

Lawrence Technological University

Assessment Report

2014-2015 Academic Year

University Assessment Committee



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## **Executive Summary of 2014-2015 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 2014-2015 UAC concentrated on improving the culture of Assessment throughout the university programs. 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. UAC also, encouraged and supported programs to improve their assessment practice and maintain a meaningful and sustainable assessment process. Programs that are still structuring their assessment process, were focused on by the UAC to provide them with all the possible support and expertise. The assessment of Ethics, Sustainability and Graphical communications is still an issue that is occupying considerable time and thoughts from the UAC. There is a discussion among the UAC members to come to a closure on these three topics assessment in 2015-2016 and present it to the faculty in the 2016 assessment day.

This report contains the 2014 Assessment Day presentations (which close-the-loop on the previous year assessment activities), and annual reports from programs for the 2014-2015 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 2014-2015 Academic Year

<b>Chair and Director of Assessment</b>	Sabah Abro
<b>College of Architecture and Design</b>	
<i>Architecture</i>	Janice Means
<i>Art and Design</i>	Andy Hanzel
<b>College of Arts and Sciences</b>	
<i>Humanities, Social Sciences, and Communication</i>	Sarah Lamers
<i>Mathematics and Computer Science</i>	Chris Cartwright
<i>Natural Sciences</i>	Changgong Zhou
<b>College of Engineering</b>	
<i>Biomedical Engineering</i>	Yawen Li
<i>Civil Engineering</i>	John Tocco
<i>Electrical and Computer Engineering</i>	Kun Hua
<i>Engineering Technology</i>	Jerry Cuper
<i>Mechanical Engineering</i>	Andrew Gerhart
<b>College of Management</b>	
<i>BSBA, BSIT, MBA, MSIT, DBA</i>	Srikant Raghavan
<b>Ex-Officio Members</b>	
<i>Associate Provost</i>	James Jolly
<i>Institutional Research and Academic Planning</i>	Steve Bridges
<i>eLearning Services</i>	Richard Bush

### UAC Membership 2014-2015 Service and Rotation

<b><u>Member</u></b>		<b><u>Years Served</u></b>	<b><u>Year Started</u></b>	<b><u>Year Ends</u></b>
<b>Chair and Director of Assessment</b>	Sabah Abro	2	2013-2014	2015-2016
<b>College of Architecture and Design</b>				
<i>Architecture</i>	Janice Means	2	2013-2014	2015-2016
<i>Art and Design</i>	Andy Hanzel	2	2013-2014	2015-2016
<b>College of Arts and Sciences</b>				
<i>HSSC</i>	Sarah Lamers	3	2012-2013	2014-2015
<i>Mathematics and Computer Science</i>	Chris Cartwright	5	2010-2011	2014-2015
<i>Natural Sciences</i>	Changgong Zhou	2	2013-2014	2015-2016
<b>College of Engineering</b>				
<i>Biomedical Engineering</i>	Yawen Li	5	2010-2011	2014-2015
<i>Civil Engineering</i>	John Tocco	7	2008-2009	2014-2015
<i>Electrical and Computer Engineering</i>	Kun Hua	3	2012-2013	2014-2015
<i>Engineering Technology</i>	Jerry Cuper	2	2013-2014	2015-2016
<i>Mechanical Engineering</i>	Andrew Gerhart	4	2011-2012	2014-2015
<b>College of Management</b>				
<i>BSBA, BSIT, MBA, MSIT</i>	Srikant Raghavan	4	2011-2012	2014-2015

### **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

#### 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 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 & 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.”

#### 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**

<b>Discipline-Specific Knowledge</b>	<b>Critical Thinking</b>	<b>Leadership &amp; Ethics</b>
“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.”	

### 2014-2015 Undergraduate Assessment Plan

Undergraduate Learning Outcomes	Assessment Strategy	Responsible Academic Unit	Class Level of Assessment	Administration Timeline	Loop-Closing Timeline
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “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
<u><b>TECHNOLOGY</b></u> “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
<u><b>SUSTAINABILITY</b></u> "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
<u><b>COMMUNICATION</b></u> “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 <ol style="list-style-type: none"> <li>a. HSSC Core Curriculum writing assessment</li> <li>b. WPE Audit</li> </ol> 2. Oral <ol style="list-style-type: none"> <li>a. UAC oral presentation rubric</li> </ol> 3. Graphical <ol style="list-style-type: none"> <li>a. Not yet determined</li> </ol>	1. HSSC 2. UAC 3. Not yet determined	1. 1 <sup>st</sup> and 2 <sup>nd</sup> year core courses; prereq to SSC/LLT 3000-4000 level courses 2. 4 <sup>th</sup> 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
<u><b>MATHEMATICS</b></u> “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. 1 <sup>st</sup> and 2 <sup>nd</sup> year courses 2. 2 <sup>nd</sup> year courses	1. Semester 2. Semester	1. Every 2 years 2. Every 2 years



<p><u>READING</u></p> <p>“LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.”</p>	Core Curriculum Diagnostic Exam	HSSC	1 <sup>st</sup> & 2 <sup>nd</sup> year Core courses	Annual /ongoing	Every 3 years (f15)
<p><u>SCIENTIFIC ANALYSIS</u></p> <p>“LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”</p>	Direct assessment of student exams, assignments and/or projects (all physics courses).	NS	All	Semester	Annual
<p><u>LEADERSHIP</u></p> <p>“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.”</p>	<ol style="list-style-type: none"> <li>1. Leadership survey</li> <li>2. Portfolio evaluation</li> <li>3. Impact report</li> </ol>	<ol style="list-style-type: none"> <li>1. Leadership program office and leadership assessment team</li> <li>2. Leadership program office and LCIC</li> <li>3. Leadership program office and LCIC</li> </ol>	<ol style="list-style-type: none"> <li>1. All</li> <li>2. 4<sup>th</sup> year</li> <li>3. All</li> </ol>	<ol style="list-style-type: none"> <li>1. Semester</li> <li>2. Semester</li> <li>3. Semester</li> </ol>	<ol style="list-style-type: none"> <li>1. Every odd year</li> <li>2. Every even year</li> <li>3. Every odd year</li> </ol>
<p><u>TEAMWORK</u></p> <p>“LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”</p>	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual
<p><u>PROFESSIONAL ETHICS</u></p> <p>“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.”</p>	To be developed and implemented by undergraduate program	Undergraduate program	To be determined by program	Annual	Annual

### 2014-2015 Graduate Assessment Plan

<b>Graduate Learning Outcomes</b>	<b>Assessment Strategy</b>	<b>Responsible Academic Unit</b>	<b>Class Level of Assessment</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “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
<u><b>TECHNOLOGY</b></u> “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
<u><b>CRITICAL THINKING</b></u> “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
<u><b>COMMUNICATION</b></u> “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
<u><b>LEADERSHIP &amp; ETHICS</b></u> “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 2014**  
**September 29, 2014**  
**A200**  
**AGENDA**

<b>Continental Breakfast: Architecture Gallery A210</b>	8:15 – 8:45
<b><u>Welcomes, Introductions, and Overview Of Assessment Processes</u></b>	
Virinder Moudgil, President Maria Vaz, Provost Jason Barrett, HSSC	8:45 – 9:20
<b><u>Assessment Updates</u></b>	
Leadership: Andy Gerhart Mathematics: Chris Cartwright Natural Sciences: Nicole Villeneuve, Changggong Zhou Writing: Jason Barrett	9:20 – 10:00
10 min. break	
<b><u>Accreditation Accomplishments</u></b>	
Architecture: Janice Means Management: Srikant Raghavan	10:10 – 10:30
<b><u>Assessment Goals for 2014-2015</u></b>	
John Tocco	10:30-10:40
<b><u>HLC Assurance / Accreditation</u></b>	
James Jolly	10:40-11:00
<b><u>New STEM Center / Taubman Complex</u></b>	
Sibrina Collins	11:00-11:45
<b><u>DEPARTMENT BREAKOUT SESSIONS / LUNCH</u></b>	11:45 – 3:00

## UAC Initiatives, 2012-14

- Implementation of (revised) Undergraduate Learning Outcomes
- Implementation of Graduate Learning Outcomes
- Standardization of reporting / submission process
- HLC Progress Report
- Accreditation: CoAD, CoM, Arch Eng, MCS
- Course evaluations: Class Climate
- Digital archiving

### LEADERSHIP CURRICULUM ASSESSMENT

**LONGITUDINAL STUDY RESULTS  
COURSE EVALUATION RESULTS**

Andrew L. Gerhart  
Jim Jolly

**Leadership Education Goals**

**Graduates will have:**

1. had experiences that promote a high level of **professionalism** and **integrity**, responsible **decision making**, **confidence** in approaching opportunities, and **pride** in their abilities;
2. had experiences that promote the **understanding** of themselves and others, **sensitivity** to other cultures in the context of globalization, and **interpersonal** skills;
3. had experiences that promote the ability to **analyze** unfamiliar situations, **assess risk**, and **formulate plans of action**;
4. been made aware of the importance of **lifelong learning**; and,
5. had experiences that promote a **global and societal perspective**.

**Leadership Education**

**Based upon the Relational Model of Leadership.**

```

graph LR
    A[University Seminar] --> B[Leadership Models & Practices]
    B --> C[Leadership Seminar Series]
    C --> D[Leadership Capstone]
    E[Introduce/encourage use of Leadership Transcript] --> D
  
```

**Assessment**

- 2007 – 2009
  - Create survey
  - Two focus groups
  - Validate
  - Measure temporal stability and internal consistency
  - Dissemination of results through peer reviewed publications
- 2010 – 2013
  - First longitudinal study completed
  - >> 1000 students = >30,000 data points

Lawrence  
Tech

The Instrument

- Survey contains 33 statements and 8 demographics questions.
- Instrument administered during first or second class period (the pre-test)
- Instrument administered during final class period (the post-test) to determine any shift in perception of their leadership skills

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Tech

Analysis Process

- Independent (non-LTU) contractor analyzed the results
  - Used paired tests with ID numbers to compare changes in an individual over each year of the curriculum.
  - Analyzed aggregate of all courses offered semester by semester
  - Analyzed each individual course each semester

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Results

**By Semester:** Of the 33 criteria tested, 30 show a statistically significant improvement at some point in the 4 year curriculum.

**By Course:** Of the 33 criteria tested, only two need an increase in emphasis.

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Path Forward

- We have identified necessary improvements both per course and curriculum-wide
- Three criteria were lacking across semesters and may need addressed in the four year curriculum
  - Risk taking, confronting discrimination, decision making on impact to environmental sustainability
- Two criteria were lacking across courses and must be better addressed in the four year curriculum
  - Aligning decisions and action with personal values, decision making on impact to environmental sustainability

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Course Evaluations

Throughout the study we have made alterations to improve curriculum elements based on student feedback.

Spring 2010: LDR 2001 Course average was  $\approx 3$

Fall 2013: LDR 2001 Course average was 3.97 (14 sections, 189 students)

Majority of comments are positive. A few are concerned about the relevance (i.e., why is the material important).

Fall 2013: COM 1001 Course average was 3.96 (16 sections, 264 students)

Based on comments, need to add more explicit leadership skills development.

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Course Evaluations

Fall 2013: Aggregate of all courses (COM 1001, LDR 2001, LDR 3000, LDR 4000)

Course Average: 3.9

Instructor Average: 4.33

1. The Course

	Strongly Agree	Agree	Disagree	Strongly Disagree	
1.1) The course was well structured with clear objectives and requirements.	10	10	0	0	10364 av=4.00 msp4.00 dev=1
1.2) The course materials (texts, audio/visual, supplemental materials) were appropriately chosen and useful relative to the course.	10	10	0	0	10328 av=3.96 msp4.00 dev=1
1.3) The course assignments (homework, projects, tests and quizzes) were relevant based upon the course objectives, materials, and lectures.	10	10	0	0	10342 av=3.90 msp4.00 dev=1
1.4) The course had clear grading criteria supported by course objectives and content.	10	10	0	0	10364 av=3.85 msp4.00 dev=1
1.5) The pace, content, and design of the course challenged me to do my best work.	10	10	0	0	10340 av=3.75 msp4.00 dev=1
1.6) Overall, the course was effective.	10	10	0	0	10340 av=3.55 msp4.00 dev=1

Add more rigor?

## LTU Assessment Day 2014

### Assessment of the Undergraduate mathematics learning outcome

Chris Cartwright, MCS

#### Undergraduate mathematics learning 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.

#### Calculus 2 Common Finals

- Given in daytime sections since 2004
- Types of problems were standardized by 2009
- Number of problems was standardized by 2011
- Since 2011, the Calc 2 common final has consisted of
  - Limits (2 questions)
  - Derivatives (4 questions)
  - Integrals (6 questions)
  - Series convergence (4 questions)
  - Taylor series (4 questions)

Undergraduate Learning Outcomes		
Discipline-Specific Knowledge	Critical Thinking	Leadership & Ethics
<b>KNOWLEDGE IN DISCIPLINE</b> "LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems." <b>TECHNOLOGY</b> "LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines." <b>SUSTAINABILITY</b> "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."	<b>COMMUNICATION</b> "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." <b>MATHEMATICS</b> "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." <b>REASONING</b> "LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view." <b>SCIENTIFIC ANALYSIS</b> "LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."	<b>LEADERSHIP</b> "LTU graduates will demonstrate civic, team, and global leadership skills by identifying a personal leadership philosophy, evaluating entrepreneurial skills, and becoming agents of positive change." <b>TEAMWORK</b> "LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflict, and evaluating team members' contributions." <b>PROFESSIONAL ETHICS</b> "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."

#### Courses chosen to assess mathematics in each major

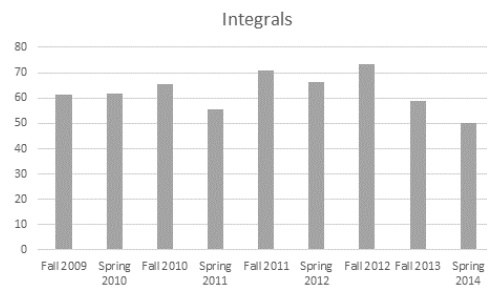
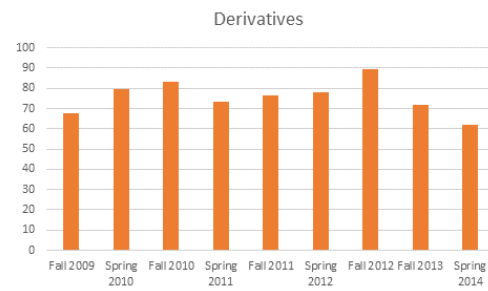
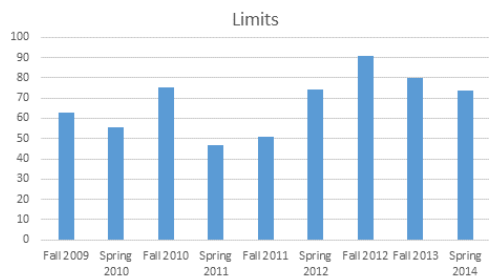
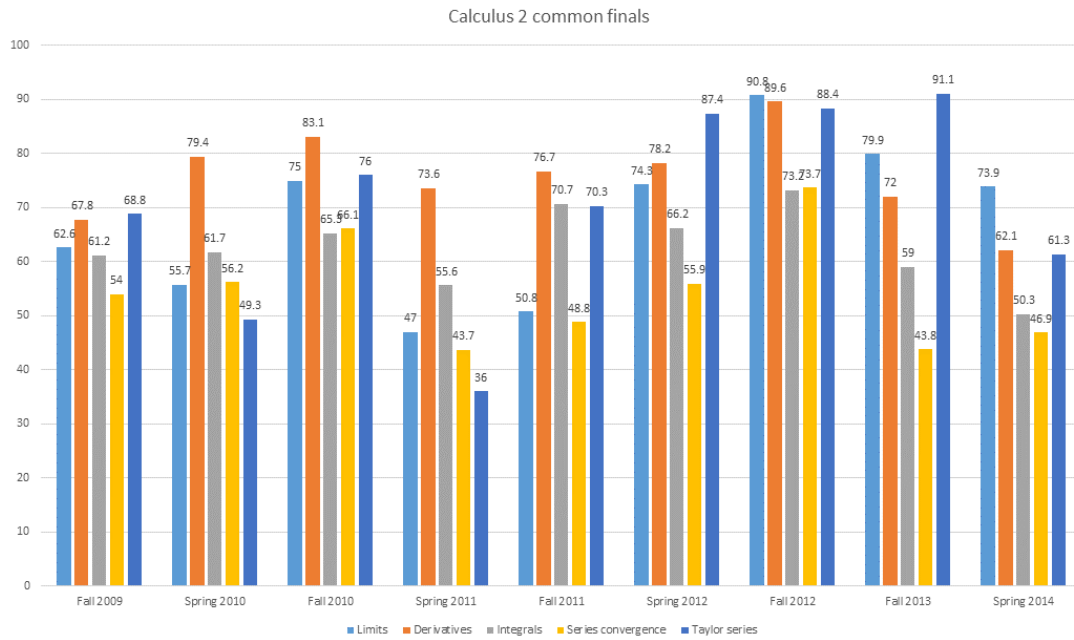
- MCS 1424 *Calculus 2* (for Engineering, Natural Sciences, Math, Computer Science, Pre-Med, etc.)
- MCS 1224 *Math Analysis 2* (for Humanities, Business, Psychology, Architecture, etc.)
- MCS1254 *Geometry in Art* (for Interior Architecture, Imaging, Media Communication, etc.)
- MCS2313 *Technical Calculus* (for Engineering Technology, etc.)

## Data set sample- Calculus 2 common final

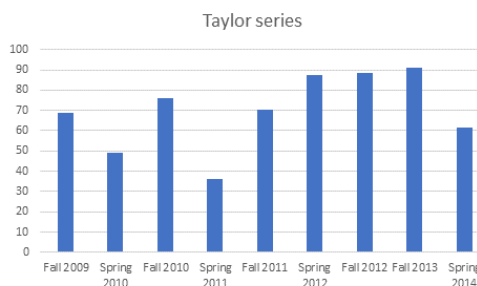
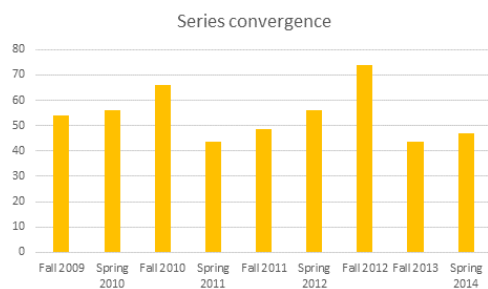
	1a	1b	2a	2b	2c	2d	3a	3b	3c	3d	3e	3f	4a	4b	5a	5b	6	7a	7b	7c	
	Limits		Differentiation				Integration						Series Conv/Div		Series AC/CC/D		Taylor	Series modification			
	0/0	inf/inf	product rule, inv trig	simplifica tion of log function	$a^u$	$u^v$ (log diff)	parts (tabular)	trig sub	half angle	C/S trig sub	parts (inv trig)	partial fractions	compare to conv. p- series	integral test	AST, ratio (factorial s)	AST, p- series comparis on test integral	series from derivative s	exponenti al	trig	binomial	TOTAL
St. No.	4	4	5	5	5	5	6	6	6	6	6	6	4	4	4	4	8	4	4	4	100
233	3	0	4	2	3	0	3	3	4	6	6	6	4	4	4	4	8	4	4	4	76
613	3	3	3	1	0	0	6	0	0	0	0	0	0	1	2	0	8	4	4	4	39
120	4	4	5	5	4	5	6	2	3	6	6	6	4	4	4	2	8	4	4	4	90

## Calculus 2 common final sample sizes

- Number of students
  - Fall 2009 53
  - Spring 2010 43
  - Fall 2010 38
  - Spring 2011 41
  - Fall 2011 15
- Number of students
  - Spring 2012 36
  - Fall 2012 17
  - Fall 2013 28
  - Spring 2014 56







## Conclusions from Calc 2 common finals

- In Fall 2011, the department decided to change the last Calc 2 lab to be a review of integrals (scores on integrals were considerably lower than those for derivatives and limits)
- Improvement in all subject areas following standardization of Finals in 2011 for three semesters, then a drop off in the two most recent semesters
- Different sections were using different notation for Taylor Series; the notation for Taylor series problems was standardized in 2011 (and communicated to the instructors)

## Geometry in Art Common Questions on three one-hour exams – implemented Spring 2012

- Tilings and rigid motions (3 questions)
- Symmetry and classification (6 questions)
- Polyhedra (3 questions)
- Golden ratio and rectangle (2 questions)
- Fibonacci numbers and ratios (2 questions)
- One-point perspective (2 questions)



## Next steps

- Expand Calc 2 common final to evening sections
- Develop a common final for Math Analysis 2
- Close the loop on Geometry in Art assessment
  - Common problems from the three hourly exams have been collected each Spring since 2012
- Standardize questions on final exams in Technical Calculus
  - Usually only one section per semester; need to standardize questions from one semester to the next



## Assessment Plan

# CRITICAL THINKING

Department of Natural Sciences

### LTU Undergraduate Learning Outcomes

“LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”

### Courses Assessed

- College Physics 1
- University Physics 1
- University Physics 1 Honor section

### Assessment Procedure

- Pre- and post-instruction test
- Statistical analysis

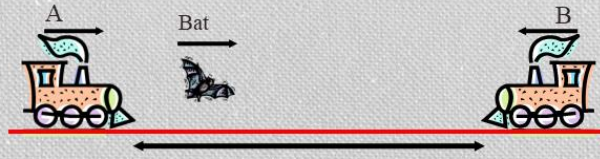


## Pre- and post-instruction test

Different versions for different courses

- Easier version for College Physics 1
- Standard version for University Physics 1
- Harder version for the honor section of University Physics 1

Not counted toward final grade



- Calculate the total distance travelled before the trains meet.
- Plot position – time graph for the bat and trains
- Calculate the time and position when the bat meets train B for the first time
- Calculate part a) again for a different starting condition (acceleration, etc.)

## Grading Rubric

- Adapted from Foundation for Critical Thinking, [www.criticalthinking.org](http://www.criticalthinking.org)
- Scored on a 0~4 scale

	4 - Exemplary If applicable, consistently does all or almost all of the following	3 - Satisfactory If applicable, consistently does most or many of the following	2 - Below Satisfactory If applicable, consistently does most or many of the following	1 - Unsatisfactory If applicable, consistently does all or almost all of the following
Purpose	~Demonstrates a clear understanding of the assignment's purpose	~Demonstrates an understanding of the assignment's purpose	~Is not completely clear about the purpose of the assignment	~Does not clearly understand the purpose of the assignment
Key Question, Problem, or Issue	~Clearly defines the issue or problem; accurately identifies the core issues ~Appreciates depth and breadth of problem	~Defines the issue; identifies the core issues, but may not fully explore their depth and breadth	~Defines the issue, but poorly (superficially, narrowly); may overlook some core issues	~Fails to clearly define the issue or problem; does not recognize the core issues
Information	~Gathers/identifies sufficient, credible, relevant information: observations, statements, logic, data, facts, questions, graphs, themes, assertions, descriptions, etc.	~Gathers/identifies sufficient, credible, and relevant information	~Gathers/identifies some credible information, but not enough; some information may be irrelevant ~Omits significant information	~Relies on insufficient, irrelevant, or unreliable information
Concepts	~Identifies and accurately explains/uses the relevant key concepts	~Identifies and accurately explains and uses the key concepts, but not with the depth and precision of a "4"	~Identifies some (not all) key concepts, but use of concepts is superficial and inaccurate at times	~Misunderstands key concepts or ignores relevant key concepts altogether
Assumptions	~Accurately identifies assumptions (things taken for granted) ~Makes assumptions that are consistent, reasonable, valid	~Identifies assumptions ~Makes valid assumptions	~Fails to identify assumptions, or fails to explain them, or the assumptions identified are irrelevant, not clearly stated, and/or invalid	~Fails to identify assumptions ~Makes invalid assumptions
Interpretations, Inferences	~Follows where evidence and reason lead in order to obtain defensible, thoughtful, logical conclusions or solutions ~Makes deep rather than superficial inferences ~Makes inferences that are consistent with one another	~Follows where evidence and reason lead to obtain justifiable, logical conclusions ~Makes valid inferences, but not with the same depth and as a "4"	~Does follow some evidence to conclusions, but inferences are more often than not unclear, illogical, inconsistent, and/or superficial	~Uses superficial, simplistic, or irrelevant reasons and unjustifiable claims ~Makes illogical, inconsistent inferences ~Exhibits closed-mindedness or hostility to reason; regardless of the evidence, maintains or defends views based on self-interest
Implications, Consequences	~Identifies the most significant implications and consequences of the reasoning (whether positive and/or negative) ~Distinguishes probable from improbable implications	~Identifies significant implications and consequences and distinguishes probable from improbable implications, but not with the same insight and precision as a "4"	~Has trouble identifying significant implications and consequences; identifies improbable implications	~Ignores significant implications and consequences of reasoning

## Data Sample

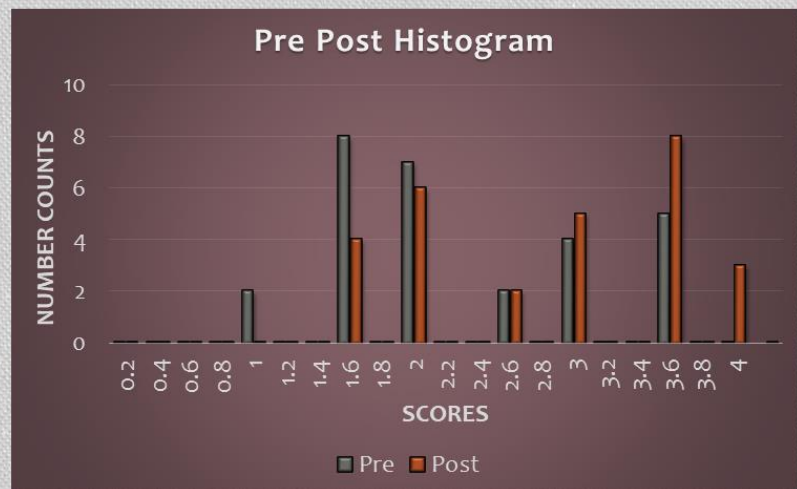
Courses	# of paired samples
College Physics (2 sections)	28
University Physics (3 sections)	60
University Physics Honor section	12

## Statistics (I)

College Physics 1

	Average
Pre-	2.23
Post-	2.79

The difference is statistically significant.  
 $p < 0.05$



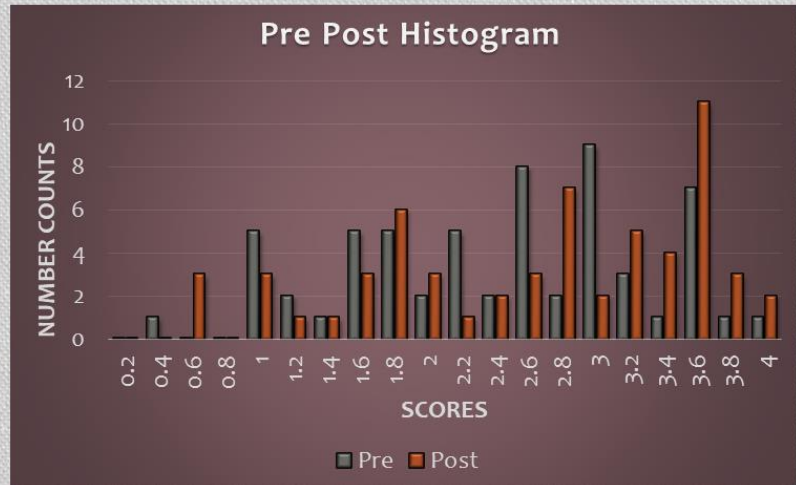


## Statistics (II)

University Physics 1

	Average
Pre-	2.33
Post-	2.54

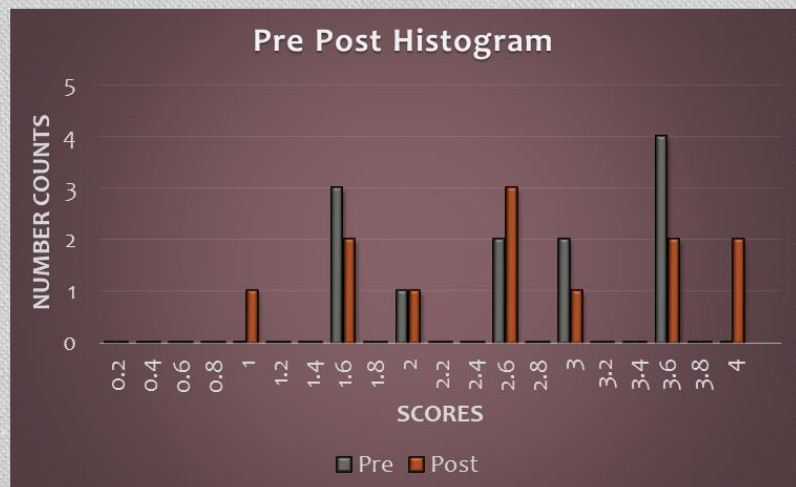
The difference is NOT statistically significant.



## Statistics (III)

University Physics 1 Honor Section

	Average
Pre-	2.63
Post-	2.63



## Future Plan

- Ensure consistent grading across sections
- Revise rubric – possibly score individual rubric items, not just the total
- Design and implement assessment of critical thinking to other Natural Sciences core courses to include students who do not need to take physics

## Writing Assessment Results 2013-2014

Processed in Excel by  
Friend to the Humanities  
Scott Schneider

## HSSC Writing Assessment

Year 1 (2008-09): English Composition, Foundations of the American Ex.  
Year 2 (2009-10): World Masterpieces 1, Development of the American Ex.  
Year 3 (2010-11): World Masterpieces 2, Junior/Senior Electives  
Year 4 (2011-12): English Composition, Foundations of the American Ex.  
Year 5 (2012-13): World Masterpieces 1, Development of the American Ex.  
Year 6 (2013-14): World Masterpieces 2, Junior/Senior Electives

12 (actually 13) point rubric: Years 1, 2, 3 (2008-09 through 2010-11)  
5 point rubric: Beginning in year 4 (2011-12 through the present)

### 2013-14

LLT 1223: World Masterpieces 2 (9 sections),  
LLT 3000/4000 (5 sections) and SSC 3000/4000 (3 sections)

-13 scorers (yeah Scott!!)

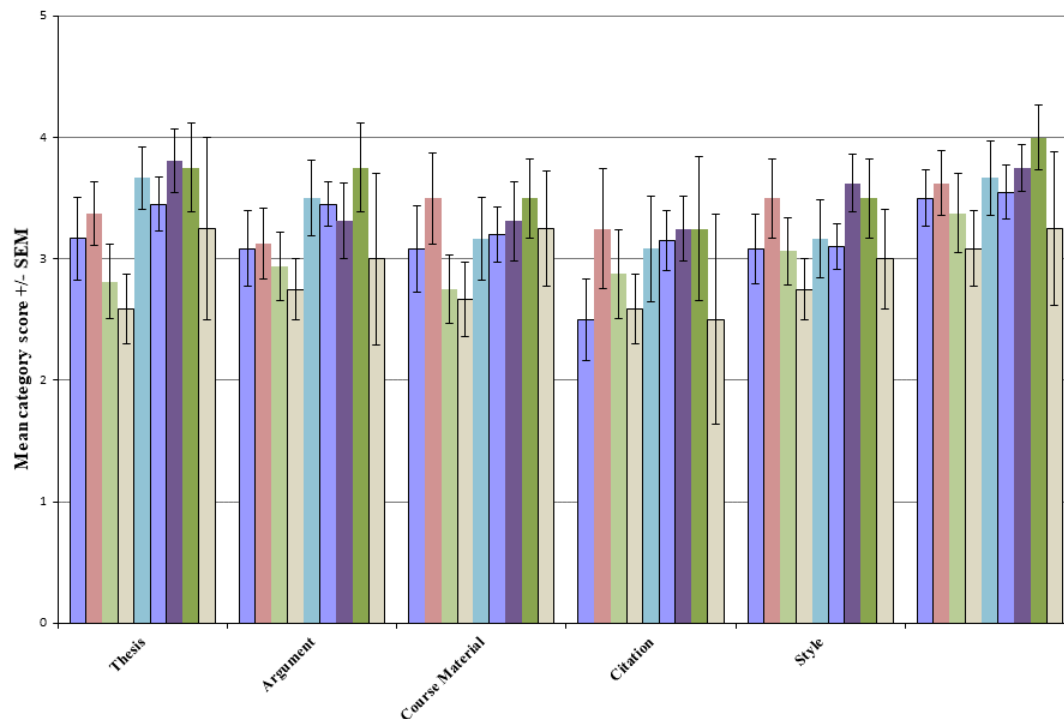
-Sample size: 181 papers (106 from WM 2 and 75 Jr/Sr electives)

-Approximately 45% of total papers from each section

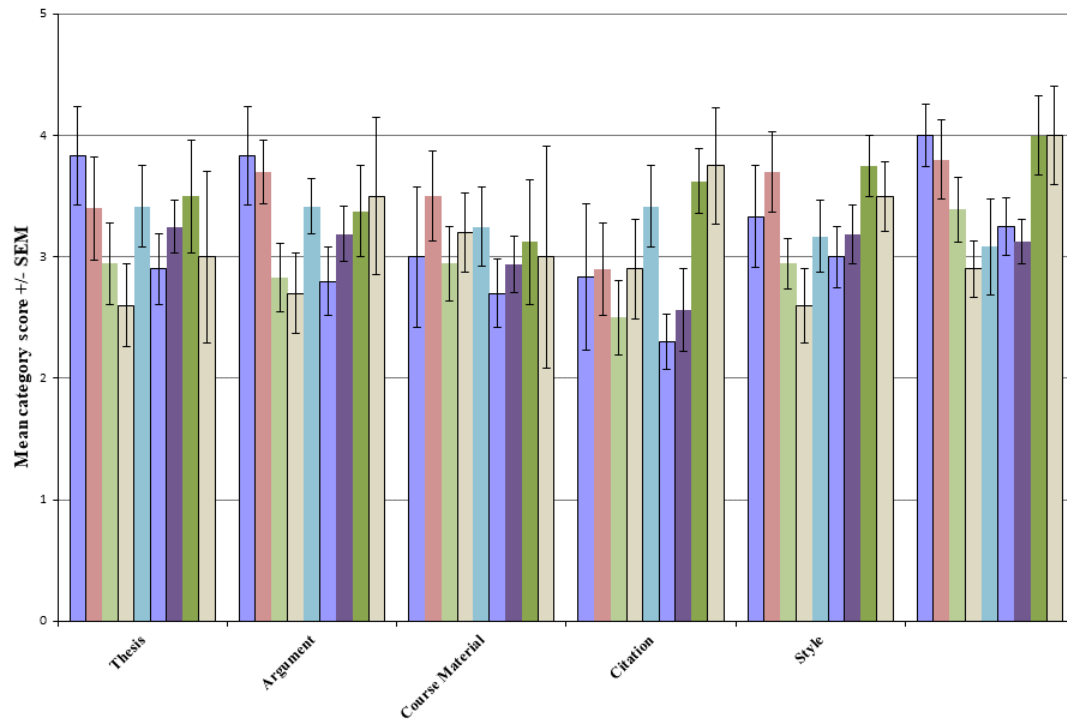
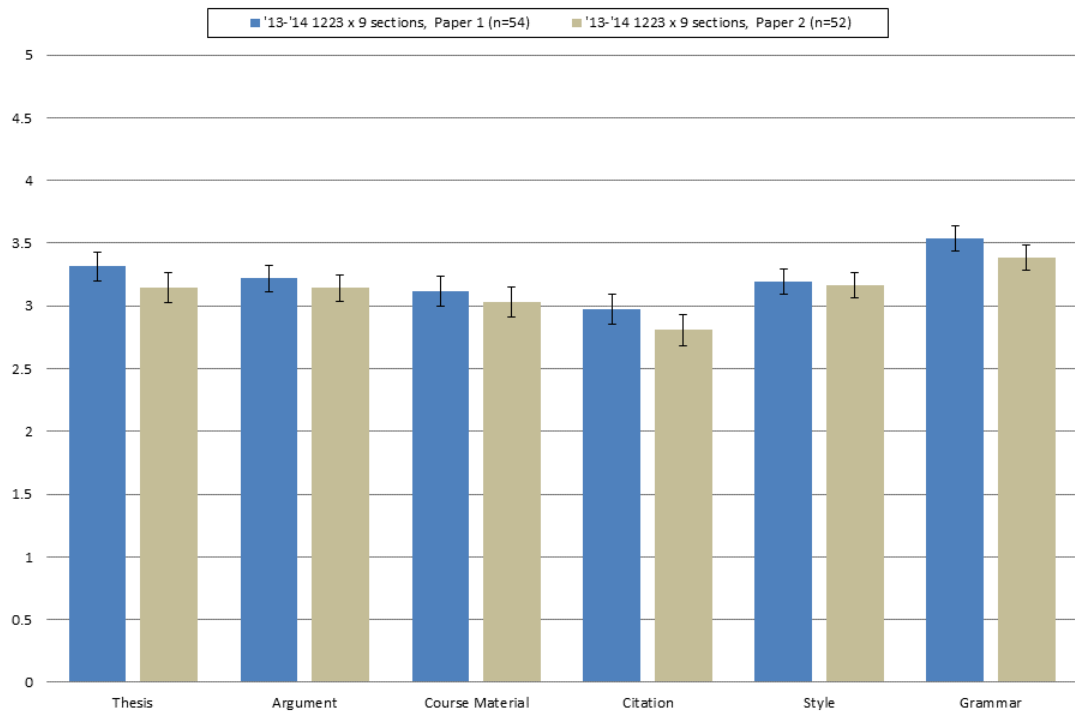
## HSSC Writing Assessment Rubric, 2.0

SCORING KEY		5	4	3	2	1
CATEGORIES		"A"	"B"	"C"	"D"	"F"
ARGUMENT	<u>A.</u> Thesis, main idea, interpretation	Insightful, original; complete thesis statement and 'roadmap' for body of paper in introduction.	Coherent, clear and complete thesis statement, but unambitious; restates consensus in class discussion.	Thesis statement addresses assigned topic, but overly general, noncommittal, or restates topic as an assertion.	Thesis statement vague, not clearly relevant to assignment.	No thesis statement.
	<u>B.</u> Development of argument through body	Body develops thesis with increasing conceptual nuance; concedes counter-arguments where applicable.	Body develops thesis, but lacks nuance, qualifications, or acknowledgment of other interpretations.	Body sustains them/ topic of thesis, but not in an analytically sequential manner; relevant counter-arguments unresolved.	Substantial portions of argument of questionable relevance to thesis; counter-arguments undermine thesis.	Arguments irrelevant to thesis; alternate interpretations not acknowledged.
EVIDENCE	<u>C.</u> Command of course material	Material subjected to critical analysis; each primary claim and many secondary claims supported by textual evidence.	Identifies and explains relevant passages; each primary claim supported by relevant examples from the texts.	Interpretation does no violence to the text; textual evidence mixed with opinion.	Coherent but excessively vague interpretation; relies primarily on opinion.	Confused about basic issues; relies nearly exclusively on opinion.
	<u>D.</u> Citations	All necessary citations provided, all in proper format (MLA/ APA / Chicago.)	Most necessary citations provided, all in proper format.	Inconsistent citations, all from valid sources.	Insufficient citations.	Few or no citations.
MECHANICS	<u>E.</u> Style / structure	Concise, direct, active prose; paragraphs organized around discrete ideas in coherent sequence; effective transitions.	Some colloquialisms, but little repetition and few passive constructions; paragraphs organized around discrete ideas, but weak transitions. Few and incidental grammar and syntax errors: does not repeat same error.	Colloquial, repetitive, or passive; paragraphs organized around discrete ideas, but without logical sequence or transitions. Moderate frequency of errors, or same errors repeated, but meaning unimpaired.	Inappropriate length: too long or too short; Stylistic errors impair meaning; paragraphs have multiple ideas and lack logical sequence.	Majority of text is superfluous; text arbitrarily sectioned into paragraphs.
	<u>F.</u> Grammar / syntax	No significant, basic errors.			Mechanical errors impair meaning.	Pervasive mechanical errors.

