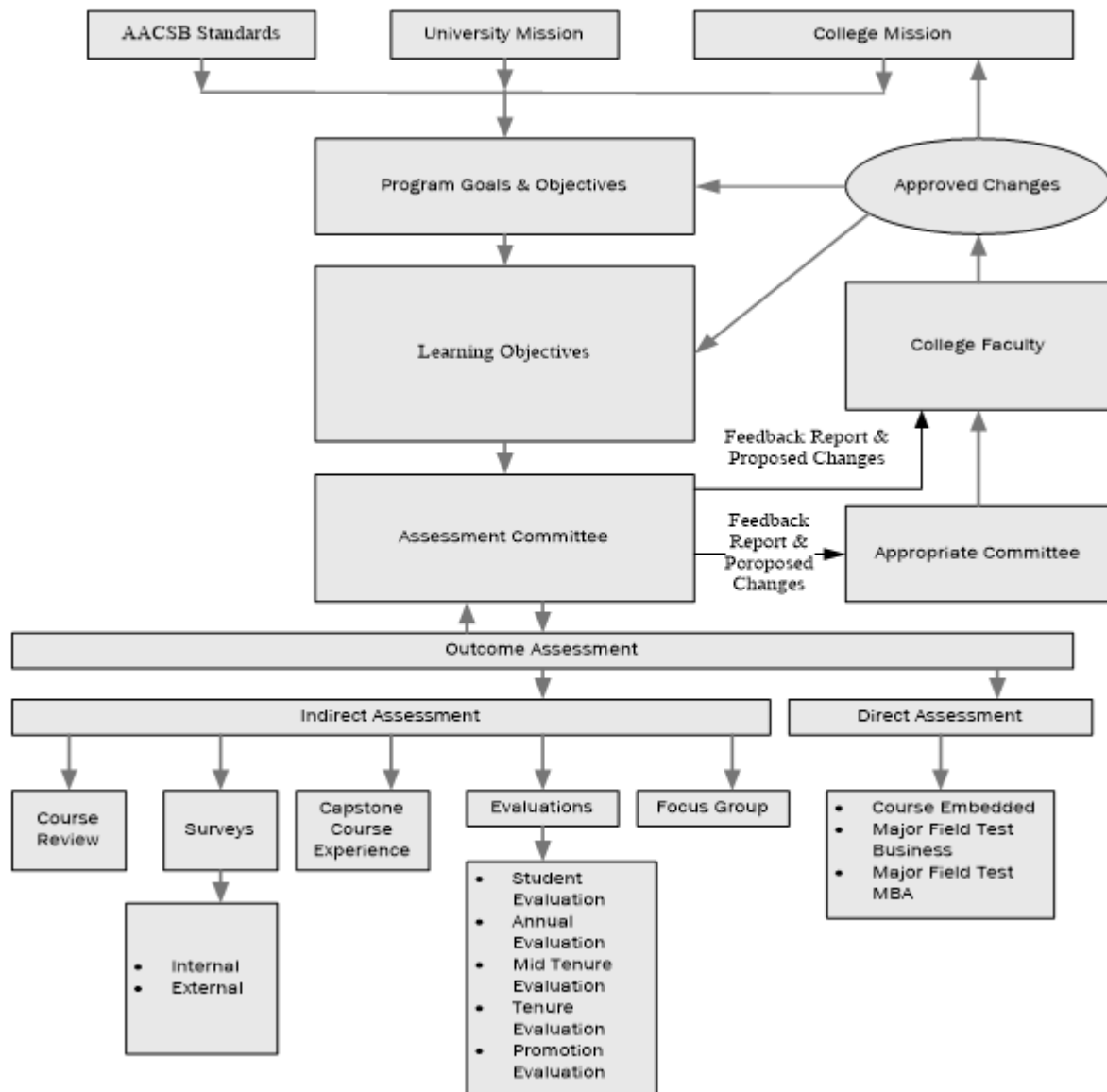Details of the BSIT program assessment plan are shown in Table 1.

