Senate Forum
Assessment Program & Process
December 5, 2013

Assessment Council
ASSESSMENT COUNCIL 2013-4

Chair Christa Walck, Associate Provost
COE Leonard Bohmann, Associate Dean
    Brian Barkdoll (Civil & Env. Eng.)
CSA John Jaszczak, Associate Dean
    Karla Kitalong (Humanities)
SBE Dean Johnson
SOT John Irwin
SFRES Andrew Storer
St Aff Beth Lunde
Lib Ellen Marks
CTL Jean DeClerck
The BIG picture

• HLC expects a more robust assessment system and evidence → we need HLC accreditation
• It’s more work for us, but it’s worth it
• We need to work together
• Standardization and consistency make results more credible
• We don’t assess everything every year, but we plan for what will be assessed and when
• Assessment is about STUDENT LEARNING, not faculty evaluation
Assessment Council

- Degree Programs
- Goal Committees
- Gen Ed Council
- Student Affairs

- Review Results & Give Feedback
- BOC-Acad. Aff.
- Provost
- Senate
Assessment Council

- Reviews all assessment results annually and provides feedback for improvement
  - Degree program reports
  - Gen Ed Council reports
  - Student Affairs reports
  - NSSE and other survey data
- Monitors how the assessment system is working and recommends improvements
- Works with CTL to support assessment
- Keeps records and generates reports
- Reports results and recommendations to Senate, Deans, Provost, BOC
Four Questions

1. What is assessment?
2. Why are we doing assessment?
3. How are we doing assessment?
   – General Education Assessment
   – Degree Program Assessment
   – Professional Accreditation
4. What support is available for assessment?
What is assessment?

The systematic collection of evidence of student learning in order to take action to improve.

Diagram:

1. Establish learning goals
2. Gather evidence
3. Analyze evidence
4. Take action
5. Reassess

Michigan Tech
Create the Future
Why are we doing assessment?

Accountability

External accountability – outcomes oriented

– Threats
  • We do not want U.S. Department of Education to expand NCLB to higher ed.
  • We do not want state legislatures to tie funding to test scores.

– Response of accreditors = emphasize assessment of student learning

Internal accountability – improve student learning
HLC requires it – we are on the edge...

- Required for federal student aid
- Necessary for ABET/AACSB/SAF professional accreditation
- Unlikely we would get federal research funding without it
Isn’t ABET enough? No.

- HLC 1P2c O While it is positive that MTU recognizes the independence of its programs to determine learning outcomes, academic assessment at Michigan Technological University may be strengthened by sharing best practices in assessment between units and developing a common framework and protocol that may enable regular, system-wide assessment to occur and ensure that institutional objectives are reached.
Isn’t ABET enough? No.

- HLC 1P17 O Currently, assessment of student learning at Michigan Technological University has focused on program review and has been unit driven. Though program assessment of culminating work, where used, is an important aspect of ensuring student learning, Michigan Technological University has an opportunity to correlate student achievement of learning and development objectives across all units, thus ensuring that student achievement of expected (institutional) learning outcomes is central to awarding of a degree.
HLC’s New **Criteria**

More emphasis on teaching, learning, and assessment of student learning.

<table>
<thead>
<tr>
<th>New Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mission</td>
</tr>
<tr>
<td>2. Integrity: Ethical and Responsible Conduct</td>
</tr>
<tr>
<td>3. <strong>Teaching and Learning: Quality, Resources and Support</strong></td>
</tr>
<tr>
<td>4. <strong>Teaching and Learning: Evaluation and Improvement</strong></td>
</tr>
<tr>
<td>5. Resources, Planning, and Institutional Effectiveness</td>
</tr>
</tbody>
</table>
HLC Criteria 3 & 4

Student achievement of institutional learning goals is central to awarding of a degree.

- Learning goals for all degree programs.
- Learning goals for undergraduate general education.
- Effective processes for assessment of student learning and achievement of learning goals.
- Methodologies that reflect good practice, including substantial participation of faculty.
Four Questions

1. What is assessment?
2. Why are we doing assessment?
3. How are we doing assessment?
   – Degree Program Assessment
   – General Education Assessment
   – Professional Accreditation
4. What support is available for assessment?
How are we doing assessment?

• First we put a **program** into place - a “common framework...to ensure institutional objectives are met.”
  - USLGs
  - LEAP rubrics → Michigan Tech USLG rubrics
  - Goal Committees

• Then we put a **process** into place for “regular, system-wide assessment.”
  - Annual assessment reports
  - Gen Ed Assessment
University Student Learning Goals

- Established in 2011 in response to HLC concerns
- Require assessment to assure achievement

1. Disciplinary Knowledge (aka Degree Program Goals)
2. Knowledge of Physical and Natural World
3. Global Literacy and Knowledge of Human Culture
4. Critical and Creative Thinking
5. Communication
6. Information Literacy
7. Technology
8. Values and Civic Engagement
Why are there EIGHT goals?