Graph A: '13-'14, LLT 1223 (9 sections), mean comparisons of Paper 1



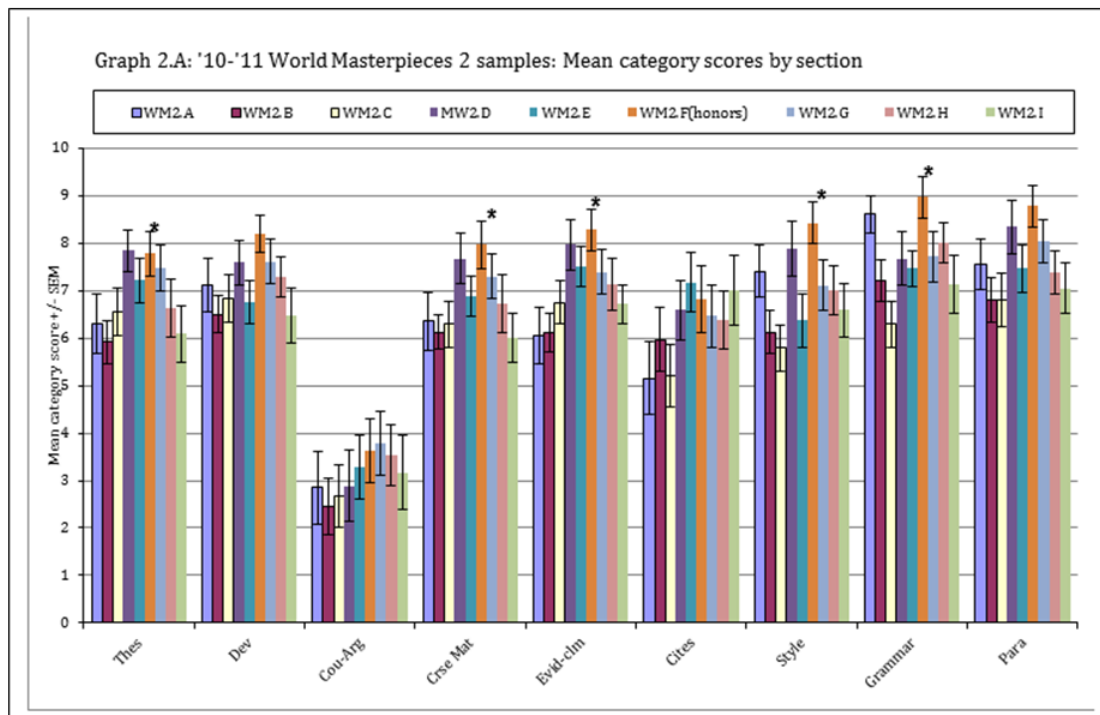


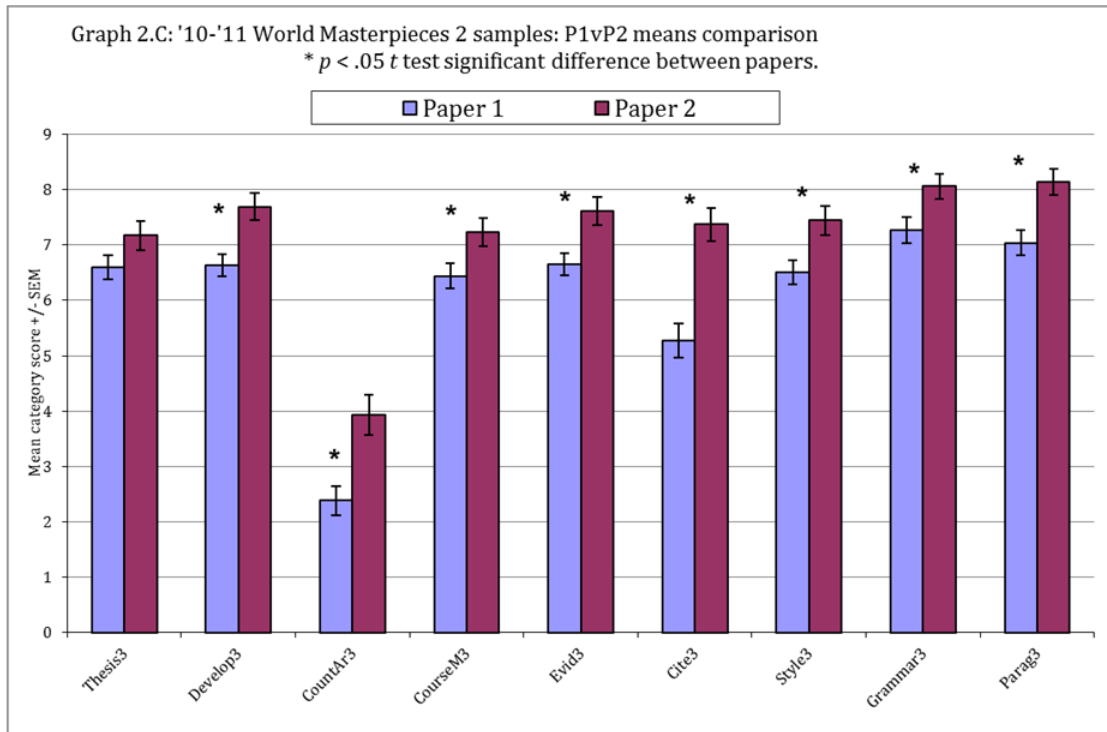
**Graph B: '13-'14, LLT 1223 (9 sections), mean comparisons of Paper 2****Graph C: '13-'14, LLT 1223 (9 sections): P1vP2 means comparison (unpaired T-test)**  
**No significant difference between papers.**

## HSSC Writing Assessment Rubric

SCORING KEY		12	11	10	9	8	7	6	5	4	3	2	1	0	
CATEGORIES		"A"			"B"			"C"			"D"			"F"	
ARGUMENT	A. Thesis, main idea, interpretation	Insightful, original; complete thesis statement and 'roadmap' for body of paper in introduction			Coherent, clear and complete thesis statement, but unambitious; restates consensus in class discussion			Thesis statement addresses assigned topic, but overly general, noncommittal, or restates topic as an assertion			Thesis statement vague, not clearly relevant to assignment			No thesis statement	
	B. Development of argument through body	Body logically unfolds claims in thesis, with increasing conceptual nuance; Skillful use of concession and qualification			Body logically unfolds central claims in thesis, but lacks nuance, concessions or qualifications			Body sustains theme/topic of thesis, but not in an analytically sequential manner			Substantial portions of argument of questionable relevance to thesis			Arguments irrelevant to thesis	
	C. Counter-arguments anticipated	Takes 'other side' into account and gives strong reasons for author's approach.			Skillful but inconsistent consideration of reasonable counter-arguments			Counter-arguments introduced, but issues unaddressed or unresolved			Counter-arguments undermine thesis			No counter-arguments acknowledged	
EVIDENCE	D. Command of course material	Demonstrates mastery; material subjected to critical analysis			Demonstrates proficiency; identifies and accurately explains relevant passages			Demonstrates competence; college-level interpretation that does no violence to the text			Coherent, but excessively vague or general			Confused about basic issues	
	E. Relation between evidence and claims	Each primary claim and many secondary claims supported by direct textual evidence			Each primary claim supported by plausible and relevant examples from texts			Textual evidence mixed with opinion			Relies primarily on opinion			Relies nearly exclusively on opinion	
	F. Citation	All necessary citations provided, all in proper format (MLA/APA)			Most necessary citations provided, all in proper format			Inconsistent citations, all from valid sources			Insufficient citations			Few or no citations	
MECHANICS	G. Concision / Style	Cannot be substantially cut; succinct, direct, active prose			Largely free of errors of style; some colloquialisms, but little repetition or redundancy; few passive constructions			Avoids errors of style that impair meaning, but prose is colloquial, repetitive, or passive			Essay could be substantially shortened; mechanical errors impair meaning			Majority of text is superfluous	
	H. Grammar / syntax	No significant, basic errors			Few and incidental grammar and syntax errors; does not repeat same error			Moderate frequency of errors, or same errors repeated, but meaning unimpaired			Mechanical errors impair meaning			Pervasive mechanical errors	
	I. Paragraphs	Paragraphs organized around discrete main ideas in coherent sequence; effective transitions			Paragraphs organized around discrete main ideas in coherent sequence, but weak transitions			Paragraphs organized around discrete main ideas, but problems with their internal construction and sequencing			Some paragraphs have multiple main ideas or incomplete ideas; transitions inferred rather than stated			Text arbitrarily sectioned into paragraphs	

## 2010-2011 WM 2 results:

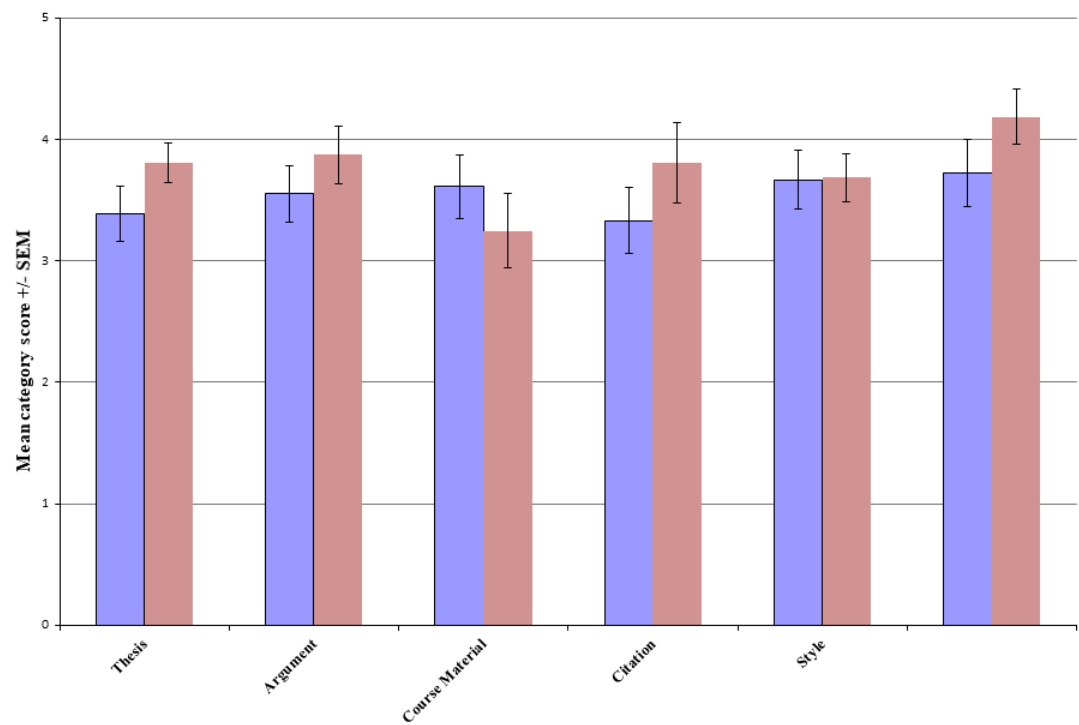




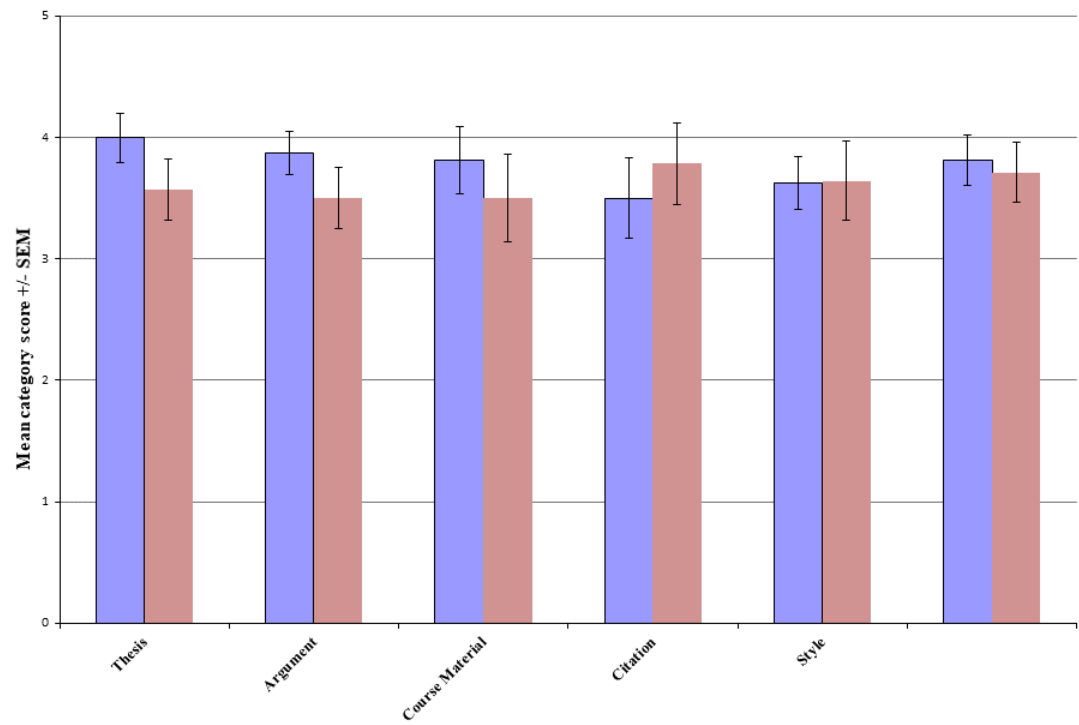
Junior/Senior Electives  
 from which two papers were collected

(2 separate LLT courses):

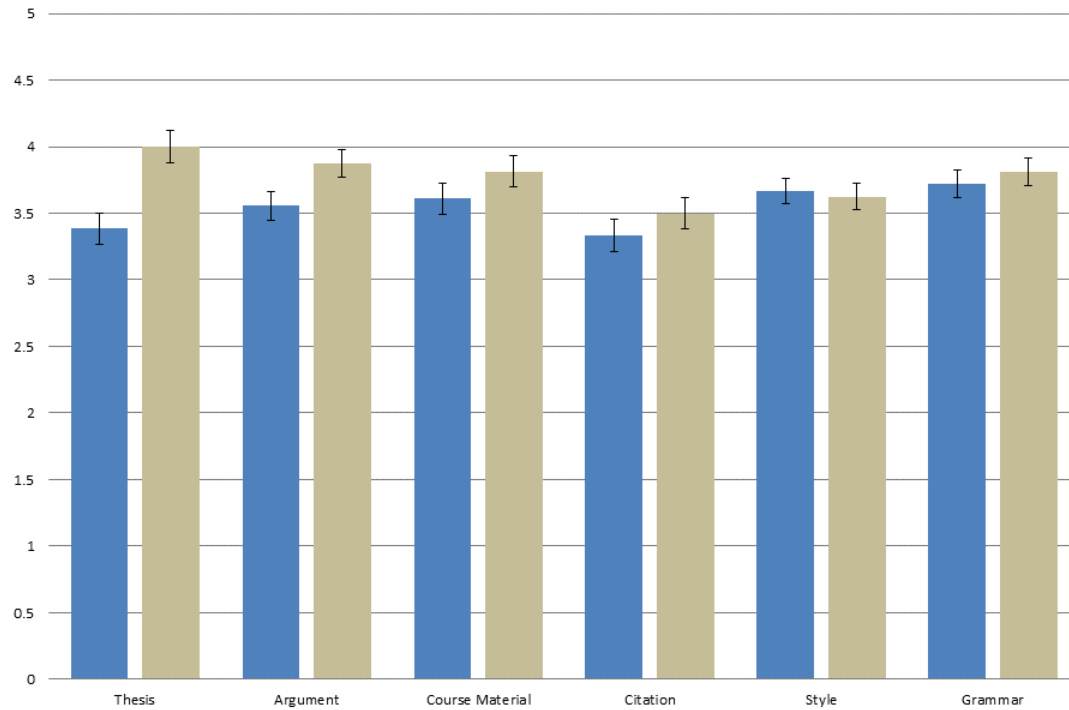
Graph D: '13-'14, LLT sections A (blue) and B (pink), mean comparisons of Paper 1



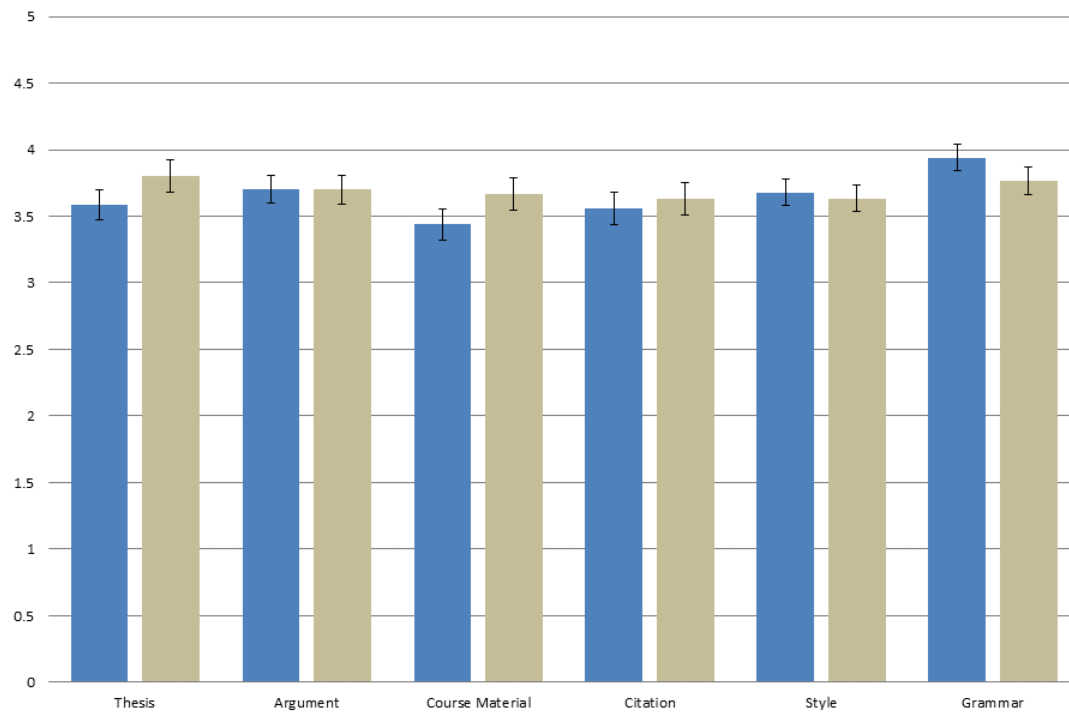
Graph E: '13-'14, LLT sections A (blue) and B (pink), mean comparisons of Paper 2



**Graph F: '13-'14 LLT section A: P1vP2 means comparison (unpaired T-test)**  
**No significant difference between papers.**

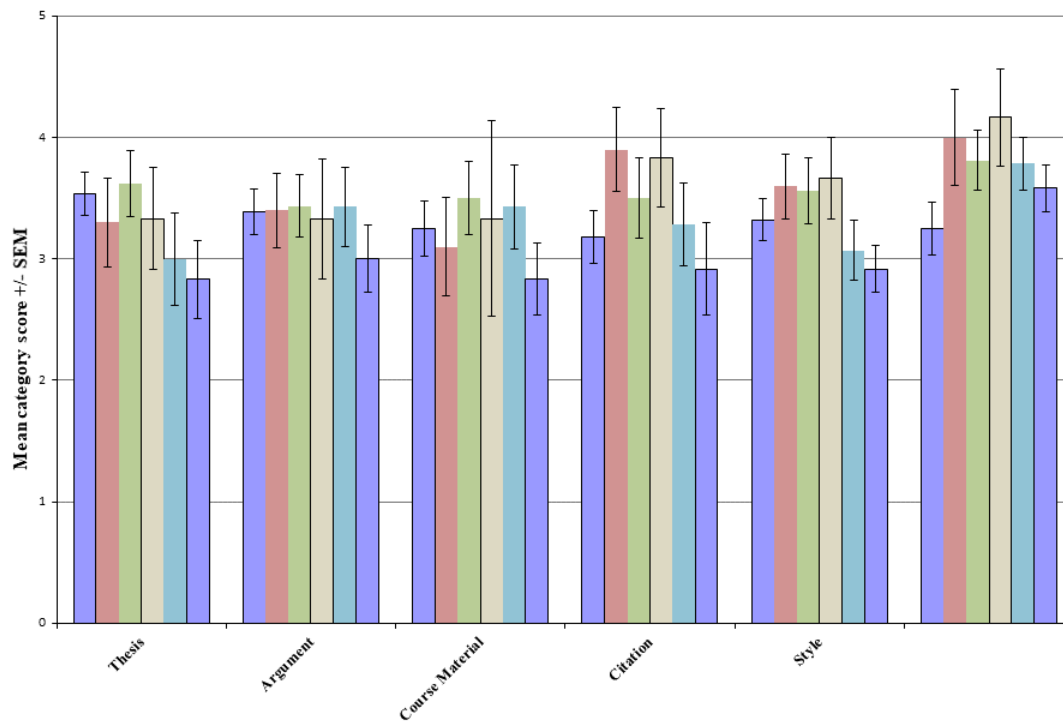


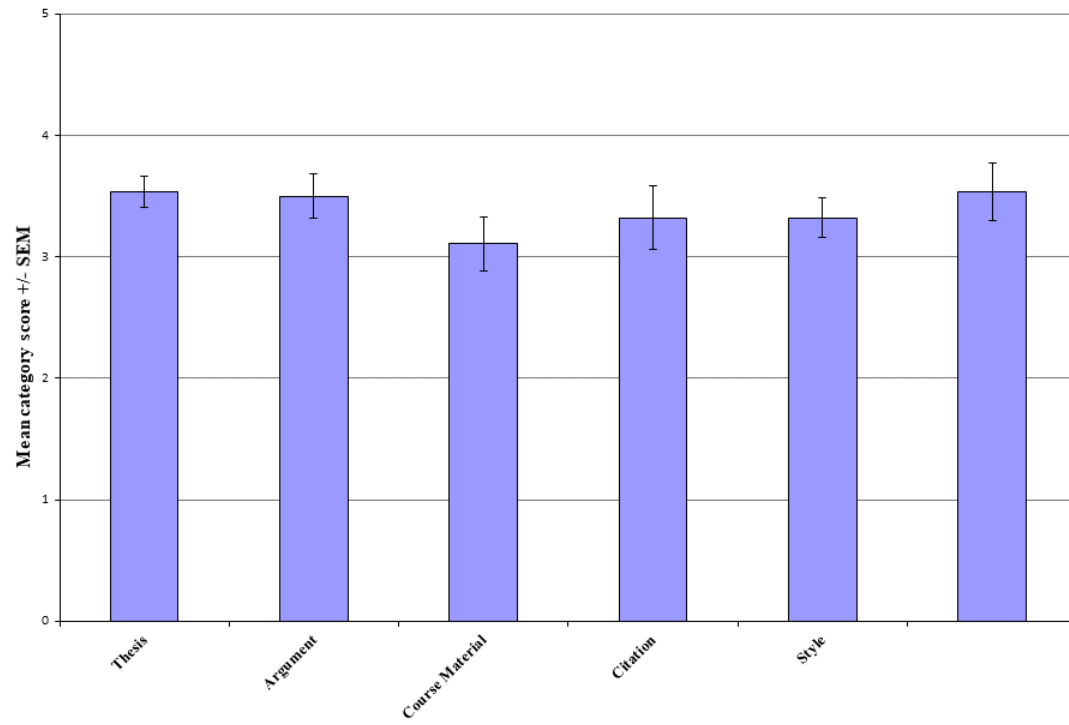
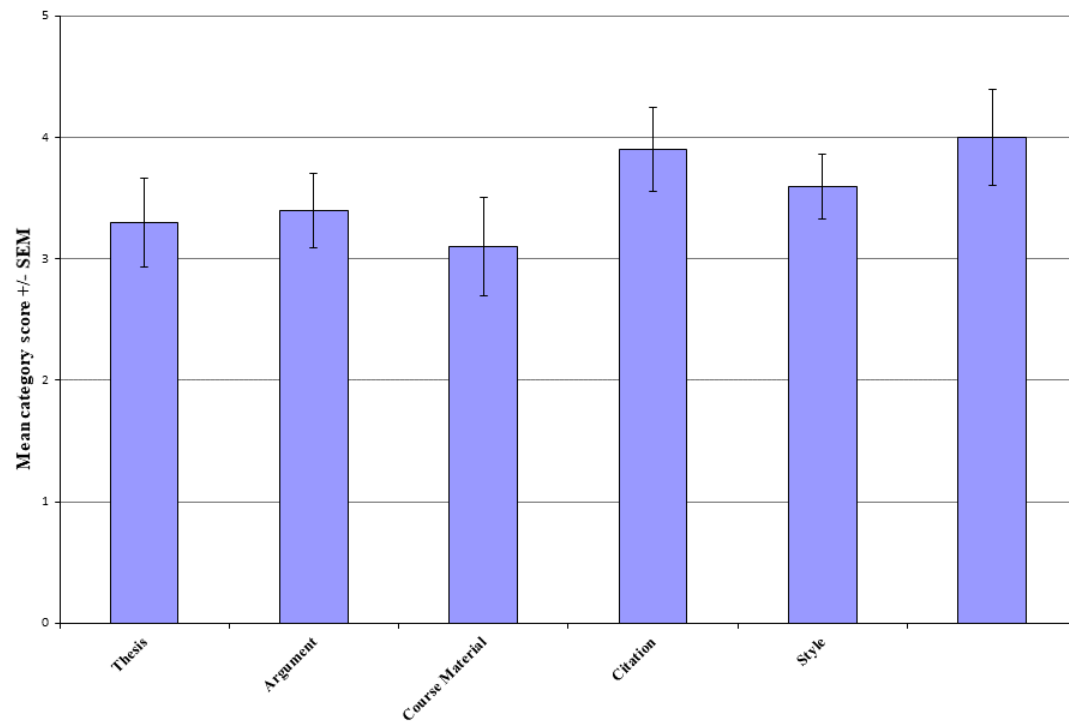
**Graph G: '13-'14, LLT section B: P1vP2 means comparison (unpaired T-test)**  
**No significant difference between papers.**

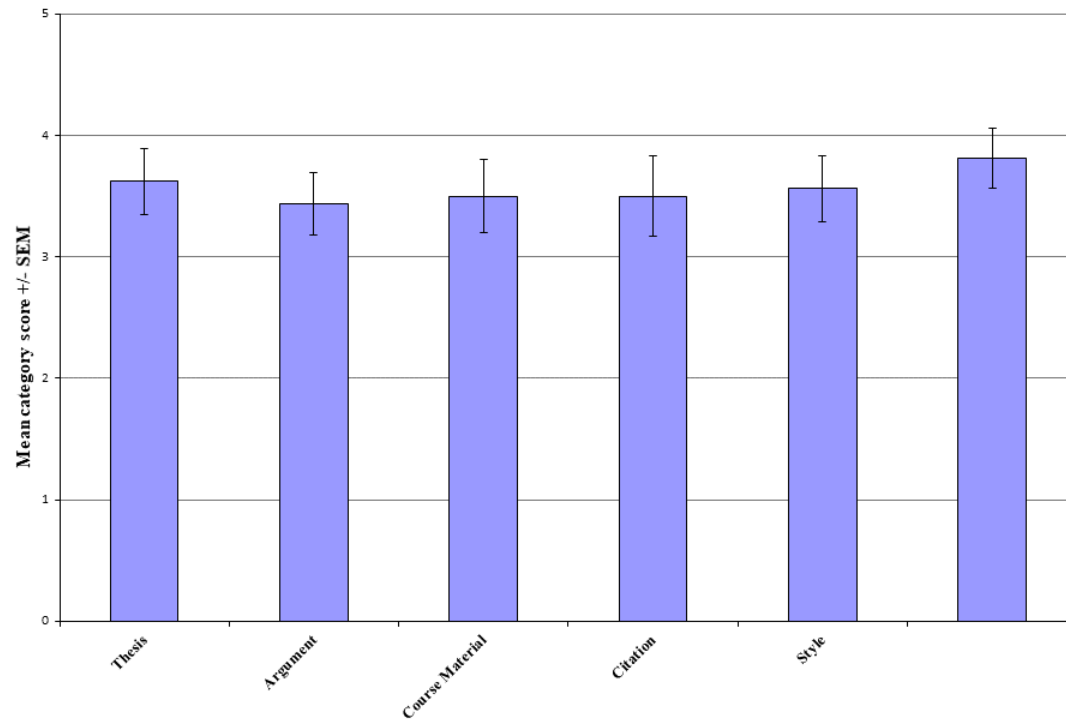
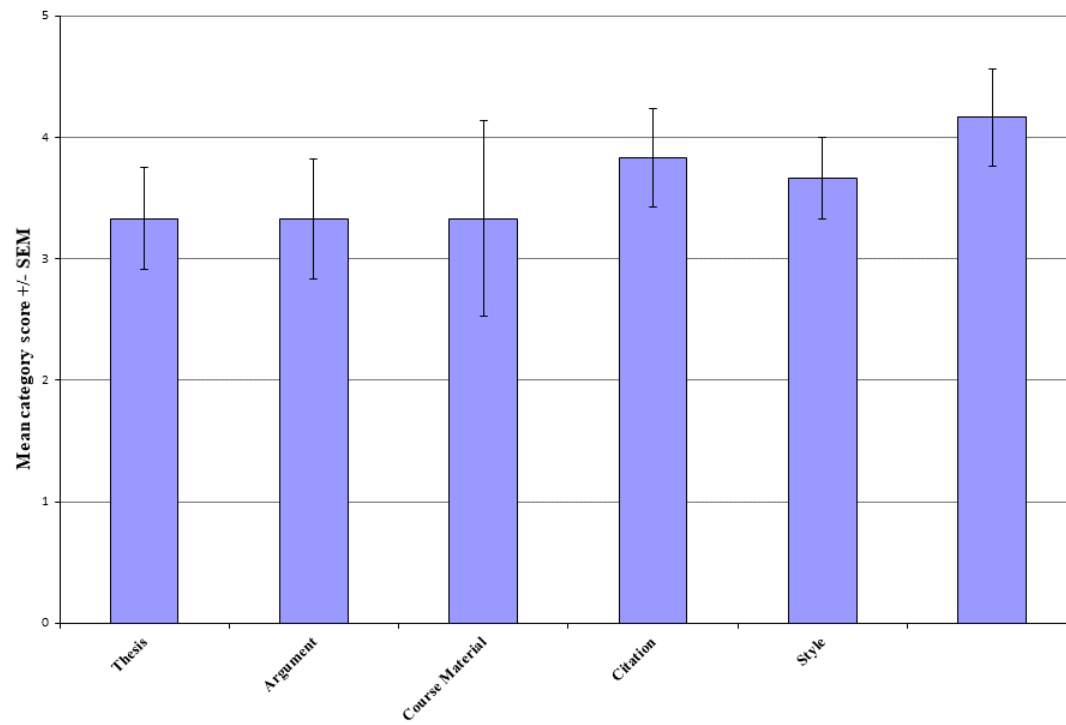


Junior/Senior Electives from which only one paper was collected  
(3 separate LLT courses, 3 separate SSC courses; 6 courses total):

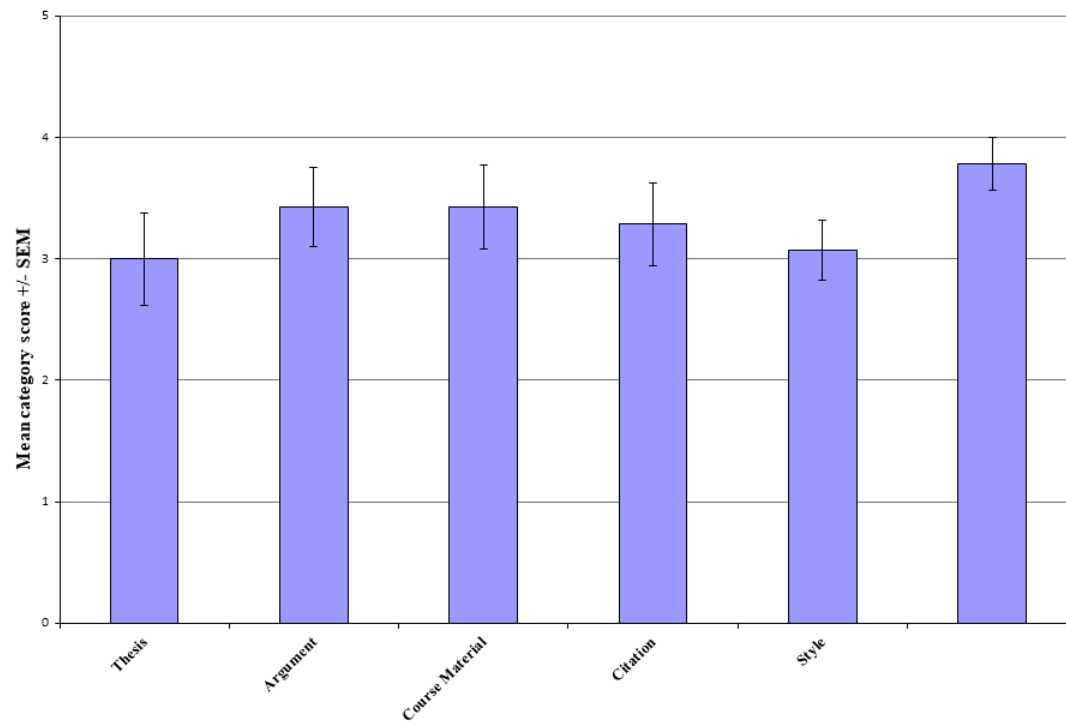
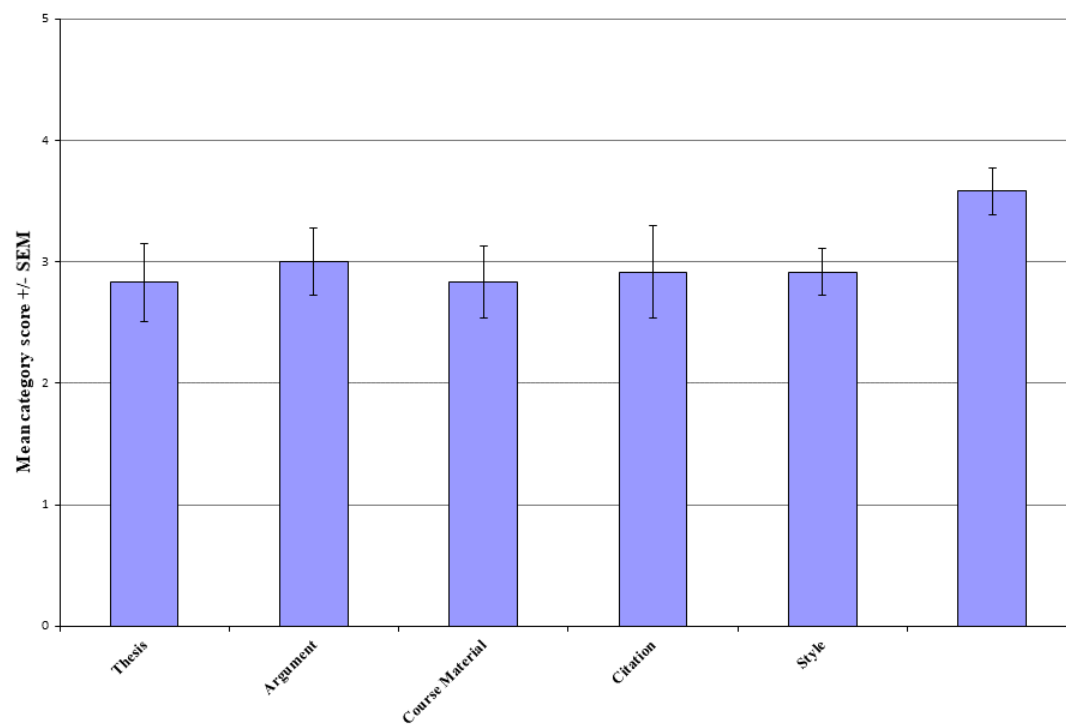
Graph H: '13-'14, LLT C, D, E; SSC A, B, C Mean comparisons of Paper 1



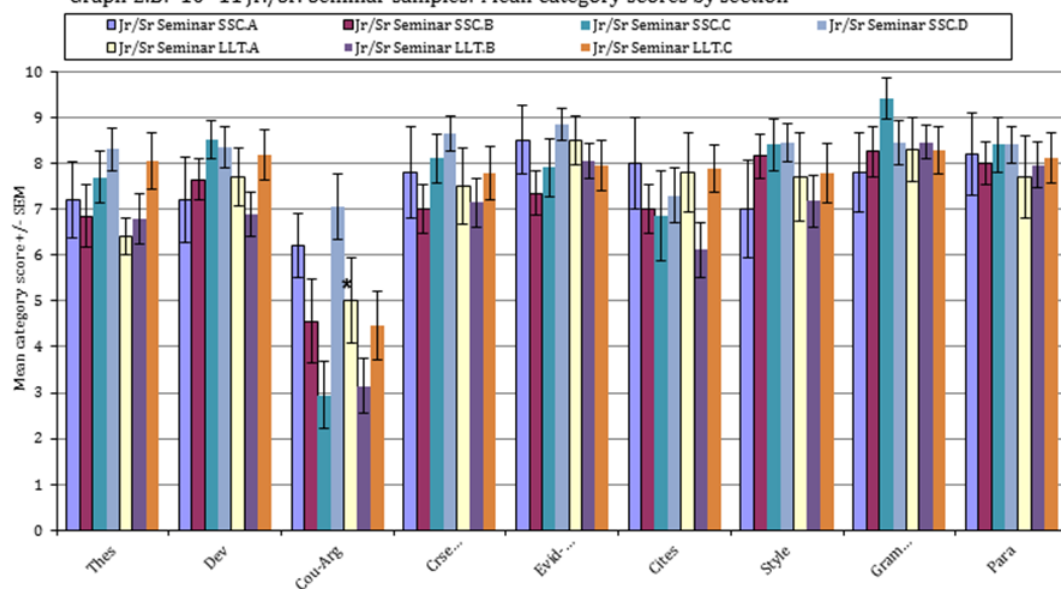
**Graph I: '13-'14, LLT C, mean comparisons of Paper 1****Graph J: '13-'14, LLT D, mean comparisons of Paper 1**

**Graph K: '13-'14, LLT course E, mean comparisons of Paper 1****Graph L: '13-'14, SSC course A, mean comparisons of Paper 1**

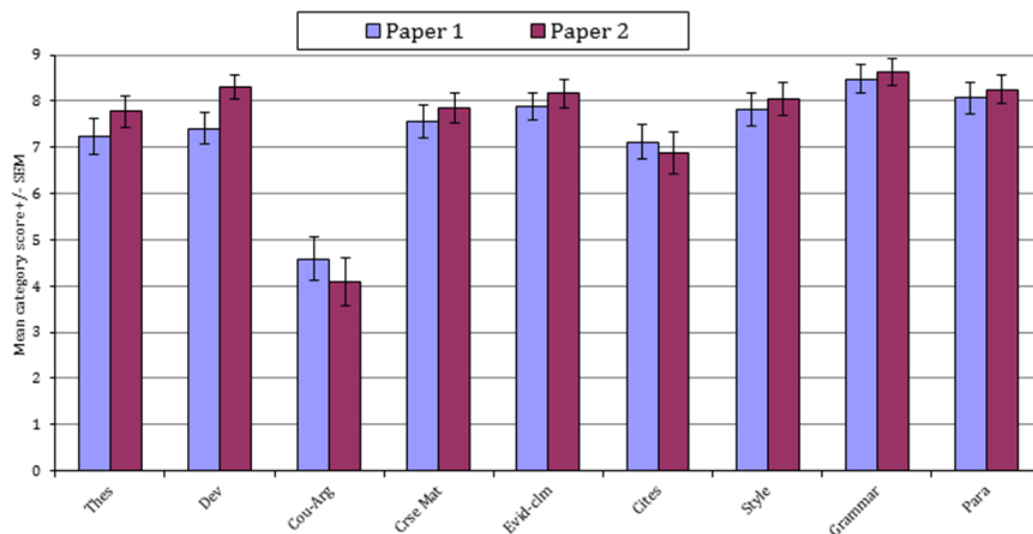


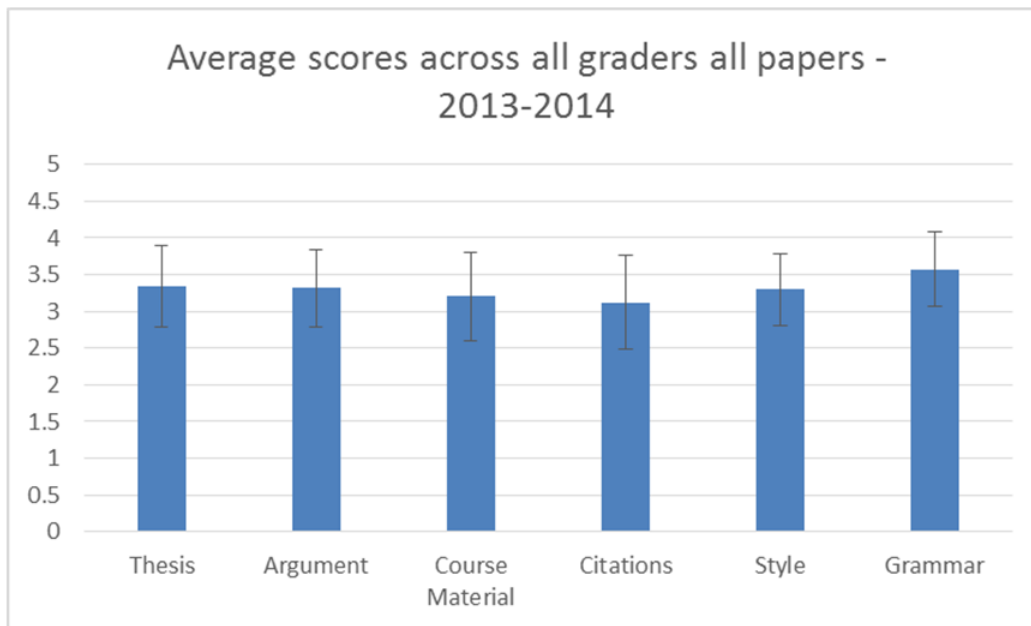
**Graph M: '13-'14, SSC course B, mean comparisons of Paper 1****Graph N: '13-'14, SSC course C, mean comparisons of Paper 1**

Graph 2.B: '10-'11 Jr./Sr. Seminar samples: Mean category scores by section



Graph 2.D: '10-'11 Jr./Sr. Seminar samples: P1vP2 means comparison

\*  $p < .05$   $t$  test significant difference between papers.