Figure 1: Continuous improvement process and outcomes assessment for BSIT

Table 1: Assessment Plan for the BSIT

LTU Undergraduate Learning Outcomes	Student Outcomes*	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
KNOWLEDGE IN DISCIPLINE "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems."	Knowledge of information systems.	Direct assessment using ETS ICT test. Indirect assessment using focus groups interview.	Mean score on the test comparable to mean score from pool of 10 comparison institutions in Michigan: Andrews University, Baker College, CMU, Cleary, Cornerstone, Davenport, Grand Valley, Kettering, Lake Superior, Madonna	Every semester.	Annual
TECHNOLOGY "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines."	Demonstrate mastery of communication technology: Use of media, Quality of PowerPoint slides.	Direct assessment using course-embedded oral presentation rubric.	80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual
SUSTAINABILITY "LTU graduates will demonstrate an awareness of sustainability concepts within their discipline and their impact on the social, economic, and environmental needs of individuals and communities."	Knowledge of legal and social environment, and international issues.	Direct assessment using ETS ICT test.	Mean scores in supporting program learning objectives comparable to mean scores from pool of 10 comparison institutions in Michigan.		
COMMUICATION "LTU graduates will demonstrate professional standards in written, oral and graphical communication by mastering the fundamentals of writing mechanics and integrating evidence and analysis within a coherent structure. In their oral communication, they will organize and deliver content with poise and articulation."	Develop and deliver a compelling oral presentation grounded in relevant information and facts Write professional quality documents.	Direct assessment using course-embedded oral presentation and communication skills rubric. University Writing Proficiency Exam (WPE).	80% of students will score 3 or higher on a 6 point scale. Pass the WPE (graduation requirement of LTU).	Every semester	Annual
MATHEMATICS "LTU graduates will demonstrate their mastery of mathematics to solve real-world problems by isolating relevant factors, constructing abstract models, communicating precisely and reasoning logically."	Analyze a problem, and identify and define the computing requirements appropriate to its solution.	Direct assessment using final exams in three mathematics courses in LTU core curriculum. Direct assessment using final exam in BSIT core courses.	Metrics provided by MSC department. Pass final exam.	Every semester	Continuously by the University

READING "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view."	Demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluation their analytical architecture from an independent point of view.	Direct assessment using tools selected by the HSSC department in four humanities and social sciences courses in LTU core curriculum. Direct assessment using term paper in BSIT core courses.	Metrics provided by HSSC department. 80% of students will score 80% or higher on HR intervention project term paper.	Every semester	Continuously by the University
SCIENTIFIC ANALYSIS "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	Identify main problem and key assumptions, evaluate the validity and relevance of data, present feasible solutions.	Direct assessment using course-embedded critical thinking rubric.	80% of students will score 3 or higher on a 6 point scale.	Every semester.	Annual
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."	Demonstrate civic, team, and global leadership skills by identifying a personal leadership philosophy, exhibiting entrepreneurial skills, and becoming agents of positive change.	Direct assessment using tools selected by the HSSC department in three humanities and social sciences courses in LTU core curriculum. Indirect assessment using focus groups interview.	Metrics provided by HSSC department. College focus group interview of graduating seniors.	Every semester.	Continuously by the University
TEAMWORK "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions."	Work collectively towards team objectives; demonstrate appropriate group techniques to participate in a team task that results in effective performance.	Direct assessment using course-embedded teamwork rubric.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
PROFESSIONAL ETHICS "LTU graduates will demonstrate an understanding of the ethical issues related to their disciplines, the ethical codes adopted by relevant professional associations, and the social consequences of their ethical decisions."	Recognize the ethical issues in a business situation; describe and use ethical frameworks applicable to business situations; develop a variety of ethical alternatives for resolving or at least addressing, a problem in business.	Direct assessment using course-embedded ethics rubric.	80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Summary
Given the extensive curriculum overhaul of the BSIT program that occurred during the 2015-2016 academic year, no program level assessment occurring during the 2015-2016. Loop-closing for the BSIT direct assessment will occur in academic year 2017-2018 for direct assessments occurring in academic 2016-2017 (see section 3). Direct assessment rubrics used for the BSBA program will be used for assessment of the BSIT learning outcomes: Technology, Communication, Mathematics, Reading, Scientific Analysis, Leadership, Teamwork, and Ethics. Assessment of BSIT learning outcomes Knowledge in Discipline and Sustainability will be involve the use of a new standardized assessment tool, the Information and Communication Technology (ICT) assessment from ETS.