### **Core Curriculum Diagnostic Reading Exam**

Pilot completed 2012-13

Data assessed and disseminated Fall 2013

Fall 2014: Revision of test questions

Spring 2015: Test to be completed by all sections of COM1103 and SSC2423

### **Writing Proficiency Exam**

Drafting of new prompts: On hold in light of Provost's Sub Committee

**Master of Architecture- 168 credits**

Submitted to: The National Architectural Accrediting Board  
Date: September 7, 2013

NAAB SPC CONDITIONS MATREX | 27 NOVEMBER 2013

DEAM-A: CRITICAL THINKING AND REPRESENTATION														DEAM-B: INTEGRATED BUILDING PRACTICES, TECHNICAL SKILLS & KNOWLEDGE														DEAM-C: LEADERSHIP & PRACTICE													
A1 Ability	A2 Ability	A3 Ability	A4 Ability	A5 Ability	A6 Ability	A7 Ability	A8 Ability	A9 Understand	A10 Understand	A11 Understand	B1 Ability	B2 Ability	B3 Ability	B4 Ability	B5 Ability	B6 Ability	B7 Understand	B8 Understand	B9 Understand	B10 Understand	B11 Understand	B12 Understand	C1 Understand	C2 Understand	C3 Understand	C4 Understand	C5 Understand	C6 Understand	C7 Understand	C8 Understand											
COURSE #														COURSE NAME																											
SEMESTER 01																																									
ARC 1002 Art and Design Awareness																																									
ARC 1103 Arch. Design 1																																									
ARC 1213 Visual Communications 1																																									
SEMESTER 02																																									
ARC 1108 Basic Design 2																																									
ARC 1213 Visual Communications 2																																									
SEMESTER 03																																									
ARC 1110 Integrated Design 1																																									
ARC 2013 Visual Communications 3																																									
ARC 3013 History of Designed Environment 1																																									
SEMESTER 04																																									
ARC 2126 Integrated Design 2																																									
ARC 3023 History of Designed Environment 2																																									
SEMESTER 05																																									
ARC 2123 Building Systems 1																																									
ARC 2124 Structures 1																																									
ARC 3117 Integrated Design 3																																									
SEMESTER 06																																									
ARC 2101 Building Systems Global Lecture																																									
ARC 2102 Building Systems 2																																									
ARC 3126 Integrated Design 4																																									
ARC 3023 Historic & Modern Systems																																									
ARC 3123 Structures 2																																									
SEMESTER 07																																									
ARC 4001 Advanced Design Studio																																									
ARC 4101 20th Century Architecture																																									
ARC 4401 Architectural, Elec. & Mech. Systems																																									
ARC 4513 Structures 3																																									
SEMESTER 08																																									
ARC 4114 Architecture Design Studio 5																																									
ARC 4543 Structures 4																																									
SEMESTER 09 (SUMMER)																																									
ARC 5010 Research Methods																																									
ARC 5804 Critical Practice Studio																																									
SEMESTER 10																																									
ARC 5603 Design Theory																																									
ARC 5814 Advanced Design Studio 1																																									
ARC 6014 Thesis 1 (taken in place of ARC 5814)																																									
SEMESTER 11																																									
ARC 5814 Advanced Design Studio 2																																									
ARC 5913 Professional Practice																																									
ARC 6014 Thesis 2 (taken in place of ARC 5814)																																									
SEMESTER 12																																									
ARC 5401 Emerging Issues																																									
ARC 6010 Practice Portfolio																																									
Primary														Secondary														Conditions included in Comprehensive Design													



[illegible]

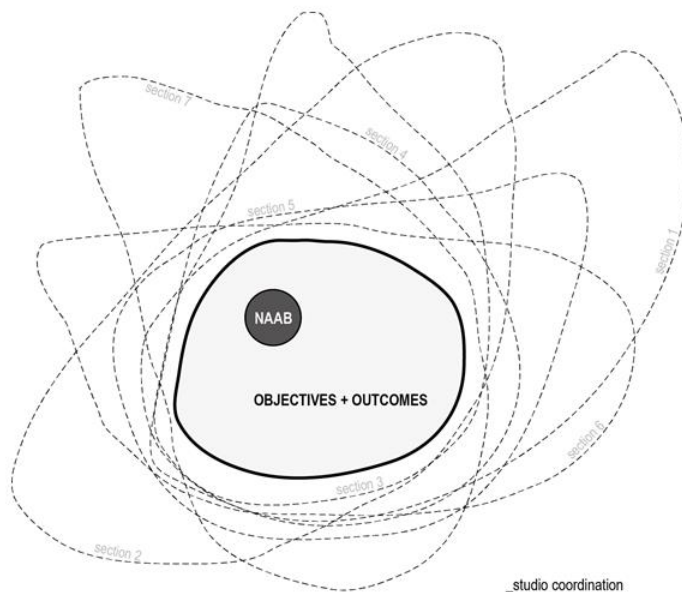
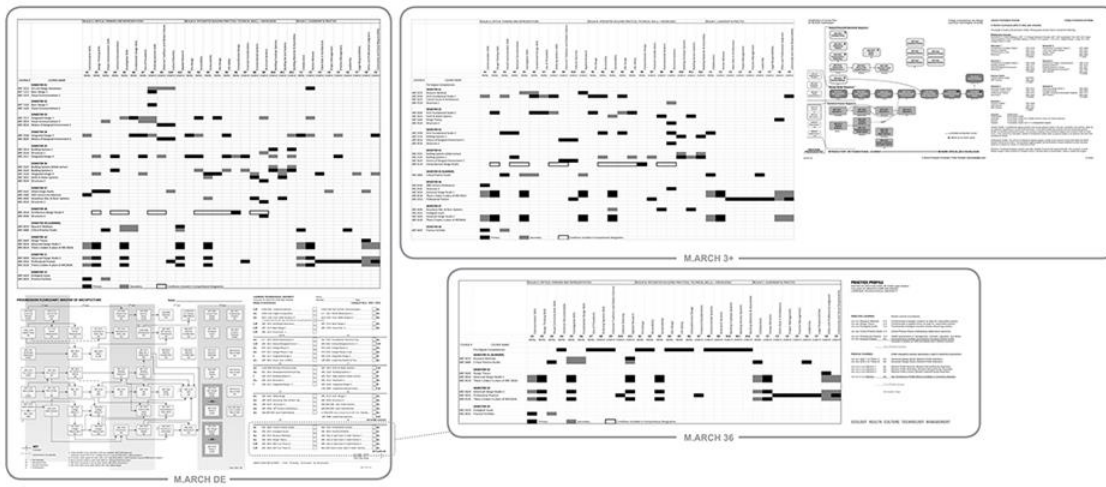
REALM A: CRITICAL THINKING AND REPRESENTATION										REALM B: INTEGRATED BUILDING PRACTICES, TECHNICAL SKILLS + KNOWLEDGE										REALM C: LEADERSHIP & PRACTICE																																									
A1		A2		A3		A4		A5		A6		A7		A8		A9		A10		A11		B1		B2		B3		B4		B5		B6		B7		B8		B9		B10		B11		B12		C1		C2		C3		C4		C5		C6					
Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability	Ability							
Communication Skills		Design Thinking Skills		Visual Communication Skills		Technical Documentation		Integrative Skills		Fundamental Design Skills		Use of Precedents		Creating Systems Skills		Historical Traditions and Global Cultures		Cultural Diversity		Applied Research		Pre-Design		Feasibility		Sustainability		Design		Life Safety		Supersustainable Design		Financial Considerations		Environmental Systems		Structural Systems		Building Technology Systems		Building Service Systems		Building Materials & Assemblies		Collaboration		Career Behavior		Client Role in Architecture		Project Management		Practice Management		Relationship		Legal Responsibilities		Ethics and Professional Judgment	
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SEMESTER 04																																																													
ARC 2126 Integrated Design 2																																																													
ARC 3613 History of Designed Environment 2																																																													
SEMESTER 05																																																													
ARC 2313 Building Systems 1																																																													
ARC 2514 Structures 1																																																													
ARC 3117 Integrated Design 3																																																													
SEMESTER 06																																																													
ARC 2321 Building Systems Global Lecture																																																													
ARC 2321 Building Systems 1																																																													
ARC 3126 Integrated Design 4																																																													
ARC 3413 HVAC & Water Systems																																																													
ARC 3523 Structures 2																																																													
SEMESTER 07																																																													
ARC 4044 Allied Design Studio																																																													
ARC 4183 20th Century Architecture																																																													
ARC 4643 Acoustical, Elec. & Hum. Systems																																																													
ARC 4533 Structures 3																																																													
SEMESTER 08																																																													
ARC 4114 Architecture Design Studio 1																																																													
ARC 4543 Structures 4																																																													
SEMESTER 09 [SUMMER]																																																													
ARC 5019 Research Methods																																																													
ARC 5804 Critical Practice Studio																																																													
SEMESTER 10																																																													
ARC 5643 Design Theory																																																													
ARC 5814 Advanced Design Studio 1																																																													
ARC 6514 Thesis 1 (taken in place of ARC 5814)																																																													
SEMESTER 11																																																													
ARC 5824 Advanced Design Studio 2																																																													
ARC 5913 Professional Practice																																																													
ARC 6524 Thesis 2 (taken in place of ARC 6424)																																																													
SEMESTER 12																																																													
ARC 5413 Ecological Issues																																																													
ARC 6833 Practice Portfolio																																																													

Primary

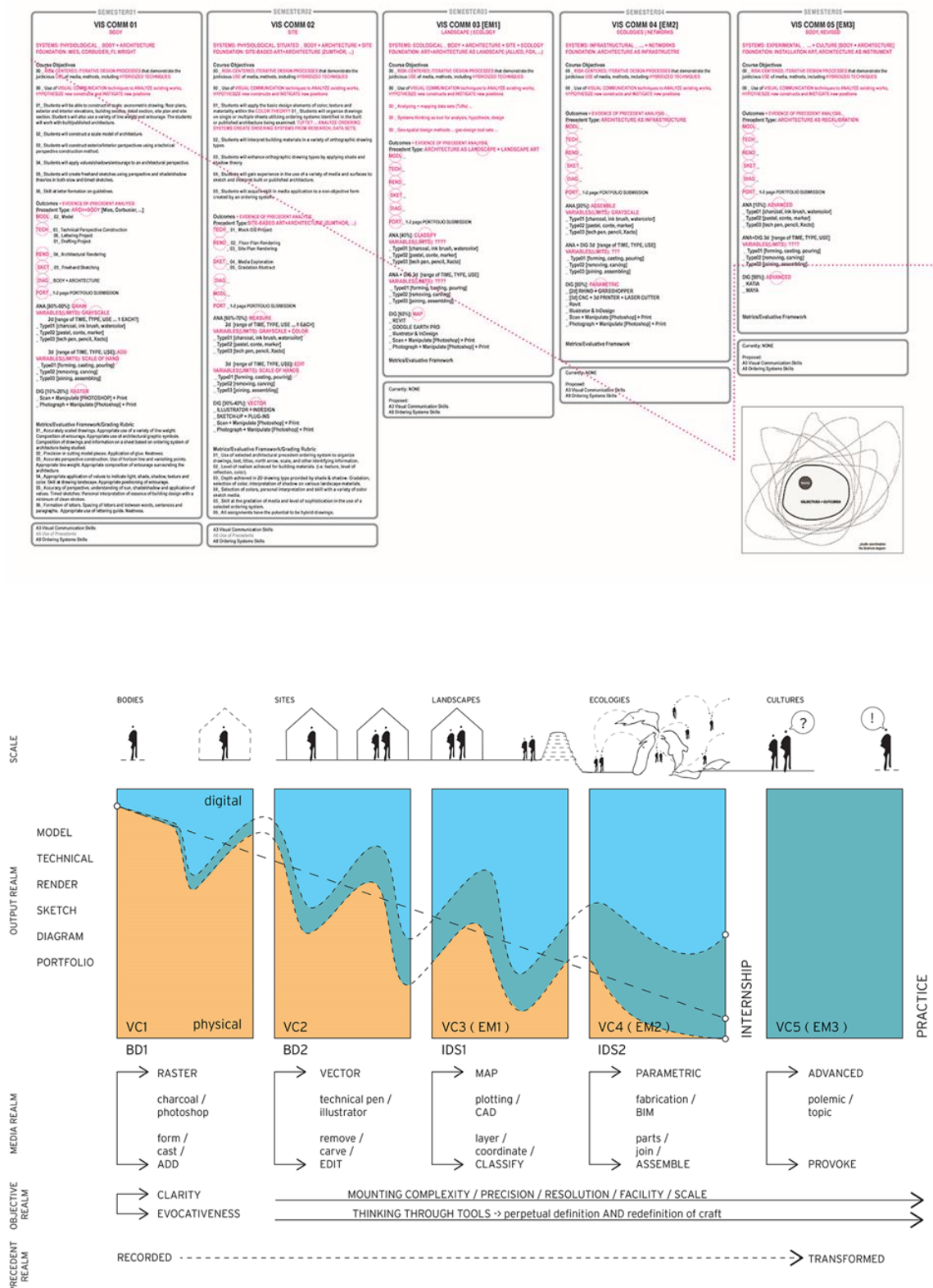
Secondary

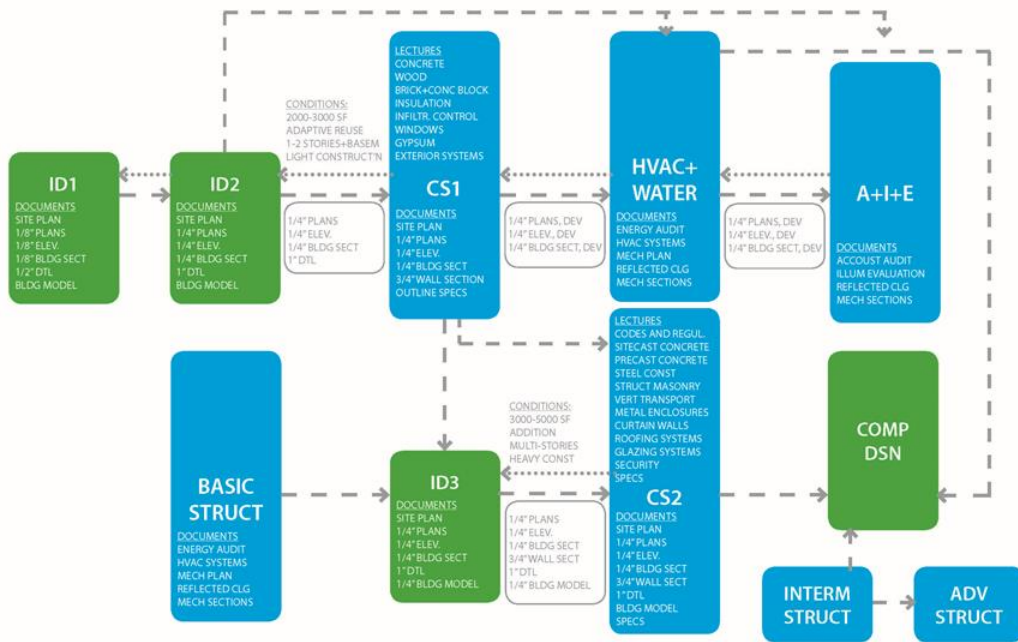
Conditions included in Comprehensive Designation



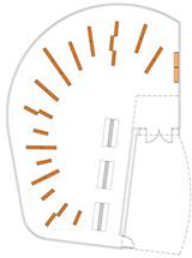






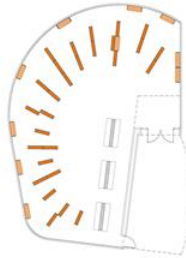


v2 ( floor plan )



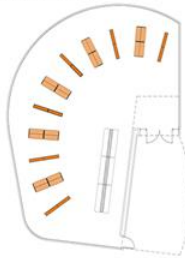
( 28 shelving units = 56 bases )

v3 ( floor plan )



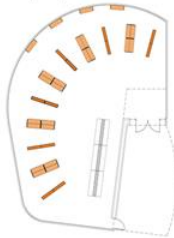
( 28 shelving units = 56 bases )

v4 ( floor plan )



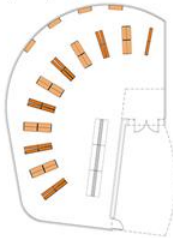
( 12 shelving units = 24 bases )

v5 ( floor plan )



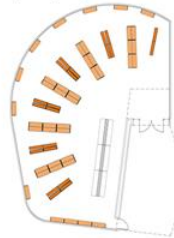
( 12 shelving units = 24 bases )

v6 ( floor plan )



( 22 shelving units = 44 bases )

v7 ( floor plan )



( 22 shelving units = 44 bases )

# What have **YOU** been up to?

the design community wants to know

Lawrence  
Tech alumni  
The Architecture and Design Chapter of the  
Alumni Association of Lawrence Technological University  
23000 West Ten Mile Road | Southfield MI 48075 | www.ltu.edu

## LTU ALUMNI DESIGN EXHIBITION 2014

(in association with 2014 NAAB Accreditation visit)

### FEATURING YOU

submit and show up!

The 2014 CoAD Design Award for Professional Excellence or the 2014 LTU ADC Alumni Award for Excellence in Design could be **YOURS!**

March 29, 2014, 8 p.m., 360 West Fort Street, Detroit 48226

**Call for entries:** We want to celebrate your accomplishments as a professional.

**Design:** a 20" x 30" board of your individual work, anything you've done since graduation! (Be sure to include your name so that you can be recognized.) LTU will print and display selected submissions at the Exhibition. All you really have to do is submit a pdf!

**Details:** Submit your board design in pdf format at a resolution of 300 dpi (full size). Label your submission file `alumnexhibition_yourname.pdf`. Please put your name and contact information in the bottom right-hand corner of your board using 18pt. Arial font in 50% gray or white.

**Submit:** your work by March 10, 2014 to `alumnexhib@ltu.edu`. Notification of selected works: March 13, 2014. E-mail RSVP to: `alumnexhib@ltu.edu`

**Unleash:** your inner designer and show us what you have been up to!











## **I. Summary of Team Findings**

### **1. Team Comments & Visit Summary**

President Dr. Moudgil and Provost Dr. Vaz strongly support the program, its research and outreach efforts. They have implemented changes at the institutional level that allowed the College of Architecture and Design (CoAD) to receive funding from external sources. They have also supported the architecture program's initiatives with internal funding. It is evident the CoAD dean, associate dean and all staff members are dedicated to the success of the architecture program. The administrative structure maintains excellent communication among the various constituencies of the CoAD. It implements changes where necessary and pursues academic areas that add to the quality of its offerings. The faculty are assets to the architecture program. It is a body that resolves disagreements through healthy debate, yet remains unified in purpose. New positions have been created, tenure-track appointments have been made, faculty have been tenured, and highly qualified adjuncts have been recruited and retained. They have actively pursued grants and contracts, have done research, and have developed a variety of projects. Alumni dedication and the regional professional community have also strengthened the architectural program. The M. Arch students excel academically and professionally, as is evident in their grade point averages, academic honors, and awards received.

The architecture program thrives in a challenging environment. Its offerings evolved as the construction economy collapsed and the professional practice dwindled. It confronted the crisis of Detroit by adding to the forces that would rebuild it. Even with some reductions, the CoAD has been able to expand contributions in research and outreach. The architecture program revised its curriculum and scheduling, and reorganized its resources to encourage interdisciplinary interactions and collaborations inside and outside the university. It added research labs and community-based initiatives with national and international impacts. It has the opportunity to lead an exploration of the best approaches to distance-learning for a relevant architectural professional education. It connects and collaborates with other regional institutions offering accredited professional degrees in architecture, as well as with community colleges and high schools. It is positioned to be a central player in the new Detroit Center for Design and Technology (DCDT). This is a facility that will consolidate efforts already in place, if it can gain the space necessary.

**National Architectural Accrediting Board, Inc.**

August 1, 2014

Dr. Virinder K. Moudgil  
President & CEO  
Office of the President  
Lawrence Technological University  
21000 West Ten Mile Road  
Southfield, MI 48075-1058

Dear President Moudgil:

At the July 2014 meeting of the National Architectural Accrediting Board (NAAB), the directors reviewed the Visiting Team Report (VTR) for the Lawrence Technological University, College of Architecture and Design.

As a result, the professional architecture program **Master of Architecture** was formally granted an eight-year term of accreditation.

This new, maximum term of accreditation was approved by the NAAB in March 2013 and put into effect for all decisions made after July 1, 2013.

The accreditation term is effective January 1, 2014. The program is scheduled for its next accreditation visit in 2022.

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## The College of Management and the Quest for Accreditation



### History of Accreditation at COM

- The College was first accredited by the Accreditation Council for Business Schools and Programs (ACBSP) in 1995 for 10 yrs.
- Next the College sought and accredited by the International Assembly for Collegiate Business Education (IACBE) in 2001 for 10" yrs.
- Most people during this time could not even spell "ass yes ment"

## Accreditation of Business Programs

- First thing they ask for now is your Assessment Plan!
- No Plan?
- Don't call us, we will call you ----- Never
- It was not like this in the past.
- Let me walk you through COM's quest for Accreditation

### History continued

- Lots of talk on "Assessment"
- What is the correct definition?
- How do you do it?
- Is assessment the same as Quality Control?
- Etc. etc. etc.
- We then started with assessing the "quality" of our programs and developed improvement plans.



## History continued

- This helped us in getting the re-accreditation of our programs by ACBSP in 2005, for 10 yrs.
- Then we progressed from “Quality Control” to Assessment plans and used those to get re-accreditation by IACBE in 2013.
- You may ask why 2 different accreditations?
- Ans: Actually, we are not done, we are going for a third one.

## Quest for AACSB

- Dean Mirshab’s goal is to lead the COM in obtaining it’s 3<sup>rd</sup> accreditation by AACSB, by 2016 or 2017. AACSB has expectations for:
- Teaching, of course
- Research by most if not all faculty
- Adequate support (financial & infrastructure)
- MOST important! Yes, a GOOD Assessment Plan that is used and constantly updated.

## Q & A



University Assessment  
Committee



- ❖ ...will demonstrate an awareness of sustainability concepts within their discipline...

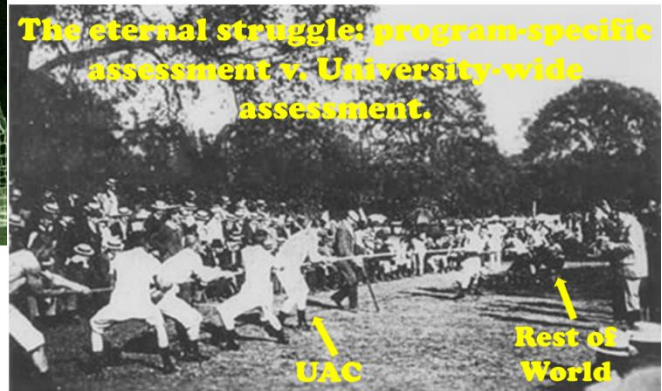


- ❖ ...will demonstrate professional standards in written, oral and graphical communication...



**The Committee seeks to complete its research for three educational goals.**

**The eternal struggle: program-specific assessment v. University-wide assessment.**



- ❖ ...will demonstrate an understanding of the ethical issues related to their disciplines...

### **Final Comments/Questions**

**Final questions, comments, suggestions, etc. regarding the UAC goals for 2014-2015**

**?**

University Assessment  
Committee





## HIGHER LEARNING COMMISSION UPDATE

Jim Jolly



1. HLC Repository
2. APPR Modifications
3. Faculty 180
4. Student Complaint Process
5. HLC Persistence Academy

## Annual Assessment Reports 2014-2015

### College of Architecture and Design

#### *BA in Architectural Studies/Master of Architecture*

### 1. Assessment Plan

The 2014-2015 Assessment Plan for BA in Architectural Studies/Master of Architecture programs can be found in Tables 1A and 1B. The outcomes of the Master of Architecture (M.Arch) degree program are directly 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. Note that the department will be upgrading to the newer 2014 NAAB criteria at a later date and the assessment plan will then be adjusted accordingly. Per direction of the Interim Architecture Chair, this change is expected to be made once a new Dean of CoAD comes on board.

M.Arch program outcomes support the university graduate and undergraduate learning outcomes as described in Table 1. Please refer to the second column in Table 1 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.”<sup>1</sup>

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 class 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 1 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 Table 1 matrix) which include written assignments, test questions and projects related to a required class.

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<sup>1</sup> [http://www.naab.org/accreditation/2004\\_Conditions\\_2.aspx](http://www.naab.org/accreditation/2004_Conditions_2.aspx)

This is the second academic year since a review by the NAAB Accreditation Team in January of 2014. Immediately prior to the NAAB visit, changes were made to the M.Arch curriculum. The visiting team gave high marks for both the program, its changes and the faculty, citing seven areas of distinction among which were curriculum review and development. The program was so highly rated, that a NAAB team plans not to return for reaccreditation for eight years, approximately six years from the issuing of this assessment report.

## **2. Action Plan (Loop-Closing)**

### **a. Report on 2014-2015 Academic Year**

The 2014-2015 Architecture Assessment Plan (developed as a completely new plan last year and found on pages 9-22) is set up so that **about one third of all assessments are planned to be addressed for loop closing every year**, beginning in FA15. This is the first year in the three year cycle to begin loop closing using this more rigorous assessment plan. Only two programs were scheduled for evaluation for loop closing this year: UG-3 and UG-5. “Loop Closing” comments are included in the “Issue and Actions” section for these two ULOs.

All assessments made during the 2014-2015 academic year, whether a loop closing year or not, are detailed below by applicable University Learning Objective (ULO). Due to the original planned distribution of the assigned assessment starting semesters, the following ULOs were not assessed for academic year 2014-2015: UG-2, UG-6 and G-1. Both UG-6 and G-1 ULOs are scheduled to start to be assessed in the FA15 semester.

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

This ULO was not assessed in SP15, as originally scheduled, due to the small cohort size of students opting to take the new lab-based format of Comprehensive Design.

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

This ULO was not assessed in SP15, as originally scheduled, due to the small cohort size of students opting to take the new lab-based format of Comprehensive Design.

#### **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 semester.
- Evaluation: 78% of the students (eleven out of fourteen) correctly answered a question where they had to determine which construction material had the largest embodied energy. Students once again exceeded, albeit by only 3%, the expectations on ranking materials based on their embodied energy.

- Issue and Actions: None identified. No changes are being made for loop closing since the goals have not only been met, but actually exceeded in the last two years.
- Responsibility: Professor Janice Means

#### **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, one quantitative problem from each of four semester exams was assessed in all class sections in FA14 and SP15.
- Evaluation: The average for every test exceed the goal of 75% for all exams except one (Exam I: 79.3%; Exam II: 72.6%; Exam III: 83%; and Exam IV: 75.96%).
- Issues and Actions: Per direction from the UAC Chair, only the results from the assessment from one course are reported above and for future assessment reports. Due to the addition of lab time and significant changes, this year is once again being treated as a benchmark year. There are some outliers in the Advanced Structures course in the last two exams and sections 'curving grades'. Loop Closing for UG-5 follows.

It was decided that the assessment results only from ARC 4543 would be reported for 2014-2015, as discussed above. However, three courses were actually assessed for this ULO: ARC 2513, 3513 and 4513. The changes in these courses are detailed below since these are courses with new content. This year's assessments provide benchmarks. Assessment results for both ARC 2513 and 3513 exceeded the goals stated in the plan by a wide margin.

- ARC 2513 Basic Structures: In this year this course was 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.
- ARC 3513 Intermediate Structures: This 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.
- ARC 4543 Advanced Structures: In this year, the class 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 inter-action, 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.

The goal for ARC 4543 was to achieve averages of 75% on selected exam problems on each of four exams. This goal was achieved for all exam averages except one. This goal will be pursued again for 2015-2016 assessment since only one year's assessment has been tallied and the course is so new. Note that during the department's recent accreditation (2014) no concerns were found with the structures courses, and LTU graduate performance on NCARB exams is slightly above average locally and nationwide.

- Responsibility: Professor Daniel Faoro

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

- Objective/Outcome: Students will demonstrate their 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, socioeconomic, public health, and cultural factors.
- Assessment: For ARC 4183, students were asked to select and read an architectural journal article from a specified time period, and then by writing a paper which answers the following questions:
  - What was the main point of the article?
  - How did the article relate to the issues covered in class?
- Evaluation: 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. Fifteen student papers were evaluated in two iterations of the assignment (the first published 1900-1930, the second covered 1930-1960). Their responses were evaluated as either "Yes" or "No" depending on whether they correctly identified the writing's main point. The success rate was 100% – all student papers correctly identified the main thesis of their topic article.
- Issue and Actions: No issues. Loop closing is scheduled for FA16.
- Responsibility: Professor Dale Gyure

#### **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: ARC 2117 students were assigned to work in teams to cast a concrete form and analyze drainage based on an existing campus drain which they had selected. Judging success was based upon: the selection of the existing drainage condition; the analysis of the existing drainage condition for its relevancy across a gamut of scales, and measuring quantifiable characteristics e.g. volume, velocity, direction, etc.; the design of an intervention that responds to and transforms the condition in legible, revealing, and critical ways; and craftsmanship of the concrete casting.
- Evaluation: 66% of the FA14 students achieved a minimum of 40 out of the total 50 points (B-), thus not meeting the goal of 75%.
- Issue and Actions: This is the first time the assignment was applied and, therefore, it can be improved. Although the loop closing is not scheduled until FA17, improvements will be instituted for the next course offering. Grading metric remains.

Immediate changes to the assignment include:

- Extending the time devoted to the project, resulting in better site selection and a higher degree of design refinement.
- Improving the coordination of lab and studio assignments.
- Providing multiple lectures, along with readings from a newly-required text book to support the assignment's goals.
- Providing a formalized concrete casting workshop.

Future Improvements include to:

- Distribute assignment/readings/lectures earlier to section instructors
- Integrate lecture content that emphasizes the relevance and relationship of site-specific design decisions to large-scale environmental ethics.
- Provide a tour of extant campus stormwater management strategies.
- Responsibility: Professor Peter L. Osler

### **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?
- Evaluation: 73% of the students in three sections each for FA14 and SP15 met the requirements of the rubric. Although close, the objective of 75% satisfaction was not met.
- Issue and Actions: There was a certain amount of inconsistency in the manner in which faculty used the assigned grading/assessment rubric. In AY 201516, the coordinator shall ensure consistent application of the rubric, and more reliable baseline data. Loop closing is scheduled for FA16.
- Responsibility: Professor Edward Orlowski

#### **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.
- Evaluation: 92% of students received a total score of 15 or above out of 20 points. This greatly exceeded the goal of 70% of students achieving 15 points.
- Issue and Actions: Loop closing is scheduled for SP18.
- Responsibility: Professor Jim Stevens

#### **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.
- Evaluation: Three sections of ARC 4116 were assessed using for the FA14 semester; one section for the SP15 semester; and two sections for SU15. This data represents a baseline for assessment of learning criteria UG-10. The range of assessments per section varied from 50% to 100% with an average of 70% compliance. Therefore, the objective of 75% satisfaction was not met for all sections assessed.

- Issues and Actions: There was inconsistency in the manner in which faculty used the assigned grading/assessment rubric: (1) it was necessary to clarify the assessment rubric after the FA14 semester; and (2) faculty require more specific instructions from the coordinator with regards to the application of the rubric and the classification of resultant data. In AY 2015-2016, the coordinator shall ensure consistent application of the rubric, and more reliable baseline data. Loop closing is scheduled for FA16.
- Responsibility: Professor Edward Orlowski

### **G-2 and NAAB SPC A11 - Applied Research**

- Objective/Outcome: Students will demonstrate the 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.
- Assessment: Each ARC 5013 student was assigned to produce a research poster based on a small research experiment to test the hypothesis and research question developed by the student. 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.
- Evaluation: A research poster from each student was evaluated in SP15. Nine out of 11 (81.82%) of the students achieved a letter grade of B or better in the poster assignment. The metric of 75% students expected to earn a letter grade of B or better has been met.
- Issue and Actions: The course structure and pedagogy of Research Methods has been modified to align course materials more efficiently with course objectives and graduate program direction. The assignment framework is slightly different and the assessment strategy needs to accommodate the changes. Loop closing is scheduled for SP16.
- Responsibility: Professor Anirban Adhya

### **G-3 and NAAB SPC A5. – Investigative Skills**

- Objective/Outcome: Students will demonstrate an ability to gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.
- Assessment: Each ARC 6514 student was to complete a Research Forum exercise by: selecting one discrete element from the research they had begun to accumulate. Students were asked to describe: (1) the element under consideration; (2) the exact means of analysis or interpretation 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. This element could be an existing building they are examining as a precedent, a book or article whose theoretical argument they were thinking about, a law or regulation whose influence on architecture they want to discern, a material whose properties

they are determining, a software platform, a specific social behavior, etc. It was to be self-contained and small enough that they could isolate part of it for this exercise.

- Evaluation: 100% (three out of three) of the students achieved 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 poster, where they had to select a discrete element from their research and describe the element, means of analysis, evidence of outcomes from that means, and relevant claims they can assert based on the process.
- Issue and Actions: The cohort is small, however all students complied. Loop closing is scheduled for SP18.
- Responsibility: Professor Anirban Adhya,

### **G-5 and NAAB SPC C8 – Applied Research**

This ULO was not assessed in SU15, as originally scheduled. Also, Rubric G-5 was not developed since the faculty member responsible (Professor Philip Plowright) was on sabbatical during part of the last academic year.

#### **b. Report on Plan for 2015-2016 Academic Year**

The Architecture Department has applied the improved assessment plan for 2014-2015 is found in Table 1, immediately following this page. With minor changes, this plan will continue to be used for the 2015-2016 Academic Year.

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

<b>LTU Learning Outcomes</b>	<b>Supporting Program Learning Objective and NAAB SPC</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> 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
<b>TECHNOLOGY</b> 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
<b>SUSTAINABILITY</b> 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

<b>COMMUNICATION</b> 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 communication strategies will be used to codify this information 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
<b>MATHEMATICS</b> 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
<b>READING</b> 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

<b>SCIENTIFIC ANALYSIS</b> 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, <i>Collect, Conduct, Convey</i> , 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
<b>LEADERSHIP</b> 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
<b>TEAMWORK</b> 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, <b>70%</b> of students will achieve 15 or more points related to collaboration out of a total possible of 20 points.	Every semester	Annual

<b>PROFESSIONAL ETHICS</b> 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
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**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 interpretation 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
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**\* 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.

## *Master of Urban Design*

### **1. Assessment Plan**

See Table 1 for the 2014-2015 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 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.

### **2. Action Plan (Loop-Closing)**

#### **a. Report on 2014-15 Academic Year**

All cohorts, except for one ULO, are too small to be meaningful due to the infancy of this program. Therefore only one ULO assessment is addressed below. Note that assessments were made during this academic year and will be combined with future data to provide meaningful close looping.

#### **G-4**

- Objective/Outcome: Students will demonstrate specific communication skills to become proficient in the visualization of urban environments.
- Assessment: ARC5742 Urban Design Methods-final project
- Evaluation: 90% (9 of 10 students) presented a comprehensive urban design alternatives scenario in a graphic (digital) format.
- Issue and Actions: None identified at this time. Loop closing is scheduled for SU16.
- Responsibility: Professor Joonsub Kim

#### **b. Report on Plan for 2015-2016 Academic Year**

The m.U.D. plan used for the 2014-2015 assessment, found in Table 1 immediately following this page, will be minimally revised for the 2015-2016 academic year. Consideration of revising the loop closing timeline will be reviewed for possible modification.

**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

## ***BFA in Game Art***

### **1. Assessment Plan: B.F.A. in Game Art**

See Table 1 below.

### **2. Action Plan (Loop-Closing) for B.F.A. in Game Art**

#### **a. Report on 2014-2015 Academic Year**

Throughout this Academic Year, no major changes have taken place, though minor adjustments have been made regarding prerequisites or Spring/Fall placement to reinforce synergy between the MCS Game Software Development program and Game Art. Notably, Integrated Game Studio as a sequence is being introduced into the MCS Game Soft. Dev. Curriculum in an attempt to provide clarity for the students and enhance our ability to distribute workload appropriately across our instructors.

The Open Elective course that replaced the Game Genre Development course in the previous year has been successful, typically filled with the Special Topics: Character and World Design course. Considering it has ran three times with moderate to high student numbers, the course becoming a full-fledged catalog offering for the Open Elective has been proposed and is awaiting approval. While the content of the course is unanimously approved and accepted, the course authorization has prompted a discussion regarding the classification of Lecture/Studio/Lab within the department of Art & Design.

In AY 2014-15, consideration was made to further enhance and encourage the student's ability to execute the skills of a game artist, but also establish an understanding of technical references and terminology. The incorporation of class-wide critiques and sessions involving heavy feedback. Students are developing high quality assets, visual presentations, and now demonstrate the ability to communicate the terms and design principles involved in game art, design, and development clearly.

Infinite Machine, the industry-lead and student-ran game development team at LTU that is extracurricular has had many successes with the creation of game titles and prototypes, but more importantly, students have revered the organization for its structure and learning-focused environment, crediting it for some of the "most important lessons" students have learned. This experience is influencing several studio courses to encourage this type of response from students within the curriculum as well.

Additionally, a grant-funded project has begun titled "Moebius" that is effectively a start-up opportunity for a small group of students. Presently, they are working on the legalities and paperwork for establishing their own LLC, while building a game product that will help launch future revenue to sustain the business.

The objectives established by N.A.S.A.D. for the AY 2015-16 for all undergraduate design programs have been reviewed and the Department of Art & Design have updated Table 1 to coincide with current practices and evaluation materials.

#### **b. Report on Plan for 2015-2016 Academic Year**

Loop closing will continue as indicated in Table 1.

During the 2015-16 AY the Game Art courses themselves 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 Art-related industry.

An emphasis on releasing games within the curriculum has already been implemented, but will continue to see success through this upcoming Academic Year. Within the first year, students will release games on the Google Play marketplace in Intro to Games & Animation with Hans Mills. In Integrated Game Studio, a Spring sequence in their Sophomore and Junior years, students will be tasked with releasing a game on a number of potential platforms, including Steam Greenlight, Google Play, the Apple Store, and more.

This provides students involved with games released before they graduate and opportunities for self-employment, which is welcomed by employers when they aim to land positions in the industry and allows the students to make an impact on the industry through entrepreneurship.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>N.A.S.A.D./ Program Outcomes</b>	<b>Assessment Tools</b>	<b>Metric/Indicators</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
<b><u>KNOWLEDGE IN DISCIPLINE</u></b> 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
<b><u>TECHNOLOGY</u></b> 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
<b><u>SUSTAINABILITY</u></b> 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
<b><u>COMMUNICATION</u></b> 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

<b>MATHEMATICS</b> 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
<b>READING</b> 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
<b>SCIENTIFIC ANALYSIS</b> 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
<b>LEADERSHIP</b> 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
<b>TEAMWORK</b> 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
<b>ETHICS</b> 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

- 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.

\*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: B.F.A. in Graphic Design** (*Updated to reflect 2014/2015 NASAD Handbook*)

See 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 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.

## **2. Action Plan (Loop-Closing) for B.F.A. in Graphic Design**

### **a. Report on 2014-2016 Academic Year**

Loop was closed on the following two program objectives.

**Program Objective:** Students will demonstrate a unique point of view while recognizing the necessary skillsets required to launch a successful career in graphic design or allied disciplines.

**Goal:** Student projects that showcase strong design conviction with mastery of professional graphic design standards.

**Assessment:** Industry evaluation of student project execution and presentation in ART 4524 via their BFA Thesis Exhibition and intermediate reviews

**Evaluation:** 70% of students receiving “Above Average” or equivalent evaluations using Art & Design Assessment Questions 1.

**Actions:** Invited industry leaders to student reviews throughout the academic year, established a standard practice of evaluation and assessment, and executed evaluations at Thesis Exhibition review

**Responsibility:** Steven Rost

**Program Objective:** Students will demonstrate the ability to articulate and reinforce a balance of technical skills with conceptual and critical thinking.

**Goal:** Student work that reflects high level of critical and conceptual thinking with technical proficiency

**Assessment:** Analysis and review of written thesis and review of design portfolio by faculty in ART 4524.

**Evaluation:** 70% of students receiving “Above Average” or equivalent evaluations using Art & Design Assessment Questions 4.

**Actions:** Invited industry leaders to student reviews throughout the core Graphic Design sequence, established a standard practice of evaluation and assessment, and executed evaluations at in previously specified courses

**Responsibility:** Steven Rost

## **b. Report on 2014-2015 Academic Year**

**Loop closing will continue as indicated in Table 1.**

Additionally, N.A.S.A.D. is issuing a new set of accreditation objectives for the AY 2014-15 academic year for all undergraduate design programs. These standards expand the required core competencies of design programs to include system design, service design, and community outreach. When the new objectives are released, the Department of Art & Design will update the Assessment Plan Table 1 to reflect the changes.

Based on final grades, 70% of students are students are achieving 70% or higher in Knowledge in Discipline, Communication and Reading. Thesis students in Graphic Design were asked to identify and solve a theoretical problem within the discipline, and to produce a final project and written paper in response. Throughout the semester, students presented their process work in a series of reviews with guest critics from related disciplines. To enhance their research throughout this process, students attended a workshop in the LTU library to develop research methodologies. Additionally, students presented their research in Senior Seminar for class discussion and feedback. The course culminated in an exhibition of their final projects that was attended by industry professionals and the general public. Additionally, students presented their research in Senior Seminar for class discussion and feedback. The course culminated in an exhibition of their final projects that was attended by industry professionals and the general public.

The loop for Seminar class included peer to peer and faculty to peer feedback. This facilitated a sense of responsibility on behalf of the students that resulted a marked improvement classroom engagement, and writing. Grades improved.

## **c. Report on Plan for 2015-2016 Academic Year**

Table 1 updated to reflect the new set of accreditation objectives for the AT 2015-2016 academic year.

Closing the loop will continue as indicated in Table 1.

Based on final grades, 70% of the students are achieving 70% or higher in Technology. In the 2015-2016 academic year, the coursework in ART 2813 (Electronic Methods for Imaging) has developed from being only technologically focused to being concept-driven. Now, technological tools are used more effectively to support and execute practical and theoretical problems and concepts. Based on grades in ART 4612, 70% of students achieved 70% or higher in Technology. Students used a variety of technologies to support their self-directed projects, and with the development of ART 2813 in 2105-2016, students should use technology in their senior

year ART 4612 with greater sophistication. 80% of students received a passing grade in the completion of the Leadership sequence. In ART 3343, 70% of students received 80% or more of a combined writing, presentation and discussion assignment. This is a new assignment in the class, where students are asked to respond to contemporary ethical issues in New Media. During the discussion, students are required to question other people's position thereby developing a critical point of view for a variety of outlooks and issues.

**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
<b><u>KNOWLEDGE IN DISCIPLINE</u></b> 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
<b><u>TECHNOLOGY</u></b> 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
<b><u>SUSTAINABILITY</u></b> 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
<b><u>COMMUNICATION</u></b> 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
<b><u>MATHEMATICS</u></b> 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

<b><u>READING</u></b> 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	Grade of Final Research presentation in ART 4514			
	N.A.S.A.D. Outcome E	Grade of final paper in ART 4612 and 4622			
<b><u>SCIENTIFIC ANALYSIS</u></b> 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
<b><u>LEADERSHIP</u></b> 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
<b><u>TEAMWORK</u></b> 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	Grade of group-based project assigned in ART 4514	70% of students receive a score of 70% or higher	Every Fall Every	Every third September starting in AY 2015-16
	N.A.S.A.D. Outcome E	Successful completion of Thesis Exhibition in ART 4524	70% of students receive a score of 60% or higher	Semester	
<b><u>ETHICS</u></b> 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

## ***BS in Industrial Design***

### **1. Assessment Plan 2014-2015 Annual Assessment Report**

See Table 1.

#### **a. Report on 2014-2015 Academic Year**

**Program Objective:** To impart, to students, a high level of critical Design Thinking, aesthetic skill and ‘creative construction’ as well as helping to develop the ability to apply a relevant integration of technology and user requirements into their proposals from concept through completion.

**Goal:** Achieve high grade percentage for student placement in profession (Affirmative note on readiness for employment) on Project Evaluation Form. Students to have a minimum rating of 80%.

**Assessment:** PEF Scoring of the project review rubric by Primary Instructors and Industry reviewers.

**Evaluation:** 70% of students receiving “Above Average” or equivalent evaluations using PEF (Trans/ID Review Form)

#### **Actions:**

- Integration of Sustainability, specifically the degree of integration into the coursework, needs to be quantified ie: awareness vs calculated integration.
- Also, special attention will be given to applying more rigorous interactive research methodologies as they relate to the design process at all levels.
- Implement feedback from students and industry for future portfolio/curricular requirements through on-going professional reviews and portfolio workshops.
- Also, an increase in VisCom (visual communication) skills has been identified by the Academic Advisory Board in both ID and Trans programs with the appropriate steps being taken to increase student skill levels and professional assessment.

**Responsibility: Andrew Hanzel**

### **2. Action Plan Closing the Loop: for Industrial Design**

#### **a. Report on Plan for 2014-2015 Academic Year**

Loop closing will commence as indicated in Table 1 – and as the B.S. in Industrial Design. The B.S. in Industrial Design program continues to evolve as the curriculum begins to address the expanding scope of ID beyond that based primarily on manufacturing/engineering driven product creation strategies. As we’ve previously stated, Industrial Design is playing an increasing role in overall corporate planning and strategy as well as increased responsibilities in turning market and research data into meaningful design actionable insights.

In this regard, increased field research content is was integrated into all course levels and research data capture is being included in 3000 level courses as well as the Professional Practice coursework. Also, revised syllabus templates were employed across the board to reflect the addition of sustainability and ethics throughout the ID pedagogy.

ECEO and PEF assessment data is used to assess knowledge in discipline and teamwork while visual communication and oral communication rubrics are utilized to score overall communication skills. Sustainability is measured by rubric where applicable with a general overview of the three P’s is covered in Professional Practice coursework.

#### **b. Report on 2015-2016 Plan**

2016 will continue with positive changes with regards to the Professional Practice coursework, specifically as a result of a Coleman Foundation grant to provide additional focus toward enhancing overall knowledge

and ability to start a small business in the field of Industrial Design with modules on business model creation, startup organization and exposure to various crowd funding opportunities.

During assessment activities it was noted that because of content comprehension disparities between quiz scores and presentation report-outs that increased rigor needs to be inserted into the 'reading competency' aspect of the Professional Practice class specifically in the testing regiment.

The revised PEF document has been created and will be fully implemented in the project presentation evaluation documentation. This document, while capturing most NASAD outcomes (ie: sustainability), expands important specific skills assessment in more detail and incorporates a more user-friendly rubric scoring format which more readily translates to an excel capture format.

The student-centered program assessment graduate questionnaires have been sent but because of the small sample size (four recent grads in ID) will serve only to gauge student satisfaction rather than directly affect curriculum changes. For these assessments we look to our Academic Advisory Boards and Professional Review of student work to inform us as to the appropriate type and scope of knowledge skills required for success in the future but will combine more robust student survey responses to these metrics in the future.

The Industrial Design program is currently expanding the scope of our projects in line with new NASAD requirements such as civic outreach with a current project aimed at solving the problems of neighborhood blight through the design and construction of neighborhood enhancement projects.

Finally, the on-going effort to integrate multi-disciplined approaches to problem solving in the Industrial Design pedagogy continues with proposals for several integrated projects with Bio-Med Engineering and Interaction Design.



**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
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	Outcome A	Thesis design project in IDD4516, IDD4526	70% of students receive a score of 65% or higher 65%	Semester	Annual
	Outcome E	Evaluation of design project in ATD4513, ATD3616, IDD3326	65% average on ECEO form		
	Outcome G	ECEO evaluation form in IDD3316, ATD3616, IDD3326, ATD3626	50% of students receive a score of 70% or higher		
<u><b>TECHNOLOGY</b></u> LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	Outcome B	ECEO evaluation rubric coursework in IDD2215, IDD3316, IDD4516	50% of students receive a score of 70% or higher	Semester	Annual
	Outcome D	Professional critiques and industry assessment of design proposal.	70% of students receive a score of 75% or higher		
<u><b>SUSTAINABILITY</b></u> 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
<u><b>COMMUNICATION</b></u> 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	Evaluation of coursework in each studio: IDD1114, IDD2214, IDD3316, IDD4516	70% of students will score 75% or higher on ECEO Form progressively tailored to course level	Semester	Annual
	Outcome F	Evaluation of coursework in each studio: IDD1124, IDD2224, IDD3326, IDD4526	70% students will score, on ECEO Form, pre-determined performance levels progressively tailored to course level published rubric.		
<u><b>MATHEMATICS</b></u> 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	Coursework in IDD2215	70% of students receive a score of 55% or higher	Semester	Annual
	Outcome D	Coursework in IDD2225	70% of students receive a score of 55% or higher		
	Outcome E	Coursework in ATD4513	70% of students receive a score of 55% or higher		

<b><u>READING</u></b> 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	Coursework in ATD4524	70% of students receive a score of 65% or higher	Semester	Annual
	Outcome E	Coursework in IDD372	70% of students receive a score of 65% or higher		
<b><u>SCIENTIFIC ANALYSIS</u></b> LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	Outcome B	Coursework in IDD3316 and IDD3326	70% of students receive a score of 60% or higher	Semester	Annual
	Outcome E	Coursework in IDD3723			
<b><u>LEADERSHIP</u></b> 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	Coursework in IDD1113 and IDD1223	70% of students receive a score of 60% or higher	Semester	Annual
	Outcome F	Coursework in ATD2832  Student exit interview and Alumni Survey	Job placement and continued relationship with program		
<b><u>TEAMWORK</u></b> LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	Outcome B	Coursework in IDD1113, and IDD1223	70% of students receive a score of 60% or higher	Semester	Annual
	Outcome E	Coursework in ATD3616, and ATD3626	70% of students receive a score of 60% or higher		
<b><u>ETHICS</u></b> 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

## ***BFA in Interaction Design***

### **1. Assessment Plan: B.F.A. in Interaction Design**

See 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:

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 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.

## **2. Action Plan (Loop-Closing) for B.F.A. in Interaction Design**

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

The BFA in Interaction Design program will undergo a comprehensive curriculum review focused on student-center learning outcomes in AY 2015-16 when it graduates its first student.

The first Interaction Design student scored 70% or higher in ART 4452. The student has not yet completed the Leadership sequence. In ART 3343, 70% of students received 80% or more of a combined writing, presentation and discussion assignment. This is a new assignment in the class, where students are asked to respond to contemporary ethical issues in New Media. During the discussion, students are required to question other people's positions, thereby developing a critical point of view for a variety of outlooks and issues.

Additionally, N.A.S.A.D. issued a new set of accreditation objectives for the AY 2014-15 academic year for all undergraduate design programs. These standards expand the required core competencies of design programs to include system design, service design, and community outreach. Assessment table 1 has been updated to reflect these changes.

**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
<b><u>KNOWLEDGE IN DISCIPLINE</u></b> 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	Review Form of Thesis show in ART 4624	70% of students receiving average of “Above Average” or equivalent cumulative score using Review Form for Presentation evaluation	Spring Semester	Every third September starting in AY 2013-14
	N.A.S.A.D. Outcome F	Review Form in response to ART 4922		Fall Semester	
	N.A.S.A.D. Outcome B	Thesis Book produced in ART 4622	70% of students receiving score of 70% or better	Spring Semester	
<b><u>TECHNOLOGY</u></b> 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	Final Research presentation in ART 4612	70% of students scoring 70% or better	Fall Semester	Every third September starting in AY 2014-15
	N.A.S.A.D. Outcome D	Final course project in ART 2813	70% of students receive a score of 70% or higher	Every Semester	
<b><u>SUSTAINABILITY</u></b> 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
<b><u>COMMUNICATION</u></b> 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	Thesis Book produced in ART 4622	70% of students receive a score of 70% or higher	Spring Semester	Every third September starting in AY 2013-14
	N.A.S.A.D. Outcome C	Review Form of final oral presentation in ART 4624	70% of students receiving average of “Above Average” or equivalent cumulative score using Review Form for Presentation evaluation	Spring Semester	
<b><u>MATHEMATICS</u></b> 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	Final grade in MCS 1254	70% of students receive a score of 70% or higher	Fall Semester	Every third September starting in AY 2015-16
	N.A.S.A.D. Outcome D	Final course project in ART 2813	70% of students receive a score of 70% or higher	Fall Semester	
	N.A.S.A.D. Outcome F	Completion of 150-hour internship in ART 4922	100% of students receive a score of 60% or higher	Fall Semester	

<b>READING</b> 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	Grade of Final Research presentation in ART 4514			
	N.A.S.A.D. Outcome E	Grade of final paper in ART 4612 and 4622			
<b>SCIENTIFIC ANALYSIS</b> 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
<b>LEADERSHIP</b> 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
<b>TEAMWORK</b> 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	Grade of group-based project assigned in ART 4514	70% of students receive a score of 70% or higher	Every Fall Every	Every third September starting in AY 2015-16
	N.A.S.A.D. Outcome E	Successful completion of Thesis Exhibition in ART 4524	70% of students receive a score of 60% or higher	Semester	
<b>ETHICS</b> 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

## ***BS in Interior Architecture***

### **1. Assessment Plan: BA Interior Architecture**

See Table 1 below.

### **2. Action Plan (Loop-Closing) for B.A. in Interior Architecture**

#### **a. Report on 2014-2015 Academic Year**

Direct assessment and evaluation of student work in the fall of 2014 by the Council for Interior Design accreditation team (VTR\_12.22.2014) showed that interior architecture students have strength in the following abilities:

- 1) Students have the ability to have a global view and develop design solutions based on ecological, socio-economic, and cultural contexts. Standard 2
- 2) Students understand and apply the concepts, principles, and theories of sustainability as they pertain to building methods, materials, systems, and occupants. Standard 2
- 3) Students understand that social and behavioral norms may vary from their own and are relevant to making appropriate design decisions. Standard 3
- 4) Students work is informed by knowledge of human factors and theories of human behavior related to the built environment. Standard 3
- 5) Students apply aspects of the design process to creative problem solving and are able to generate creative solutions that support the human experience within interior environments. Standard 4
- 6) Students engage in team work structures and dynamics and understand the nature and value of integrated design practices. Standard 5
- 7) Students have knowledge of interiors, architecture, decorative arts, and art within a historical and cultural context. Standard 8

#### **b. Report on Plan for 2015-2016 Academic Year**

- (1) Although students have knowledge of interiors, architecture, decorative arts, and art within a historical and cultural context the application in their final projects is lacking. In the following academic year, precedent influence will be referenced within student project concept statements and evidence of application incorporated graphically within final projects.
- (2) Students understand but do not always apply the laws, codes, standards, and guidelines that impact the design of interior spaces, specifically in regards to fire suppression. In the following academic year, specific instruction on fire suppressions systems will be incorporated into each studio course and application will be evident graphically within final projects.

#### Courses Assessed:

Interior Architecture 1, 2, 3, and Allied: Interiors

1. Administer assessment tools for advisory board and industry reviews. (IA Studio - Juror Review Questionnaire).
2. Establish learning goals and test them against the existing curriculum.

Loop closing will continue as indicated in Table 1.

As the Interior Architecture Program is housed in the Department of Art and Design, it falls under N.A.S.A.D. as well as CIDA (See below). N.A.S.A.D. is issuing a new set of accreditation objectives for

the AY 2014-15 academic year for all undergraduate design programs. These standards expand the required core competencies of design programs to include system design, service design, and community outreach. When the new objectives are released, the Department of Art & Design will update the Assessment Plan Table 1 to reflect the changes



**Table 1: Assessment Plan for BS in Interior Architecture**

<b>LTU Undergraduate Learning Outcomes</b>	<b>N.A.S.A.D./ Program Outcomes</b>	<b>Assessment Tools</b>	<b>Metric/Indicators</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
<b><u>KNOWLEDGE IN DISCIPLINE</u></b> 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
<b><u>TECHNOLOGY</u></b> 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
<b><u>SUSTAINABILITY</u></b> 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
<b><u>COMMUNICATION</u></b> 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

<b>MATHEMATICS</b> 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
<b>READING</b> 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
<b>SCIENTIFIC ANALYSIS</b> LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	NA			Semester	Annual
<b>LEADERSHIP</b> 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
<b>TEAMWORK</b> 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
<b>ETHICS</b> 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

Listed here is an interpretation of the NASAD outcomes as compared with CIDA program standards:

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.

CIDA Standard 4. Design Process

Entry-level interior designers need to apply all aspects of the design process to creative problem solving. Design process enables designers to identify and explore complex problems and generate creative solutions that optimize the human experience within the interior environment.

- 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.

Standard 2. Global Perspective for Design

Entry-level interior designers have a global view and weigh design decisions within the parameters of ecological, socio-economic, and cultural contexts.

Standard 3. Human-centered Design

The work of interior designers is informed by knowledge of human factors and theories of human behavior related to the built environment.

- c) 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.

CIDA Standard 8. History

Entry-level interior designers apply knowledge of interiors, architecture, decorative arts, and art within a historical and cultural context.

- d) 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.

Standard 5. Collaboration

Entry-level interior designers engage in multi-disciplinary collaboration

Standard 7. Professionalism and Business Practice

Entry-level interior designers use ethical and accepted standards of practice, are committed to professional development and the industry, and understand the value of their contribution to the built environment.

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

Council for Interior Design Accreditation Professional Standards  
 II-18 Adopted June 2008, effective in 2009; clarifications approved November 2010, effective July 2011; clarifications approved April 2013; effective January 2014.

### **Standard 1. Mission, Goals, and Curriculum**

The interior design program has a mission statement that describes the scope and purpose of the program. Program goals are derived from the mission statement and the curriculum is structured to achieve these goals.

### **Standard 2. Global Perspective for Design**

Entry-level interior designers have a global view and weigh design decisions within the parameters of ecological, socio-economic, and cultural contexts.

### **Standard 3. Human-centered Design**

The work of interior designers is informed by knowledge of human factors and theories of human behavior related to the built environment.

### **Standard 4. Design Process**

Entry-level interior designers need to apply all aspects of the design process to creative problem solving. Design process enables designers to identify and explore complex problems and generate creative solutions that optimize the human experience within the interior environment.

### **Standard 5. Collaboration**

Entry-level interior designers engage in multi-disciplinary collaboration.

### **Standard 6. Communication**

Entry-level interior designers are effective communicators.

### **Standard 7. Professionalism and Business Practice**

Entry-level interior designers use ethical and accepted standards of practice, are committed to professional development and the industry, and understand the value of their contribution to the built environment.

### **Standard 8. History**

Entry-level interior designers apply knowledge of interiors, architecture, decorative arts, and art within a historical and cultural context.

### **Standard 9. Space and Form**

Entry-level interior designers apply elements and principles of two- and three-dimensional design.

### **Standard 10. Color**

Entry-level interior designers apply color principles and theories.

### **Standard 11. Furniture, Fixtures, Equipment, and Finish Materials**

Entry-level interior designers select and specify furniture, fixtures, equipment, and finish materials in interior spaces.

**Standard 12. Environmental Systems**

Entry-level interior designers use the principles of lighting, acoustics, thermal comfort, and indoor air quality to enhance the health, safety, welfare, and performance of building occupants.

**Standard 13. Building Systems and Interior Construction**

Entry-level interior designers have knowledge of building systems and interior construction.

**Standard 14. Regulations and Guidelines**

Entry-level interior designers use laws, codes, standards, and guidelines that impact the design of interior spaces.

**Standard 15. Assessment and Accountability**

The interior design program engages in systematic program assessment contributing to ongoing program improvement. Additionally, the program must provide clear, consistent, and reliable information about its mission and requirements to the public.

**Standard 16. Support and Resources**

The interior design program must have a sufficient number of qualified faculty members, as well as adequate administrative support and resources, to achieve program goals.

## ***BS in Transportation Design***

### **1. Assessment Plan**

See Table 1.

### **2. Action Plan (Loop-Closing) for B.S. in Transportation Design**

#### **a. Report on 2014-2015 Academic Year**

**Program Objective:** To provide the training, motivation and requisite skills development to advance knowledge and leadership with students toward the integration of transportation design with the fundamentals of engineering, and the expertise with which to apply this knowledge in their professional careers.

**Goal:** Achieve high percentage for student placement in profession (Advanced Studies on Project Evaluation Form to have a minimum rating of 80% (B-) )

**Assessment:** Leadership Portfolio Industry evaluation of student project and interviews in ATD 4526

**Evaluation:** 70% of students receiving “Above Average” or equivalent evaluations in PEF(ECEO) assessment.

**Actions:** Implement feedback from students and industry for future portfolio deliverable requirements through on-going reviews and portfolio workshops

**Responsibility:** Keith Nagara

#### **b. Report on Plan for 2015-2016 Academic Year**

Loop closing will continue as indicated in Table 1. We will continue to monitor and assess the Program Outcomes as defined in section 2.a.

Program Objectives from AY 2014-15 have been added to Table 1 below. Also, the NASAD outcomes were corrected on Table 1 to reflect the Industrial Design foundation of Transportation Design

Additionally, N.A.S.A.D. accreditation objectives have been integrated into the AY 2014-15 academic year for all undergraduate design programs under Leadership. These standards expand the required core competencies of design programs to include system design, service design, and community outreach.

**Table 1: Assessment Plan for BS in Transportation Design**

<b>LTU Undergraduate Learning Outcomes</b>	<b>N.A.S.A.D./ Program Outcomes</b>	<b>Assessment Tools</b>	<b>Metric/Indicators</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.	Outcome A	Thesis design project in IDD4516, IDD4526	70% of students receive a score of 65% or higher 65%	Semester	Annual
	Outcome E	ECEO evaluation rubric in IDD3316, ATD3616, IDD3326, ATD3626	65% average on ECEO form		
	Outcome G	Evaluation of course content/grade ATD4513	50% of students receive a score of 70% or higher		
<u><b>TECHNOLOGY</b></u> LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.	Outcome B	ECEO evaluation rubric coursework in IDD2215, IDD3316, IDD4516	50% of students receive a score of 70% or higher	Semester	Annual
	Outcome D	Professional critiques and industry assessment of design proposal.	70% of students receive a score of 75% or higher		
<u><b>SUSTAINABILITY</b></u> 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
<u><b>COMMUNICATION</b></u> 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	Evaluation of coursework in each studio: IDD1114, IDD2214, IDD3316, IDD4516	70% of students will score 75% or higher on ECEO Form progressively tailored to course level	Semester	Annual
	Outcome F	Evaluation of coursework in each studio: IDD1124, IDD2224, IDD3326, IDD4526	70% students will score, on ECEO Form, pre-determined performance levels progressively tailored to course level published rubric.		
<u><b>MATHEMATICS</b></u> 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	Coursework in IDD2215	70% of students receive a score of 55% or higher	Semester	Annual
	Outcome D	Coursework in IDD2225	70% of students receive a score of 55% or higher		
	Outcome E	Coursework in ATD4513	70% of students receive a score of 55% or higher		

<u><b>READING</b></u> 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	Coursework in ATD 4513	70% of students receive a score of 65% or higher	Semester	Annual
	Outcome E	Coursework in IDD3723	70% of students receive a score of 65% or higher		
<u><b>SCIENTIFIC ANALYSIS</b></u> LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.	Outcome B	Coursework in IDD3316 and IDD3326	70% of students receive a score of 60% or higher	Semester	Annual
	Outcome E	Coursework in IDD3723	70% of students receive a score of 60% or higher		
<u><b>LEADERSHIP</b></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.	Outcome I	Coursework in IDD1113 and IDD1223	70% of students receive a score of 60% or higher	Semester	Annual
	Outcome F Outcome G	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 Job Placement and continued professional relationship with ID Program/University through professional organizations.		
<u><b>TEAMWORK</b></u> LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members' contributions.	Outcome H	Coursework and Team Rubric score in ATD4513	70% of students receive a score of 60% or higher in teamwork	Semester	Annual
	Outcome I	Coursework in ATD3616, and ATD3626	70% of students receive a score of 60% or higher		
<u><b>ETHICS</b></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.	Outcome G	Ethics quiz (multiple choice) in ATD4513	70% of students will achieve a score of 70% or higher	Semester	Annual



## **NASAD Essential Competencies, Experiences, and Opportunities for Transportation and Industrial Design**

### **NASAD Outcome A.**

Ability to design products and systems, including but not limited to a foundational understanding of how products and systems are made; what makes them valuable; how they are developed, realized, and distributed; and how they are related to environmental and societal issues and responsible design.

### **NASAD Outcome B**

Ability to use technologies and tools associated with multi-dimensional design representation, development, dissemination, and application.

### **NASAD Outcome C**

Foundational knowledge of the history of industrial design, including but not limited to the influences of works and ideas on the evolution of design study and practice over time and across cultures.

### **NASAD Outcome D.**

Fundamental knowledge of user experience, human factors, applied ergonomics, contextual inquiry, user preference studies, and usability assessments.

### **NASAD Outcome E**

Ability to research, define, and communicate about problems, variables, and requirements; conceptualize and evaluate alternatives; and test and refine solutions, including the ability to synthesize user needs in terms of value, aesthetics, and safety.

### **NASAD Outcome F**

Ability to communicate concepts and specifications in verbal, written, and multiple media at levels ranging from abstraction and sketches, to detailed multi-dimensional, functional, and visual representations.

### **NASAD 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.

### **NASAD 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.

### **NASAD Outcome I**

Acquisition of collaborative skills and the ability to work effectively in interdisciplinary or multidisciplinary teams.

## College of Arts and Sciences

### *BA in English and Communication Arts*

#### 1. Assessment Plan : B.A. in English and Communication Arts

(see Table 1: Assessment Matrix below.)

#### 2. Action Plan for BA in English and Communication Arts

##### a. Report on 2014-2015 Academic Year

**Learning Objective 1:** Students can perform in an exceptional manner in the two internships required in the degree.

**Assessment:** No assessment performed

**Evaluation:** N/A

**Issue:** N/A

**Actions:** Program curriculum currently under revision

**Responsibility:** Sara Lamers, effective 2015-16

**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 performed

**Evaluation:** n/a

**Issue:** n/a

**Actions:** Program curriculum currently under revision

**Responsibility:** Sara Lamers, effective 2015-16

**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 performed

**Evaluation:** n/a

**Issue:** n/a

**Actions:** Program curriculum currently under revision

**Responsibility:** Sara Lamers, effective 2015-16

**Learning Objective 4:** Students can write and edit technical documents.

**Assessment:** No assessment performed

**Evaluation:** n/a

**Issue:** n/a

**Actions:** Program curriculum currently under revision

**Responsibility:** Sara Lamers, effective 2015-16

**Learning Objective 5:** Students achieve university-level competency in academic and professional prose styles.

**Assessment:** No assessment performed

**Evaluation:** n/a

**Issue:** n/a

**Actions:** Program curriculum currently under revision

**Responsibility:** Sara Lamers, effective 2015-16

**Learning Objective 6:** Students can deliver effective oral presentations.

**Assessment:** No assessment performed

**Evaluation:** n/a

**Issue:** n/a

**Actions:** Program curriculum currently under revision

**Responsibility:** Sara Lamers, effective 2015-16

**b. Report on Plan for 2014-2015 Academic Year**

- 1) APPR in 2015-16
- 2) Program curriculum currently under review and revision
- 3) Revise program learning objectives
- 4) Revise assessment matrix according to revised learning objectives
- 5) Implement revised assessment matrix.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “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
<u><b>TECHNOLOGY</b></u> “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
<u><b>SUSTAINABILITY</b></u> "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."					
<u><b>COMMUNICATION</b></u> “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 in Speech class. Papers in Jr.Sr. electives reviewed by industry rep.	Rubric	Annual	Annual

<b><u>MATHEMATICS</u></b> “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.”					
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”					
<b><u>LEADERSHIP</u></b> “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.”					
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”					
<b><u>PROFESSIONAL ETHICS</u></b> “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.”					

## *BS in Humanities*

1. **Assessment Plan: B.S. Humanities**  
(see Table 1: Assessment Matrix below.)
2. **Action Plan (Loop-Closing) for B.S. in Humanities**

- a. **Report on 2014-2015 Academic Year**

**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:** Dan Shargel

**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:** Dan Shargel

**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:** Dan Shargel

**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:** Dan Shargel

**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:** Dan Shargel

**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:** Dan Shargel

**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:** Dan Shargel

**b. Report on Plan for 2015-2016 Academic Year**

1. Program curriculum currently under review
2. Revise assessment matrix
3. Implement revised assessment matrix

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “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
<u><b>TECHNOLOGY</b></u> “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
<u><b>SUSTAINABILITY</b></u> "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."					
<u><b>COMMUNICATION</b></u> “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



<b><u>MATHEMATICS</u></b> “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		
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”					
<b><u>LEADERSHIP</u></b> “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.”					
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”					
<b><u>PROFESSIONAL ETHICS</u></b> “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.”					

## *BS in Media Communication*

### 1. Assessment Plan BSMC

See Table 1 below.

### 2. Action Plan (Loop-Closing) for BSMC

#### a. Report on 2014-2015 Academic Year

**Learning Objective 1a:** Graduates will have an in-depth understanding of the scope and purpose of the media industry.

**Assessment:** Student work in specific courses as detailed on matrix

**Evaluation:** No loop closing in 2014/2015

**Issues:** N/A

**Actions:** Next loop closing: Summer 2017

**Responsibility:** Jody Gaber, program director

**Learning Objective 1b:** Graduates will understand the standards of professional practices within the media industry.

**Assessment:** Student work in specific courses as detailed on matrix

**Evaluation:** No loop closing in 2014/2015

**Issues:** N/A

**Actions:** Next loop closing: Summer 2017

**Responsibility:** Jody Gaber, program director

**Learning Objective 2:** Obtain an industry-standard skill set in production, post-Production and web technology.

**Assessment:** Student work in specific courses as detailed on matrix

**Evaluation:** No loop closing in 2014/2015

**Issues:** N/A

**Actions:** Next loop closing schedule for Summer 2016

**Responsibility:** Jody Gaber, program director

**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 specific courses as detailed on matrix

**Evaluation:** No loop closing in 2014/2015

**Issues:** N/A

**Actions:** Work with instructors to incorporate sustainability projects in class curriculum. Develop sustainability rubric. Collect data for Summer 2016 loop closing.

**Responsibility:** Jody Gaber, program director

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

**Assessment:** HSSC Writing Assessment; Writing Proficiency Exam; and composite scores from all assignments in courses listed on the matrix

**Evaluation:** Course specific rubrics were developed. Scores from Fall 2012 to Summer

2015 are as follows:

MCO 2543: Writing for Electronic & Print Media: 57% scored 4 or higher as applied to a 5 point rubric. 70% threshold not met.

MCO 3713: Advanced Writing for Media: 64% scored 4 or higher as applied to a 5 point rubric. 70% threshold not met.

COM 2113: Speech: 48% scored 4 or higher as applied to a 5 point rubric. 70% threshold not met.

MCO 3633: Social Media: 63% scored 4 or higher as applied to a 5 point rubric. 70% threshold not met.

**Issues:** Use of HSSC writing assessment data is not appropriate as it does not capture all students within the degree program. Use of the Writing Proficiency Exam is problematic as every Media Communication student is required to pass this exam. It is not realistic to assess writing and presentation skills from only one or two assignments.

**Actions:** Neither the HSSC writing assessment data nor the WPE grades will be used as assessment tools. Identify additional assignments to serve as assessment tools. Determine best practice to meet threshold. Next loop closing Summer 2018.

**Responsibility:** Jody Gaber, Program Director

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

**Assessment:** Student work in specific courses as detailed on the matrix

**Evaluation:** SSC 3723: Ethics: 80% received a C or higher. Threshold met.

COM 4963: Communication Law: 100% received a C or higher. Threshold met.

MCO 1003: Media, Communication and Society: 84% scored 5 as applied to a 5 point rubric. 15% scored 4 as applied to a 5 point rubric. Threshold met.

**Issues:** Use of final grades as an assessment tool is problematic

**Actions:** Finalize rubrics in order to be applied to more-specific assignments. Next loop closing scheduled for Summer 2018.

**Responsibility:** Jody Gaber, Program Director

#### **b. Report on Plan for 2014-2015 Academic Year**

- 1) Meet with instructors to update and revise assignments and rubrics.
- 2) Continue to refine data archive
- 3) Create a portfolio review panel utilizing industry advisors and adjuncts to provide students with valuable industry standard feedback.
- 4) Revisit thresholds for learning outcome 4.
- 5) Collect and assess data on learning outcome 2 and 3 for Summer 16 loop closing.

**Table 1: Assessment Plan for BS in Media Communication**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “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
<u><b>TECHNOLOGY</b></u> “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
<u><b>SUSTAINABILITY</b></u> "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
<u><b>COMMUNICATION</b></u> “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

LTU Undergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Admin Timeline	Loop-Closing Timeline
<u>MATHEMATICS</u> “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
<u>READING</u> “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
<u>SCIENTIFIC ANALYSIS</u> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”				Semester	Annual
<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.”				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.”				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.”	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

## *BS in Psychology*

### 1. Assessment Plan: B.S. Psychology (see Table 1: Assessment Matrix below.)

### 2. Action Plan for B.S. in Psychology

#### a. Report on 2014-2015 Academic Year

**Program Learning Objective 1:** 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:** Use of knowledge rubrics administered in target courses as detailed on matrix.

**Evaluation:** No loop closing in 2014/2015

**Issue:** N/A

**Action:** Next loop closing Fall 2016

**Responsibility:** Psychology instructors of the target courses for the administration and the scoring of rubrics. Program director for data analysis and loop closing.

**Program Learning Objective 2:** 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:** Use of Technology rubric administered in Experimental Psychology Laboratory.

**Evaluation:** No loop closing in 2014/2015

**Issue:** Not enough technology in most of psychology courses.

**Action:** Enhance the overall use of technology in all psychology courses and, in particular, Research Methods and Senior Research Project 1 and 2. Next loop closing scheduled for Fall 2016.

**Responsibility:** Psychology instructors of the target courses for the administration and the scoring of rubrics. Program director for data analysis and loop closing.

**Program Learning Objective 3:** 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:** The survey consists of 26 questions which measure the interest of students about several topics related to sustainability, e.g. Environmental policies, Food security, Sustainable cities etc. The criteria to meet were: 1) Average higher than 67% and 2) At least 15% of the students scoring above 90%, our students did not meet the requested criteria. As the mean interest in the topic was 3.18 on a 5 point scale, (which corresponds to an average score of 64%) and no students scored 90%, the threshold was not met.

**Issue:** It seems that the interest in sustainability could be higher among psychology students. Whether this is unique to psychology students or a broader phenomenon at LTU is unclear.

**Action:** PSY1003: World of the Mind could increase its focus on psychological aspects of sustainability

**Responsibility:** Psychology faculty for the scoring and administration. Program director for data analysis and loop closing.

**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:** The mean score was 90.44%. The majority of student (13 out of 23) scored above 90%. The threshold was met.

**Issues:** None

**Action:** None

**Responsibility:** Psychology faculty for the scoring and administration. Program director for data analysis and loop closing.

**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 were 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:** Every student met the minimum criterion of exceeding 67% with the majority of the students exceeding 90%. The threshold was met.

**Issues:** None

**Action:** None

**Responsibility:** Psychology faculty for the scoring and administration. Program director for data analysis and loop closing.

#### **b. Report on Plan for 2015-2016 Academic Year**

4. General revision of rubrics for better consistency with APA undergraduate learning goals. Examination of thresholds.
5. Learning objectives 1, 2 will be assessed in the 2015-2016 academic year. Learning objectives 3, 4 and 5 will be assessed in the 2016-2017 academic year

**Table 1: Assessment Plan for BS in Psychology**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b><u>KNOWLEDGE IN DISCIPLINE</u></b> “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 the administration of rubrics in the four areas of interest.  Target courses are: 1. Clinical psychology: Introductory psychology, Clinical psychology, Abnormal psychology. 2. Neuroscience and cognition: Introductory psychology, Cognitive psychology, Sensation and perception, Behavioral neuroscience; 3. Experimental methods and techniques: Introductory psychology, Research methods, Experimental Design and programming; 4. Social psychology: Introductory psychology, Social psychology, Industrial psychology, Organizational psychology	Each of the 4 single macro area scores should be higher than 67%.	Each semester in which target courses occur.  (there is always at least one target course running each semester)	Every 2 years  Next LC: Fall 2014
<b><u>TECHNOLOGY</u></b> “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 in which the target course occurs.	Every 2 years  Next LC: Fall 2014
<b><u>SUSTAINABILITY</u></b> "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 course is PSY 1003 World of the Mind	Two criteria to meet: 1. Average higher than 67% At least 15% of the students score above 90%	Each semester in which the target course occurs.	Every 2 years  Next LC: Fall 2015



<b><u>COMMUNICATION</u></b> “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		Semester	Annual
<b><u>MATHEMATICS</u></b> “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		Semester	Annual
<b><u>READING</u></b> “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		Semester	Annual
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields.”	Objective 4: 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 7 subscales of the senior research project rubric.  Targeted course is PSY 4922 Senior Research Project 2	Two criteria to meet: 3. Average higher than 67% At least 15% of the students score above 90%	Each semester in which target courses occur.	Every 2 years  Next LC: Fall 2015
<b><u>LEADERSHIP</u></b> “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			

<p><u><b>TEAMWORK</b></u>  “LTU graduates will demonstrate team- building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”</p>					
<p><u><b>PROFESSIONAL ETHICS</b></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.”</p>	<p>Objective 5: 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.</p>	<p>Score is based on the ethics topic of PSY 2113- Research Method course. See appendix 4.   Target course is PSY 2113- Research Methods</p>	<p>Two criteria to meet:  1. Average higher than 67%  At least 15% of the students score above 90%</p>	<p>Each semester in which course occurs 2013- 2014.   Each semester in which target course occurs.</p>	<p>Every 2 years   Next LC: Fall 2015</p>

## *MS in Technical and Professional Communication*

### 1. MSTPC Assessment Plan

See Table 1 below.

### 2. Action Plan (Loop-Closing) for MSTPC

#### a. Report on 2014-15 Academic Year

**Learning Objective 1:** Design, produce, and evaluate the various types of technical and professional communication required by diverse audiences

**Assessment:** Graduate Exit Survey

**Evaluation:** The five graduates between 2013 and 2015 who took the survey, rated their achievement of the objective on a scale from 1-5 and the average was **4.8**

**Issue:** No issues were identified.

**Actions:** Next loop closing Summer 2017.

**Responsibility:** Corinne Stavish, program director

**Learning Objective 2:** Gain insight into the current research methodologies applicable to the fields of technical and professional communication

**Assessment:** Research rubric applied to Semester Project in COM6453

**Evaluation:** No loop closing in 2014-15

**Issues:** N/A

**Actions:** COM6453 is offered in the Fall 2015. Loop closing scheduled for Summer 2016

**Responsibility:** Corinne Stavish, program director

**Learning Objective 3:** Apply major rhetorical theories of technical and professional discourse to a variety of communication environments

**Assessment:** Rhetoric Rubric applied to Final Project in COM6443, Rhetoric of Technical Communication

**Evaluation:**

- In the area of Skills—critical understanding of visual, oral, written and digital forms and the role and uses of rhetoric in society—the six students had an average of 2.3 on a scale of 3
- In the area of Content—demonstrates advanced knowledge of argumentation and persuasion in the field and expresses these concepts clearly in written, oral and digital forms—the six students had an average of 2.1 on a scale of 3
- In the area of Product—demonstrates knowledge of form and function, audience and reflects theoretical understanding and practical implementation—the six students had an average of 2.1 on a scale of 3.

**Issues:** The average score just made it to the B range. No major issues identified, but the instructor will be advised to pay attention to the weak areas the next time the course is offered.

**Actions:** Next loop closing will be completed next time COM6443 is offered, which varies depending upon enrollment.

**Responsibility:** Corinne Stavish, program director

**Learning Objective 4:** Use verbal, visual, analytical, and digital skills to create and enhance communication in professional environments

**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 students had an average of 2 on a scale of 3.
- In the area of Clarity and Coherence—fluent and concise writing, logical organization and audience adaptation—the students had an average of 2.5 on a scale of 3.

- In the area of Content—excellent style, organization, content, and publishable quality—the students had an average of 2 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.

**Actions:** We will make all instructors in the program aware of the need to work on the students' writing skills. (See Plan for 2015-16 academic year.). Next loop closing will be summer 2016.

**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:**

- In the area of Content—interacts fluently on the topic and provides in-depth elaboration on aspects of the content—the four students had an average of 2.6 on a scale of 3
- In the area of Organization—develops a clear overall and internal structure; presents meaningful transitions and summary information, and uses effective visuals—the four students had an average of 2.3 on a scale of 3
- In the area of Delivery—demonstrates fluency in use of English; connects with audience; has dynamic presentation—the four students had an average of 2.6 on a scale of 3

**Issues:** No issues identified. Students achieved over the 2 point expectation.

**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:** No loop closing in 2014-15.

**Issues:** No issues identified.

**Actions:** There were no graduates in 2014; therefore, the exit survey was not administered. Next loop closing summer 2016.

**Responsibility:** Corinne Stavish, program director

### Report on Plan for 2014-15 Academic Year

- Make all instructors in the program aware of the need to work on the students' writing skills: *We asked all instructors to work more on writing, sent some students to the AAC, and are continuing to follow up on writing skills.*
- Administer Oral Rubric: *Accomplished*
- Administer Exit Survey: *Accomplished*
- Complete a rubric for Rhetoric to be added to assessment tool for learning objective #1: *Accomplished*
- Administer Rhetoric Rubric: *Accomplished*
- Collect assignments in identified courses and score with appropriate rubric: *Accomplished*
- Close loop on learning goals 1, 4, 5: *Accomplished*

### Plan for 2015-16 Academic Year

- Continue to work on writing skills
- Discuss what types of writing courses might be introduced in the program
- Administer Exit Survey
- Close loop on learning goals 2, 3, 4, 6

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

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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	Ongoing—every graduate completes Exit Survey	1) Design, produce, and evaluate the various types of technical and professional communication required by diverse audiences.
“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 time COM6453, Research Methods, is offered (varies)	2) Gain insight into the current research methodologies applicable to the fields of technical and professional communication
“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 time COM6443, Rhetoric of Technical Communication is offered (varies)	Bi-annual, beginning Summer 2014
“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 Communication Rubric	Every time COM7203, Technical Communication Practicum is offered  Every time COM6553, Advanced Interpersonal Communication is offered (Fall of even years)	Annual, beginning Summer 2013  Bi-annual, beginning Summer 2013
“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	Ongoing—every graduate should complete Exit Survey	Bi-annual, beginning Summer 2014

## ***BS in Mathematics***

### **1. Assessment Plan: BS in Mathematics**

See Table 1 below

#### **1. Action Plan (Loop-Closing)**

##### **a. Report on 2014-2015 Academic Year**

The department of Mathematics and Computer Science has not had a culture of assessment for well over fifteen years. Half of the existing Mathematics faculty have been hired in the past five years, and the program objectives and curriculum had been established well before they arrived. For fifteen years or more, assessment was primarily done by the department chair (who is now retired) and three assessment coordinators, none of whom were effective at coordinating assessment. With each new assessment coordinator the department was effectively starting over again with assessment efforts. In Fall 2014 under the leadership of a new chair, the department decided that previous assessment efforts had been ineffective, and that a new direction was needed. In Fall 2014 and Spring 2015 the department revised the Mathematics curriculum to emphasize applied rather than theoretical mathematics and put assessment efforts on hold until the new curriculum was in place. In Spring 2015 the Math faculty decided that assessment efforts of the new program outcomes would begin by assessing three core Mathematics courses MCS1414 Calculus 1, MCS1424 Calculus 2, and MCS2414 Calculus 3. As a necessary step before assessment was possible, In Spring 2015 it was decided to create Standard Syllabi in these three courses for the programs in Mathematics. These Standard Syllabi are still under development and will be completed in Fall 2015. A pilot assessment will be done on MCS1414, MCS1424, and MCS2414 in Fall 2015 and a full assessment will be done on these three courses in Spring 2016.

#### #1: [Apply knowledge of mathematics appropriate to a problem.]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

#### #2: [Analyze a problem, and identify and define the mathematical techniques appropriate to its solution]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

#### #3: [Design, implement, and evaluate a mathematical model that satisfies specified requirements]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

#4: [Function effectively on teams to accomplish a common goal, including performing leadership tasks.]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

#5: [Communicate mathematical ideas and models effectively to a range of audiences both orally and in written form.]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

#6: [Analyze the local and global impact of models on individuals, organizations, and society.]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

#7: [Recognize the need for and engage in life-long learning, continuing professional development and adapt to changes in the field.]

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414

Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

**#8: [Use current and established techniques, skills, and tools necessary for applying mathematics.]**

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

**#9: [Secure employment and/or attend graduate school in mathematics or any field based on mathematics, drawing on their experiences, both within and outside the major to become responsible citizens and effective professionals.]**

Assessment:	The mathematics faculty are currently revising the program outcomes, with new outcomes to be completed Fall 2015.
Evaluation:	A pilot assessment on the new program outcomes will take place Fall 2015 in MCS1414, MCS1424, and MCS2414
Issues:	Issues will be identified in May 2016 based on a full assessment done in MCS1414, MCS1424 and MCS2414 in Spring 2016.
Actions:	Actions will be proposed in May 2016 and implemented in Fall 2016.
Responsibility:	MCS1414=Nelson, MCS1424 = Dabkowski, MCS2414= Yu

## **b. Report on Plan for 2015-2016 Academic Year**

### **Fall 2015**

- Completion of standard ABET-type syllabus (including course learning objectives) and course outline for MCS1414, MCS1424, and MCS2414.
- The entire math faculty will approve the standard course syllabi and objectives for MCS1414, MCS1424, and MCS2414 by December 2015
- Revise assessment plan for 2015-16, including new program outcomes
- Pilot assessment in MCS1414, MCS1424, and MCS2414 in sections taught by full-time faculty; problems from final exams that are relevant to course objectives will be used in each of the three core Math courses

### **Spring 2016**

- The standard syllabi and course outlines for MCS1414, MCS1424, and MCS2414 will be implemented in all sections



- A full assessment of MCS1414, MCS1424, and MCS2414 will be done in all sections using problems on final exams relevant to course learning objectives
- A Close the Loop assessment workday will be held in May 2016 to evaluate the results of the data collected in MCS1414, MCS1424, and MCS2414. Issues will be identified, and actions will be decided and responsibility assigned to Math faculty for continuous improvement

**Table 1: Assessment Plan for BS in Mathematics**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	<i>Apply</i> knowledge of computing and mathematics appropriate to a problem.(1)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
	<i>Display</i> a complete understanding of a computer language ((syntax, semantics and terminology), <i>develop</i> and <i>debug</i> complex code. (2)	Direct assessment of student work	Level 3 on direct assessment rubric	Annual	Annual
	<i>Apply</i> current and established techniques, skills, and tools necessary for applying mathematics and computing practice.(8)	Direct assessment of student work	Level 3 on direct assessment rubric	Annual	Annual
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	<i>Design, implement, and evaluate</i> a mathematical model, computer- based system, process, component, or program to meet its specified requirements (3)	Direct assessment of Senior Project written reports	Level 3 on direct assessment rubric	Annual	Annual
<u><b>SUSTAINABILITY</b></u> "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."	<i>Recognize</i> 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	Level 3 on survey rubric	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”	<i>Plan, create and integrate</i> 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	Annual	Annual

<b><u>MATHEMATICS</u></b> “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.”	<i>Analyze</i> a problem, and <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”	<i>Analyze</i> a problem, and <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>LEADERSHIP</u></b> “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.”	<i>Analyze</i> the local and global impact of computing and models on individuals, organizations, and society. (6)	Alumni survey	Level 3 on survey rubric	Annual	Annual
<b><u>TEAMWORK</u></b> “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)	Exit interview	Affirmative answers from 80% of interviewees.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.”	<i>Secure</i> employment and/or <i>attend</i> 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	Level 3 on survey rubric	Annual	Annual

## *BS in Computer Science*

### **1. Assessment Plan: BS in Computer Science**

See Table 1 below

### **2. Action Plan (Loop-Closing)**

#### **c. Report on 2014-2015 Academic Year**

The department of Mathematics and Computer Science has not had a culture of assessment for well over fifteen years. Half of the existing Computer Science faculty have been hired in the past five years, and the program objectives and curriculum had been established well before they arrived. For fifteen years or more, assessment was primarily done by the department chair (who is now retired) and three assessment coordinators, none of whom were effective at coordinating assessment. With each new assessment coordinator the department was effectively starting over again with assessment efforts. In Fall 2014 under the leadership of a new chair, the department decided that previous assessment efforts had been ineffective, and that a new direction was needed. In Spring 2015 the department decided to replace the existing program outcomes and replace them with ABET Computer Science program outcomes. The CS faculty decided that assessment efforts of the new program outcomes would begin by assessing three core Computer Science courses MCS1514 Computer Science 1, MCS2514 Computer Science 2, and MCS2534 Data Structures. As a necessary step before assessment was possible, in Spring 2015 it was decided to create Standard Syllabi in these three courses for the program in Computer Science. These Standard Syllabi are still under development and will be completed in Fall 2015. A pilot assessment will be done on MCS1514, MCS2514, and MCS2534 in Fall 2015 and a full assessment will be done on these three courses in Spring 2016.

#### #1: [Apply knowledge of computing and mathematics appropriate to the discipline.]

Assessment:	This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.
Evaluation:	Evaluation of the new ABET CS program outcomes will begin Spring 2016.
Issues:	Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.
Actions:	A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.
Responsibility:	MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#### #2: [Analyze a problem, and identify and define the computing requirements appropriate to its solution.]

Assessment:	This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.
Evaluation:	Evaluation of the new ABET CS program outcomes will begin Spring 2016.
Issues:	Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.
Actions:	A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.
Responsibility:	MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#### #3 [Design, implement, and evaluate a computer-based system, process, component, or program to meet its specified requirements.]

Assessment:	This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.
Evaluation:	Evaluation of the new ABET CS program outcomes will begin Spring 2016.

Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.  
 Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.  
 Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#4: [Function effectively on teams to accomplish a common goal.]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.  
 Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.  
 Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.  
 Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.  
 Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#5: [Plan, create and integrate oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding.]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.  
 Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.  
 Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.  
 Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.  
 Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#6: [Analyze the local and global impact of computing on individuals, organizations, and society.]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.  
 Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.  
 Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.  
 Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.  
 Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#7: [Recognize the need for and engage in continuing professional development [and learn new technologies] and adapt to changes in the field]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.  
 Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.  
 Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.  
 Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.  
 Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#8: [Apply current techniques, skills, and tools necessary for computing practice.]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.  
 Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.  
 Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.  
 Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.

Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#9: [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.]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.

Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.

Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.

Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.

Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#10: [Display a complete understanding of a computer language (syntax, semantics and terminology), develop and debug complex code.]

Assessment: This program outcome has been replaced with new ABET Computer Science program outcome. Assessment of the new CS program outcomes will begin Fall 2015.

Evaluation: Evaluation of the new ABET CS program outcomes will begin Spring 2016.

Issues: Course objectives for MCS1514, MCS2514 and MCS2534 need to be developed before assessment can be done in these three courses.

Actions: A pilot assessment will be done in MCS1514, MCS2514, and MCS2534 in Fall 2015.

Responsibility: MCS1514=Azar, MCS2514=Wang, MCS2534 = Goulding

#### **d. Report on Plan for 2015-2016 Academic Year**

##### **Fall 2015**

- Standard syllabi and course outlines will be completed for MCS1514, MCS2514 and MCS2534
- Course learning objectives for MCS1514, MCS2514, and MCS2534 will be developed and mapped to ABET CS program outcomes
- The entire CS faculty will approve the standard syllabus and outline for MCS1514, MCS2514, and MCS2534 by December 2015
- Revise assessment plan for 2015-16
- Pilot assessment of MCS1514, MCS2514, and MCS2534 in sections taught by full-time faculty; assessment will done by evaluation of problems on final exams that are relevant to course learning objectives.

##### **Spring 2016**

- Standard syllabi and course outlines will be implemented for MCS1514, MCS2514, and MCS2534
- Data will be collected in all sections of MCS1514, MCS2514 and MCS2534 consisting of final exam problems relevant to course learning objectives in these three courses
- A Close the Loop assessment workday will be held in May 2016 to evaluate the results of the data collected in MCS1514, MCS2514, and MCS2534. Issues will be identified and actions will be decided and assigned responsibility to CS faculty members for continuous improvement.

**Table 1: Assessment Plan for BS in Computer Science**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	<i>Apply</i> knowledge of computing and mathematics appropriate to a problem.(1)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
	<i>Display</i> a complete understanding of a computer language ((syntax, semantics and terminology), <i>develop</i> and <i>debug</i> complex code. (10)	Direct assessment of student work	Level 3 on direct assessment rubric	Annual	Annual
	<i>Apply</i> current and established techniques, skills, and tools necessary for applying mathematics and computing practice.(8)	Direct assessment of student work	Level 3 on direct assessment rubric	Annual	Annual
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	<i>Design, implement, and evaluate</i> a mathematical model, computer- based system, process, component, or program to meet its specified requirements (3)	Direct assessment of Senior Project written reports	Level 3 on direct assessment rubric	Annual	Annual
<u><b>SUSTAINABILITY</b></u> "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."	<i>Recognize</i> 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	Level 3 on survey rubric	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”	<i>Plan, create and integrate</i> 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	Annual	Annual

<b><u>MATHEMATICS</u></b> “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.”	<i>Analyze</i> a problem, and <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”	<i>Analyze</i> a problem, and <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>LEADERSHIP</u></b> “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.”	<i>Analyze</i> the local and global impact of computing and models on individuals, organizations, and society. (6)	Alumni survey	Level 3 on survey rubric	Annual	Annual
<b><u>TEAMWORK</u></b> “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)	Exit interview	Affirmative answers from 80% of interviewees.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.”	<i>Secure</i> employment and/or <i>attend</i> 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	Level 3 on survey rubric	Annual	Annual



## ***BS in Mathematics and Computer Science***

### **3. Assessment Plan : BS in Mathematics and Computer Science**

See Table 1 below

### **4. Action Plan (Loop-Closing)**

#### **a. Report on 2014-2015 Academic Year**

The department of Mathematics and Computer Science has not had a culture of assessment for well over fifteen years. Half of the existing Math/CS faculty have been hired in the past five years, and the program objectives and curriculum had been established well before they arrived. For fifteen years or more, assessment was primarily done by the department chair (who is now retired) and three assessment coordinators, none of whom were effective at coordinating assessment. With each new assessment coordinator the department was effectively starting over again with assessment efforts. In Fall 2014 under the leadership of a new department chair, the department decided that previous assessment efforts had been ineffective, and that a new direction was needed. In Fall 2014 and Spring 2015 the department revised the Mathematics curriculum to emphasize applied rather than theoretical mathematics and put assessment efforts on hold until the new curriculum was in place. The Mathematics faculty is currently in the process of determining new program outcomes for the BS in Mathematics and Computer Science in light of the new curriculum and the adoption of ABET Computer Science program outcomes in the BS of Computer Science. In Spring 2015 the Math/CS faculty decided that assessment efforts of the new curriculum would begin by assessing three core Mathematics courses MCS1414 Calculus 1, MCS1424 Calculus 2, and MCS2414 Calculus 3 and three core Computer Science courses MCS1514 Computer Science 1, MCS2514 Computer Science 2 and MCS2534 Data Structures. As a necessary step before assessment was possible, it was decided in Spring 2015 to create Standard Syllabi in these six courses for the BS in Mathematics and Computer Science. These Standard Syllabi are still under development and will be completed in Fall 2015. A pilot assessment will be done on these six courses in Fall 2015 and a full assessment will be done on these six courses in Spring 2016.