3. Assessment Plan for 2016-2017 Academic Year

Assessment plan for BSIT for academic year 2016-2017 is shown in Table 2. The outcomes are indicated according to the direct assessment course-embedded rubrics. Course-embedded assessment occurs on a two-year cycle (biennial basis) and is completed by course instructors and at least one evaluator. Beginning in Spring 2017, the ETS ICT test is administered two times per year (biannual basis) to seniors in the program.

Table 2: Assessment Plan for BSIT for 2016-2017

Course	ETS ICT	Oral Presentation Rubric	Written Communication Skills Rubric	Critical Thinking Rubric	Teamwork Rubric	Ethics Rubric
INT 3803		Spring 2017	Spring 2017	Fall 2016		Spring 2017
INT 4203		Spring 2017	Fall 2016			Spring 2017
INT 4303	Spring 2017			Spring 2017	Spring 2017	

Interviews of BSIT student focus group will occur in Spring 2017.

Master of Business Administration

1. Assessment Plan and Summary

In the fall of 2012, The College of Management formed an Assessment Committee. The initial charge to the committee was to develop a plan that assures learning within the context of the mission of the University and the College. Starting with the Mission of the College, the Committee developed learning goals, objectives and rubrics for the MBA program which were presented to the faculty and approved by them in academic year 2012-2013.

The College of Management Assessment Committee is charged with the development and implementation of a systematic assessment program for the MBA program. The Committee is responsible for the assessment of the MBA learning goals adopted by the faculty and oversees the collection of data relating to each learning goal; interprets the results of the data; communicates results to appropriate policy-making committees and administrators; proposes changes in curriculum and pedagogy based on the results; and reviews the effectiveness of such changes. The College Assessment Committee works closely with the University's Assessment Committee.

Program-level assessment addresses the following LTU graduate learning outcomes: Knowledge in Discipline, Technology, Critical Thinking, Communication, and Leadership & Ethics.

Figure 1 graphically depicts the continuous improvement process and assurance of learning outcomes assessment process of the MBA. As shown in Figure 1, AACSB accrediting standards, the University's mission and the School's mission combine to produce assurance of learning program goals and objectives for the MBA program. Assurance of learning outcomes assessment integrates indirect assessment with direct assessment.

Indirect assessment of the MBA program involves course review, internal and external surveys, capstone course experience, mid-term and end-of-term student evaluations, and student focus group interviews.

Direct assessment of the MBA program involves the use of rubric-based course-embedded assessment rubrics via STEPS, a web-based assessment software application used to collect, analyze, document, store and distribute direct assessment data. Course-embedded assessment occurs on a two-year cycle (biennial basis). Rubrics are completed by course instructors and at least one evaluator. Direct assessment also involves the use of a standardized assessment tool, the Educational Testing Service (ETS) Major Field Test (MFT) for MBA which is administered to all students who take MBA 6073.