#### #1: [Apply knowledge of computing and mathematics appropriate to a problem.]

Assessment:	The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.
Evaluation:	A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.
Issues:	Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.
Actions:	Actions will be decided in May 2016 based on data collected in the six core courses.
Responsibility:	MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#### #2: [Analyze a problem, and identify and define the computing requirements and mathematical techniques appropriate to its solution.]

Assessment:	The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.
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Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.

Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.

Actions: Actions will be decided in May 2016 based on data collected in the six core courses.

Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#3: [Design, implement, and evaluate a mathematical model, computer-based system, process, component, or program to meet its specified requirements]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.

Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.

Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.

Actions: Actions will be decided in May 2016 based on data collected in the six core courses.

Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#4: [Function effectively on teams to accomplish a common goal, including performing leadership tasks]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.

Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.

Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.

Actions: Actions will be decided in May 2016 based on data collected in the six core courses.

Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#5: [Plan, create and integrate oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding.]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.

Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.

Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.

Actions: Actions will be decided in May 2016 based on data collected in the six core courses.

Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#6: [Analyze the local and global impact of computing and models on individuals, organizations, and society.]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.

Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.

Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.

Actions: Actions will be decided in May 2016 based on data collected in the six core courses.  
 Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#7: [Recognize the need for and an ability to engage in continuing professional development [and learn new technologies] and adapt to changes in the field.]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.  
 Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.  
 Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.  
 Actions: Actions will be decided in May 2016 based on data collected in the six core courses.  
 Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#8: [Apply current and established techniques, skills, and tools necessary for applying mathematics and computing practice.]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.  
 Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.  
 Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.  
 Actions: Actions will be decided in May 2016 based on data collected in the six core courses.  
 Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#9: [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.]

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.  
 Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.  
 Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.  
 Actions: Actions will be decided in May 2016 based on data collected in the six core courses.  
 Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar, MCS2514 = Wang, MCS2534 = Goulding

#10: [Display a complete understanding of a computer language ((syntax, semantics and terminology), develop and debug complex code.)

Assessment: The mathematics faculty are currently revising the program outcomes for the BS in Mathematics and Computer Science, to be completed Dec 2015.  
 Evaluation: A pilot assessment on the six core Math/CS courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 will be completed in Fall 2015.  
 Issues: Issues will be identified based on a full assessment of the six core Math/CS courses in Spring 2016.  
 Actions: Actions will be decided in May 2016 based on data collected in the six core courses.

Responsibility: MCS1414 = Nelson, MCS1424= Dabkowski, MCS2414 = Yu, MCS1514=Azar,  
MCS2514 = Wang, MCS2534 = Goulding

## **b. Report on Plan for 2015-2016 Academic Year**

### **Fall 2015**

- For six core courses MCS1414, MCS1424, MCS2414, MCS1514, MCS2514, and MCS2534 standard syllabi and outlines will be completed by December 2015
- Math faculty will agree on new program outcomes for BS in Math/CS.
- Course objectives for the six courses listed above will be developed and mapped to the new program outcomes by Math faculty for the three math courses and by CS faculty for the three CS courses
- All Math faculty will approve the three Math course objectives, syllabus, and outline, and all CS faculty will approve the three CS objectives, syllabus, and outline by December 2015
- Pilot assessment in sections of each of these six courses taught by full-time faculty, using problems from final exams relevant to course objectives
- Revise the assessment plan for 2015-16.

### **Spring 2016**

- The common course syllabi and course outlines will be implemented in the six courses listed above.
- A full assessment in all sections of the six courses listed above will be completed using problems on final exams relevant to course learning objectives
- A Close the Loop assessment workday will be held in May 2016 to evaluate the results of the data collected in the six courses. Issues will be identified, actions will be decided, and responsibility assigned based on the evaluation.

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

LTU Undergraduate Learning Outcomes	Supporting Program Learning Objective	Assessment Tools	Metrics/ Indicators	Administration Timeline	Loop- Closing Timeline
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	<i>Apply</i> knowledge of computing and mathematics appropriate to a problem.(1)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
	<i>Display</i> a complete understanding of a computer language (syntax, semantics and terminology), <i>develop</i> and <i>debug</i> complex code. (10)	Direct assessment of student work	Level 3 on direct assessment rubric	Annual	Annual
	<i>Apply</i> current and established techniques, skills, and tools necessary for applying mathematics and computing practice.(8)	Direct assessment of student work	Level 3 on direct assessment rubric	Annual	Annual
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	<i>Design, implement, and evaluate</i> a mathematical model, computer- based system, process, component, or program to meet its specified requirements (3)	Direct assessment of Senior Project written reports	Level 3 on direct assessment rubric	Annual	Annual
<u><b>SUSTAINABILITY</b></u> "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."	<i>Recognize</i> 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	Level 3 on survey rubric	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”	<i>Plan, create and integrate</i> 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	Annual	Annual

<b><u>MATHEMATICS</u></b> “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.”	<i>Analyze</i> a problem, and <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”	<i>Analyze</i> a problem, and <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>LEADERSHIP</u></b> “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.”	<i>Analyze</i> the local and global impact of computing and models on individuals, organizations, and society. (6)	Alumni survey	Level 3 on survey rubric	Annual	Annual
<b><u>TEAMWORK</u></b> “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)	Exit interview	Affirmative answers from 80% of interviewees.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.”	<i>Secure</i> employment and/or <i>attend</i> 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	Level 3 on survey rubric	Annual	Annual

## *MS in Computer Science*

### **1. Assessment Plan**

See Table 1 below.

### **2. Action Plan (Loop-Closing)**

#### **a. Report on 2014-2015 Academic Year**

The Mathematics and Computer Science department is currently focusing its assessment efforts on undergraduate courses. The undergraduate curriculum has been substantially revised in the past year, and the Masters curriculum will need to also undergo a significant revision. Half of the current Computer Science faculty have joined LTU since the Masters Program outcomes and curriculum were determined. This academic year was also the first year of a new Chair of Math/CS after a previous chair of 15 years. The department has decided that the curriculum and the program outcomes should be revised first before attempting to collect data from Masters level courses. Assessment of Masters level courses will begin once both the undergraduate and graduate curriculum has been revised.

#### #1 [Display a thorough understanding of the theoretical concepts and practical uses of computer science in two concentrations.]

Assessment: This outcome may need to be revised by Computer Science faculty.

Evaluation: Courses to assess revised program outcomes will need to be determined.

Issue: No issues were identified.

Actions: The plan is to assess all Master of Science courses on a three year cycle. Assessment will begin as soon as program outcomes are revised.

Responsibility: Revision of program outcomes = ALL CS faculty

#### #2 [Demonstrate a sufficient depth of knowledge in a substantive area of computer science to pursue advanced practical work in industry]

Assessment: This outcome may need to be revised by Computer Science faculty.

Evaluation: Courses to assess revised program outcomes will need to be determined.

Issue: No issues were identified.

Actions: The plan is to assess all Master of Science courses on a three year cycle. Assessment will begin as soon as program outcomes are revised.

Responsibility: Revision of program outcomes = ALL CS faculty

#### #3 [Formulate and analyze technical requirements for new or existing projects]

Assessment: This outcome may need to be revised by Computer Science faculty.

Evaluation: Courses to assess revised program outcomes will need to be determined.

Issue: No issues were identified.

Actions: The plan is to assess all Master of Science courses on a three year cycle. Assessment will begin as soon as program outcomes are revised.

Responsibility: Revision of program outcomes = ALL CS faculty

#### #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* ]

Assessment: This outcome may need to be revised by Computer Science faculty.

Evaluation: Courses to assess revised program outcomes will need to be determined.

Issue: No issues were identified.

Actions: The plan is to assess all Master of Science courses on a three year cycle. Assessment will begin as soon as program outcomes are revised.

Responsibility: Revision of program outcomes = ALL CS faculty

#5 *[Plan, create and integrate oral and written communication of [mathematical and algorithmic ideas] effectively to audiences having a range of technical understanding.]*

Assessment: This outcome may need to be revised by Computer Science faculty.

Evaluation: Courses to assess revised program outcomes will need to be determined.

Issue: No issues were identified.

Actions: The plan is to assess all Master of Science courses on a three year cycle. Assessment will begin as soon as program outcomes are revised.

Responsibility: Revision of program outcomes = ALL CS faculty

## **b. Report on Plan for 2015-2016 Academic Year**

Assessment efforts in the MS in CS program are currently being put on hold until the assessment of undergraduate Computer Science programs is revised. After a robust program of assessment in undergraduate CS courses has been implemented, it will probably require at least an additional year to revise the MS of CS curriculum and assessment plan.



**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.”	<i>Display</i> a thorough understanding of the theoretical concepts and practical uses of computer science in two concentrations.	Direct assessment of student assignments	Level 3 on graduate assignment rubric	Annual	Annual
	Demonstrate a sufficient depth of knowledge in a substantive area of computer science to pursue advanced practical work in industry	Alumni survey	Level 3 on survey rubric	Biennial	Annual
“LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies”	<i>Formulate</i> and <i>analyze</i> technical requirements for new or existing projects	Direct assessment of student collaborative research projects	Level 3 on project rubric	Annual	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 <i>master</i> new topics required to <i>understand</i> and <i>synthesize</i> solutions to novel problems, based on their technical knowledge of computer science and their ability to <i>think critically</i>	Alumni Survey	Level 3 on rubric	Annual	Annual
“LTU graduates will communicate effectively using written, oral, graphical, and digital formats.”	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	Annual (Spring)	Annual
“LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.”	Students will develop a broad perspective on professional issues.	Evaluation of work in ARI5622 ID	70% of students obtain a grade of B or above	Annual (Fall)	Annual

**BS in Chemical Biology****1. Assessment Plan – Chemical Biology**

See Table 1.

**2. Action Plan (Loop-Closing) for Chemical Biology Program****a. Report on 2014-2015 Academic Year**

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.
Assessment Tool 1:	Evaluation of ETS National Chemistry Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Need to work on evaluation process and metric
Actions 1:	Evaluation completed and running average was not met. Refer to the assessment plan section
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.
University Learning Outcomes:	LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”
Program Learning Objective:	Students will be able to apply knowledge to solve advanced problems in their discipline.
Assessment Tool 1:	Direct assessment of student assignments with lab report rubric.
Metrics:	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.
Issue:	None
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Instructors of BIO 2323, BIO 2201, CHM 3411 and BIO 4813.
Assessment Tool 2:	Course objectives in BIO 2323, BIO 2201, CHM 3411 and BIO 4813.
Metric:	80% “confident” and “very confident” overall of their mastery of the course objectives.
Issue:	None
Actions:	Goal met at 95%. No further action taken at this time.
Responsibility:	Instructors of BIO 2323, BIO 2201, CHM 3411 and BIO 4813.

University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment:	Evaluation of Senior project proposal with project rubric in PSC 3001.
Metrics:	80% "satisfactory" or "superior" performance.
Issue:	Student were required to consider relevant sustainability issues in their senior project proposal, and they all did, when relevant, in their project proposal. But sustainability issues do not apply to all projects.
Actions:	Refer to the assessment plan
Responsibility:	Instructor of PSC 3001
University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment Tool 1:	Direct assessment of student assignments with an assignment rubric.
Metrics:	Evaluation of written work including papers and laboratory reports at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	BIO1221 has undergone significant curriculum change, and writing report are no longer required; this assessment does not apply any more. Assessment of BIO 1221 will be dropped because BIO1221 is a freshman course, any assessment would be premature.
Actions:	Refer to the assessment plan section
Responsibility:	Instructor of BIO 2323, BIO 1221, 1231, 4811 and CHM 3403
Assessment Tool 2:	Direct assessment of student assignments with a project/lab report rubrics.
Metrics:	Laboratory reports will be evaluated using rubric, including standards for organization, language, and visual communication (tables/graphs) at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	BIO1221 has undergone significant curriculum change, and writing report are no longer required; this assessment does not apply any more. Assessment of BIO 1221 will be dropped because BIO1221 is a freshman course, any assessment would be premature.
Actions:	The metrics has been met for the other courses other than BIO1221.
Responsibility:	Instructor of BIO 2323, BIO 1221, 1231, 4811 and CHM 3403
Assessment Tool 3:	Evaluation of student presentations using oral presentation rubric.
Metrics:	80% "satisfactory" or "superior" performance based on rubric.
Issue:	No results are collected due to ambiguity in responsibility.
Actions:	Refer to the assessment plan section.
Responsibility:	Faculty requiring student presentations in their course.

University Learning Outcomes:	“LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool 1:	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 or PSC 3001 with rubric.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None
Actions:	Refer to the assessment tasks section.
Responsibility:	Instructor of BIO 4813 or PSC 3001.
Assessment Tool 2:	Completion of an independent research project or experiment with minimal assistance in BIO 4811 and/or BIO 4912/4922.
Metrics:	80% “satisfactory” or “superior” performance by the senior year
Issue:	None
Actions:	Refer to the assessment plan section.
Responsibility:	Instructor of BIO 4811 and/or BIO 4912/4922.
University Learning Outcomes:	“LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Instructor and team-self evaluation in BIO 1221, BIO 1231, BIO 2201 or BIO 2203.
Metrics:	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
Issue:	BIO1221 has undergone significant curriculum change, and team work is no longer required; this assessment does not apply any more. Assessment of BIO 1221 will be dropped because BIO1221 is a freshman course, any assessment would be premature. The team process has been informally assessed in the other courses, no formal rubric has been applied.
Actions:	Refer to the assessment plan section.
Responsibility:	Instructor of BIO 1221, BIO 1231, BIO 2201 or BIO 2203.
University Learning Outcomes:	“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.”
Program Learning Objective:	Same as University Learning Outcomes

Assessment Tool:	Ethics case study assignment or quiz in PSC 3001
Metrics:	80% “satisfactory” or “superior” performance.
Issue:	Requirement to address research ethical issues has been included as part of the PSC 3001 course assignments. But no rubric exists for application.
Actions:	Refer to the assessment plan.
Responsibility:	Instructor of PSC 3001 and NS faculty

#### **a. Report on Plan for 2015-2016 Academic Year**

In the drafting of this report, it is observed that the current assessment plan and assessment process both need revision.

It is found that some courses have undergone significant curriculum and/or pedagogy changes and the previous assessment does not apply at all. For example, assessment of written work is assigned to BIO1221 Biology 1 Lab. But starting from last academic year, the pedagogy of the course has switch to Course-based Undergraduate Research Experiences (CUREs), technical writing is no longer a priority of the course, which makes it no longer a valid candidate for assessing writing.

In some other courses, assessment was done, but in an informal way due to lack of assessment instruments. PSC3001 Introduction to Project assess students’ awareness of sustainability issue and professional ethics issues. But no rubrics or any other quantifiable assessment tools are available to be applied, the assessment results remain less reliable.

For all undergraduate programs, national ETS exams were used to gauge students’ knowledge gain. The validity and reliability of this assessment has been debated internally. We noticed that some students did not take the exam seriously, and performed at a much lower level than they really were; in addition, the topic coverage of the ETS exams does not match the topic coverage of our programs. These issues plagued this assessment severely.

It is also found that there are some mismatch of courses and their assessments. For example, assessing student project/lab report and assessing student presentation skills are assigned to the course PHY3653 Contemporary Physics. However, report writing and presentation are minimally required in the course; meanwhile, PHY3661 Contemporary Physics Lab, which has a strong emphasis on report writing, is not assessed in this regard.

In addition, a few other issues exist in the current assessment practice. Some of the assessments need clearly defined metrics. The instructor who is responsible for assessing CHM3411 reported that the evaluation of student writing in the course is: The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation; however, the criteria of being qualified is not defined, which leaves huge ambiguity in assessment implementation and assessment result interpretation.

Another common issue almost all instructor reported is that the current assessment plan is very hard to follow up. An instructor is often responsible of assessing different University Learning Outcomes in different courses in different semesters. One can be easily overwhelmed by the assessment tasks, and ends up inadequately assessing one or two goals.

To address the current issues, we would propose a different course of assessment for this academic year.

In Fall 2015:

- An assessment database will be created by the department assessment coordinator, with which all faculty members can easily discover/sort out their responsibility; and with which the assessment coordinator can easily follow up with faculty members.
- The department will revisit the timing of ETS exams, the mismatch of ETS exam topics and program topics, and the evaluation metrics of the exams.
- The faculty member of the three disciplines (biology, chemistry and physics) will revisit the current assessment plan, redefine assessment activities based on course work, pedagogy and available assessment instruments, redefine assessment metrics and to address the mismatch issue.

In Spring 2015:

- Implement the new assessment activities to applicable courses/programs.

**Table 1: Assessment Plan for BS in Chemical Biology**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	Evaluate knowledge and expertise gained in their field.	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	Annually, late spring.	Every two years. Fall 2012.  Every four years beginning Spring 2013
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Students will be able to apply knowledge to solve advanced problems in their discipline.	Direct assessment of coursework with lab report rubric in BIO 2323, BIO 2201, CHM 3411, and BIO 4813	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.	Semester the course is offered.	Annual
<u><b>SUSTAINABILITY</b></u> "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."		PBL problem with poster or paper with project proposal rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”		Evaluation of written work including papers and laboratory reports with writing/projects/lab report rubrics.  Laboratory reports will be evaluated using lab report rubric, including standards for organization, language, and visual communication (tables/graphs).  Evaluation of student presentations using oral presentation rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual

<b><u>MATHEMATICS</u></b> “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 <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”		Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 or PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in BIO 4811 and/or BIO 4912/4922.	80%“satisfactor” or “superior” performance.	Annual	Annual
<b><u>LEADERSHIP</u></b> “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			Annual
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”		Instructor and team- self-evaluation in BIO 1221, BIO 1231, BIO 2201 or BIO 2203.	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.	Annual	Annual



**BS in Chemistry****1. Assessment Plan - Chemistry**

See Table 1

**2. Action Plan (Loop-Closing) for the Chemistry Program****a. Report on 2014-2015 Academic Year**

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.
Assessment Tool 1:	Evaluation of ETS National Chemistry Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Need to work on evaluation process and metric
Actions 1:	Evaluation completed and running average was not met. Refer to the assessment plan section
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; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.
University Learning Outcomes:	“LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”
Program Learning Objective:	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.
Assessment Tool 1:	Direct assessment of coursework with lab report rubric in CHM 3411, CHM4632/1, CHM4541, CHM3463
Metrics:	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation
Issue:	Rubrics were applied for CHM3411, but the metrics needs update to define what 80% means. CHM3463: General guidelines were provided, no formal rubrics were applied.
Actions:	Refer to the assessment plan section
Responsibility:	Instructors of CHM 3411, CHM4632/1, CHM4541, and CHM3463.

Assessment Tool 2:	Course objectives survey.
Metric:	80% “confident” and “very confident” overall of their mastery of the course objectives.
Issue:	None.
Actions:	Goal met with an overall average of 92%. No further action taken at this time.
Responsibility:	Instructor of course.
University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment:	Evaluation of Senior project proposal with project rubric in PSC 3001.
Metrics:	80% “satisfactory” or “superior” performance.
Issue:	Student were required to consider relevant sustainability issues in their senior project proposal, but sustainability issues do not apply to all projects.
Actions:	Students all considered sustainability issues, when relevant, in their project proposal.
Responsibility:	Instructor of PSC 3001.
University Learning Outcomes:	“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.”
Program Learning Objective:	The same as University Learning Outcomes
Assessment Tool 1:	Direct assessment of student assignments with an appropriate rubric.
Metrics:	Evaluation of written work including papers and laboratory reports at the 80% “satisfactory” or “superior” performance based on rubrics.
Issue:	Goal met at 100%, but the criterion of “satisfactory” or “superior” performance needs to be defined.
Actions:	Refer to the assessment plan section.
Responsibility:	Instructor CHM 3403, CHM 3452, CHM 3383, CHM4632/1, and CHM4541.
Assessment Tool 2:	Direct assessment of student assignments with a project/lab report rubrics.
Metrics:	Laboratory reports will be evaluated using rubric, including standards for organization, language, and visual communication (tables/graphs) at the 80% “satisfactory” or “superior” performance based on rubrics.
Issue:	Goal met at 100%, but the criterion of “satisfactory” or “superior” performance needs to be defined.
Actions:	Refer to the assessment plan section.
Responsibility:	Instructor CHM 3403, CHM 3452, CHM 3383, CHM4632/1, and CHM4541.

Assessment Tool 3:	Evaluation of student presentations using oral presentation rubric.
Metrics:	80% “satisfactory” or “superior” performance based on rubric.
Issue:	No results are collected due to ambiguity in responsibility.
Actions:	Refer to the assessment plan section.
Responsibility:	Faculty requiring student presentations in their course.
University Learning Outcomes:	“LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool 1:	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of CHM 4643, CHM 4723 or PSC 3001 with rubric.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None.
Actions:	Goal met. No further action at time.
Responsibility:	Instructor of CHM 4643, CHM 4723 or PSC 3001.
Assessment Tool 2:	Completion of an independent research project or experiment with minimal assistance in CHM4632, or CHM 3463 and/or CHM4912/4922.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	The criterion of “satisfactory” or “superior” performance needs to be defined.
Actions:	Goal met in CHM 4912/4922 at 100%. No further action taken at this time.
Responsibility:	Instructor of CHM4632, or CHM 3463 and/or CHM4912/4922.
University Learning Outcomes:	“LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Instructor and team-self evaluation in CHM 4632, CHM 4541, CHM 3463.
Metrics:	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
Issue:	CHM3463 stressed independent study skills, team work is not an essential component of the course. This assessment should be removed from the course to better reflect the nature of the course.
Actions:	Refer to the assessment plan section
Responsibility:	Instructor of CHM 4632, CHM 4541, or CHM 3463.

University Learning Outcomes:	“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.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Ethics case study assignment or quiz in PSC 3001
Metrics:	80% “satisfactory” or “superior” performance.
Issue:	Requirement to address research ethical issues has been included as part of the PSC 3001 course assignments. But no rubric exists for application.
Actions:	Refer to the assessment plan.
Responsibility:	Instructor of PSC 3001 and NS faculty.

### **b. Report on Plan for 2015-2016 Academic Year**

In the drafting of this report, it is observed that the current assessment plan and assessment process both need revision.

It is found that some courses have undergone significant curriculum and/or pedagogy changes and the previous assessment does not apply at all. For example, assessment of written work is assigned to BIO1221 Biology 1 Lab. But starting from last academic year, the pedagogy of the course has switch to Course-based Undergraduate Research Experiences (CUREs), technical writing is no longer a priority of the course, which makes it no longer a valid candidate for assessing writing.

In some other courses, assessment was done, but in an informal way due to lack of assessment instruments. PSC3001 Introduction to Project assess students’ awareness of sustainability issue and professional ethics issues. But no rubrics or any other quantifiable assessment tools are available to be applied, the assessment results remain less reliable.

For all undergraduate programs, national ETS exams were used to gauge students’ knowledge gain. The validity and reliability of this assessment has been debated internally. We noticed that some students did not take the exam seriously, and performed at a much lower level than they really were; in addition, the topic coverage of the ETS exams does not match the topic coverage of our programs. These issues plagued this assessment severely.

It is also found that there are some mismatch of courses and their assessments. For example, assessing student project/lab report and assessing student presentation skills are assigned to the course PHY3653 Contemporary Physics. However, report writing and presentation are minimally required in the course; meanwhile, PHY3661 Contemporary Physics Lab, which has a strong emphasis on report writing, is not assessed in this regard.

In addition, a few other issues exist in the current assessment practice. Some of the assessments need clearly defined metrics. The instructor who is responsible for assessing CHM3411 reported that the evaluation of student writing in the course is: The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation; however, the criteria of being qualified is not defined, which leaves huge ambiguity in assessment implementation and assessment result interpretation.

Another common issue almost all instructor reported is that the current assessment plan is very hard to follow up. An instructor is often responsible of assessing different University Learning Outcomes in different courses in different semesters. One can be easily overwhelmed by the assessment tasks, and ends up inadequately assessing one or two goals.

To address the current issues, we would propose a different course of assessment for this academic year.

In Fall 2015:

- An assessment database will be created by the department assessment coordinator, with which all faculty members can easily discover/sort out their responsibility; and with which the assessment coordinator can easily follow up with faculty members.
- The department will revisit the timing of ETS exams, the mismatch of ETS exam topics and program topics, and the evaluation metrics of the exams.
- The faculty member of the three disciplines (biology, chemistry and physics) will revisit the current assessment plan, redefine assessment activities based on course work, pedagogy and available assessment instruments, redefine assessment metrics and to address the mismatch issue.

In Spring 2015:

- Implement the new assessment activities to applicable courses/programs.

**Table 1: Assessment Plan for BS in Chemistry**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	Evaluate knowledge and expertise gained in their field.	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	Annually, late spring.	Every two years. Fall 2012.  Every four years beginning Spring 2013
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Students will be able to apply knowledge to solve advanced problems in their discipline.	Direct assessment of coursework with lab report rubric in BIO 2323, BIO 2201, CHM 3411, and BIO 4813	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.	Semester the course is offered.	Annual
<u><b>SUSTAINABILITY</b></u> "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."		PBL problem with poster or paper with project proposal rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”		Evaluation of written work including papers and laboratory reports with writing/projects/lab report rubrics.  Laboratory reports will be evaluated using lab report rubric, including standards for organization, language, and visual communication (tables/graphs).  Evaluation of student presentations using oral presentation rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual

<b><u>MATHEMATICS</u></b> “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 <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”		Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 or PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in BIO 4811 and/or BIO 4912/4922.	80%“satisfactor” or “superior” performance.	Annual	Annual
<b><u>LEADERSHIP</u></b> “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			Annual
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”		Instructor and team- self-evaluation in BIO 1221, BIO 1231, BIO 2201 or BIO 2203.	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.	Annual	Annual

**BS in Environmental Chemistry****1. Assessment Plan – Environmental Chemistry**

See Table 1.

**2. Action Plan (Loop-Closing) for the Environmental Chemistry Program****a. Report on 2014-2015 Academic Year**

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.
Assessment Tool 1:	Evaluation of ETS National Chemistry Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	Need to work on evaluation process and metric
Actions 1:	Evaluation completed and running average was not met. Refer to the assessment plan section
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; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.
University Learning Outcomes:	“LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”
Program Learning Objective:	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.
Assessment Tool 1:	Direct assessment of coursework w/ lab report rubric in CHM 3392, CHM 4632/1, CHM 4541, CHM 3463
Metrics:	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation
Issue:	None.
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Instructors of CHM 3392, CHM4632/1, CHM4541, and CHM3463.
Assessment Tool 2:	Course objectives survey.
Metric:	80% “confident” and “very confident” overall of their mastery of the course objectives.
Issue:	None.



Actions:	Goal met with an overall average of 92%. No further action taken at this time.
Responsibility:	Instructor of course.
University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment:	Evaluation of Senior project proposal with project rubric in PSC 3001.
Metrics:	80% "satisfactory" or "superior" performance.
Issue:	Student were required to consider relevant sustainability issues in their senior project proposal, but sustainability issues do not apply to all projects.
Actions:	Students all considered sustainability issues, when relevant, in their project proposal.
Responsibility:	Instructor of PSC 3001.
University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment Tool 1:	Direct assessment of student assignments with appropriate rubric.
Metrics:	Evaluation of written work including papers and laboratory reports at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	Goal met at 100%, but the criterion of "satisfactory" or "superior" performance needs to be defined.
Actions:	Refer to the assessment plan section.
Responsibility:	Instructor CHM 3403, CHM 3452, CHM 3383, CHM4632/1, and CHM4541.
Assessment Tool 2:	Direct assessment of student assignments with a project/lab report rubrics.
Metrics:	Laboratory reports will be evaluated using rubric, including standards for organization, language, and visual communication (tables/graphs) at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	Goal met at 100%, but the criterion of "satisfactory" or "superior" performance needs to be defined.
Actions:	Refer to the assessment plan section.
Responsibility:	Instructor CHM 3403, CHM 3452, CHM 3383, CHM4632/1, CHM4541 and CHM 3392.
Assessment Tool 3:	Evaluation of student presentations using oral presentation rubric.
Metrics:	80% "satisfactory" or "superior" performance based on rubric.
Issue:	No results are collected due to ambiguity in responsibility.
Actions:	Refer to the assessment plan section.

Responsibility:	Faculty requiring student presentations in their course.
University Learning Outcomes:	“LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool 1:	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of CHM 4632, CHM 3463 or PSC 3001 with rubric
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None
Actions:	No Environmental Chemistry major enrolled. No further action taken at this time.
Responsibility:	Instructor of CHM 4643, CHM 3463 or PSC 3001.
Assessment Tool 2:	Completion of an independent research project or experiment with minimal assistance in CHM4632, or CHM 3463 and/or CHM4912/4922.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None
Actions:	No Environmental Chemistry major enrolled. No further action taken at this time.
Responsibility:	Instructor of CHM4632, or CHM 3463 and/or CHM4912/4922.
University Learning Outcomes:	“LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Instructor and team-self evaluation in CHM 4632, CHM 4541, CHM 3463.
Metrics:	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
Issue:	CHM3463 stressed independent study skills, team work is not an essential component of the course. This assessment should be removed from the course to better reflect the nature of the course.
Actions:	Refer to the assessment plan section
Responsibility:	Instructor of CHM 4632, CHM 4541, or CHM 3463.
University Learning Outcomes:	“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.”

Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Ethics case study assignment or quiz in PSC 3001
Metrics:	80% “satisfactory” or “superior” performance.
Issue:	Requirement to address research ethical issues has been included as part of the PSC 3001 course assignments. Rubric will be developed in Spring 2015.
Actions:	Refer to the assessment plan.
Responsibility:	Instructor of PSC 3001 and NS faculty.

### **b. Report on Plan for 2015-2016 Academic Year**

In the drafting of this report, it is observed that the current assessment plan and assessment process both need revision.

It is found that some courses have undergone significant curriculum and/or pedagogy changes and the previous assessment does not apply at all. For example, assessment of written work is assigned to BIO1221 Biology 1 Lab. But starting from last academic year, the pedagogy of the course has switch to Course-based Undergraduate Research Experiences (CUREs), technical writing is no longer a priority of the course, which makes it no longer a valid candidate for assessing writing.

In some other courses, assessment was done, but in an informal way due to lack of assessment instruments. PSC3001 Introduction to Project assess students’ awareness of sustainability issue and professional ethics issues. But no rubrics or any other quantifiable assessment tools are available to be applied, the assessment results remain less reliable.

For all undergraduate programs, national ETS exams were used to gauge students’ knowledge gain. The validity and reliability of this assessment has been debated internally. We noticed that some students did not take the exam seriously, and performed at a much lower level than they really were; in addition, the topic coverage of the ETS exams does not match the topic coverage of our programs. These issues plagued this assessment severely.

It is also found that there are some mismatch of courses and their assessments. For example, assessing student project/lab report and assessing student presentation skills are assigned to the course PHY3653 Contemporary Physics. However, report writing and presentation are minimally required in the course; meanwhile, PHY3661 Contemporary Physics Lab, which has a strong emphasis on report writing, is not assessed in this regard.

In addition, a few other issues exist in the current assessment practice. Some of the assessments need clearly defined metrics. The instructor who is responsible for assessing CHM3411 reported that the evaluation of student writing in the course is: The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation; however, the criteria of being qualified is not defined, which leaves huge ambiguity in assessment implementation and assessment result interpretation.

Another common issue almost all instructor reported is that the current assessment plan is very hard to follow up. An instructor is often responsible of assessing different University Learning Outcomes in different courses in different semesters. One can be easily overwhelmed by the assessment tasks, and ends up inadequately assessing one or two goals.

To address the current issues, we would propose a different course of assessment for this academic year.

In Fall 2015:

- An assessment database will be created by the department assessment coordinator, with which all faculty members can easily discover/sort out their responsibility; and with which the assessment coordinator can easily follow up with faculty members.
- The department will revisit the timing of ETS exams, the mismatch of ETS exam topics and program topics, and the evaluation metrics of the exams.
- The faculty member of the three disciplines (biology, chemistry and physics) will revisit the current assessment plan, redefine assessment activities based on course work, pedagogy and available assessment instruments, redefine assessment metrics and to address the mismatch issue.

In Spring 2015:

- Implement the new assessment activities to applicable courses/programs.

**Table 1: Assessment Plan for BS in Environmental Chemistry**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	Evaluate knowledge and expertise gained in their field.	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	Annually, late spring.	Every two years. Fall 2012.  Every four years beginning Spring 2013
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Students will be able to apply knowledge to solve advanced problems in their discipline.	Direct assessment of coursework with lab report rubric in BIO 2323, BIO 2201, CHM 3411, and BIO 4813	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.	Semester the course is offered.	Annual
<u><b>SUSTAINABILITY</b></u> "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."		PBL problem with poster or paper with project proposal rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”		Evaluation of written work including papers and laboratory reports with writing/projects/lab report rubrics.  Laboratory reports will be evaluated using lab report rubric, including standards for organization, language, and visual communication (tables/graphs).  Evaluation of student presentations using oral presentation rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual

<b><u>MATHEMATICS</u></b> “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 <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”		Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 or PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in BIO 4811 and/or BIO 4912/4922.	80%“satisfactor” or “superior” performance.	Annual	Annual
<b><u>LEADERSHIP</u></b> “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			Annual
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”		Instructor and team- self-evaluation in BIO 1221, BIO 1231, BIO 2201 or BIO 2203.	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.	Annual	Annual

## ***BS in Molecular and Cell Biology***

### **1. Assessment Plan – Molecular and Cell Biology**

See Table 1.

### **2. Action Plan (Loop-Closing) for Molecular and Cell Biology Program**

#### **a. Report on 2014-2015 Academic Year**

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.
Assessment Tool 1:	Evaluation of ETS National Exam
Metrics:	60% of graduates score at or above national mean. (4 year running average)
Issue 1:	None
Actions 1:	Evaluation completed and running average met.
Responsibility:	Tony Sky -Chairperson of the Natural Science Department with assistance from NS faculty.

Assessment Tool 2:	Evaluation of exit exam results
Issue 1:	Data being gathered and under review
Action 1:	Alignment of curriculum with exit exam questions; identification of weak points; identification of weak points.
Responsibility:	Tony Sky – Chairperson of the Natural Sciences Department with assistance from NS faculty.

University Learning Outcomes:	“LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”
Program Learning Objective:	Students will be able to apply knowledge to solve advanced problems in their discipline.
Assessment Tool 1:	Direct assessment of student assignments with lab report rubric.
Metrics:	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.
Issue:	None
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Instructors of BIO 2323, BIO 2201, CHM 3411 and BIO 4813.

Assessment Tool 2:	Course objectives survey in BIO 2323, BIO 2201, CHM 3411 and BIO 4813.
Metric:	80% “confident” and “very confident” overall of their mastery of the course objectives.
Issue:	None.
Actions:	Goal met at 95%. No further action taken at this time.
Responsibility:	Instructors of BIO 2323, BIO 2201, CHM 3411 and BIO 4813.

University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment:	Evaluation of Senior project proposal with project rubric in PSC 3001.
Metrics:	80% "satisfactory" or "superior" performance.
Issue:	Student were required to consider relevant sustainability issues in their senior project proposal, and they all did, when relevant, in their project proposal. But sustainability issues do not apply to all projects.
Actions:	Students met requirement at 100%.
Responsibility:	Instructor of PSC 3001.
University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment Tool 1:	Direct assessment of student assignments with an appropriate rubric.
Metrics:	Evaluation of written work including papers and laboratory reports at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	None
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Instructor of BIO 2323, BIO 1221, 1231, 4811 and CHM 3403
Assessment Tool 2:	Direct assessment of student assignments with a project/lab report rubrics.
Metrics:	Laboratory reports will be evaluated using rubric, including standards for organization, language, and visual communication (tables/graphs) at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	None
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Instructor of BIO 2323, BIO 1221, 1231, 4811 and CHM 3403
Assessment Tool 3:	Evaluation of student presentations using oral presentation rubric.
Metrics:	80% "satisfactory" or "superior" performance based on rubric.
Issue:	None
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Faculty requiring student presentations in their course.
University Learning Outcomes:	"LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields."



Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool 1:	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 or PSC 3001 with rubric.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None
Actions:	Metric met in PSC 3001 so no further action taken.
Responsibility:	Instructor of BIO 4813 or PSC 3001.
Assessment Tool 2:	Completion of an independent research project or experiment with minimal assistance in BIO 4811 and/or BIO 4912/4922.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None.
Actions:	Goal met at 100%. No further action taken at this time.
Responsibility:	Instructor of BIO 4811 and/or BIO 4912/4922.
University Learning Outcomes:	“LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Instructor and team-self evaluation in BIO 1221, BIO 1231, BIO 2201 or BIO 2203.
Metrics:	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
Issue:	None
Actions:	Goal met. No further action at this time.
Responsibility:	Instructor of BIO 1221, BIO 1231, BIO 2201 or BIO 2203.
University Learning Outcomes:	“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.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Ethics case study assignment or quiz in PSC 3001
Metrics:	80% “satisfactory” or “superior” performance.
Issue:	Requirement to address research ethical issues has been included as part of the PSC 3001 course assignments. Rubric will be developed in Spring 2015.
Actions:	Refer to the assessment plan.
Responsibility:	Instructor of PSC 3001 and NS faculty.

#### **b. Report on Plan for 2015-2016 Academic Year**

In the drafting of this report, it is observed that the current assessment plan and assessment process both need revision.

It is found that some courses have undergone significant curriculum and/or pedagogy changes and the previous assessment does not apply at all. For example, assessment of written work is assigned to BIO1221 Biology 1 Lab. But starting from last academic year, the pedagogy of the course has switch to Course-based Undergraduate Research Experiences (CUREs), technical writing is no longer a priority of the course, which makes it no longer a valid candidate for assessing writing.

In some other courses, assessment was done, but in an informal way due to lack of assessment instruments. PSC3001 Introduction to Project assess students' awareness of sustainability issue and professional ethics issues. But no rubrics or any other quantifiable assessment tools are available to be applied, the assessment results remain less reliable.

For all undergraduate programs, national ETS exams were used to gauge students' knowledge gain. The validity and reliability of this assessment has been debated internally. We noticed that some students did not take the exam seriously, and performed at a much lower level than they really were; in addition, the topic coverage of the ETS exams does not match the topic coverage of our programs. These issues plagued this assessment severely.

It is also found that there are some mismatch of courses and their assessments. For example, assessing student project/lab report and assessing student presentation skills are assigned to the course PHY3653 Contemporary Physics. However, report writing and presentation are minimally required in the course; meanwhile, PHY3661 Contemporary Physics Lab, which has a strong emphasis on report writing, is not assessed in this regard.

In addition, a few other issues exist in the current assessment practice. Some of the assessments need clearly defined metrics. The instructor who is responsible for assessing CHM3411 reported that the evaluation of student writing in the course is: The designation of qualified/not qualified will be given. 80% will receive a "qualified" designation; however, the criteria of being qualified is not defined, which leaves huge ambiguity in assessment implementation and assessment result interpretation.

Another common issue almost all instructor reported is that the current assessment plan is very hard to follow up. An instructor is often responsible of assessing different University Learning Outcomes in different courses in different semesters. One can be easily overwhelmed by the assessment tasks, and ends up inadequately assessing one or two goals.

To address the current issues, we would propose a different course of assessment for this academic year.

In Fall 2015:

- An assessment database will be created by the department assessment coordinator, with which all faculty members can easily discover/sort out their responsibility; and with which the assessment coordinator can easily follow up with faculty members.
- The department will revisit the timing of ETS exams, the mismatch of ETS exam topics and program topics, and the evaluation metrics of the exams.
- The faculty member of the three disciplines (biology, chemistry and physics) will revisit the current assessment plan, redefine assessment activities based on course work, pedagogy and available assessment instruments, redefine assessment metrics and to address the mismatch issue.

In Spring 2015:

- Implement the new assessment activities to applicable courses/programs.

**Table 1: Assessment Plan for BS in Chemical Biology**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	Evaluate knowledge and expertise gained in their field.	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	Annually, late spring.	Every two years. Fall 2012.  Every four years beginning Spring 2013
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Students will be able to apply knowledge to solve advanced problems in their discipline.	Direct assessment of coursework with lab report rubric in BIO 2323, BIO 2201, CHM 3411, and BIO 4813	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.	Semester the course is offered.	Annual
<u><b>SUSTAINABILITY</b></u> "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."		PBL problem with poster or paper with project proposal rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”		Evaluation of written work including papers and laboratory reports with writing/projects/lab report rubrics.  Laboratory reports will be evaluated using lab report rubric, including standards for organization, language, and visual communication (tables/graphs).  Evaluation of student presentations using oral presentation rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual

<b><u>MATHEMATICS</u></b> “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 <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”		Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of BIO 4813 or PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in BIO 4811 and/or BIO 4912/4922.	80%“satisfactor” or “superior” performance.	Annual	Annual
<b><u>LEADERSHIP</u></b> “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			Annual
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”		Instructor and team- self-evaluation in BIO 1221, BIO 1231, BIO 2201 or BIO 2203.	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.	Annual	Annual

**BS in Physics****1. Assessment Plan - Physics**

See Table 1.

**2. Action Plan (Loop-Closing) for the Physics Program****a. Report on 2014-2015 Academic Year**

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.
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:	section Need to work on evaluation process and metric
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.
University Learning Outcomes:	“LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”
Program Learning Objective:	Students will be able to apply knowledge to solve advanced problems in their discipline
Assessment Tool 1:	Direct assessment of coursework with rubric in PHY 3661 and PHY 4781.
Metrics:	At least 80% will receive a “qualified” designation.
Issue:	The courses selected for this assignment is not the right candidate.
Actions:	Refer to the assessment plane
Responsibility:	Instructors of PHY 3661 and PHY 4781.
Assessment Tool 2:	Course objectives survey.
Metric:	80% “confident” and “very confident” overall of their mastery of the course objectives.
Issue:	The courses this assessment applies must be determined first.
Actions:	Refer to the assessment plan
Responsibility:	All instructors of Physics courses.

University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment:	Evaluation of Senior project proposal with project rubric in PSC 3001.
Metrics:	80% "satisfactory" or "superior" performance.
Issue:	Student were required to consider relevant sustainability issues in their senior project proposal, and they all did, when relevant, in their project proposal. But sustainability issues do not apply to all projects.
Actions:	Refer to the assessment plan
Responsibility:	Instructor of PSC 3001.
University Learning Outcomes:	"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."
Program Learning Objective:	The same as University Learning Outcomes
Assessment Tool 1:	Direct assessment of student assignments with appropriate rubric.
Metrics:	Evaluation of written work including papers and laboratory reports at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	PHY3653 is not suitable for this assessment due to its low requirement of writing; meanwhile a few other courses, PHY3661 and PHY4781, which are very suitable for this assessment, are not assessed.
Actions:	Refer to the assessment plan
Responsibility:	Instructor PHY 3653, PHY 4843, and PHY 4912/4922.
Assessment Tool 2:	Direct assessment of student assignments with a project/lab report rubrics.
Metrics:	Laboratory reports will be evaluated using rubric, including standards for organization, language, and visual communication (tables/graphs) at the 80% "satisfactory" or "superior" performance based on rubrics.
Issue:	PHY3653 is not suitable for this assessment due to its low requirement of writing; meanwhile a few other courses, PHY3661 and PHY4781, which are very suitable for this assessment, are not assessed. This assessment seems to partially overlap with the previous one.
Actions:	Refer to the assessment plan
Responsibility:	Instructor PHY 3653, PHY 4843, and PHY 4912/4922.
Assessment Tool 3:	Evaluation of student presentations using oral advance physics course rubric.
Metrics:	80% "satisfactory" or "superior" performance based on rubrics.
Issue:	No results are collected due to ambiguity in responsibility. Specific courses need to be assigned to this assignment.

Actions:	Refer to the assessment plan
Responsibility:	Faculty requiring student presentations in their course.
University Learning Outcomes:	“LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool 1:	Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of PSC 3001 with rubric.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	Only one physics major student was in the class.
Actions:	The student met the goal.
Responsibility:	Instructor of PSC 3001.
Assessment Tool 2:	Completion of an independent research project or experiment with minimal assistance in PHY 3661, PHY 4781 and/or PHY 4912/4922.
Metrics:	80% “satisfactory” or “superior” performance by the senior year.
Issue:	None.
Actions:	Goal met in PHY 3661, PHY 4781, PHY 4912/4922 at 100%. No further action taken at this time.
Responsibility:	Instructor of PHY 3661, PHY 4781 and/or PHY 4912/4922.
University Learning Outcomes:	“LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Instructor and team-self evaluation in PHY 2413/2423.
Metrics:	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.
Issue:	Due to different pedagogy by different instructor, not all courses involved in this assessment have adequate team-building and collaboration process to assess.
Actions:	Refer to the assessment plan.
Responsibility:	Instructor of PHY 2413/2423.
University Learning Outcomes:	“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.”
Program Learning Objective:	Same as University Learning Outcomes
Assessment Tool:	Ethics case study assignment or quiz in PSC 3001
Metrics:	80% “satisfactory” or “superior” performance.

Issue:	Requirement to address research ethical issues has been included as part of the PSC 3001 course assignments. But no rubric exists for application.
Actions:	Refer to the assessment plan.
Responsibility:	Instructor of PSC 3001 and NS faculty.

### **b. Report on Plan for 2015-2016 Academic Year**

In the drafting of this report, it is observed that the current assessment plan and assessment process both need revision.

It is found that some courses have undergone significant curriculum and/or pedagogy changes and the previous assessment does not apply at all. For example, assessment of written work is assigned to BIO1221 Biology 1 Lab. But starting from last academic year, the pedagogy of the course has switch to Course-based Undergraduate Research Experiences (CUREs), technical writing is no longer a priority of the course, which makes it no longer a valid candidate for assessing writing.

In some other courses, assessment was done, but in an informal way due to lack of assessment instruments. PSC3001 Introduction to Project assess students' awareness of sustainability issue and professional ethics issues. But no rubrics or any other quantifiable assessment tools are available to be applied, the assessment results remain less reliable.

For all undergraduate programs, national ETS exams were used to gauge students' knowledge gain. The validity and reliability of this assessment has been debated internally. We noticed that some students did not take the exam seriously, and performed at a much lower level than they really were; in addition, the topic coverage of the ETS exams does not match the topic coverage of our programs. These issues plagued this assessment severely.

It is also found that there are some mismatch of courses and their assessments. For example, assessing student project/lab report and assessing student presentation skills are assigned to the course PHY3653 Contemporary Physics. However, report writing and presentation are minimally required in the course; meanwhile, PHY3661 Contemporary Physics Lab, which has a strong emphasis on report writing, is not assessed in this regard.

In addition, a few other issues exist in the current assessment practice. Some of the assessments need clearly defined metrics. The instructor who is responsible for assessing CHM3411 reported that the evaluation of student writing in the course is: The designation of qualified/not qualified will be given. 80% will receive a "qualified" designation; however, the criteria of being qualified is not defined, which leaves huge ambiguity in assessment implementation and assessment result interpretation.

Another common issue almost all instructor reported is that the current assessment plan is very hard to follow up. An instructor is often responsible of assessing different University Learning Outcomes in different courses in different semesters. One can be easily overwhelmed by the assessment tasks, and ends up inadequately assessing one or two goals.

To address the current issues, we would propose a different course of assessment for this academic year.

In Fall 2015:

- An assessment database will be created by the department assessment coordinator, with which all faculty members can easily discover/sort out their responsibility; and with which the assessment coordinator can easily follow up with faculty members.



- The department will revisit the timing of ETS exams, the mismatch of ETS exam topics and program topics, and the evaluation metrics of the exams.
- The faculty member of the three disciplines (biology, chemistry and physics) will revisit the current assessment plan, redefine assessment activities based on course work, pedagogy and available assessment instruments, redefine assessment metrics and to address the mismatch issue.

In Spring 2015:

- Implement the new assessment activities to applicable courses/programs.

**Table 1: Assessment Plan for BS in Physics**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Supporting Program Learning Objective</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<u><b>KNOWLEDGE IN DISCIPLINE</b></u> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	Exhibit a proficiency in the methods of scientific inquiry in laboratory and/or research projects.	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	Annually, late spring.	Every two years. Fall 2012.  Every four years beginning Spring 2013
<u><b>TECHNOLOGY</b></u> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Students will be able to apply knowledge to solve advanced problems in their discipline.	Direct assessment of coursework with lab report rubric in PHY3661, PHY4781	The designation of qualified/not qualified will be given. 80% will receive a “qualified” designation.	Semester the course is offered.	Annual
<u><b>SUSTAINABILITY</b></u> "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."		PBL problem with poster or paper with project proposal rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual
<u><b>COMMUNICATION</b></u> “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.”		Evaluation of written work including papers and laboratory reports with writing/projects/lab report rubrics.  Laboratory reports will be evaluated using lab report rubric, including standards for organization, language, and visual communication (tables/graphs).  Evaluation of student presentations using oral presentation rubric.	80%“satisfactor” or “superior” performance.	Annual	Annual

<b><u>MATHEMATICS</u></b> “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 <i>identify</i> and <i>define</i> the computing requirements and mathematical techniques appropriate to its solution. (2)	Direct assessment of standard questions on student final exams.	Level 3 on direct assessment rubric	Annual	Annual
<b><u>READING</u></b> “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
<b><u>SCIENTIFIC ANALYSIS</u></b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”		Evaluation of student presentation of a paper from the literature to a panel of faculty and students as part of PSC 3001 with rubric. Completion of an independent research project or experiment with minimal assistance in PHY3661, PHY4781, PHY4912/4922	80%“satisfactor” or “superior” performance.	Annual	Annual
<b><u>LEADERSHIP</u></b> “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			Annual
<b><u>TEAMWORK</u></b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”		Instructor and team- self-evaluation in PHY2413/2423	Team process check survey will be used. 80% of responses with “always satisfied” or “frequently satisfied” to survey which will include peer evaluation.	Annual	Annual
<b><u>PROFESSIONAL ETHICS</u></b> “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.	Annual	Annual

**College of Engineering**  
**BS in Biomedical Engineering**

**5. Assessment Plan for BME Program**

See Table 1 below.

**6. Action Plan (Loop-Closing) for BME Program**

**a. Report on 2014-2015 Academic Year**

During the 2014-2015 academic year, the BME program adopted key performance indicators (KPIs) for more in-depth and program-specific evaluation of student outcomes. Each KPI 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*.

Below are the assessment results:

***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, BME 3703 Biotransport, and BME 4313 Tissue Mechanics. Yellow flag was raised for KPI a-2 evaluation in BME 3703 Biotransport.
- *Issue:* Insufficient preparation, lack of confidence and proficiency on difficult concepts involving physics and math in Bioinstrumentation and Biotransport, and insufficient effort on homework and exams in Tissue Mechanics.
- *Actions:* The instructor for BME 3103 will work with ME faculty to fix the prerequisite course issue. The instructor for BME 3703 will adjust some of the course learning objectives and the level of attainment for these learning objectives.
- *Responsibility:* Mansoor Nasir, Yawen Li

***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 Red flag on key performance indicator (KPI) n-1 evaluation in BME 3703 Biotransport.

- *Issue:* Lack of confidence and proficiency on difficult new concepts.
- *Actions:* The instructor will adjust some of the course learning objectives and the level of attainment for these learning objectives.
- *Responsibility:* Yawen Li

Four other programs outcomes (c, f, h, and o) were reviewed in accordance with the BME program assessment plan and no corrective action is necessary based on evaluation of assessment results.

2014-2015 saw the implementation of the new direct assessment method using KPIs. All BME faculty agreed that the KPI assessment along with the new Faculty Course Assessment Report (FCAR) provided a more meaningful evaluation of the level of attainment of student outcomes.

Review of the BME program educational objectives (PEOs) was initiated by the BME faculty in spring 2015. Based on feedback from the industry advisory board and alumni, the revised PEOs were published in the University catalog and BME program website.

#### **b. Report on Plan for 2014-2015 Academic Year**

In preparation for the ABET site visit in fall 2106, all student outcomes will be assessed except the ones assessed in 2014-2015 academic year. BME 3103 Intro to Bioinstrumentation and BME 3703 Biotransport will be reassessed on outcomes (a) and (n) following the proposed corrective actions described above.

Alumni survey will be conducted in fall 2015.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>BME ABET Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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
<b>TECHNOLOGY</b> “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
<b>SUSTAINABILITY</b> "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

<p><b>COMMUNICATION</b>  “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.”</p>	<p><i>g. Communication</i></p>	<p>Faculty evaluation of senior project presentations.</p> <p>Direct assessment of student assignments.  Course Objectives  WPE</p>	<p>Green or white flag  Pass the WPE</p>	<p>Every Semester</p>	<p>Annual</p>
<p><b>MATHEMATICS</b>  “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.”</p>	<p>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)</p>	<p>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</p>	<p>Green or white flag</p>	<p>Every Semester</p>	<p>Annual</p>
<p><b>READING</b>  “LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.”</p>		<p>LTU core curriculum</p>			<p>Continuously by the University</p>
<p><b>SCIENTIFIC ANALYSIS</b>  “LTU graduates will demonstrate critical thinking and apply analytical and problem- solving skills in scientific fields.”</p>	<p>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)</p>	<p>Direct assessment of student assignments from BME 4113, 4203, 3703, 4313, 4103, 4801, 2201  Faculty evaluation of senior design  Course objective survey  Alumni survey</p>	<p>Green or white flag</p>	<p>Every Semester</p>	<p>Annual</p>

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.”	<i>d. Teams</i>	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.”	<i>f. Professional and ethics</i>	Direct assessment of student assignments from BME 3002 Exit interviews Course objective survey Alumni survey	4.0 on Level 3	Every Semester	Annual

<sup>1</sup>: 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

<sup>2</sup>: The target level of attainment is quantified using Bloom's taxonomy:

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

<sup>3</sup>: Each ABET outcome is assessed using a combination of several assessment tools. Each assessment tool may involve evaluation/analysis of multiple courses or other components. Details of this approach can be found in the *BME program annual assessment report 2014-2015*.

<sup>4</sup>: Each key performance indicator is assessed using an “excellent, Adequate, Minimal, Unsatisfactory” (EAMU) vector. The description and nominal measurement ranges for each level are set as appropriate to the task associated with the key performance indicator. The performance vectors are classified into four categories: “Red flag”, “Yellow flag”, “White flag” and “Green flag” as described below:

- Red flag: Below 2.0 average performance vector and more than 10% of the class demonstrating unsatisfactory performance
- Yellow flag: Below 2.0 average performance vector and less than 10% of the class demonstrating unsatisfactory performance; or above 2.0 average performance vector and more than 10% of the class demonstrating unsatisfactory performance
- White flag: Not under Red, Yellow or Green flag classifications
- Green flag: Above 2.75 average performance vector and no indication of any unsatisfactory performance

Details of the KPI assessment method can be found in the *BME program annual assessment report 2014-2015*.

**BS in Civil Engineering****1. ASSESSMENT PLAN**

See Table 1: Assessment Plan for the Civil Engineering Program

Appendix 1: Subdiscipline Terminal Course Flowchart to demonstrate Program Criteria compliance

Appendix 2: Student Outcome Descriptions

Appendix 3: Student Outcome Course Coverage and Level of Achievement Matrix

**2. ACTION PLAN (LOOP CLOSING/CONTINUOUS IMPROVEMENT)****a. Report on 2014-2015 Academic Year**Assessment Process

The Civil Engineering assessment process was reviewed and evaluated based on knowledge acquired at the ABET Symposium in spring 2015 and discussions with the Assessment Coordinator of the Biomedical Engineering Program. The goal was to make the assessment process more streamlined and robust using the vector approach. As a result of the review, several changes are underway that will enhance the process and made the evaluation more useful.

**Outcomes assessed and rankings in 2014-2015**

#2 Natural Sciences Rank: 4	#3 Humanities Rank: 4	
#4 Social Science Rank: 4	#5 Material Sciences Rank: 4	#6 Mechanics Rank: 4
#7 Experiments Rank: 4	#8 Problem Solving Rank: 4	#9 Design Rank: 4
#10 Sustainability Rank: 4	#11 Contemporary Issues Rank: 4	#12 Risk and Uncertainty Rank: 4
#13 Project Management Rank: 2	#14 Breadth in Civil Eng. Concern	#15 Technical Specialization Rank: 4
#16 Communication Concern	#17 Public Policy Rank: 4	#18 Business Administration Rank: 4
#19 Globalization Rank: 4	#21 Teamwork Rank: 4	#22 Attitudes Rank: 4
#23 Lifelong Learning Rank: 4	#24 Ethical Responsibilities Rank: 4	

### Courses that included the assessed outcomes in 2014-2015

- ECE3013 Mech. of Materials in CE
- ECE3723 Theory of Structures
- ECE4032 CE Design Project 2
- ECE4243 Construction Project Man.
- ECE4743 Concrete Design
- ECE4443 Foundation Engineering
- ECE3424 Soil Mechanics
- ECE4022 CE Design Project 1
- ECE4051 Ethics & Professional Issues
- ECE4544 Hydraulic Engineering
- ECE4761 Structural Design Test Lab
- ECE4843 Highway Engineering

During the 2014-2015 close-the-loop meetings faculty discussed the efficacy of the actions taken to address outcomes that fell below a rank of three, or were of concern.

#### #21: Teamwork

Issue: Faculty identified teamwork issues, such as conflict and disunity among team members, as the source of overall poor Capstone performance was required to raise the quality of deliverables.

Actions: A two-pronged approach was taken, which included a requirement to discuss potential or actual team issues at every formal meeting with the Team Advisor. Also, formal meeting minutes were required so any problems were documented. *Faculty were satisfied that the actions resolved the matter and there were no serious team issues.*

#### #16: Communication

Issue: As discussed originally in the Teamwork outcome, students were not performing well on Capstone deliverables, especially the communication components. Faculty determined they needed to become more engaged, rather than expecting teams and team members to achieve the outcome levels on their own.

Actions: Faculty team advisors conducted a formal meeting with their teams at least every other week, with a formal agenda and meeting minutes. During the meetings the Team Advisor reviewed the rubrics for the upcoming deliverable and confirm that all team members understood the criteria. *While faculty were minimally satisfied with the oral presentations, they still were not satisfied with the quality of the written technical reports. All agreed additional measures were necessary.*

### **b. Report on Continuous Improvement Plan for 2015-2016 Academic Year**

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

**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 Outcome #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
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 #16 Communication	Advisory Board and faculty evaluation of capstone poster and project presentations  Direct assessment of student assignments	<i>Meets Expectations</i> on technical presentation rubrics  <i>Rank 4</i> on direct assessment rubric; Achievement <i>Level 5</i> for top tier courses WPE	Every semester	Annual

<b>MATHEMATICS</b> “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	<i>Rank 4</i> on direct assessment rubric;  <i>Achievement Level 3</i> for top tier courses	Every semester	Annual
<b>READING</b> “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
<b>SCIENTIFIC ANALYSIS</b> “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	<i>Rank 4</i> on direct assessment rubric; <i>Achievement Level 4</i> for top tier courses	Every semester.	Annual
<b>LEADERSHIP</b> “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 <i>Rank 4</i> on direct assessment rubric; <i>Achievement Level 3</i> for top tier courses  Above national average for Carnegie peer institutions	Every semester.	Annual
<b>TEAMWORK</b> “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	<i>Rank 4</i> on direct assessment rubric; <i>Achievement Level 3</i> for top tier courses <i>Rank 3</i> 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	<i>Rank 4</i> on direct assessment rubric; Achievement <i>Level 4</i> for top tier courses Above national average for Carnegie peer institutions	Every semester	Annual
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## *Master of Civil Engineering/MS in Civil Engineering*

### **1. Assessment Plan for MSCE and MCE**

This document focuses on the “new” MSCE program. However, a few current graduate students are still completing the requirements of the “old” MCE program. As of summer 2014, the Department of Civil Engineering is no longer accepting new students into the MCE program and all new students must fulfill the “new” requirements of the MSCE program. Most students in the MCE program switched over to the new MSCE program.

The student outcomes of the Master of Science in Civil Engineering (MSCE) degree program are listed below. 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 2015-2016 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 MCE/MSCE student outcomes. Program assessment is conducted using the following tools:

**Direct Assessment of courses:** Direct assessment of student learning is performed in specific selected courses. Please note that MCE/MSCE program has no designated concentrations. Most courses are offered once in two years.

**Presentations:** Formal presentations are mandated in some courses and in the new MSCE program, it is required that students take a minimum amount of courses with formal presentations. 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 is included in the Appendix.



**Assessment of thesis and graduate projects:** The members of the committee are to provide their evaluations outlining the quality of the thesis or project using the rubric provided to them. 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 followed by a brief interview by the program director. A copy of the survey is included in the Appendix.

Columns 3-6 in Table 1 represent the plan for the academic year 2015-2016. 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 Graduate Director on an annual basis.

## **2. ACTION PLAN (LOOP CLOSING/CONTINUOUS IMPROVEMENT)**

### **a. Report on 2014-2015 Academic Year**

The assessment activities that were planned for the 2014-2015 academic year were not all performed. The department saw a dramatic increase in enrollment in the graduate programs. All faculty members spent more time on the graduate courses due to issues not experienced in previous years. There were issues with attendance, poor attitude, plagiarism, etc., making it cumbersome to focus on assessment. However, the department needs to make the assessment of graduate programs more of a priority. The only classes in which assessment activities were performed were ECE 5773, ECE 5413, and ECE 5473. Some assessment data is also available from an exit interview and from one thesis defense.

The planned tools for assessment on the previous academic year included the following:

1. Exit Interviews
2. Direct Assessment of ECE 5773, ECE 5343, ECE 5413, ECE 5823, ECE 5753, ECE 5523, ECE 5813, and ECE 5473.
3. Oral presentations in relevant classes in which formal presentations are designated per the program brochure.
4. Evaluation of thesis and graduate project reports and presentations using rubrics.

This section would better reflect on the outcomes if it was organized by outcome; similar to the presentation used in Section 2b. However, since limited assessment was performed, this section will discuss each item listed above chronologically (1-4).

In regards to Item 1, messages were sent to all MCE/MSCE students graduating in the previous academic year. The responses were minimal. Only one student responded by filling out a survey. The student that responded was also a graduate research assistant and therefore, was provided with more opportunities to work in the laboratory than other students. Most comments were favorable with some recommendations to improve the program as follows:

- “MCE students should be given more opportunity to have hands on experience construction activities”.
- “The department should collaborate more with industry for internship placement for all students to build the confidence of students before they start their professional lives, if possible, it should be mandatory as part of the requirements for graduation”.

It is not known if the first comment above is feasible. Site investigations or laboratory classes are uncommon at the graduate level but may give the program a competitive edge. The second comment is an excellent idea to strengthen and grow the program. The program would be more attractive with this service to the students. The comment will be shared with the department chair to see if anything can be done to assist the graduates with internship opportunities but the task would take time and a budget to perform.

Outcomes (d) and (f) are specifically evaluated using the exit interviews. The comments in response to all questions are all positive indicating 100% of the graduates reached the highest expected achievement level defined in Section 1 for each outcome based on BOK2.

In regards to Item 2, only ECE 5773 was properly assessed for reasons described earlier in this section. The program director needs assistance in collecting information and more efforts from the faculty on reporting out the classes they are responsible for. However, as mentioned, the classes were more demanding to manage than in previous years. For ECE 5773, the assessment procedures and results are summarized as follows:

- Outcome (a): Problems 2, 3, and 4 of the final exam and Problems 1 and 3 were assessed from Exam 2. The results showed that approximately 65% of the solutions were correct (reached the highest achievement level per BOK 2). This was less than the target of 80%.
- Outcome (b): Two homework assignments were assessed. Homework 11 was assessed as the students were required to perform rigorous work in Microsoft Excel. The results showed that 85% of the students mastered this skill which is greater than target of 80%. Homework 13 was assessed as the students were required to use RISA-3D to perform an analysis. 100% of the students were able to master this skill.
- Outcome (c): Same as Outcome (a). Problems 2, 3, and 4 of the final exam and Problems 1 and 3 were assessed from Exam 2. The results showed that approximately 65% of the solutions were correct (reached the highest achievement level per BOK 2). This was less than the target of 80%.
- Outcome (d): Design problems on exams were assessed. Problem 4 on Exam 1 was assessed. About 50% of the students were able to develop an acceptable design. This is less than the target of 80% and was very discouraging as this was in response to a take home portion of the exam. Problem 2 of the final exam was assessed. About 83 % of the students were able to master this problem (small errors acceptable for this percentage).

In regards to Item 3, presentations were assessed in three classes. The three classes were ECE 5773, ECE 5473, and ECE 5413. Rubrics were filled out for each student. The results were not favorable. The scores were often (about 50 % of the time) below the “meet expectations” level. Therefore, about 50% of the results were considered acceptable. However, the classes were heavily consumed by new graduate students from India who have very limited experience presenting as it is not part of their previous educational culture. The department needs to find new ways to enforce students to attend and learn from presentations. The expectations at the graduate level are high but this is one skill that the faculty should be less critical about for the next academic year. The primary outcome addressed with this assessment is Outcome (e)

In regards to Item 4, one student completed a Thesis defense prior to the development of this report. The student didn’t finish until early October 3, 2015. However, since it is complete, it will be reflected on here. Please see the appendix for the rubric. The data is evaluated by outcome and average scores were determined for each outcome by averaging all categories in which the outcome is considered

relevant (e.g. average of first two categories from rubric to obtain average score for Objective (a)).

- Objective (a) Average 8.0 / 10.
- Objective (b) Average 9.0 / 10.
- Objective (c) Not applicable per rubric.
- Objective (d) Average 7.0 / 10.
- Objective (e) Average 8.8 / 10.
- Objective (f) Average 8.4 / 10.

The target for the rubric is 8/10. 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. The result of Objective (d) still indicates the student "met expectations".

## **b. Report on Continuous Improvement Plan for 2015-2016 Academic Year**

Primarily, in order to have continuous improvement in the MSCE 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 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.

Overall, the program director recommends a clean slate with respect to assessment. The department will assess at total of seven courses in the upcoming academic year as listed in Table 1. These courses have been selected since they are planned to be taught by full-time faculty. Therefore, a model of assessment can be established and integrated into courses that are primarily taught by adjunct faculty.

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. For the new MSCE program, all students are expected to achieve this educational outcome; but for the time being, it will primarily be assessed for students taking the research sections.

The specific assessment tools used for Outcomes (a-e) in each class are still being deciphered. It is known that Outcome (b) will only be assessed in ECE 6743 and ECE 5843 in which specialized technology is used for the class assignments. Specific tools for Outcomes (a, c, d, and e) 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 6743 (exception Outcome e).

*Outcome a:* Formulate and solve ill-defined engineering problems

*Assessment:* See Table 1

*Actions:* This outcome will be assessed in all courses listed in Table 1. For instance, in ECE 6743, Problem 1 and 3 of Exam 1 will be assessed and Problem 2 of Exam 2 will be assessed.

*Note:* this outcome is slightly assessed for a graduate project/thesis defense as well.

*Outcome b:* Applied specialized tools and technologies

*Assessment:* See Table 1

*Actions:* This outcome will be assessed in ECE 6743 and ECE 5843. For instance, in ECE 6743, students are required to use MathCAD to solve integration and matrix structural analysis.

Their performance is only reflected on homework assignments which will be assessed when relevant. Students are also required to use excel to perform analyses in small time increments and plot the displacement response of structures. Note: this outcome is slightly assessed for a graduate project/thesis defense as well.

*Outcome c: Analyze a complex system or process*

*Assessment:* See Table 1

*Actions:* This outcome will be assessed in all courses listed in Table 1. For instance, in ECE 6743, Problem 1 and 3 of Exam 1 will be assessed and Problem 2 of Exam 2 will be assessed (similar to Outcome (a)).

*Outcome d: Design a system or process*

*Assessment:* See Table 1

*Actions:*

- This outcome will be assessed in all courses listed in Table 1. For instance, in ECE 6743, Problem 3 of the final exam will be assessed since it is the only topic relevant for design; instead of just analysis.
- The outcome is directly assessed after receiving exit interview responses as shown in Table 1.
- This outcome will also somewhat be assessed in thesis and graduate projects as the research courses are related to create new knowledge or technologies in a traditional or emerging specialized technical area.

*Outcome e: Plan, compose and integrate (communication)*

*Assessment:* See Table 1

*Actions:*

- Direct assessment will be performed in all courses listed in Table 1 using term reports which are planned in all courses.
- Due to the setup of the new MSCE program, several courses are assessed using formal presentations. They are not all listed in Table 1 since they can vary substantially by semester. The oral presentation rubric is included in the appendix and a summary of the metrics used for evaluation is included in Table 1.
- Students working on a graduate project or thesis are required to develop their final document and are also required to have a final defense presentation. One rubric has been developed for both requirements and is filled out by all committee members at the final presentation.

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. The program director does not want to take high measures such as holding the degree. Last year, the program director did not require students to come in; in a hope that they would fill out the questionnaire without having to come in. This was not successful.

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 5753 and ECE 5783 thus far and need to be developed for the remaining courses. All faculty associated with the MSCE program are heavily loaded and it is currently unknown when the course purpose documents will be complete.

**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) <i>Apply</i> specialized tools or technologies to solve problems in a traditional or emerging specialized technical area appropriate to civil engineering (d) <i>Design</i> 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 6743, ECE 5433, ECE 5713, ECE 5843, ECE 5413, ECE 5703, ECE and ECE 5543.	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) <i>Formulate</i> and solve ill-defined engineering problem appropriate to civil engineering by <i>selecting</i> and applying appropriate techniques and tools (c) <i>Analyze</i> 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 6743, ECE 5433, ECE 5713, ECE 5843, ECE 5413, ECE 5703, ECE and ECE 5543.	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) <i>Design</i> a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering (f) <i>Evaluate</i> the design of a complex system or process, or <i>evaluate</i> 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 6743, ECE 5433, ECE 5713, ECE 5843, ECE 5413, ECE 5703, ECE and ECE 5543. 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) <i>Plan, compose</i> and <i>integrate</i> the verbal, written, virtual, and graphical communication of a project to technical and non- technical audiences	Direct assessment of assignments or exams in ECE 5433, ECE 5713, ECE 5843, ECE 5413, ECE 5703, ECE and ECE 5543. 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

<p>“LU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.”</p>	<p>(d) <i>Design</i> a system or process or create new knowledge or technologies in a traditional or emerging specialized technical area appropriate to civil engineering (f) <i>Evaluate</i> the design of a complex system or process, or <i>evaluate</i> the validity of newly-created knowledge in a traditional or emerging advanced specialized technical area appropriate to civil engineering</p>	<p>Exit Interview</p>	<p>Exit interview survey, 80% should reach the highest expected achievement level for each outcome based on BOK2.</p>	<p>Each Semester</p>	<p>Annual</p>
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\*See section 1 in the report for details on program outcome

**LAWRENCE TECHNOLOGICAL UNIVERSITY**  
**DEPARTMENT OF CIVIL ENGINEERING**

**APPENDIX 1 Revised**  
**STUDENT OUTCOMES ASSESSMENT SCHEDULE**

**NOTES**

- ❖ The Schedule sets forth the terms each course and its salient outcomes are scheduled for assessment.
- ❖ The next anticipated accreditation review is fall 2016.
- ❖ In preparation for accreditation, all courses are assessed in fall 2015 and spring 2016.

COURSES	STUDENT OUTCOMES/TERMS OUTCOMES ARE ASSESSED																							
	#1 Mathematics	#2 Natural Sciences	#3 Humanities	#4 Social Sciences	#5 Materials Science	#6 Mechanics	#7 Experiments	#8 Problem Recognition & Solving	#9 Design	#10 Sustainability	#11 Contemporary Issues & Historical Perspectives	#12 Risk & Uncertainty	#13 Project Management	#14 Breadth in CE Areas	#15 Technical Specialization	#16 Communication	#17 Public Policy	#18 Business & Public Administration	#19 Globalization	#20 Leadership	#21 Teamwork	#22 Attitudes	#23 Lifelong Learning	#24 Professional & Ethical Responsibility
ECE1012 CE Perspectives			F15	F15															F15			F15		
ECE1013 Surveying and Land Measurement							F15 S16							F15 S16										
ECE1101 CE Computer Graphics Lab															F15									
ECE1102 Engineering Computer Applications Lab												F15												
ECE1413 CE Materials					F15 S16																			
LDR2001 Leadership																				F13 F15 S16				
ECE2103 Computer Aided Infrastructure Planning										F15 S16		F15 S16												
MCS3403 Probability & Statistics												F15 S16												
ECE3013 Mechanics of Materials	F14 F15 S16	F14 F15 S16			F14 F15 S16																			
ECE3213 Construction Engineering					S14 F15 S16												F13 S14 F15 S16	F13 S14 F15 S16						

COURSES	STUDENT OUTCOMES/TERMS OUTCOMES ARE ASSESSED																							
	#1 Mathematics	#2 Natural Sciences	#3 Humanities	#4 Social Sciences	#5 Materials Science	#6 Mechanics	#7 Experiments	#8 Problem Recognition & Solving	#9 Design	#10 Sustainability	#11 Contemporary Issues & Historical Perspectives	#12 Risk & Uncertainty	#13 Project Management	#14 Breadth in CE Areas	#15 Technical Specialization	#16 Communication	#17 Public Policy	#18 Business & Public Administration	#19 Globalization	#20 Leadership	#21 Teamwork	#22 Attitudes	#23 Lifelong Learning	#24 Professional & Ethical Responsibility
ECE3324 Environmental Eng. 1														S14 F15 S16										
ECE3424 Soil Mechanics					F14 F15 S16		F14 F15 S16														F14 F15 S16			
ECE3523 Hydromechanics						S14 F15 S16		S14 F15 S16																
ECE3723 Theory of Structures	F14 F15 S16	F14 F15 S16				F14 F15 S16																		
ECE3823 Transportation Engineering				S14 F15 S16							S14 F15 S16													
ECE4022 CE Design Project 1				F12 F13 F14 F15					F12 F13 F14 F15	F12 F13 F14 F15				F12 F13 F14 F15		F12 F13 F14 F15			F12 F13 F14 F15	F12 F13 F14 F15	F12 F13 F14 F15	F12 F13 F14 F15	F12 F13 F14 F15	
ECE4032 CE Design Project 2				S13 S14 S15 S16					S13 S14 S15 S16	S13 S14 S15 S16				S13 S14 S15 S16		S13 S14 S15 S16			S13 S14 S15 S16	S13 S14 S15 S16	S13 S14 S15 S16	S13 S14 S15 S16	S13 S14 S15 S16	
ECE4051 Ethics & Professional Issues			S13 F15 S16								S13 F15 S16						S13 F15 S16		S13 F15 S16			S13 F15 S16	S13 F15 S16	S13 F15 S16
ECE4243 CE Management Practices								F13 F15 S16						F13 F15 S16	F13 F15 S16	F13 F15 S16	F13 F15 S16	F13 F15 S16	F13 F15 S16					
ECE4263 Cost Estimating, Bidding and Contracting													F15					F15						F15
ECE4343 Environmental Engineering 2														S16	S16									
ECE4363 Environmental Eng. Design									S16					S16	S16									
ECE4443 Foundation Engineering						F15			F15					F15	F15	F15								







## *PhD in Civil Engineering*

### 1. ASSESSMENT PLAN

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/MCE 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 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 real-world 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. The PhD program is assessed yearly. 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 tools:

**Independent Research:** May not be applicable for all students. It is common for a PhD student to take ECE 7993 Independent Research at least once in the first two years as a means to investigate research topics. 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. A copy of the rubric is included in the Appendix.

**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 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. Copies of the rubrics are 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. 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. A copy of the exit interview questionnaire is included in the Appendix.

The result of the assessment of the student outcomes is presented to the department faculty during the annual close loop meeting in summer. However, very minimal results needed to be discussed due to the small number of PhD students in the program as discussed in Section 2.

## **2. ACTION PLAN (LOOP CLOSING/CONTINUOUS IMPROVEMENT)**

### **a. Report on 2014-2015 Academic Year**

All outcomes were assessed in the 2014-2015 academic year. However, there are only six students in the PhD program. To date, no students have completed the PhD program and therefore, no students have completed a final defense or an exit interview. In addition, only one student in the last academic year completed an independent research course. Two students completed the proposal examination in the past academic year. Overall, a larger sample size is required to perform an adequate assessment. A summary of the results are provided only:

#### Independent Research (Outcomes a, b):

Student Abdulla Ali: Student performed efficient work with all marks being scored 8-10. This was favorable for Educational Outcomes (a) and (b) and met expectations.

#### Proposal Examination (Outcomes a, b, c):

- Student Samer Alsharif: Proposal examination was in spring 2015. See Appendix for rubric. Four reviewers and all scores were from 7-10 for all reviewers meaning it met expectations or exceeded expectations.
- Student Abdulla Ali: Student performed sufficient work with all marks being scored 7-10 except “Visual Aids” and “Delivery”. Both of these were related to inadequate performance in the presentation and the student was told that although he passes the exam, a more prepared and mistake free presentation is necessary to complete the final presentation. Therefore, the results of Outcomes (a) and (b) were sufficient but Outcome (c) was insufficient.

Overall, with two students presenting, 100% had sufficient work for outcomes (a) and (b) and 50% of the students has sufficient work for Outcome (c).

### **b. Report on Continuous Improvement Plan for 2015-2016 Academic Year**

The program director will continue to use the same assessment techniques in the following academic year as in the previous academic year. There is currently too small of a sample size to find reason to deviate from the assessment plan or teaching methods. Therefore, no major forms of continuous improvement are recommended at this time. The first PhD student will likely complete by fall 2015 and the second and third will likely complete by spring 2016. These are the only three expected to complete in this academic year. With the first three students completing this academic year, it is necessary to perform the initial assessment of the program.

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. The department has increased the requirements of English skills and previous research experience required to enter the PhD program. There has been a lack of applications in the past year. Overall, there is limited planned to assess.

**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) <i>Evaluate</i> the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) <i>Evaluate</i> 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	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) <i>Evaluate</i> the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) <i>Evaluate</i> 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	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) <i>Evaluate</i> the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) <i>Evaluate</i> 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	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) <i>Evaluate</i> the effectiveness of a designed experiment in meeting an ill-defined real-world need (b) <i>Evaluate</i> 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

## ***BS in Computer Engineering***

### **1. Assessment Plan for Computer Engineering Program**

See Table 1 below.

### **2. Action Plan (Loop-Closing) for Computer Engineering Program**

#### **a. Report on 2014-2015 Academic Year**

In the 2014-2015 academic year, the following Computer Engineering student outcomes have been assessed in ECE department, which are modified ABET a, c-h and k outcomes [Among those outcomes, the highlighted **(a)** **(c)** **(e)** and **(k)** outcomes (in bold) are assessed in 2014-2015]. The relations of LTU outcomes and ECE supporting objectives can be found in Table 1 (Page 4-7). 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. Please note that student outcomes b, i and j will not be reported here, because they are not related to any LTU undergraduate outcomes.

- a) An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations;**
- 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 computer 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.
- k) An ability to use the techniques, skills and modern computer engineering tools necessary for engineering practice.**

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

**Outcome a:** An ability to apply knowledge of mathematics, science, and engineering to computer engineering situations;

- *Assessment:* Faculty evaluation of senior project oral presentations, EEE3124 Signal and System semester design project from Spring 15;
- *Evaluation:* Assessment results indicate 3.75 for the level of achievement on a 5.0 scale, which is higher than targeted 3.0.
- *Issue:* (1) Although the design project was required in my course, it may not have been required in other sections of the course that semester. (In fact it is not sure whether there were any other sections offered that semester.) by Dr. Michael Cloud.

(2) Senior Projects have shown very good performances regarding outcome a.

- *Actions:* (1) Add the design project as a requirement on the ABET syllabus for EEE3124.

(2) No actions needed for outcome a.

- *Responsibility:* Michael Cloud, Nabih Jaber

**Outcome c (design):** 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

- *Assessment:* Faculty evaluation of senior projects oral presentation, Exam 2 questions and grades of EEE3223 Advanced Digital Electronics;
- *Evaluation:* Assessment results indicate a 3.4 for the level of achievement on a 5.0 scale, which is higher than targeted 3.0.
- *Issue:* (1) Some senior project oral presentations failed to give their design details.

(2) In some exam reports of EEE3223 Advanced Digital Electronics, required 'circuit design' parts are missed.

- *Actions:* (1) The instructor of senior project will consider the assessment of project report, besides oral presentations.

(2) The instructor of EEE3223 Advanced Digital Electronics can share good 'design' samples in the class.

- *Responsibility:* Lisa Anneberg, Nabih Jaber

**Outcome e (Solve Engineering Problems):** An ability to identify, formulate, and solve computer engineering problems;

- *Assessment:* Faculty evaluation of senior projects oral presentation, Exam 2 questions and grades of EEE3223 Advanced Digital Electronics;
- *Evaluation:* Assessment results indicate a 2.8 for the level of achievement on a 5.0 scale, which is lower than targeted 3.0.
- *Issue:* (1) Some senior projects didn't explain how they used mathematical tools to help their design.

(2) In evaluation forms of senior projects, a lot of teams are combined with CompE and EE major student.

(3) Required 'real world solutions' are missed in some EEE3223 Advanced Digital Electronics exam reports.

- *Actions:* (1) Slide pages of Quantitative Analysis will be required;

(2) Indicate major on Evaluation forms of Senior Projects

(3) A discussion session of 'Solving Engineering Problems' is to be created in the class.

(4) Technical report rubrics needs to capture 'design' requirements in the future assessments, by Dr. Elin Jensen

- *Responsibility:* Lisa Anneberg, Nabih Jaber, Elin Jensen

**Outcome k (Modern Tools):** An ability to use the techniques, skills and modern computer engineering tools necessary for engineering practice.

- *Assessment:* Faculty evaluation of senior projects, EEE3124 Signal and System semester design project from Spring 15;
- *Evaluation:* Assessment results indicate a higher than 3.75 for the level of achievement on a 5.0 scale, which is much higher than targeted 3.0.
- *Issue:* (1) Although the design project was required in my course, it may not have been required in other sections of the course that semester. (In fact I'm not sure whether there were any other sections offered that semester.).

(2) Senior Projects are doing well regarding outcome k.

- *Actions:* (1) Add the design project as a requirement on the ABET syllabus for EEE3124. (2) No actions needed for Senior Project.
- *Responsibility:* Michael Cloud, Nabih Jaber

## **b. Report on Plan for Computer Engineering Undergraduate Academic Year**

In the 2015-2016 academic year the faculty will also continue to evaluate the use of various rubrics and summary reporting formats.

The following CompE Supporting Objectives will be used for the future assessment:

- d) An ability to function on multidisciplinary teams;
- 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.

Currently, ABET outcomes (b),(i) and (j) are not mapped to any university outcomes. In the 2015-2016 academic year, Table 1 will be edited by mapping university outcomes to all ABET a-k outcomes.

All program 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.



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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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.	Direct assessment of student assignments	3 out of 5	Every semester.	Annual
<b>TECHNOLOGY</b> “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.	3 out of 5	Every semester	Annual
<b>SUSTAINABILITY</b> "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.	Direct assessment of student assignments	3 out of 5	Every semester	Annual
<b>COMMUNICATION</b> “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  LTU Core Curriculum	3 out of 5 WPE	Every semester	Annual

<b>MATHEMATICS</b> “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	3 out of 5	Every semester	Annual
<b>READING</b> “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
<b>SCIENTIFIC ANALYSIS</b> “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	3 out of 5	Every semester.	Annual
<b>LEADERSHIP</b> “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.	LTU Leadership curriculum	3 out of 5	Every semester.	Annual
<b>TEAMWORK</b> “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	3 out of 5	Every Semester	Annual

<b>PROFESSIONAL ETHICS</b> “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. FE exam PBL&ACL Projects	3 out of 5	Every semester	Annual
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## ***BS in Electrical Engineering***

### **1. Assessment Plan for Electrical Engineering Program**

See Table 1 below.

### **2. Action Plan (Loop-Closing) for Electrical Engineering Program**

#### **a. Report on 2014-2015 Academic Year**

In the 2014-2015 academic year, the following ECE department student outcomes have been assessed in ECE department, which are modified ABET a, c-h and k outcomes [Among those outcomes, the highlighted **(a)** **(c)** **(e)** and **(k)** outcomes are assessed in 2014-2015]. The relations of LTU outcomes and ECE supporting objectives can be found in Table 1 (Page 4-7). 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. Please note that student outcomes b, i and j will not be reported here, because they are not related to any LTU undergraduate outcomes.

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

**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.

**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 a :** *an ability to apply knowledge of mathematics, science, and engineering.*

- *Assessment:* Faculty evaluation of senior projects, EEE3124 Signal and System semester design project from Spring 15;
- *Evaluation:* Assessment results indicate a 4.75 for the level of achievement on a 5.0 scale, which is much higher than targeted 3.0.
- *Issue:* (1) Although the design project was required in my course, it may not have been required in other sections of the course that semester. (In fact it is not sure whether there were any other sections offered that semester.) by Dr. Michael Cloud.

(2) Senior Projects have shown very good performances regarding outcome a.

- *Actions:* (1) Add the design project as a requirement on the ABET syllabus for EEE3124.

(2) No actions needed for outcome a.

- *Responsibility:* Michael Cloud, Nabih Jaber

**Outcome c :** An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political ethical, health and safety, manufacturability, and sustainability.

- *Assessment:* Faculty evaluation of senior projects, Faculty evaluation of senior projects, Exam 2 questions and grades of EEE3223 Advanced Digital Electronics;
- *Evaluation:* Assessment results indicate a 3.3 for the level of achievement on a 5.0 scale, which is higher than targeted 3.0.
- *Issue:* (1) Some senior project oral presentations failed to give their design details.

(2) In some exam reports of EEE3223 Advanced Digital Electronics, required 'circuit design' parts are missed.

- *Actions:* (1) The instructor of senior project will consider the assessment of project report, besides oral presentations.

(2) The instructor of EEE3223 Advanced Digital Electronics can share good 'design' samples in the class.

**Outcome e :** An ability to identify, formulate, and solve engineering problems

- *Assessment:* Faculty evaluation of senior projects, Exam 2 questions and grades of EEE3223 Advanced Digital Electronics;
- *Evaluation:* Assessment results indicate a 3.1 for the level of achievement on a 5.0 scale, which is a little higher than targeted 3.0.
- *Issue:* (1) Some senior project presentations didn't explain how they used mathematical tools to help their design.

(2) In evaluation forms of senior projects, a lot of teams are combined with CompE and EE major student.

(3) Required 'real world solutions' are missed in some EEE3223 Advanced Digital Electronics exam reports.

- *Actions:* (1) Slide pages of Quantitative Analysis will be required;

(2) Indicate major on Evaluation forms of Senior Projects

(3) A discussion session of 'Solving Engineering Problems' is to be created in the class.

(4) Technical report rubrics needs to capture 'design' requirements in the future assessments, by Dr. Elin Jensen

- *Responsibility:* Lisa Anneberg, Nabih Jaber, Elin Jensen

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

- *Assessment:* Faculty evaluation of senior projects, EEE3124 Signal and System semester design project from Spring 15;

- *Evaluation:* Assessment results indicate a 4.75 for the level of achievement on a 5.0 scale, which is much higher than targeted 3.0.
  - *Issue:* (1) Although the design project was required in my course, it may not have been required in other sections of the course that semester. (In fact I'm not sure whether there were any other sections offered that semester.).
- (2) Senior Projects are doing well regarding outcome k.
- *Actions:* (1) Add the design project as a requirement on the ABET syllabus for EEE3124. (2) No actions needed for Senior Project.
  - *Responsibility:* Michael Cloud, Nabih Jaber

## **b. Report on Plan for ECE Undergraduate Academic Year**

In the 2015-2016 academic year the faculty will also continue to evaluate the use of various rubrics and summary reporting formats.

The following EE Supporting Objectives will be used for the future assessment:

- d) An ability to function on multidisciplinary teams;
- 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.

Currently, ABET outcomes (b),(i) and (j) are not mapped to any university outcomes. In the 2015-2016 academic year, Table 1 will be edited by mapping university outcomes to all ABET a-k outcomes.

All program 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.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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.	Direct assessment of student assignments	3 out of 5	Every semester.	Annual
<b>TECHNOLOGY</b> “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.	3 out of 5	Every semester	Annual
<b>SUSTAINABILITY</b> "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.	Direct assessment of student assignments	3 out of 5	Every semester	Annual
<b>COMMUNICATION</b> “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  LTU Core Curriculum	3 out of 5 WPE	Every semester	Annual

<b>MATHEMATICS</b> “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	3 out of 5	Every semester	Annual
<b>READING</b> “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
<b>SCIENTIFIC ANALYSIS</b> “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	3 out of 5	Every semester.	Annual
<b>LEADERSHIP</b> “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.	LTU Leadership curriculum	3 out of 5	Every semester.	Annual
<b>TEAMWORK</b> “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	3 out of 5	Every Semester	Annual



<b>PROFESSIONAL ETHICS</b> “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. FE exam PBL&ACL Projects	3 out of 5	Every semester	Annual
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## *MS in Electrical and Civil Engineering*

### **1. Assessment Plan and Result of 2014-2015 for MS ECE Program**

See Table 1 below.