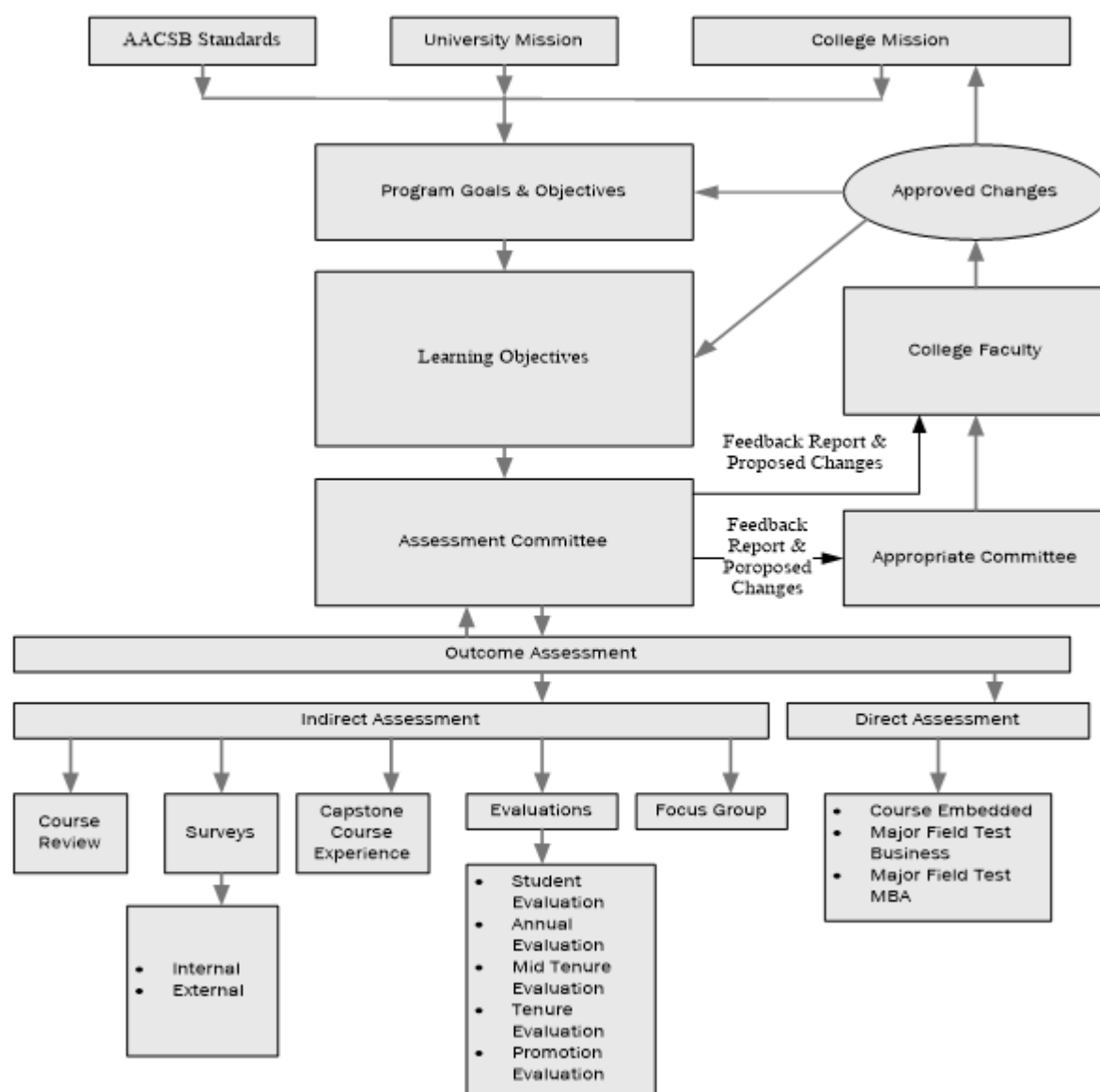Details of the MBA program assessment plan are shown in Table 1.

Figure 1: Continuous improvement process and outcomes assessment for MBA

Table 1. Assessment Plan for MBA

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop-Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Knowledge of marketing, management, finance, accounting, and strategic integration.	Direct assessment using ETS MFT in MBA. Indirect assessment using focus groups interview.	Mean scores in supporting program learning objectives comparable to mean scores from pool of comparison institutions in the United States: Bryant University, RI; Chapman University, CA; Citadel, SC; Dallas Baptist University, TX; Embry-Riddle Aeronautical University, FL, New Jersey Institute of Technology, NJ, New York Institute of Technology, NY, Tulane University, LA University of Detroit Mercy, MI; University of St. Thomas, MN, University of St. Thomas, TX; and Xavier University, OH. College focus group interview of graduating MBA students.	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Identify business problems and opportunities that result from factors internal and external to the organization; Apply both quantitative and qualitative techniques from different disciplines to address problems and opportunities.	Direct assessment using STEPS course-embedded integration rubric.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Perform a global business situation analysis, formulate effective global business strategies and evaluate them.	Direct assessment using STEPS course-embedded global awareness rubric.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Deliver a compelling oral presentation grounded in relevant information and facts; Write professional quality documents.	Direct assessment using STEPS course-embedded oral presentation and written communication rubrics.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual

| "LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics." | Demonstrate appropriate group techniques to ensure the effective performance of the team; Demonstrate effective leadership skills in a group project; Identify the ethical issues, develop suitable frameworks, and develop a variety of ethical alternatives for resolving the problem. | Direct assessment using STEPS course-embedded teamwork and ethics rubrics. | 80% of students will score 3 or higher on a 6 point scale. | Every Semester | Annual |