### **2. Action Plan (Loop-Closing) for MS ECE Program**

#### **a. Report on 2014-2015 Academic Year**

In the 2014-2015 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 found 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. Program assessment is conducted using the following tool:

- (1) **Assessment Night Presentation:** Students were asked to present technical details of their work, including major algorithm, system analysis technique and simulation/experiment results, which were assessed by ECE faculties, Industry Administration Board members and graduate students through questions and results of questionnaires.

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

### **Report on Plan for MS ECE Academic Year 2015-2016**

The following EE Supporting Objectives will be used for the future assessment:

- a) Read and review literature published in the field of Electrical and Computer Engineering;
- b) Communicate effectively using written, oral, graphical and digital form;
- c) Develop an awareness of professional issues, such as ethics, and lifelong learning by participation in local and national chapters of IEEE and ACM

**Table 1: Assessment Plan for MS in ECE**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

## Appendix- Assessment Night

All of our graduate courses are offered at night. In each Spring semester [a week or 2 after spring break], we choose two nights on Tuesday and Wednesday to have 'assessment night' for the graduate program.

On 'assessment night' all graduate classes are cancelled. Thesis and non-thesis students and faculty associated with classes scheduled for that night are required to attend 'assessment night' in which non-thesis students who are not in their first semester will make technical presentations to the students and faculty. Students will be divided into several groups according to different topics and learning outcomes. IAB members will be invited, so will employers of graduate students. The presentations will be required to address the graduate learning outcomes.

If there is not enough time, all non-thesis students will be required to be prepared for a presentation, the actual presenters will be randomly chosen. The faculty and audience will rate the presentation according to a rubric. Loops will be closed based on the results of the ratings.

The topic of the presentations will be of the student's choosing but must be approved by the department and should be sufficiently technical in nature as well as address the other graduate learning outcomes.

First semester students are exempted since they might not have a topic until after they have completed a full graduate course.

Most graduate students start in the Fall semester, so this is done in the Spring so more students are prepared to present.

Assessment night will go from 6PM to 9PM which is 180 minutes or 9 20 minute presentations. This would allow about 1/3 of our current 25 students to present. We could do it on both a Tuesday and a Wednesday night if we need more time. Or the session can be extended a bit.

The first Assessment Night of ECE department was held on Mar 26 (Tuesday) and Mar 27 (Wednesday), 5:00 pm-8:00 pm, in RM T225. (Both Mar 26 and Mar 27 nights' graduate classes have been cancelled).

The presentation time of each student was limited in 10 to 15 mins (10 to 12 slides) plus 5 minutes of question and answer session. Students were welcome to rework their past presentations that they prepared for one of their graduate class.

Students were also encouraged to present technical details of their work, including major algorithm, system analysis technique and simulation/experiment results that you studied in one of your graduate courses.

There is no pass or fail grade for any of the presentation, the only requirement is that graduate students make an oral presentation of their chosen topic related to one of their graduate courses.

### Questions:

1. Student shown proficiency and advanced knowledge in the report Evaluation Result: 2.79/5

2. Student used modern techniques, and technologies for analyzing the problem presented Evaluation Result: 3.0/5
3. Student shown proficiency in modern simulation or other experimental tools Evaluation Result: 3.29/5
4. Student has a project team with students in other majors  
Evaluation Result: 1/5 (Instructor assigned projects to each student, cooperation with other majors need to get approval from the instructor)
5. How would you rate the technical quality of the paper Evaluation Result: 3.29/5
6. How is the presentation (Rate the paper organization, the clearness of text and figures) Evaluation Result: 3.14/5
7. The report has the reference part and compared other's professional work. Evaluation Result: 2.43/5
8. Fluent English and professional written in the report Evaluation Result: 3.29/5
9. Is the paper of interest to practitioners in Engineering? Evaluation Result: 3.86/5

## *MS in Electrical and Computer Engineering*

### **1. Assessment Plan and Result of 2014-2015 for MS ECE Program**

See Table 1 below.

### **2. Action Plan (Loop-Closing) for MS ECE Program**

#### **a. Report on 2014-2015 Academic Year**

In the 2014-2015 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. Program assessment is conducted using the following tool:

**(2) Assessment Night Presentation:** Students were asked to present technical details of their work, including major algorithm, system analysis technique and simulation/experiment results, which were assessed by ECE faculties, Industry Administration Board members and graduate students through questions and results of questionnaires.

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

## **Report on Plan for MS ECE Academic Year 2015-2016**

The following EE Supporting Objectives will be used for the future assessment:

- a) Read and review literature published in the field of Electrical and Computer Engineering;
- b) Communicate effectively using written, oral, graphical and digital form;\
- c) Develop an awareness of professional issues, such as ethics, and lifelong learning by participation in local and national chapters of IEEE and ACM



**Table 1: Assessment Plan for MS in ECE**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

## Appendix- Assessment Night

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If there is not enough time, all non-thesis students will be required to be prepared for a presentation, the actual presenters will be randomly chosen. The faculty and audience will rate the presentation according to a rubric. Loops will be closed based on the results of the ratings.

The topic of the presentations will be of the student's choosing but must be approved by the department and should be sufficiently technical in nature as well as address the other graduate learning outcomes.

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Assessment night will go from 6PM to 9PM which is 180 minutes or 9 20 minute presentations. This would allow about 1/3 of our current 25 students to present. We could do it on both a Tuesday and a Wednesday night if we need more time. Or the session can be extended a bit.

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The presentation time of each student was limited in 10 to 15 mins (10 to 12 slides) plus 5 minutes of question and answer session. Students were welcome to rework their past presentations that they prepared for one of their graduate class.

Students were also encouraged to present technical details of their work, including major algorithm, system analysis technique and simulation/experiment results that you studied in one of your graduate courses.

There is no pass or fail grade for any of the presentation, the only requirement is that graduate students make an oral presentation of their chosen topic related to one of their graduate courses.

### Questions:

10. Student shown proficiency and advanced knowledge in the report Evaluation Result: 2.79/5

11. Student used modern techniques, and technologies for analyzing the problem presented Evaluation Result: 3.0/5
12. Student shown proficiency in modern simulation or other experimental tools Evaluation Result: 3.29/5
13. Student has a project team with students in other majors  
Evaluation Result: 1/5 (Instructor assigned projects to each student, cooperation with other majors need to get approval from the instructor)
14. How would you rate the technical quality of the paper Evaluation Result: 3.29/5
15. How is the presentation (Rate the paper organization, the clearness of text and figures) Evaluation Result: 3.14/5
16. The report has the reference part and compared other's professional work. Evaluation Result: 2.43/5
17. Fluent English and professional written in the report Evaluation Result: 3.29/5
18. Is the paper of interest to practitioners in Engineering? Evaluation Result: 3.86/5

## ***BS in Mechanical & Manufacturing Engineering Technology***

### **1. Assessment Plan for BS in MMET**

The 2014-2015 plan is presented in Table 1

### **2. Action Plan (Loop-Closing) for the Bachelor of Science in Mechanical & Manufacturing Engineering Technology (BSMMET) Program**

#### **a. Report on 2014-2015 Academic Year**

In 2014-2015, ten courses were used to assess to the Student Outcomes (SOs) a through k listed at the end of this report. SOs are mapped to the University Educational Outcomes as seen in Table 1.

Each course in the curriculum has several Course Learning Objectives that directly feed one or more SOs. Two types of assessment forms were used to assess our SOs through courses learning objectives linked to these outcomes, direct (by instructor) and indirect (by student).

Both types were meant to assess the same Course Learning Objectives to assure consistency of the assessment process. Two rubrics were developed; one is to be used by instructors for the direct assessment and the other by the students for the indirect.

Results of the assessment process has been discussed in the “Close-the-Loop Meeting” in the Engineering Technology Department on September 15, 2015. This meeting was held during the afternoon working session of the University Assessment Day. In response to the UAC request, the department faculty reviewed the template of the annual assessment report and discussed any suggested changes to the template. The faculty concluded that the template is sufficient and no changes were required.

The department reviewed the end of semesters’ course evaluation forms summary, comments from current students, exit interviews of graduates, and relevant items discussed in the IAB meetings to help improve the assessment process.

In the review of the assessment data, it was found that the indicators used for assessing Student Outcomes through different courses to be different. A decision was made to have a standard indicator of 80% of the average score in assessment of Course Learning Objectives that are used to attain different SOs. Previously, some of the average scores varied from 70% to 80%.

Incorporating this change, the department concluded that BSMMET SOs were satisfied and exceeded in most of the knowledge areas. The data proved consistency of most of the assessment results from both the direct and indirect methods of assessment. As a general conclusion, the assessment process revealed that meeting the University Educational Outcome (which are linked to the department’s SOs) was satisfactory.

Based on a thoroughly review of the Student Outcomes, the faculty suggested the following course of action:

**Outcome a:** *an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines.*

- **Assessment:** Direct and indirect assessment of TME1023, TEE2053, MCS2313.
- **Evaluation:** Direct assessment results of learning objectives of TME1023 and TEE2053 indicated that the overall performance slightly exceeded the target of 80% by an average of 1%. However, the overall performance of MCS2313 fell short of 80% by 1% for the direct assessment. The indirect assessment results revealed that 88% of students believed that the objectives were very well met or perfectly met of the above courses.
- **Issue:** No issues were raised for TME1023 and TEE2053 courses. There is inconsistency in the assessment of the learning objectives of MCS2313. Direct assessment shows that the 80% was not met by 1%, but the indirect assessment done by students indicated exceeding of target by 14%.
- **Actions:** The direct assessment for MCS2313 indicates that the instructor should consider providing more discussion and homework on some of the Course Objective areas.
- **Responsibility:** Jerry Cuper, assessment coordinator; Sabah Abro, instructor of the course.

**Outcome b:** *an ability to apply knowledge of mathematics, science, and engineering.*

- **Assessment:** Direct and indirect assessment of TEE 2093, MCS3324, TME3113.
- **Evaluation:** Direct assessment results of course learning objectives of the above courses indicated achievement of 85% average target score and exceeding the average target score by an average of 5%. The indirect assessment results revealed that 87% of students believed that the objectives were very well met or perfectly met, which exceeded the target by 12%.
- **Issue:** No issues were raised.
- **Actions:** No actions are required at this point.
- **Responsibility:** Jerry Cuper, assessment coordinator, is to monitor the future assessment results.

**Outcome c:** *an ability to conduct, analyze, and interpret experiments, and apply experimental results to improve processes.*

- **Assessment:** Direct and indirect assessment of TIE4115, TME4343 courses.
- **Evaluation:** Direct assessment results indicate that the overall performance exceeded the target of 80% by 6%; the overall indirect assessment results of 98% exceeded the target by 18%, which revealed that high percentage of students believed that the objectives were very well met or perfectly met.
- **Issue:** No issues were raised.
- **Actions:** No actions are required at this point.
- **Responsibility:** Jerry Cuper, assessment coordinator, is to monitor the future assessment results.

**Outcome d:** *an ability to apply creativity in the design of systems, components, or processes appropriate to program educational objectives.*

- **Assessment:** Direct and indirect assessment of TIE4115, Senior Project course.
- **Evaluation:** Direct assessment results indicate that the 80% mastery levels of objectives were exceeded by 7%. The indirect assessment results revealed that 98% of students believed that the objectives were very well met or perfectly met.
- **Issue:** Since presentations are an important part of the course, it was discussed that students should have some more training in preparing and presenting their work. It was suggested in close the loop meeting that some webinars should be identified and direct students to participate in them to improve their skills.
- **Actions:** The instructor will increase emphasis on preparing students in presentation techniques.
- **Responsibility:** Jerry Cuper, assessment coordinator, Ken Cook, instructor of the course.

**Outcome e:** *an ability to function effectively on teams.*

- **Assessment:** Direct and indirect assessment of TIE4115, TME4343 courses.
- **Evaluation:** Direct assessment results indicate that the overall performance exceeded the target of 80% by 6%; the overall indirect assessment results of 98% exceeded the target by 18%, which revealed that high

percentage of students believed that the objectives were very well met or perfectly met.

- *Issue:* No issues were raised.
- *Actions:* No actions are required at this point.
- *Responsibility:* Jerry Cuper, assessment coordinator, is to monitor the future assessment results.

**Outcome f:** *an ability to identify, analyze and solve technical problems.*

- *Assessment:* Direct and indirect assessment of TME4343, TME4103 and MCS3324 courses.
- *Evaluation:* Direct assessment results indicate that 80% mastery level of objectives was exceeded by 5%. The indirect assessment results revealed that an average of 88% of students believed that the objectives were perfectly or very well met.
- *Issue:* No issues were raised.
- *Actions:* No actions are required at this point.
- *Responsibility:* Jerry Cuper, assessment coordinator, is to monitor the future assessment results.

**Outcome g:** *an ability to communicate effectively.*

- *Assessment:* Direct and indirect assessment of TIE4115, TIE3203 and COM3000 (WPE).
- *Evaluation:* Direct assessment results indicate that the 80% mastery levels of objectives were exceeded by 8%. The indirect assessment results revealed that 89% of students believed that the objectives were very well met or perfectly met, which exceeded the target by 14%. Direct, indirect assessment of above courses and WPE exam results indicate that mastery levels of objectives were exceeded.
- *Issue:* No issues were raised.
- *Actions:* No actions are required at this point.
- *Responsibility:* Jerry Cuper, assessment coordinator, is to monitor the future assessment results.

**Outcome h:** *recognition of the need for, and an ability to engage in lifelong learning.*

- *Assessment:* Direct and indirect assessment of TIE4115, TME4343 courses.
- *Evaluation:* Direct assessment results indicate that the overall performance exceeded the target of 80% by 6%; the overall indirect assessment results of 98% exceeded the target by 18%, which revealed that high percentage of students believed that the objectives were very well met or perfectly met.
- *Issue:* No issues were raised.
- *Actions:* No actions are required at this point.
- *Responsibility:* Jerry Cuper, assessment coordinator, is to monitor the future assessment results

**Outcome i:** *an ability to understand professional, ethical and social responsibilities.*

- *Assessment:* Direct and indirect assessment of TIE4115, TIE3203 and completing the leadership program.
- *Evaluation:* Direct assessment results indicate that the 80% mastery levels of objectives were exceeded by 8%. The indirect assessment results revealed that 89% of students believed that the objectives were very well met or perfectly met, which exceeded the target by 14%. Direct, indirect assessment of above courses and leadership courses results indicate that mastery levels of objectives were exceeded.
- *Issue:* No issues were raised.
- *Actions:* No actions are required at this point.
- *Responsibility:* Jerry Cuper, assessment coordinator, is to monitor the future assessment results.

**Outcome j:** *a respect for diversity and knowledge of contemporary professional, societal and global issues.*

- *Assessment:* Direct and indirect assessment of TIE4115, Senior Project course.
- *Evaluation:* Direct assessment results indicate that the 80% mastery levels of objectives were exceeded by 7%. The indirect assessment results revealed that 98% of students believed that the objectives were very well met or perfectly met.

- *Issue:* It was discussed that students should have some more discussion on global manufacturing issues. It was suggested in close the loop meeting that some webinars should be identified and direct students to participate in them to improve their skills.
- *Actions:* The instructor will provide a list of suggested websites with information and articles on this topic and advise students to read them.
- *Responsibility:* Jerry Cuper, assessment coordinator, Ken Cook, instructor of the course.

***Outcome k: a commitment to quality, timeliness, and continuous improvement.***

- *Assessment:* Direct and indirect assessment of TIE4115, Senior Project course and TIE3203 Technical Project Management and TME4343 Six Sigma 2.
- *Evaluation:* Direct assessment results indicate that the 80% mastery levels of objectives were exceeded by 6%. The indirect assessment results revealed that 91% of students believed that the objectives were perfectly or very well met.
- *Issue:* Direct assessment data for TIE3203 indicated exceeding the average target score by an average of 10%. This indicates an inconsistency with the indirect assessment where 79% of the students believed that objectives were very well and perfectly met. The direct assessment data could indicate the need for evaluating target scores.
- *Actions:* Instructor will be asked to review the target scores and elevate the rigorousness of the course.
- *Responsibility:* Jerry Cuper, assessment coordinator, Pat Shamamy, instructor of the course.

## **b. Report on Plan for 2015-2016 Academic Year**

The department is planning to have all courses offered for the BSET program, which are being assessed, to be used at least once by the end of 2015-2016 academic year. This is important for the ABET accreditation process and for having an overall discussion about the program assessment plan in Closing-the-Loop Meeting in September 16.

The pilot course assessment for other degree programs in the department went well based on assessing two courses from BSCM and BSAET. The department will finalize the assessment plans for both programs and pursue a larger scale assessment for the courses of the two programs.

As recommended in Closing-the-Loop Meeting of September 2015, Jerry Cuper, assessment coordinator, with the help of the chair will review course objectives for all courses and discuss changes with instructors if needed

**Table 1: Assessment Plan for the BS in MMET**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	a: knowledge, techniques, skills b: math, science, engineering, and technology c: conduct, analyze, interpret experiments	Objectives of All core courses	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every semester.	Annual
<b>TECHNOLOGY</b> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	a: knowledge, techniques, skills d: design of systems, components, or processes f : identify, analyze, solve tech. problems	Objectives of TIE4115, TIE3163, TME1023, TIE3063, MCS3324, TME3333, TME4103, TEE3103	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every semester	Annual
<b>SUSTAINABILITY</b> "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."	d: design of systems, components, or processes h: ability to engage in lifelong learning j: professional, societal and global issues k: quality, timeliness, and continuous improvement	Objectives of TIE4115, TIE3203 TME4413, TME4343, Leadership program	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment. Passing Leadership courses.	Every semester	Annual
<b>COMMUNICATION</b> “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: communicate effectively	Objectives of TIE4115, TIE3203, WPE (COM3000)	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment. Passing WPE exam	Every semester	Annual
<b>MATHEMATICS</b> “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.”	b: math, science, engineering, and technology c: conduct, analyze, interpret experiments	MCS2313, MCS3324, TEE4214, TME3204, TEE4224	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every semester	Annual



<b>READING</b> “LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.”	f : identify, analyze, solve tech. problems g: communicate effectively	Objectives of TIE4115, TIE3203, TIE3163, WPE (COM3000)	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment. Passing WPE		Continuously by the University
<b>SCIENTIFIC ANALYSIS</b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”	c: conduct, analyze, interpret experiments d: design of systems, components, or processes	Objectives of TEE4214, TEE4224, MCS3324, TIE4115, TME3113	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every semester.	Annual
<b>LEADERSHIP</b> “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.”	e: function effectively on teams i: professional, ethical and social responsibilities j: professional, societal and global issues	Objective of TIE4115, TIE3163, TIE3203, TME4343, Leadership Program	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every semester.	Annual
<b>TEAMWORK</b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”	e: function effectively on teams k: quality, timeliness, and continuous improvement	Objectives of TIE4115, TIE3203, TME3333, TME4343, TME4413	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every Semester	Annual
<b>PROFESSIONAL ETHICS</b> “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.”	i: professional, ethical and social responsibilities j: professional, societal and global issues	Objectives of TIE4115, TME4343, TIE3203, TME4413	A target score 80% or better in achieving relevant course objectives and percentages of rank 4 to 5 of the indirect assessment	Every semester	Annual

Program Learning Outcomes

- a an appropriate mastery of the knowledge, techniques, skills, and modern tools of their disciplines
- b an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology
- c an ability to conduct, analyze, and interpret experiments, and apply experimental results to improve processes
- d an ability to apply creativity in the design of systems, components, or processes appropriate to program educational objectives
- e an ability to function effectively on teams
- f an ability to identify, analyze and solve technical problems
- g an ability to communicate effectively
- h a recognition of the need for, and an ability to engage in lifelong learning
- i an ability to understand professional, ethical and social responsibilities
- j a respect for diversity and knowledge of contemporary professional, societal and global issues
- k a commitment to quality, timeliness, and continuous improvement

## ***BS in Mechanical Engineering***

### **1. Assessment Plan Bachelor of Science in Mechanical Engineering (BSME)**

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.

### **2. Action Plan (Loop-Closing) for B.S. Mechanical Engineering**

#### **a. Report on 2014-2015 Academic Year**

Background: For the fourth 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 is 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 three years. First EGE 1012 no longer exists. It has been eliminated from outcome f. The course has been replaced 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 was used by the senior project advisors for the first time. It may not have been as effective as other rubrics, so a third rubric may be applied in 2015-2016.

Each summer (typically in 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 worked in from 2012 through 2015. 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.

			2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017	
	Assessment Tools/Measures	Application	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	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
	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
	Faculty Advisor meeting with team to discuss team functionality	EME4212, EME4252	X	X	X	X	X	X	X	X	X	X	X	X
	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	
		EME3013, EME3123, EME4003		X		X		X		X		X		X
f	10 multiple choice ethics questions	EME4222, EME4253			X		X		X		X		X	
	Case study assignment on ethics	EGE1012			X									
	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
	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
	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
	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			
	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	
	Statement of current professional organization memberships	Exit Interview		X				X				X		
	Statement of professional goals and plans for graduate studies	Exit Interview		X				X				X		
	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		
	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
	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

As a general overview, selecting and using appropriate rubrics has been difficult. Over the past three 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.

- *Objective/Outcome:* Knowledge in Discipline
  - *Assessment:* See Table 1
  - *Evaluation:* All
  - *Issue and Actions:* Outcome a data from EME 3033 indicates that goals were not met for 2014-2015, and in fact, dropped even lower. The goals were not met in 2012-2013 because the students’ exam questions were based on an old textbook. Two years ago, the questions were rewritten to reflect the new textbook, and yet the target was still not met. Later, it was noted in June 2014 that the questions were concept questions as opposed to calculation questions. This was likely a factor in causing the lower scores as the students have had less experience during the course answering concept questions. For 2014-2015, the scores are a reflection of “all or nothing” in a multiple choice quiz, thus the lower scores. Perhaps a new tool is needed, or a tiered scoring system. In addition, Dr. Fernandez will meet with a committee to examine if the course is missing some of the content that needs to be addressed. If there are no outliers causing the metric to be unmet, the assessment tool will need further examination. One course section did not meet the metric for outcome a, but it was discovered the adjunct instructor was having some personal issues. This instructor was not rehired. For the remaining courses where data is gathered for outcome a, the metric was met and seems to be a fair representation and did not need changes. A new rubric was used for Outcome c. The metric has been raised as students appear to be performing quite well. Metric analysis from Outcome e indicates that targets were mostly met. Three issues were noted/addressed. First, Heat Transfer results had been abnormally high due to an exam problem without enough rigor. The student problem evaluated was changed to better reflect the outcome needs. The students are now near the desired metric. Second, one section of Fluid Mechanics indicated low scores. An issue was identified with the instructor and will be addressed for future courses. Finally, in EME 4003, the metric was not met. We have not determined the cause, so no action will be taken at this time, but the situation will be monitored next year.
  - *Responsibility:* Course instructors implement the plan; Dr. Riedel and Dr. Gerhart track the results.
- 
- *Objective/Outcome:* Technology
  - *Assessment:* See Table 1
  - *Evaluation:* All
  - *Issue and Actions:* 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. While it was our goal to create a tool by December 1, 2013,

we missed our target date. Dr. Fernandez was able to identify a tool by September 1, 2014 and was run on a trial basis for 2014-2015. The results are pending. 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.

- *Responsibility:* Course instructors implement the plan; Dr. Riedel and Dr. Gerhart track the results.
  
- *Objective/Outcome:* Sustainability
- *Assessment:* See Table 1
- *Evaluation:* All
- *Issue and Actions:* For the fourth year, sustainability assessment continues to be a “thorn” as we took a while to settled on all of the final assessment tools and rubrics and now are awaiting results to be analyzed. ABET Outcome h, while useful, is difficult to apply a metric. The department is still considering what to do with the collected coursework, and a rubric is being pursued. Currently only a short paragraph is written by students in senior projects about environmental sustainability. This is probably not enough depth to measure the university goal. Social sustainability assessment has not been decided upon although this appears to be an area that LDR 2001 could address, especially considering the student survey questions available for use. While not difficult but potentially time consuming, data can be taken for just ME students as major is a demographic collected. For environmental and economic sustainability two assessment tools were added in two separate courses. The instructors (Dr. Ahad and Prof. Reimer) collected data in 2011-2012, 2012-2013, and 2013-2014 but results analysis was not completed. Dr. Ahad collected data for EME 2033 Manufacturing Process and the students exceeded the target metric. The administration timeline will be every semester, but the plan is currently in transition. The course where data was collected for economic sustainability (EGE 3311) no longer exists and has been replaced with EGE 2233. After the first offerings of the course during 2013-2014, the department decided the prior assessment tool was not acceptable. A new tool will be pursued. 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 will be contacted and a course committee will convene to determine an assessment plan.
- *Responsibility:* Course instructors implement the plan; Dr. Riedel and Dr. Gerhart track the results.
  
- *Objective/Outcome:* Communication
- *Assessment:* See Table 1
- *Evaluation:* All
- *Issue and Actions:* Outcome g covers all three forms of communication (written, oral, graphic). A new (better) writing rubric was identified in September 2012 and first piloted in Spring 2013 semester. The results indicated that the metric was too low, and was raised for 2013-2014. Closing-the-loop indicates that students are meeting the target. Spring 2015 scores were slightly low in Heat Transfer, but was expected due to the introduction of a challenging Problem-based learning module. We would like to see our students eventually meet our metric (72% should increase

to 80% within a few years). Even if the Heat Transfer score was lower than desired, students show improvement in writing from early junior (Dynamics) to later senior (Heat Transfer) years. For oral communication two years ago, the department added an early assessment (sophomores in EME 2011) so that a comparison can be made to later assessment (seniors in EME 4412). In the first year, students showed longitudinal improvement from sophomore to senior years. Currently there is little to no difference in oral presentation skills between sophomore and senior years. This is likely the effect of the emphasis on presentations in freshmen engineering courses. Nonetheless, the students are meeting our target and are deemed very good at presenting. Graphical communication assessment is a new addition. The department discovered that we already collect data for this in the written and oral communication rubrics as well as the new outcome c rubric. That data was collected for the first time in 2013-2014 for Dynamics and Heat Transfer only; the students are meeting the metric in Heat Transfer, but other course data is not reported for this year. For now, no changes are anticipated, although results from senior project oral presentation visual aids should be analyzed in 2015-2016.

- *Responsibility:* Course instructors and senior project advisors; Dr. Riedel and Dr. Gerhart track the results.
  
- *Objective/Outcome:* Mathematics
- *Assessment:* See Table 1
- *Evaluation:* All (and soon, Mathematics Department)
- *Issue and Actions:* 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 support.
- *Responsibility:* Course instructors implement the plan; Dr. Riedel and Dr. Gerhart track the results.
  
- *Objective/Outcome:* Scientific Analysis
- *Assessment:* See Table 1
- *Evaluation:* All
- *Issue and Actions:* 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.
- *Responsibility:* Course instructors implement the plan; Dr. Riedel and Dr. Gerhart track the results.
  
- *Objective/Outcome:* Leadership
- *Assessment:* See Table 1
- *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 and is being 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 still under consideration as 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. In addition, two years ago, consideration was made to add an assessment involving Engineering Solution Impact. It was decided the effort was not worth limited conclusion that could be drawn. Finally it is being considered to use LDR 3000 and LDR 4000 (portfolios) to assess leadership. *Responsibility:* Course instructors implement the plan; Dr. Riedel and Dr. Gerhart track the results.

- *Objective/Outcome:* Lifelong Learning
  - *Assessment:* See Table 1
  - *Evaluation:* All
  - *Issue and Actions:* 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. Exit Surveys of seniors indicate metrics are being met (despite small sample sizes). For the latest survey, two changes were to be made to the exit surveys to gather more useful data, were not made for 2015, but will be made for the next assessment cycle. The question phrase “do you feel” will be changed to “explain.” (In other words, changed from a yes or no answer to more detailed descriptions.) Also a question will be added whether their professional memberships will continue. Joining as a student member is cheap and often required for senior project competition teams. In addition, first year membership is typically discounted. Asking the students if they will continue a membership after graduation and then beyond the first year will indicate actual sincerity in lifelong learning. Even without these changes, results from the first data collection to the second showed improvement. 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.
  - *Responsibility:* Course instructors and Dr. Riedel implement the plan; Dr. Riedel and Dr. Gerhart track the results.
- 
- *Objective/Outcome:* Teamwork
  - *Assessment:* See Table 1
  - *Evaluation:* All
  - *Issue and Actions:* For outcome d, the students are meeting the recently raised metrics with one exception. In third semester projects (“Projects 2”) the low score is a reflection of a lack of rigor in Projects 1. It was determined that ~50% of the students are doing the work (which is not atypical in team projects). In addition, competition teams were smaller in 2014-2015 because of low enrollments four years earlier during economic recession. That added some stress to the workload required (i.e., metrics were set when teams were large). Enrollment is back up some the metric will remain unchanged. Besides peer evaluation, faculty evaluation via rubric (direct assessment) was attempted for 2013-2014 & 2014-2015. Results were not reliable (i.e., the rubric did not measure what we wanted), and the rubric is not sufficient to evaluate an individual student’s team contributions. A new rubric will be sought, particularly one that requires a student-faculty meeting.



- *Responsibility:* Faculty advisors/students implement the plan; Dr. Riedel, Dr. Yee, and Dr. Gerhart will find a new rubric and track the results.
- *Objective/Outcome:* Ethics
- *Assessment:* See Table 1
- *Evaluation:* All
- *Issue and Actions:* 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 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 case study has been added to the new course EGE 2233. A rubric and metric were developed, but results are still pending from Prof. Reimer. Finally, 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.  
The department decided that college-wide ethics assessment should be performed in EGE 1001 since two class periods (with a written paper) are focused on ethics.
- *Responsibility:* Course instructors implement the plan; Prof. Reimer will get rubric; Dr. Riedel and Dr. Gerhart track the results.

Other Assessment: ABET outcome j (contemporary issues) is not used in the University Outcomes. We have continued analysis in senior projects, but will add Mechatronics course data in 2015-2016.

#### **b. Report on Plan for 2015-2016 Academic Year**

Loop closing will commence as indicated in Table 1. Besides that the action items listed in section 2.a. will be followed. A summary is repeated here for clarity.

- *Objective/Outcome:* Knowledge in Discipline
- *Issue and Actions:* Outcome a scoring tool in EME 3033 will be evaluated and a committee will examine individual questions to find discrepancies. We will monitor EME 4003 data for future changes.
- *Objective/Outcome:* Technology
- *Issue and Actions:* Outcome k metric should be finalized, and preliminary results analyzed.
- *Objective/Outcome:* Sustainability
- *Issue and Actions:* ABET Outcome h needs a tool/metric. Social sustainability assessment needs addressing (LDR 2001?). Data will be continued to be collected in EME 2033 and needs monitoring. Rubrics and metrics must be established and analyzed for environmental and economic sustainability (Prof. Reimer). Former professor that updated the Cost Analysis course will be contacted, and a course committee will convene to determine an assessment plan.

- *Objective/Outcome:* Communication
- *Issue and Actions:* For graphical communication, collect presentation visual data for EME 2011 and EME 3043. Continue Heat Transfer data collection.
  
- *Objective/Outcome:* Mathematics
- *Issue and Actions:* No changes.
  
- *Objective/Outcome:* Scientific Analysis
- *Issue and Actions:* No changes.
  
- *Objective/Outcome:* Leadership
- *Issue and Actions:* Outcome h needs a metric. Develop/deploy tool/survey in our “Third-Tuesday Seminars.” Consider using LDR 3000 and 4000 portfolio to assess leadership.
  
- *Objective/Outcome:* Lifelong Learning
- *Issue and Actions:* Update Exit Survey questions as indicated in prior report section. A tool/survey for our “Third-Tuesday Seminars” should be finalized. Perhaps include senior projects seminar critiques.
  
- *Objective/Outcome:* Teamwork
- *Issue and Actions:* Implement student-faculty meeting. Identify better direct assessment rubric for individual contributions to teamwork in senior projects.
  
- *Objective/Outcome:* Ethics

*Issue and Actions:* Outcome f needs new tool. Dr. Riedel, Dr. Yee, and Dr. Gerhart will investigate current questions. Prof. Tocco and Dr. Carpenter may have a new test, and if so, it will be reviewed for possible questions. Professor Reimer will be assessing an Ethics assignment in the e-mindset course. Add a NSPE Ethics Code-related statement to Senior Project Reports.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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
<b>TECHNOLOGY</b> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Outcome k Outcome b	Evaluation of coursework in EGE1102, EME2012, EME3033, EME3133 Exam questions on laboratory technique in EME4412	Identifying assignments to use for each course. In progress. 70% of students receive a score of 60% or higher	Every semester	Annual
<b>SUSTAINABILITY</b> "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 EME4222, EME4252 or EME4253, EME 3023 Manf. Processes (environment and economic - part of project) EGE 3311 Strat. Mang.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
<b>COMMUNICATION</b> “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 by 2014	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 by 2014	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 Thursday 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
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## ***BS in Industrial Operations Engineering***

### **1. Assessment Plan Bachelor of Science in Industrial Engineering (BSIE)**

See Table 1a for course mapping and Table 1b for assessment plan.

#### **ABET Criterion 3: B.S. Industrial Engineering Program Outcomes**

Upon successful completion of the B.S.I.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.

### **2. Action Plan (Loop-Closing) for Bachelor of Science in Industrial Engineering (BSIE)**

#### **a. Report on 2014-2015 Academic Year**

Background: The department reset the assessment procedures in 2011-2012 (i.e., “assessment housecleaning”). An updated and rigorous data collection, closing-the-loop schedule, and faculty processes were developed and are being followed for the third year in a row. 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 is collected and analyzed for all outcomes every year. (Note that the collection is often split between the Fall and Spring semesters.) Each summer (typically in late June), the entire ME department meets to close-the-loop on all of the data that was collected. The department also convenes for follow-up at the commencement of the academic year, during Assessment Day, and for during select department meetings throughout the academic year.

In general, the BSIOE program shares information and data collection with the ME program. This was done since the BSIOE program either shares courses with the BSME program or has them cross listed. Also, since the program has very few students in it and hence the general opinion was that the sample size would be very small to perform a significant analysis. The data has not been separated. The issue of separating the data was addressed at the ABET conference in Pittsburg in April 2014. The outcome was that the BSIOE program and the BSME program assessments should be separated regardless of the number of students in the program. Though it was mentioned that the data would be separated, due to resource limitation, the share data is used for the evaluation for the academic year 2014-2015. Therefore, BSME

evaluation is used for common and cross listed courses. All data and analysis are available in the BSME program assessment.

In the 2015-2016 academic year and the following years, core IE courses will be used for the BSIE program assessment. Therefore there would not be necessary separate the data from BSME. Details can be found in the following section for 2015-2015 academic year planning.

**b. Report on Plan for 2015-2016 Academic Year**

The program name has been changed to BSIE (Bachelor of Science in Industrial Engineering) in Summer 2015 which will be consistence with other engineering programs at LTU. The program has a new director (Dr. Ahad Ali) from this semester (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 by removing ME courses. 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). An Industrial Engineering Lab will be established in the coming academic years. A benchmark visit plan is scheduled this semester to Wright State University for their program and IE lab facilities. That would help us what experimental modules should be included in the proposal Industrial Engineering Lab at LTU. More benchmarking visits would be arranged in near future if needed. Now LTU has joined as a member of the CIEDAH (Council of Industrial Engineering Department Academic Head).

Previous all assessments for BSIE were integrated with BSME program. There were no separation of data. New assessment plan is proposed where core IE courses of BSIE program will be used for the assessment. Course offering were not consistence for BSIE program. It was affecting to do proper assessment and follow up the improvement. Now BSIE courses will be offered based on the flowchart. It would be easier to collect data and perform analysis including close the loop. Table 1a shows the timeline of the data collection plan for the next two academic year. Similar plan will be maintained based on the progress of the BSIE assessment. Table 1b shows the details assessment plan including undergraduate learning outcomes, ABET outcomes, assessment tools, metrics/Indicators, administration timeline and loop-closing for BSIE program:

Table 1a: Course Mapping of BSIO Program

	Assessment Tools/Measures	Application	2015-2016		2016-2017	
			Fall	Spring	Fall	Spring
a	Evaluate final exam problem using problem solving rubric	EIE 3653	X		X	
		EIE 3043, EIE 3453			X	
		EIE 3123, EIE 3353, EIE 4453		X		X
b	5 questions on Final Exam	EIE 4553		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, EIE4253	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 3123, EIE 3453	X		X	
		EIE 3753, EIE 4553	X		X	
f	10 multiple choice ethics questions	EIE4252, EIE4253	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, EIE 3753, EIE 4013	X	X	X	X
	Evaluation of technical report writing using writing rubric	EIE 3043, EIE 3453, 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	Fulfilled by passing EGE 1102, EIE 2012, EIE 3043, EIE 3453					



**Table 1b: Assessment Plan for the BS in Industrial Operations**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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
<b>TECHNOLOGY</b> “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
<b>SUSTAINABILITY</b> "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
<b>COMMUNICATION</b> “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 by 2016	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 by 2016	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

<b>PROFESSIONAL ETHICS</b> “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 achieve a score of 70% or higher	Every semester	Annual
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## ***BS in Robotics Engineering***

### **1. Assessment Plan for the Bachelor of Science in Robotics Engineering**

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, based in part on the 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
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

### **2. Action Plan (Loop-Closing) for the Bachelor of Science in Robotics Engineering**

#### **a. Report on 2014-2015 Academic Year**

A complete assessment plan was developed and finalized for the BSRE program during the 2014-2015 academic year that is being used for the ABET accreditation self-study in 2016. The following goals were achieved in the past year:

- The portion of the BSRE assessment plan that relies on existing assessment efforts in the mechanical engineering classes has been updated to reflect changes in the assessment activities in those classes. Details on these changes can be found in the BSME portion of the assessment report.
- An assessment plan for the BSRE classes has been developed and data collected in these classes.
- After a review, it was determined that there were no existing assessment activities in the electrical engineering classes that are part of the BSRE flowchart, and thus these classes cannot practically be included in the program's assessment plan.
- The BSRE assessment plan was modified to account for the curriculum change that was effective in fall 2014 (EME 4603, EME 3133 and SSC 2303 replaced with EGE 2013, EME 3043 and EME 3013).

#### **b. Report on Plan for 2015-2016 Academic Year**

For the upcoming academic year, the focus of the assessment plan will be to:

- Extract assessment data relating to BSRE students in classes with a diverse population (from the point of view of academic major).
- Update the assessment plan based on close-the-loop meeting results.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators**</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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		
	Outcome e	Rubric used to evaluate final reports in ERE4014	80 % of teams will score 70 % or above		
		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		
<b>TECHNOLOGY</b> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Outcome k	Evaluation of coursework in EME2012	Identifying assignments to use for each course. In progress.	Every semester	Annual
		Term project grade in ERE3114	70 % of students will score 80 % or above		
		Computer assignment grade in ERE4113			
	Outcome b	Term project grade in ERE 2024	75 % of students will score 70 % or above		
		Term project grade in ERE 3024			
<b>SUSTAINABILITY</b> "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 EME4252 or EME4253	50 % of students will score 70 % or above	Every semester	Annual
<b>COMMUNICATION</b> “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	50% of students will score 80% or higher	Every semester	Annual
		Writing rubric used for technical paper in ERE3024	70% of students will score 80% or higher		
		Oral presentation rubric used in ERE4014	70% of students will score 80% or above		

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.”					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  Ethics/Integrity statement on final report in EME4252 and EME4253	70% of students will achieve a score of 70% or higher Need to develop metric	Every semester	Annual
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## ***MS in Mechanical Engineering***

### **1. Assessment Plan Master of Science in Mechanical Engineering**

See Table 1, below.

### **2. Action Plan (Loop-Closing) for Master of Science in Mechanical Engineering**

#### **a. Report on 2014-2015 Academic Year**

*Outcome 1:* Advanced knowledge in discipline

*Assessment:* See Table 1

*Results:* -

*Issues and Actions:*

No new assessment data is collected in the 2014-2015 Academic Year. The new data will be collected in the solids track, EME 5333 Advanced Dynamics in Fall 2015. A common problem will be asked for students to solve in the final exam.

*Outcome 2:* Analytic and problem-solving skills

*Assessment:* See Table 1

*Results:* 100% of the students met the target (34/34)

*Issues and Actions:*

This objective was assessed for in Spring 2015 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:* 59% of the students met the target (19/32)

*Issues and Actions:*

EME5353 Transport Phenomena I course is used to assess this outcome. Students 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:* 100% of the students met the target (34/34)

*Issues and Actions:*

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-written*

*Assessment: See Table 1*

*Results: 93.75% of the students met the target (30/32)*

*Issues and Actions:*

Communication skills in oral, were assessed in the same project in the previous outcome 3. 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.

## **b. Report on Plan for 2015-2016 Academic Year**

The assessment plan will be carried out as planned (see Table 1) with changes.

Based on the program changes, the assessment will be carried out in two different tracks: solids and thermal fluids. The assessment in the solids track will focus more on the EME5333 Advanced Dynamics, since it is the only solids track course that is 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 2015 in EME 5363Transport Phenomena II or EME 5153 Applied Thermodynamics and in Spring 2015 in EME5333 Advanced Dynamics or EME5213 Mechanical Vibrations 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 2015 in EME 5363Transport Phenomena II or EME 5153 Applied Thermodynamics and in Spring 2015 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 2016 in EME 5353 Transport 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 2015 in EME 5153 Applied Thermodynamics or EME 5363 Transport Phenomena II and in Spring 2016 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 2016.

**Table 1: Assessment Plan for MS in ME**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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.	EME 5363Transport Phenomena II or EME 5153 Applied Thermodynamics and EME5223 Advance Mechanics of Materials 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 EME5223 Advance Mechanics of Materials or EME5213 Mechanical Vibrations I Analysis and interpretation, using software, of a peer reviewed technical paper 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 engineering publications.	EME 5353 Transport Phenomena I 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 EME5223 Advance Mechanics of Materials 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

## *MS in Mechatronics System Engineering*

### **1. Assessment Plan Master of Science in Mechatronic Systems Engineering (MSMSE)**

See Table 1, below

### **2. Action Plan (Loop-Closing) for M.S. Mechatronic Systems Engineering**

#### **a. Report on 2014-2015 Academic Year**

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 20.0%

*Issues and Actions:*

A new, unique exam problem 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. In Spring 2015, only 5 of the 16 students enrolled in the course were enrolled in the MSMSE program. The results were calculated based on these 5 MSMSE students.

*Responsibility:*

Implementing: James Mynderse, course coordinator

Tracking: James Mynderse, program director

*Outcome 2:* Analytic and problem-solving skills

*Assessment:* See Table 1

*Results:* not yet scored

*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. Student deliverables have been collected but not yet scored. Loop closing will begin in 2016.

*Responsibility:*

Implementing: James Mynderse, course coordinator

Tracking: James Mynderse, program director

*Outcome 3:* Evaluate technical publications

*Assessment:* See Table 1

*Results:* not yet scored

*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. Student deliverables have been collected but not yet scored. Loop closing will begin in 2016.

*Responsibility:*

Implementing: James Mynderse, course coordinator

Tracking: James Mynderse, program director

*Outcome 4: Effective communication**Assessment:* See Table 1*Results:* not yet scored*Issues and Actions:*

During the 2014-2015 academic year, oral communication data was collected in MSE 6183 but not in MSE 5183. This will be corrected in the 2015-2016 academic year. Written communication data was collected in both. Loop closing will begin in 2016.

*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. Implementation of this assessment will be discussed with other ME Graduate Program directors.

*Responsibility:*

Implementing: James Mynderse, course coordinator

Tracking: James Mynderse, program director

**b. Report on Plan for 2015-2016 Academic Year**

Data-taking will continue in 2015-2016 based on the revised assessment plan. Loop closing will begin in 2015-2016.

**Table 1: Assessment Plan for MS in MSE**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

## *MS in Automotive Engineering*

### **1. Assessment Plan for M.S. Automotive Engineering**

The assessment plan matrix is shown in Table 1. It includes assessment techniques, metrics, and loop closing information.

### **2. Action Plan (Loop-Closing) for M.S. Automotive Engineering**

#### **a. Report on 2014-2015 Academic Year**

##### **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 2015.
- *Evaluation:* 83% of the students scored 85% or better.
- *Issue:* The metric of “80% of the students will score 85% or better” was met. Only five students (out of thirty) did not score 85% or better. They scored 84%.
- *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 2014.
- *Evaluation:* 77.4% of the students scored 85% or better.
- *Issue:* The metric of “80% of the students will score 85% or better “ was not met. Seven students (out of 31) did not score 85% or better. Six of these students scored 80%; the seventh scored 53.3%. If one of these six students scored above 85%, the metric would have been 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.

##### **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 2015.
- *Evaluation:* 59% of the students scored 85% or better.
- *Issue:* The metric of “75% of the students will score 85% or better” was not met. There was a large influx of Indian students into the MSAE program. Many of them are of low quality. The instructor noted that “there were some very good presentations, but there were far too many with an effort that appeared to be much less than what would be expected for 15% of the grade in an entire course.”
- *Actions:* The admission requirements have been raised for students admitted for Spring 2016.
- *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 2014.
- *Evaluation:* 23.8% of the students scored 85% or better.
- *Issue:* The metric of “80% of the students will score 85% or better” was not met. Only five students out of 21 scored 85% or better. Only 10 students out of 21 scored 75% or better. There was a large influx of Indian students into the MSAE program. Many of them are of low quality and do not put in the effort. This was the first time that this adjunct professor did the assessment in his class. Since he came from industry, he may have scored the students lower than someone from academia.
- *Actions:* Meet with Dr. Sitaram to see what can be modified. The admission requirements have been raised for students admitted for Spring 2016.
- *Responsibility:* Dr. Kingman Yee, Director of M.S. Automotive Engineering, is responsible for implementing the plan or tracking the results.

#### b. Report on Plan for 2015-2016 Academic Year

During the 2015-2016 academic year, above assessments will continue for the fourth round.

In Fall 2015:

EME5433 (Vehicle Dynamics 1): no changes are planned.

EME5433 (Vehicle Crashworthiness): the adjunct instructor will be contacted to see if the process or metric should be modified. He will conduct his second assessment.



In Spring 2016:

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:

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

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

The following 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.

**Table 1: Assessment Plan for MS in AE**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

## ***Master of Engineering Management***

### **1. Assessment Plan – Master of Engineering Management**

Table1 illustrates a complete common assessment plan matrix including assessment techniques, metrics, and loop closing information.

### **2. Action Plan (Loop-Closing)**

#### **a. Report on 2014-2015 Academic Year**

The following outcomes measured for EEM 6753 Engineering Supply Management (fall 2014), EMS 7613 Technology Management (Fall 2014) and EEM 6803 (spring 2015).

- 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.

#### **b. Report on Plan for 2015-2016 Academic Year**

The courses that are planned for fall 2015: EEM 6753 Engineering Supply Chain Management and EEM 6763 Quality Engineering Systems.

**Table 1: Assessment Plan for MEM**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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.	EME 6803 or EME 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.	EME 6803, EME 6703 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.	EME 6763, EME 6703 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.	EME 6713, EME 6803, EME 6403 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

## *Master of Engineering in Manufacturing Systems*

### **1. Assessment Plan – Master of Engineering in Manufacturing Systems (MEMS)**

See Table 1, below.

### **2. Action Plan (Loop-Closing)**

#### **a. Report on 2014-2015 Academic Year**

The MEMS program was started at a time when the college of engineering was just beginning to offer master of engineering programs. The initial course work was developed to help engineers who worked during the day, earn graduate professional degrees. As the department gained experience in offering such programs the graduate enrollment grew and the number of graduate programs offered by the ME department increased. The programs offered also increased in scope to educate not just part time students but also full time students. These programs provided more of an academic base rather than a professional one. Due to these changes there has been a drastic shift in the enrollment data. Enrollment in the professional programs dropped and stagnated while enrollment in the academic programs grew significantly. In addition the academic programs offered competing courses that made the professional courses less attractive. This caused a strain on the department resources. This led the ME faculty to conclude that the MEMS program should be phased out and replaced by a concentration in the Master of Science in Mechanical Engineering (MEMS) program.

It should be noted that the department tried hard to bolster the professional programs prior to enacting this decision. The professional programs were supported and the program directors were replaced to bring new strategic ideas to boost enrollment. The results however were not up to expectations and hence the decision to phase out the professional degrees was made by the department. The enrollment data has been presented in the graphs below.

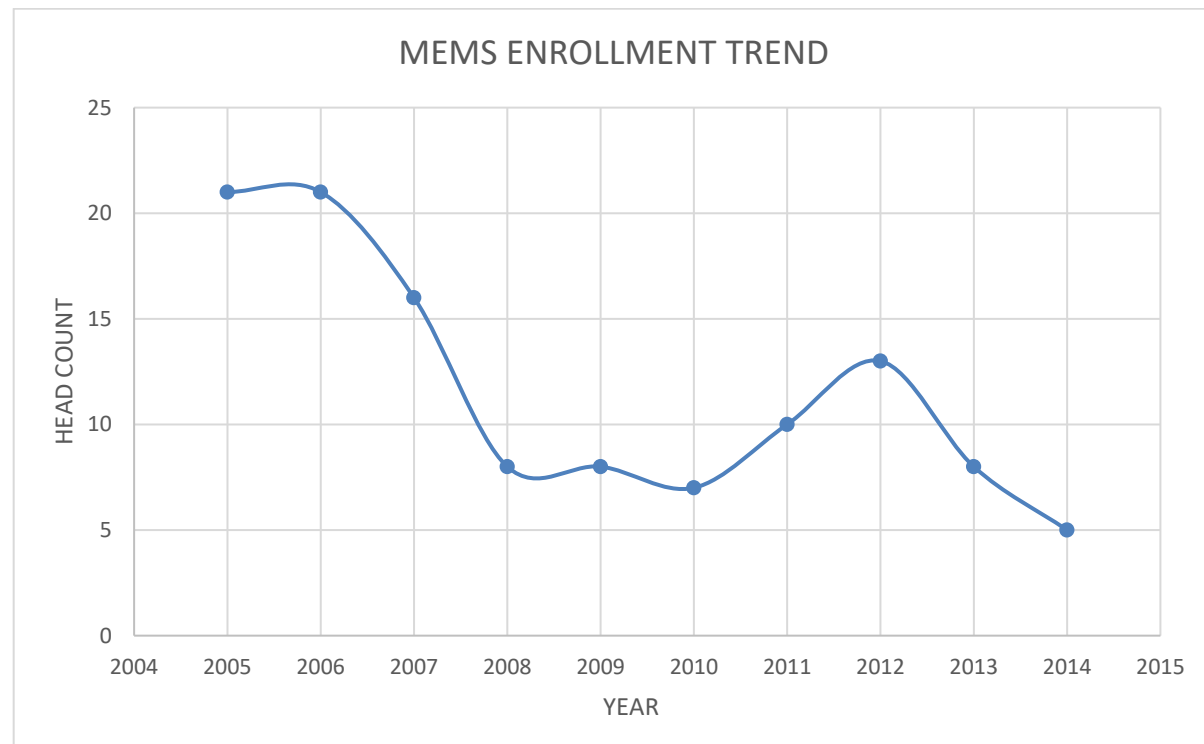


Figure 1. Enrollment data for the MEMS program for the past 10 years

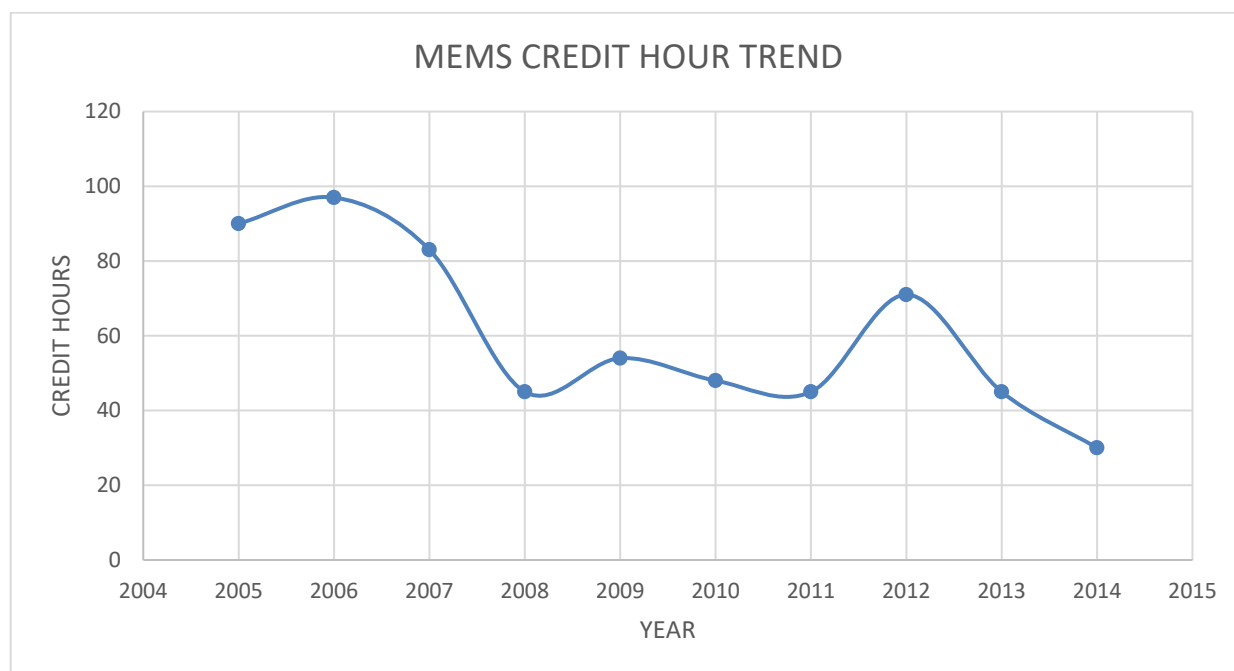


Figure 2. Credit Hours data for the MEMS program for the past 10 years

Assessment action: Based on the explanation given above the MEMS program assessment activities were put on hold. In the future manufacturing courses with an EME prefix will be assessed in the MSME program.

**b. Report on Plan for 2015-2016 Academic Year**

Follow assessment plan shown in Table 1.

**Table 1: Assessment Plan for MEMS**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

## ***MS in Industrial Engineering***

### **1. Assessment Plan – Master of Science in Industrial Engineering (MSIE)**

See Table 1a below.

### **2. Action Plan (Loop-Closing) for MSIE**

#### **a. Report on 2014 – 2015 Academic Year**

See Table 1b below.

The following outcomes are measured for EME 5603 Engineering Systems Simulation (Fall 2014), EME 7613 Technology Management (Fall 2014) and EME 6403 Quality Control (Spring 2015).

- 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. 85% students have scored above 85 out of 10 scale. There are some improvements in the application of advanced knowledge, analysis, presentation and literature review. The communication in oral presentation and written report needs some improvement.

#### **b. Report on Plan for 2015 – 2016 Academic Year**

Two courses are planned for Fall 2015: EMS 5603 Engineering Systems Simulation and EIE 76653 Advanced Optimization Techniques.



**Table 1a: Assessment Plan for MSIE**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

**Table 1b: Assessment Plan for MSIE**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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 optimization techniques (LP, IP, NLP, etc.) and tools	Course project	88% of students receive a score of 60% or higher	Every Semester	Annual
“LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies”	Utilization of Lindo / Lingo / Solver Software for Optimization Utilization of Word, PPT, Bb in coursework	Course project	87% of students receive a score of 60% or higher	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 advanced optimization.	Course project	90% of students receive a score of 60% or higher	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 proposal and final presentations and reports	Course project	79% of students receive a score of 60% or higher	Every Semester	Annual
“LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.”				Every Semester	Annual

*Doctorate in Mechanical Engineering***1. Assessment Plan for Doctor of Engineering in Mechanical Engineering (DEME)**

See Table 1, below

**2. Action Plan (Loop-Closing) for Doctor of Engineering in Mechanical Engineering****a. Report on 2013-2014 Academic Year**

In Fall 2014, the updated assessment plan was implemented and the doctoral dissertation is used for assessing all learning outcomes (except Outcome #5 in Table 1 which will be assessed by an exit survey). A single dissertation assessment rubric, with multiple parts, will be used to score each of the individual items in the assessment plan, rather than a separate rubric for each item. This way all the assessment information will be contained in one document. Also, assessment of DEME and DEMS students will follow the same rubrics and strategies.

During the past year 2014 Fall – 2015 Summer, there was no DEME student graduated; therefore, no assessment data to report out. In 2015 Spring, a Doctoral Procedures Committee was formed within ME department (6 faculty members) to formulate standard procedures and timelines for overseeing all doctoral student dissertation projects, and a preliminary rubric was developed for assessing their dissertation work (shown in Table 10a).

**b. Report on Plan for 2015-2016 Academic Year**

The 2015-2016 plan will focus on two action items: (1) The dissertation rubric developed during the past year will be finalized by the Doctoral Procedures Committee, and will be sent to all ME faculty for implementation. Data will be collected whenever a new doctoral dissertation is completed; (2) An exit survey for graduating doctoral students will be developed to assess Outcome #5 (LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics). Loop-closing is scheduled to be done every two years, with the next one coming in Fall 2016.

**Table 1: Assessment Plan for DEME**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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 responsibilities,	Every Semester	Annual

## *Doctorate in Manufacturing Systems*

### **1. Assessment Plan Doctor of Engineering in Manufacturing Systems (DEMS)**

See Table 1 below. The metrics/indicators were originally based on percentages (i.e., student will receive a score of 85 % or higher) but upon researching other universities and how they assess dissertations, we adopted a rubric which rates the student on the following levels: Excellent, Very Good, Acceptable, Needs Improvement, Needs Significant Improvement.

While the assessment plan calls for loop-closing every two years, it was decided to evaluate this year's data (one year's worth of data) and do any loop-closing based on it since the rubric is new and it would be better to evaluate the rubric sooner rather than later and then make any adjustments to the rubric, if necessary.

### **2. Action Plan (Loop-Closing) for DEMS**

#### **a. Report on DEMS for 2014-2015 Academic Year**

Assessment data for this year includes two students:

Student #1: graduated (passed final defense) in May 2015 (6 committee members)

Student #2: passed proposal exam in March 2015 (4 committee members)

Results are as follows:

Learning Objective #1: Students will demonstrate a mastery of knowledge and understanding of manufacturing systems (Final Defense)

Student #1: 1 Acceptable, 4 Very Good, 1 Excellent

The results show that the student met the required metrics. There are no issues/concerns at this time so no action is necessary.

Learning Objective #2: Students will provide a plan, including the methods/tools, for solving their problem and conducting their research (Proposal Exam and Final Defense)

Student #1: 4 Very Good, 2 Excellent

Student #2: 1 Needs Improvement, 1 Acceptable, 2 Very Good

Student #1 met the required metrics, however student #2 did not (1 Needs Improvement). Student #2 was given feedback by the committee on his proposal to help improve this part of it and the student did make improvements to the proposal based on the feedback and therefore no action is necessary at this time.

Learning Objective #3: Students will conduct and disseminate independent research which results in new knowledge. (Final Defense)

Student #1: 2 Acceptable, 3 Very Good, 1 Excellent

The results show that the student met the required metrics. There are no issues/concerns at this time so no action is necessary.

Learning Objective #4: Students will be able to effectively document and communicate the results of their research. (Proposal Exam and Final Defense)

Student #1: Written – 5 Very Good, 1 Excellent

Oral – 1 Acceptable, 4 Very Good, 1 Excellent

Student #2: Written – 2 Needs Improvement, 2 Acceptable

Oral – 1 Needs Significant Improvement, 2 Needs Improvement  
1 Acceptable

Student #1 met the required metrics for both written and oral communication, however student #2 did not meet the metrics for either written or oral communication. During the writing of his proposal, Student #2 was referred to the Academic Achievement Center by his academic advisor. The student did go to the AAC for help and did get help that improved his proposal, however, it was not enough. A large number of our graduate students (master and doctoral degrees) are international students and the issue of their weak communication skills has been a subject of concern not only for the ME Dept. but for other departments in the college as well. It appears that several factors, such as TOEFL scores (which were raised in 2014) and ESL coursework, may need to be looked at to address this issue. These issues are at least college level issues and perhaps university wide issues as well. No action is taken at this time until a plan of action is determined at the college level.

**b. Report on Plan for DEMS 2015-2016 Academic Year**

Overall the rubric appears to be working well so we will continue to use it to evaluate the proposal exam and final defense exam.

Will initiate a discussion with the COE Doctoral Governance Committee on how to deal with the weak communication skills of the international graduate students.

Will develop an exit survey for the DEMS students by the end of this year and will begin using it for students graduating in May 2016.

At the beginning of Fall 2015, the faculty of the ME Dept. voted to shut down the MEMS and DEMS programs and integrate the courses from these programs into the Master of Science in Mechanical Engineering (MSME) program and the Doctor of Engineering in Mechanical Engineering (DEME) program. So the department will now only have one doctorate degree and any students who do wish to do manufacturing will do it under the MSME and DEME programs. As of Fall 2015, no more students will be admitted to the MEMS and DEMS programs so the effort with the DEMS will be to get the current students in the programs graduated in a timely manner. We will continue to do assessment for the DEMS program, however, due to the current size of the program (approximately 18 active students) and that no more students are being admitted, the amount of data collected for the program will be small and infrequent.

**Table 1: Assessment Plan for DEMS**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“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

**College of Management**  
***BS in Business Administration***

**1. Assessment Plan**

The assessment plan for the BSBM program is provided in table 1 below.

**2. Action Plan (Loop-Closing)**

**a. Report on 2014-2015 Academic Year**

Based on the close-the-loop meeting for the 2014-2015 academic year, the BBA Program assessed and evaluated the following outcome(s):

- (i) Outcome: Gain practical experience in the work place and apply theoretical tools and concepts. (COM program learning outcome #1.2).  
Assessment: 15 students who interned at various companies during the Fall of 2014, the Spring of 2015 and Summer of 2015 were administered a test for determining the quality of their work at the places where they interned. All of the students (100%) scored 80% or more.  
Evaluation: The goal for this objective is for all students to score 80% or more. Based on the data provided, this goal was met.  
Issue: Since the goal was met, there are no issues regarding this objective.  
Actions: Since there are no issues, no action is planned for this objective.  
Responsibility: The COM Assessment Committee and the BBA program director are responsible for this action plan.
  
- (ii) Outcome: Graduates will deliver a compelling oral presentation. (COM program learning outcome #4.1).  
Assessment: 39 students were administered an oral assessment test with 10 traits and 96% of the student-trait scores were a 3 or better on a six point scale. The goal for this assessment is that 80% or more students will score a 3 or better on a six point scale.  
Evaluation: The goal for this assessment was met.  
Issue: There is no issue(s) to consider as the goal was met  
Actions: The COM Assessment Committee should monitor this assessment and consider elevating the goal for the future.  
Responsibility: The COM Assessment Committee and the BSBA program director are responsible for this action.
  
- (iii) Outcome: Graduates will write professional quality documents. (COM program learning outcome #4.2).  
Assessment: 3 students were administered a written assessment test with 10 traits and 93% of the student-trait scores were a 3 or better on a six point scale. The goal for this assessment is that 80% or more students score a 3 or better score on a six point scale.  
Evaluation: The goal for this assessment was met.  
Issue: There is no issue(s) to consider as the goal was met  
Actions: The COM Assessment Committee should monitor this assessment and consider elevating the goal for the future.



Responsibility: The COM Assessment Committee and the BSBA program director are responsible for this action.

- (iv) Outcome: Graduates will analyze problems in-depth. (COM program learning outcome #7.1).

Assessment: 5 students were administered an assessment test to evaluate their critical thinking abilities by using a 7 trait rubric and 77% of the student-trait scores were 3 or better on a six point scale. The goal for this assessment is that 80% or more students will score a 3 or better score on a six point scale.

Evaluation: The goal was not met. However, the deficiency is only 3 percentage point and hence does not warrant any major adjustments at this stage.

Issue: The issue here is that the goal is being missed, even though by a small margin. While a major intervention is not necessary at this stage, we need to make sure this is a one-time anomaly.

Actions: The COM Assessment Committee should monitor the assessment of this outcome and plan for some corrective action if the goal is missed again and by a larger margin.

Responsibility: The COM Assessment Committee and the BSBA program director are responsible for this action.

#### **b. Report on Plan for 2015-2016 Academic Year**

Four of the 10 objectives listed in the plan were assessed this year. While the objectives assessed were meeting or nearly meeting the prescribed goals, we have to do a better job of assessing more of the planned objectives. This will be carried out this year by the Assessment Committee. The plan this academic year is to assess COM program learning outcomes 7.1, 7.2, 7.3, 9.1, 9.2, and 10 in the BSBA program.

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

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “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 the knowledge in the areas of accounting, finance, management, marketing and quantitative tools & techniques. Gain practical experience in a workplace and apply theoretical tools and concepts.	Administering the ETS Major Field Test (Business), once or twice a year Administer Internship Supervisory Evaluation to all students that go on internship	Since 2012-13 will be the first year of implementing the MFT, the goal will be to pilot the exam and establish metrics All students score 80% or more.	Every semester.	Annual
<b>TECHNOLOGY</b> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Graduates will demonstrate a mastery of communication technology	Administered in selected core courses on a rotation basis, using rubric R7.	80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual
<b>SUSTAINABILITY</b> "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."					
<b>COMMUNICATION</b> “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 deliver a compelling oral presentation  Graduates will write professional quality documents	Administered in selected core courses on a rotation basis, using rubric R6.  Administered in selected core courses on a rotation basis, using rubric R8.	80% of students will score 3 or higher on a 6 point scale.  80% of students will score 3 or higher on a 6 point scale.	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.”				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.”				Every semester	Continuously by the University
SCIENTIFIC ANALYSIS “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”	<p>Graduates will analyze problems in-depth.</p> <p>Graduates will evaluate data thoroughly.</p> <p>Graduates will present feasible solutions.</p>	<p>Administered in selected core courses on a rotation basis, using rubric</p> <p>Administered in selected core courses on a rotation basis, using rubric</p> <p>Administered in selected core courses on a rotation basis, using rubric .</p>	<p>80% of students will score 3 or higher on a 6 point scale.</p> <p>80% of students will score 3 or higher on a 6 point scale.</p> <p>80% of students will score 3 or higher on a 6 point scale.</p>	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.”				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.”	<p>Graduates will work collectively towards team objectives.</p> <p>Graduates will demonstrate professional interpersonal relations with other team members.</p>	<p>Administered in selected core courses on a rotation basis, using rubric</p> <p>Administered in selected core courses on a rotation basis, using rubric .</p>	<p>80% of students will score 3 or higher on a 6 point scale.</p> <p>80% of students will score 3 or higher on a 6 point scale.</p>	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.”	Graduates will identify ethical issues implicit in a business situation, describe and use ethical frameworks to those business situations.	Administered in selected core courses on a rotation basis, using rubric	80% or more scoring 3 or higher on a 6 point scale.	Every semester	Annual
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## ***BS in Information Technology***

### **1. Assessment Plan**

The assessment plan for the BSIT program is provided in table 1 below.

### **2. Action Plan (Loop-Closing)**

#### **a. Report on 2014-2015 Academic Year**

The assessment for the BSIT program was not carried out in the 2014-15 academic year by assessing 3 of the 10 outcomes in the general assessment plan. The number of outcomes assessed is rather low as we are slowly building up enrollment in this program. Each of the outcomes assessed are documented below, along with the follow-up action, as required:

- (i) Outcome: Graduates will deliver a compelling oral presentation. (COM program learning outcome #4.1).

Assessment: 39 students were administered an oral assessment test with 10 traits and 96% of the student-trait scores were a 3 or better on a six point scale. The goal for this assessment is that 80% or more students will score a 3 or better on a six point scale.

Evaluation: The goal for this assessment was met.

Issue: There is no issue(s) to consider as the goal was met

Actions: The COM Assessment Committee should monitor this assessment and consider elevating the goal for the future.

Responsibility: The COM Assessment Committee and the BSIT program director are responsible for this action.

- (ii) Outcome: Graduates will write professional quality documents (COM program learning outcome #4.2).

Assessment: 3 students were administered a written assessment test with 10 traits and 93% of the student-trait scores were a 3 or better on a six point scale. The goal for this assessment is that 80% or more students score a 3 or better score on a six point scale.

Evaluation: The goal for this assessment was met.

Issue: There is no issue(s) to consider as the goal was met

Actions: The COM Assessment Committee should monitor this assessment and consider elevating the goal for the future.

Responsibility: The COM Assessment Committee and the BSIT program director are responsible for this action.

- (iii) Outcome: Graduates will analyze problems in-depth. COM program learning outcome #7.1).

Assessment: 5 students were administered an assessment test to evaluate their critical thinking abilities by using a 7 trait rubric and 77% of the student-trait scores were 3

or better on a six point scale. The goal for this assessment is that 80% or more students will score a 3 or better score on a six point scale.

Evaluation: The goal was not met. However, the deficiency is only 3 percentage point and hence does not warrant any major adjustments at this stage.

Issue: The issue here is that the goal is being missed, even though by a small margin.

While a major intervention is not necessary at this stage, we need to make sure this is a one-time anomaly.

Actions: The COM Assessment Committee should monitor the assessment of this outcome and plan for some corrective action if the goal is missed again and by a larger margin.

Responsibility: The COM Assessment Committee and the BSIT program director are responsible for this action.

#### **b. Report on Plan for 2015-2016 Academic Year**

Again, only three of the 10 objectives listed in the plan were assessed this year. While the objectives assessed were meeting or nearly meeting the prescribed goals, we have to do a better job of assessing more of the planned objectives. This will be carried out this year by the Assessment Committee. The plan this year is to assess COM program learning outcomes 7.1, 7.2, 7.3, 9.1, 9.2 and 10 in the BSIT program.

**Table 1: Assessment Plan for the BSIT**

<b>LTU Undergraduate Learning Outcomes</b>	<b>Student Outcomes*</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
<b>KNOWLEDGE IN DISCIPLINE</b> “LTU graduates will demonstrate a mastery of the knowledge base in their discipline and an expertise in solving practical and theoretical problems.”	Students will apply knowledge of core information technology concepts to professional problems	Administering the ICCP Exam once or twice a year to seniors.	80% will score 50% or higher (ACP certification) and 50% will score 70% or higher (CCP certification).	Every semester.	Annual
<b>TECHNOLOGY</b> “LTU graduates will demonstrate the ability to apply advanced technologies to practical and theoretical problems in their disciplines.”	Graduates will demonstrate a mastery of communication technology	Administered in selected core courses on a rotation basis, using rubric	80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual
<b>SUSTAINABILITY</b> "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."					
<b>COMMUNICATION</b> “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 deliver a compelling oral presentation  Graduates will write professional quality documents	Administered in selected core courses on a rotation basis, using rubric  Administered in selected core courses on a rotation basis, using rubric	80% of students will score 3 or higher on a 6 point scale.  80% of students will score 3 or higher on a 6 point scale.	Every semester	Annual
<b>MATHEMATICS</b> “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.”				Every semester	Continuously by the University

<b>READING</b> “LTU graduates will demonstrate proficiency in reading and interpreting complex, intellectually challenging texts and evaluating their analytical architecture from an independent point of view.”				Every semester	Continuously by the University
<b>SCIENTIFIC ANALYSIS</b> “LTU graduates will demonstrate critical thinking and apply analytical and problem-solving skills in scientific fields.”	Graduates will analyze problems in-depth.  Graduates will evaluate data thoroughly.  Graduates will present feasible solutions.	Administered in selected core courses on a rotation basis, using rubric Administered in selected core courses on a rotation basis, using rubric Administered in selected core courses on a rotation basis, using rubric.	80% of students will score 3 or higher on a 6 point scale.  80% of students will score 3 or higher on a 6 point scale. 80% of students will score 3 or higher on a 6 point scale.	Every semester.	Annual
<b>LEADERSHIP</b> “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.”				Every semester.	Continuously by the University
<b>TEAMWORK</b> “LTU graduates will demonstrate team-building and collaboration skills by making decisions, building consensus, resolving conflicts, and evaluating team members’ contributions.”	Graduates will work collectively towards team objectives.  Graduates will demonstrate professional interpersonal relations with other team members.	Administered in selected core courses on a rotation basis, using rubric  Administered in selected core courses on a rotation basis, using rubric.	80% of students will score 3 or higher on a 6 point scale.  80% of students will score 3 or higher on a 6 point scale.	Every Semester	Annual
<b>PROFESSIONAL ETHICS</b> “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 identify ethical issues implicit in a business situation, describe and use ethical frameworks to those business situations.	Administered in selected core courses on a rotation basis, using rubric	80% or more scoring 3 or higher on a 6 point scale.	Every semester	Annual



## ***Master of Business Administration***

### **1. Assessment Plan: MBA**

The assessment plan for the MBA program is provided in table 1 below.

### **2. Action Plan (Loop-Closing) for the MBA program**

#### **a. Report on 2014-2015 Academic Year**

Based on the close-the-loop meeting for the 2014-2015 academic year, the MBA Program assessed and evaluated the following outcome(s):

- (i) **Outcome:** Graduates will demonstrate the understanding of the knowledge, in all the disciplines of the MBA program. (COM program learning outcome #1).  
**Assessment:** 23 students in the fall of 2014 and 19 students in the spring of 2015 took the ETS Major Fields Test for MBA students. The average score in the fall of 2014 was 244 (43 percentile) and in spring of 2015 was 238 (42 percentile). However, if you combine both the terms and look for the academic year 2014-15 (both Fall & Spring terms) we get an average score of 241 (which falls in the 52 percentile).  
**Evaluation:** We are still in the process of benchmarking for this outcome. A default goal was to reach above the 50<sup>th</sup> percentile for the average score. This goal was not met in either the fall of 2014 or the spring of 2015. Surprisingly, it was met on an academic year basis (but we suspect some error here as it is not logical.)  
**Issue:** We should treat this goal as not being met and not rely on a technically meeting it on an academic basis. We should aspire to steadily increasing our performance in the future.  
**Actions:** The Assessment Committee should continue discussing among themselves as well as the rest of the faculty to find ways to improve the performance of our students in the ETS Major Field tests. The Committee will take its time to develop the strategy and then incorporate them during the course of the academic year.  
**Responsibility:** The COM Assessment Committee and the MBA program director are responsible for this action.
- (ii) **Outcome:** Graduates will deliver a compelling oral presentation. (COM program learning outcome #4.1).  
**Assessment:** 39 students from three courses were administered a test of making a presentation. 98.18% of the students scored “3” or better on a scale of 0 to 6. Further, the average score of all the students was 4.94 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, and then some.  
**Issue:** Since the goal was met, there are no issues specific to this goal.  
**Actions:** Accordingly, no actions other than continued monitoring of this goal are planned. However, we may consider pushing the goal up a notch or two.  
**Responsibility:** The COM Assessment Committee and the MBA program director are responsible for this action.

- (iii) Outcome: Graduates will demonstrate appropriate group techniques to ensure the effective performance of the team. (COM program learning outcome #5.1).  
Assessment: 10 students in two courses were administered a test of working effectively with their peers in a team work setting and 90% of the students scored “3” or better on a 6 point scale. In addition, the average score of all the students was 5.04 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.  
Issue: Since the goal was met, there are no issues specific to this goal.  
Actions: Since there are no issues to address, there is no specific actions planned with respect to this outcome. However, the Assessment Committee noted the high percentage of students meeting the raised goal of “4” or better on a 6 point scale. This tracking activity should continue till a decision on raising the goal on this outcome is made.  
Responsibility: The COM Assessment Committee and the MBA program director are responsible for this action.
- (iv) Outcome: Graduates will identify the ethical issues, develop suitable frameworks, and develop a variety of ethical alternatives for resolving the problem. (COM program learning outcome #5.3).  
Assessment: 11 students were tested by requiring them analyze a situation inter-twined with “ethical” decisions and asked to develop suitable alternatives. 95.45% of the students scored “3” or better on a 6 point scale. Also, the average score of the students computed to 4.825 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. Also, the average score of 4.85 far exceeded the “3” point out of a scale of 6.  
Issue: Since the goal was met for this outcome there are no issues with respect to this outcome.  
Actions: Accordingly, no actions other than continued monitoring of this goal are planned.  
Responsibility: The COM Assessment Committee and the MBA program director are responsible for this action.

#### **b. Report on Plan for 2015-2016 Academic Year**

As you can see, only four of the 9 objectives listed in the plan were assessed this year. That is alright as long as we assess all the objectives over a course of 2 or 3 years. The goals for all the objectives have been met. The plan for this academic year is to assess COM program learning outcomes 1, 3, 4.1, 4.2, 5.1, 5.2, and 5.3 in the MBA program.

**Table 1: Assessment Plan for MBA**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
"LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline."	Graduates will have the knowledge in all the disciplines of the MBA program.	Using the ETS major field tests in MGT 6063	Benchmark the first year	Every Semester	Annual
"LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies"	Graduates will identify business problems and opportunities that result from factors internal and external to the organization. Graduates will apply both quantitative and qualitative techniques from different disciplines to address problems and opportunities.	Administer Integration Rubric in MGT 6063 & OPM 6033, MIS 6013	80% scoring 3 or higher on the 6 point scale.	Every Semester	Annual
"LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature."	Graduates will perform a global business situation analysis, formulate effective global business strategies and evaluate them.	Administer primarily in MGT 6053, & other core courses	80% scoring 3 or higher on the 6 point scale.	Every Semester	Annual
"LTU graduates will communicate effectively using written, oral, graphical, and digital formats."	Graduates will deliver a compelling oral presentation.  Graduates will write professional quality documents.	Administer in core courses	80% scoring 3 or higher on the 6 point scale.	Every Semester	Annual
"LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics."	Graduates will demonstrate appropriate group techniques to ensure the effective performance of the team. Graduates will demonstrate effective leadership skills in a group project. Graduates will identify the ethical issues, develop suitable frameworks, and develop a variety of ethical alternatives for resolving the problem.	Administer in core courses	80% scoring $\geq 3$ on a 6 point scale.	Every Semester	Annual

## *Master of Science in Information Technology*

### **1. Assessment Plan for MSIT program**

The assessment plan for the MSIT program is provided in table 1 below:

### **2. Action Plan (Loop-Closing) for MSIT program**

#### **a. Report on 2014-2015 Academic Year**

Based on the close-the-loop meeting for the 2014-2015 academic year, the MSIT Program assessed and evaluated the following outcome(s):

- (i) Outcome: Graduates will deliver a compelling oral presentation. (COM program learning outcome #4.1).  
Assessment: 85 students in one course were administered a test of making a presentation. 97.74% of the students scored “3” or better on a scale of 0 to 6. Further, the average score of all the students was 4.534 on a 6 point scale.  
Evaluation: The goal for this objective was 75% of the students scoring a “3” or better on a 6 point scale. Hence we can consider this goal as having been met, and then some.  
Issue: Since the goal was met, there are no issues specific to this goal.  
Actions: Accordingly, no actions other than continued monitoring of this goal are planned. However, we may consider pushing the goal up a notch or two.  
Responsibility: The COM Assessment Committee and the MSIT program director are responsible for this action.
  
- (ii) Outcome: Graduates will demonstrate appropriate group techniques to ensure the effective performance of the team. (COM program learning outcome #5.1).  
Assessment: 11 students were administered a test for demonstrating their ability to work in a team setting. 85.45% of the students scored “3” or better on a 6 point scale. In addition, the average score of all the students computed to 5.074 on a 6 point scale.  
Evaluation: The goal for this objective was 75% of the students scoring a “3” or better on a 6 point scale. This goal was met, and then some.  
Issue: Since the goal was met, there are no issues to discuss.  
Actions: Since there are no issues to address, no action plan is being developed for this objective.  
Responsibility: The COM Assessment Committee and the MSIT program director are responsible for this action.

#### **b. Report on Plan for 2015-2016 Academic Year**

As you can see, only two of the 9 objectives listed in the plan were assessed this year. The reason for the lack of sufficient coverage of goals for the assessment of progress is due to the MSIT program is currently in the process of being revised and updated so that the curriculum is current with this growing field. Since the Dean and the concerned faculty would like to put the program in order first, the alignment of the assessment activity to be in line with the updated

program will follow. It is anticipated that this will be done by the end of the current academic year. The plan this academic year is to assess COM program learning outcomes 4.1, 4.2, 5.1, 5.2, and 5.3 in the MSIT program.

**Table 1: Assessment Plan for MSIT**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop- Closing Timeline</b>
“LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.”	Graduates will have the knowledge in all the disciplines of the MSIS program.	Administering the ICCP Exam in MIS 7593.	80% will score 50% or higher (ACP certification) and 50% will score 70% or higher (CCP certification).	Every Semester	Annual
“LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies”	Graduates will identify business problems and opportunities that result from factors internal and external to the organization. Graduates will apply both quantitative and qualitative techniques from different disciplines to address problems and opportunities.	Administer Integration rubric in MIS 6123 and MIS 6143	80% scoring 3 or higher on the 6 point scale.	Every Semester	Annual
“LTU graduates will evaluate scholarly literature and, in accordance with their course of study, contribute to the literature.”	Graduates will perform a global business situation analysis, formulate effective global business strategies and evaluate them.	Administer MIS 7463	80% scoring 3 or higher on the 6 point scale.	Every Semester	Annual
“LTU graduates will communicate effectively using written, oral, graphical, and digital formats.”	Graduates will deliver a compelling oral presentation.  Graduates will write professional quality documents.	Administer in core courses	80% scoring 3 or higher on the 6 point scale.	Every Semester	Annual
“LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.”	Graduates will demonstrate appropriate group techniques to ensure the effective performance of the team. Graduates will demonstrate effective leadership skills in a group project. Graduates will identify the ethical issues, develop suitable frameworks, and develop a variety of ethical alternatives for resolving the problem.	Administer in core courses	80% scoring $\geq 3$ on a 6 point scale.	Every Semester	Annual

## *Doctor of Business Administration*

### **1. Assessment Plan for the DBA program**

The assessment plan for the DBA program is given in Table 1 below.

### **2. Action Plan (Loop-Closing) for the DBA program**

#### **a. Report on 2014-2015 Academic Year**

Based on the close-the-loop meeting for the 2014-2015 academic year, the DBA Program assessed and evaluated the following outcome(s):

**(i) Outcome: Assess the ability of the students to successfully plan and conduct applied research and understand the contribution and application of research to management (LTU Grad outcome #1.1 and #1.2).**

Assessment: Students are provided the *Doctoral Dissertation Planning Model* with criteria and outcomes to assess a quality proposal for DIS 8113-8133 and for dissertation DIS 8143-8183.

Evaluation: The goal for this objective was 80% of the students successfully defend proposal at first or second time with acceptable rating and only minor corrections. This is required for all students prior to moving to the dissertation research. Based on the data provided, this goal was met. In addition, 100% of students must successfully defend dissertation with an acceptable rating or contingent upon changes by committee.

Issue: Given AACSB Assurance of Learning, we are creating a *Proposal/Dissertation Evaluation Rubric* to ensure that the committee is holding the student to high quality proposals and dissertations. A draft of this document is included at the end of this report. This new document aligns with the *Doctoral Dissertation Planning Model* and *Doctoral Dissertation Guidelines*.

Actions: The *Proposal/Dissertation Evaluation Rubric* will be reviewed by the doctoral faculty in fall 2014 and implement in late fall or early 2015.

Responsibility: The COM Assessment Committee and the DBA program director are responsible for this action.

**(ii) Outcome: Assess the ability of the students to critically evaluate qualitative data in the field of their interest (LTU Grad outcome #2.2a).**

Assessment: Nine students were administered a test of evaluating a qualitative research article and 88% of the students scored 4 or higher on a 6 point rubric D3.

Evaluation: The goal for this objective was 80% of the students to score 4 or higher on a 6 point rubric D3. Based on the data provided, this goal was met.

Issue: None

Actions: The RES 7023: Qualitative Research Course was updated with all new texts when taught in winter 2014.

Responsibility: The COM Assessment Committee and the DBA program director are responsible for this action.

**(iii) Outcome: Assess the ability of the students to critically evaluate quantitative research in the field of their interest (Grad Outcome #2.2b).**

Assessment: Four students were administered a test of evaluating a quantitative article and 100% of the students scored 4 or higher on a 6 point rubric D4.

Evaluation: The goal for this objective was 80% of the students to score 4 or higher on a 6 point rubric D4. This goal was met.

Issue: Since the goal was met, there are no issues specific to this goal.

Actions: Accordingly, no actions other than continued monitoring of this goal are planned.

Responsibility: The COM Assessment Committee and the DBA program director are responsible for this action.

**(iv) Outcome: Assess the ability of the students to write a high quality “Qualifying Paper” (QP) (Grad Outcome #3).**

Assessment: Five students were administered a test of writing a “Qualifying Paper” and 100% of the students scored an “Acceptable” rating, all of who were writing this for the first time. Of the five students, three students were given 30 day window to do minor edits and make sure QP adhered to APA Style – Sixth edition.

Evaluation: The goal for this objective was 80% of the students to score an “Acceptable” in their 1<sup>st</sup> or 2<sup>nd</sup> attempt. This goal was met.

Issue: Since the goal was met, there are no issues specific to this goal.

Actions: Accordingly, no actions other than continued monitoring of this goal are planned. The faculty can request a 30-day window to do basically style revisions.

Responsibility: The COM Assessment Committee and the DBA program director are responsible for this action.

- (v). The Three Year Academic Program Planning and Review (APPR) was completed and final version submitted on April 21, 2014. As it relates to our annual assessment report continuous improvements are made in all the research courses (RES 7013, 7023, 7033, and 7043) to make sure the students are understanding the rigors of quantitative and qualitative designs and methods in particular as it relates to the use of hands-on statistical analysis software, theory construction, and model-building.

A survey was completed with our alumni in December 2013, and several suggested to increase the rigor of the research courses and make sure there is adequate research and writing based on scholarly literature in the program. There is also an Appendix B in this report that lists DBA Alumni and Students’ Accomplishments. Twenty-five % of our students are engaging in peer-reviewed scholarship.

**b. Report on Plan for 2015-2016 Academic Year**

Follow the assessment plan in Table 1.



**Table 1: Assessment Plan for DBA**

<b>University Graduate Learning Outcomes</b>	<b>Supporting Program Learning Objectives</b>	<b>Assessment Tools</b>	<b>Metrics/ Indicators</b>	<b>Administration Timeline</b>	<b>Loop-Closing Timeline</b>
“LTU graduates will apply and, in accordance with their course of study, develop advanced knowledge within their discipline.”	Successfully plan and conduct applied research to address problems or issues arising from the practice of management. Understand the contribution of research to the practice of management, and can critically review, interpret, and apply theoretical and empirical findings to improve the practice of management.	Administer to each Dissertation Proposal using Evaluation Rubric Administer to each Dissertation using Rubric	80% of students successfully defend proposal at first or second defense with acceptable rating and only minor corrections 80% of students will successfully defend dissertation with acceptable rating and only minor corrections needed	Every Semester	Annual
“LTU graduates will analyze and interpret information and implement decisions using the latest techniques and technologies”	Demonstrate ability to review and select appropriate research design and methods for applied research projects. Review and evaluate a scholarly qualitative article. Review and evaluate a scholarly quantitative article.	Administer to each Dissertation Proposal using Evaluation Rubric Administer in RES 7023 – Qualitative Article Review, when it is taught, using Rubric Administer in RES 7033 – Quantitative Article Review, when it is taught, using Rubric	80% of students successfully defend proposal at first or second defense with acceptable rating and only minor corrections 80% of students score 4 or higher on the 6 point qualitative article review rubric 80% of students score 4 or higher on the 6 point quantitative article review rubric .	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 a research topic. Undertake research of a quality that is acceptable for publication in peer-reviewed journal, conference proceedings and other publication outlets (such as handbooks, case studies) that make a contribution to the practice of management.	Administer to each Qualifying Paper (QP), using Rubric  Track Peer-reviewed Publication Record of all the students in the program using the Annual Scholarship survey.	80% of students achieve acceptable rating on QP Rubric at first or second submission 25% of students/alumni achieve peer-reviewed publication or presentation within 24 months of graduation	Every Semester	Annual
“LTU graduates will communicate effectively using written, oral, graphical, and digital formats.”	Demonstrate the ability to present concepts and analyses through graphical and digital formats. Demonstrate the ability to communicate effectively using professionally written quality documents.	Oral Presentation Rubric in selected courses Written Presentation Rubric in selected courses	80% of students at 85% or higher on rubric 80% of students at 90% or higher on rubric	Every Semester	Annual
“LTU graduates will develop a broad perspective on professional issues, such as lifelong learning, sustainability, leadership, and ethics.”	Analyze and assess the impact of leadership behavior on interpersonal relationships and organization performance along with a greater sensitivity of their decisions on effectively leading change.	Administer in MGT 8073 – Change Leadership Self- Assessment Rubric Administer in MGT 8013 – 360 Evaluation, using Rubric Annual Self-Report of Scholarly and Professional Activities in sustainability, leadership, and ethics	At least 75% of students in the course will achieve 80% or higher on each assignment rubric Overall activity reporting for each entering cohort increases each year by at least 20%	Every Semester	Annual