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Summary
Loop-closing for MBA direct assessment from 2015-2016 occurred in an all faculty meeting led by the COM Assessment Committee on April 1, 2016. Knowledge in Discipline and Communication were addressed. Focus group data from 2015-2016 is being reviewed and processed for loop-closing during the 2016-2017 academic year.

Objective: Knowledge in Discipline
- Assessment: ETS MFT in MBA mean scores in supporting program learning objectives of marketing, management, finance, accounting, and strategic integration are comparable to mean scores from pool of comparison institutions in the United States (see Table 1). Test was administered in Fall 2015 and Spring 2016 to 54 students.
- Evaluation: The goal for this objective was met (comparison mean in marketing = 54, LTU mean = 56; comparison mean in management = 55, LTU mean = 58; comparison mean in finance = 44, LTU mean = 42; comparison mean in accounting = 44, LTU mean 44; comparison mean in strategic integration = 50, LTU mean = 50).
- Issue: Faculty met on April 2016 to address ETS test results.
- Actions: To further improve the performance of graduating students the college has used item analysis report to examine the extent to which ETS test questions were addressed in core courses. To address the time lag between courses and the test, in spring 2016 test takers participated in Accounting and Finance review sessions.
- Responsibility: The COM Assessment Committee will monitor administration of the ETS MFT in MBA in academic year 2016-2017. ETS test will be administered in Fall 2016 and Spring 2017 (see Table 2).

Objective: Technology
- Assessment: Integration rubric for students in MBA 6073 on analyzing a complex problem by using their quantitative and qualitative tool in their skill set. Over 80% of the students scored "3" or better on a 6 point scale. Also, the average score of the students computed to 4.35 out of 6.
- Evaluation: The goal for this objective was 80% of the students to score "3" or better on a 6 point scale. Based on the data provided, this goal was met.
- Issue: Since the goal was met for this outcome there are no issues with respect to this outcome.
- Actions: No actions other than continued monitoring of this goal are planned.
- Responsibility: The COM Assessment Committee (see Table 2).

Objective: Critical Thinking
- Assessment: Global awareness rubric for 25 students in MBA 6023 (8) and MBA 6073 (17) were tested by requiring them to analyze a global business situation analysis, formulate effective business strategies and evaluate them. Over 80% of the students scored "3" or better on a 6 point scale. Also, the average score of the students computed to 4.30 out of 6.
- Evaluation: The goal for this objective was 80% of the students to score "3" or better on a 6 point scale. Based on the data provided, this goal was met.
- Issue: Since the goal was met for this outcome there are no issues with respect to this outcome.
- Actions: No actions other than continued monitoring of this goal are planned.

- Responsibility: The COM Assessment Committee (see Table 2).

Objective: Communication--Oral
- Assessment: Oral presentation rubric for 19 students from two sections of MGT 6033 were administered a test of making a presentation. Over 80% of students scored "3" or better on a scale of 0 to 6. Further, the average score of all the students was 4.03 on a 6 point scale.
- Evaluation: The goal for this objective was 80% of the students scoring a "3" or better on a 6 point scale. Hence we can consider this goal as having been met.
- Issue: Although the goal was met for this outcome, as more international students enter the program, it is important to maintain high standards for the delivery of oral presentations.
- Actions: To maintain high standards of public speaking skills of the students, the College hosted a Speechcraft program of Toastmasters International. Speechcraft, which is organized in an 8-module program, afforded the students the opportunity to practice public speaking and communication skills, under the leadership of experienced Toastmasters. The students were required to prepare and present 6 different speeches, write evaluations of fellow student presentations, and participate regularly in extemporaneous speaking over a 10 week period. Some 25 LTU students participated with 20 students completing all requirements. The students learned by doing and gained valuable personal and communication skills of confidence building, gestures, organizing speech material, eye contact, effective feedback and much more, in a friendly supportive environment. Speechcraft will occur regularly in the 2016-2017 academic year.
- Responsibility: The COM Assessment Committee (see Table 2).

Objective: Communication--Written
- Assessment: Written presentation rubric for 5 students form ACC 6003 were administered a test of writing a term paper. 80% of the students scored "3" or better on a 6 point scale. Also, the average score of the students computed to 2.97 out of 6.
- Evaluation: The goal for this objective was 80% of the students to score "3" or better on a 6 point scale. Based on the data provided, this goal was met. However, on an average score basis, this outcome barely reached 3.0. The reason for the low average was that one out of the five students taking this test was very poor in writing skills and was able to bring down the average substantially.
- Issue: To assist students with achieving high writing quality, students will be required to utilize the Academic Achievement Center and to obtain a signature on their draft.
- Actions: No actions other than continued monitoring of this goal are planned. However, we should ensure that students with substantial writing handicaps should not be permitted to take courses before they complete enhancing their language deficiencies.
- Responsibility: The COM Assessment Committee (see Table 2).

Objective: Leadership & Ethics—Leadership in Teams
- Assessment: Leadership in teamwork rubric for 20 students in MBA 6053 were administered a test of working effectively with their peers in a team work setting and over 80% scored "3" or better on a 6 point scale. In addition, the average score of all the students was 5.52 out of total of 6.
- Evaluation: The goal for this objective was 80% of the students to score "3" or better on a 6 point scale. Based on the data provided, this goal was met.

Master of Science in Information Technology

1. Assessment Plan and Summary

In the fall of 2012, The College of Management formed an Assessment Committee. The initial charge to the committee was to develop a plan that assures learning within the context of the mission of the University and the College. Starting with the Mission of the College, the Committee developed learning goals, objectives and rubrics for the MSIT program which were presented to the faculty and approved by them in academic year 2012-2013.

The College of Management Assessment Committee is charged with the development and implementation of a systematic assessment program for the MSIT program. The Committee is responsible for the assessment of the MSIT learning goals adopted by the faculty and oversees the collection of data relating to each learning goal; interprets the results of the data; communicates results to appropriate policy-making committees and administrators; proposes changes in curriculum and pedagogy based on the results; and reviews the effectiveness of such changes. The College Assessment Committee works closely with the University's Assessment Committee.

Program-level assessment addresses the following LTU graduate learning outcomes: Knowledge in Discipline, Technology, Critical Thinking, Communication, and Leadership & Ethics.

Figure 1 graphically depicts the continuous improvement process and assurance of learning outcomes assessment process of the MSIT. As shown in Figure 1, AACSB accrediting standards, the University's mission and the School's mission combine to produce assurance of learning program goals and objectives for the MSIT program. Assurance of learning outcomes assessment integrates indirect assessment with direct assessment.

Indirect assessment of the MSIT program involves course review, internal and external surveys, capstone course experience, mid-term and end-of-term student evaluations, and student focus group interviews.

Direct assessment of the MSIT program involves the use of rubric-based course-embedded assessment rubrics via STEPS, a web-based assessment software application used to collect, analyze, document, store and distribute direct assessment data. Rubrics are completed by course instructors and at least one evaluator. Direct assessment also involves the use of final exams and case study reports to assess discipline level knowledge.

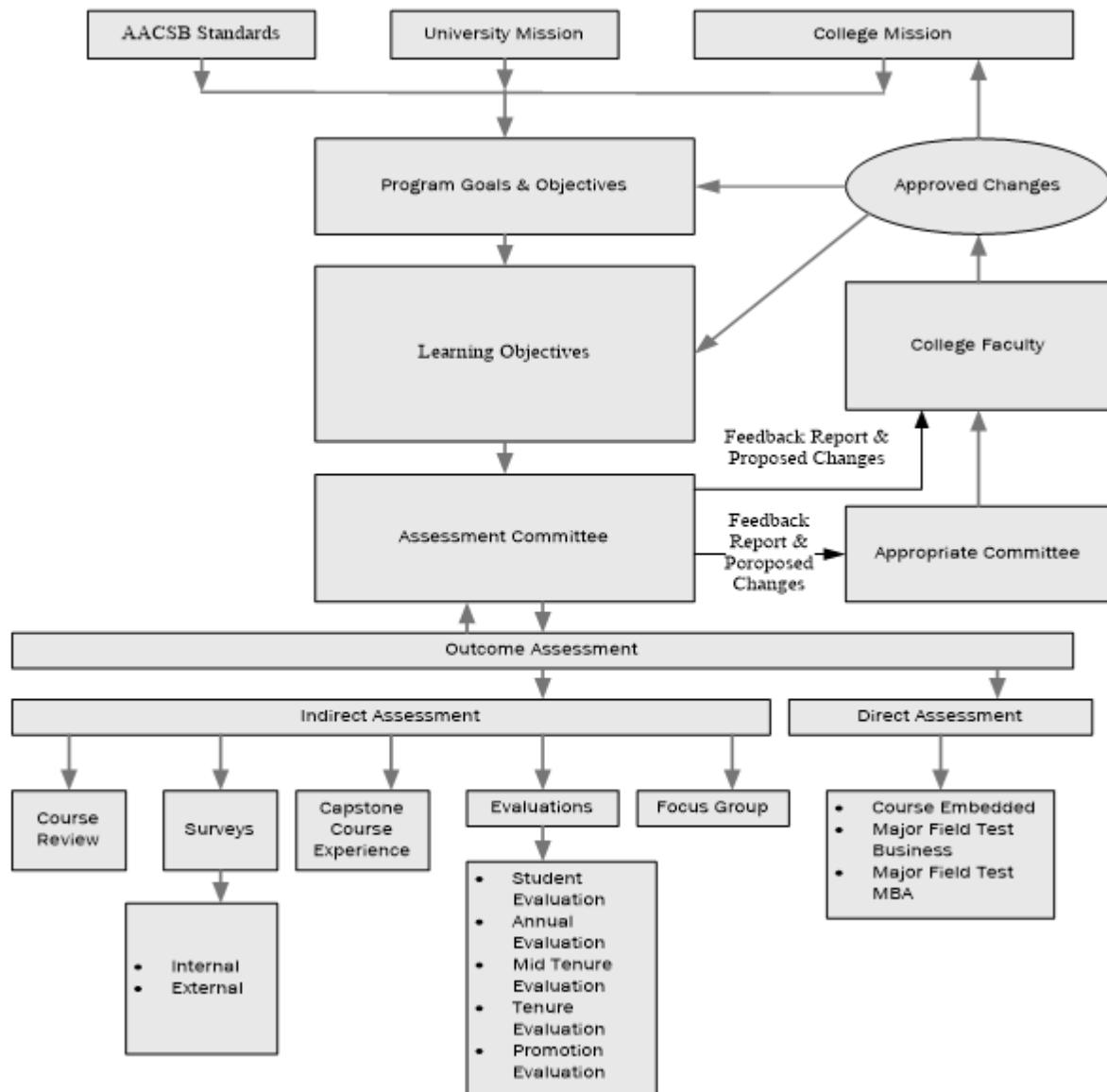Details of the MSIT program assessment plan are shown in Table 1.

Figure 1: Continuous improvement process and outcomes assessment for MSIT

Table 1. Assessment Plan for MSIT

University Graduate Learning Outcomes	Supporting Program Learning Objectives	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Knowledge of database modeling and administration, systems analysis and design, enterprise systems security, and information technology integration.	Direct assessment using final exams and case study scores. Indirect assessment using focus groups interview.	80% of students will score 70% or higher on final exams and case study reports. College focus group interview of graduating MSIT students.	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Identify business problems and opportunities that result from factors internal and external to the organization; Apply both quantitative and qualitative techniques from different disciplines to address problems and opportunities.	Direct assessment using course-embedded integration rubric.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Perform a global business situation analysis, formulate effective global business strategies and evaluate them.	Direct assessment using course-embedded global awareness rubric.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Deliver a compelling oral presentation grounded in relevant information and facts; Write professional quality documents.	Direct assessment using course-embedded oral presentation and written communication rubrics.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Demonstrate appropriate group techniques to ensure the effective performance of the team; Demonstrate effective leadership skills in a group project; Identify the ethical issues, develop suitable frameworks, and develop a variety of ethical alternatives for resolving the problem.	Direct assessment using course-embedded teamwork and ethics rubrics.	80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual

2. Report on 2015-2016 Academic Year and Action Plan (Loop Closing)

Summary
Loop-closing for MSIT direct assessment from 2015-2016 occurred in an all faculty meeting led by the COM Assessment Committee on April 1, 2016. Knowledge in Discipline, Communication--Written, and Leadership & Ethics—Ethics were addressed. Focus group data from 2015-2016 is being reviewed and processed for loop-closing during the 2016-2017 academic year.

Objective: Knowledge in Discipline
- Assessment: Final exams and case study scores in MSIT Core Courses INT 6113, INT 6123, INT 7223, INT 7593 with 80% of students scoring 70% or higher on final exams and case study reports.
- Evaluation: The goal for this objective was 80% of students scored 70% or higher on final exams and case study reports in INT 6113, INT 6123, INT 7223, INT 7593. Based on the data provided, this goal was met.
- Issue: Since the goal was met for this outcome there are no issues with respect to this outcome.
- Actions: No actions other than continued monitoring of this goal are planned.
- Responsibility: The COM Assessment Committee.

Objective: Technology, Critical Thinking, Communication—Oral, Leadership & Ethics--Leadership
- Assessment: Not assessed in 2015-2016.
- Actions: Plan to assess these learning outcomes in 2016-2017.
- Responsibility: The COM Assessment Committee (see Table 2 for schedule).

Objective: Communication--Written
- Assessment: Written presentation rubric for 5 students form INT 6123 were administered a test of writing a term paper. 80% of the students scored "3" or better on a 6 point scale. Also, the average score of the students computed to 3.33 out of 6.
- Evaluation: The goal for this objective was 80% of the students to score "3" or better on a 6 point scale. Based on the data provided, this goal was met.
- Issue: Since the goal was met for this outcome there are no issues with respect to this outcome.
- Actions: No actions other than continued monitoring of this goal are planned. However, we should ensure that students with substantial writing handicaps should not be permitted to take courses before they complete enhancing their language deficiencies.
- Responsibility: The COM Assessment Committee (see Table 2).

Objective: Leadership & Ethics—Ethics
- Assessment: Ethics rubric for 5 students in INT 7223 were tested by requiring them analyze a situation inter-twined with "ethical" decisions and asked to develop suitable alternatives. Over 80% of the students scored "3" or better on a 6 point scale. Also, the average score of the students computed to 3.86 out of 6.
- Evaluation: The goal for this objective was 80% of the students to score "3" or better on a 6 point scale. Based on the data provided, this goal was met.
- Issue: Since the goal was met for this outcome there are no issues with respect to this outcome.
- Actions: No actions other than continued monitoring of this goal are planned.
  - Responsibility: The COM Assessment Committee (see Table 2)

3. Assessment Plan for 2016-2017 Academic Year

Assessment plan for MSIT for academic year 2016-2017 is shown in Table 2. The outcomes are indicated according to the direct assessment course-embedded rubrics. Course-embedded assessment occurs on a two-year cycle (biennial basis) and is completed by course instructors and at least one evaluator.

Table 2: Assessment Plan for MSIT for 2016-2017

Course	Oral Presentation Rubric	Written Communication Skills Rubric	Global Awareness Rubric	Teamwork Rubric	Ethics Rubric	Integration Rubric
INT 6113			Fall 2016		Spring 2017	
INT 6123		Fall 2016		Spring 2017		
INT 7223	Fall 2016	Spring 2017	Fall 2016			
INT 7593						Spring 2017

Interviews of MSIT student focus group will occur in Spring 2017.