When we compared

– University strategic goals
– ABET a-k
– AACSB & SAF objectives
– LEAP Essential Learning Outcomes (for CSA)

these were the goals that were consistently important for all students to succeed.
All Michigan Tech Students should achieve these goals to graduate.

This will require collective effort.

- General Education Program AND
- Degree Programs
  - disciplinary goals
  - opportunities to practice and improve competencies developed in general education AND
- Student Affairs programming
  - co-curricular opportunities to practice and improve competencies.
Why are we using **LEAP VALUE** rubrics to assess USLGs?

– Provide a common, consistent framework for assessment of USLGs across disciplines.
– Assess work students produce as a part of their curriculum
– Validated by AAC&U: A *faculty-developed response* to concerns about higher education quality raised by DOE
– Used nationwide at 1000 institutions.
– Can adapt these rubrics → Michigan Tech rubrics
– Can map existing rubrics onto these rubrics.
What is a rubric? Sample Communication Rubric

Written communication is the development and expression of ideas in writing. Written communication involves learning to work in many genres and styles. It can involve working with many different writing technologies, and mixing texts, data, and images. Written communication abilities develop through iterative experiences across the curriculum.

<table>
<thead>
<tr>
<th>Levels are cumulative so that the Capstone level incorporates achievements at levels 1-3</th>
<th>Beginning Level 1</th>
<th>Developing Level 2</th>
<th>Proficient Level 3</th>
<th>Exemplary Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context of and Purpose for Writing</strong></td>
<td>Demonstrates minimal attention to context, audience, purpose, or task</td>
<td>Demonstrates awareness of context, audience, purpose, and task</td>
<td>Demonstrates adequate consideration that aligns work to considerations of audience, context, purpose, and task</td>
<td>Demonstrates a thorough understanding that focuses all elements of the work.</td>
</tr>
<tr>
<td><strong>Organization and Conventions</strong></td>
<td>Develop unclear or inconsistent organizational pattern; shows little awareness of genre and disciplinary conventions</td>
<td>Develop organizational pattern unevenly; follows disciplinary or task expectations at a basic level of understanding</td>
<td>Develop recognizable organizational pattern that structures the whole work; uses disciplinary or task conventions consistently</td>
<td>Develop organizational pattern that enhances flow and cohesiveness through the whole work; demonstrates detailed attention to and successful execution of disciplinary or task conventions</td>
</tr>
<tr>
<td><strong>Content Development</strong></td>
<td>Is simplistic in some parts of the work</td>
<td>Is appropriate through most of the work</td>
<td>Is compelling through the whole work</td>
<td>Demonstrates subject mastery</td>
</tr>
<tr>
<td><strong>Sources and Evidence</strong></td>
<td>Minimally supports ideas in the writing</td>
<td>Demonstrates an attempt to use credible and/or relevant sources</td>
<td>Demonstrates consistent use of credible, relevant sources</td>
<td>Demonstrates skillful use of high-quality, credible, diverse, and relevant sources</td>
</tr>
<tr>
<td><strong>Control of Syntax and Mechanics</strong></td>
<td>Language use impedes meaning because of errors.</td>
<td>Appropriate language use that conveys meaning although may have noticeable errors.</td>
<td>Straightforward language use that clearly conveys meaning with few errors.</td>
<td>Skillful language use to communicate meaning with clarity and fluency and virtually error-free.</td>
</tr>
</tbody>
</table>
Goal Committees

Goal Committees are being established for each USLG (except Goal 1 Disciplinary).

• Faculty from multiple disciplines with expertise or interest in goal

• Tasks:
  – Adapt LEAP rubric for Michigan Tech
  – Provide support – Canvas course, workshops
  – Conduct assessment of General Education
  – Sample evidence of achievement of all students from orientation to graduation
Goal committees will use samples of student work to chart student progress on learning goals.
So, if this is where we are going (achieve learning goals), how will we get there? And, how will we know we got there?

Assessment Process
We are still developing our assessment process...
Degree Program Assessment Process

Degree programs assess **two goals** each year.

- **One** goal is chosen by program
- **One** USLG is designated by Assessment Council for all programs → use USLG (adapted LEAP) rubric
- Emphasis on **embedded, direct** assessment of USLGs – use student work in a required course
- Program faculty determine: Was target met? What actions will be taken?
- Annual report sent to Assessment Council for review and feedback
## Annual Assessment Report

<table>
<thead>
<tr>
<th>LEARNING GOALS</th>
<th>ASSESSMENT ACTIVITY</th>
<th>WHEN?</th>
<th>RESULTS 1</th>
<th>ACTION PLANNED WHEN?</th>
<th>RESULTS 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Date:</td>
<td></td>
<td>Date:</td>
</tr>
<tr>
<td>Type:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>__ Course Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>__ Other Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>__ Indirect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brief description:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Goal:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Date:</td>
<td></td>
<td>Date:</td>
</tr>
<tr>
<td>Type:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>__ Course Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>__ Other Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>__ Indirect</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brief description:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University Goal:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Degree Program Assessment Process

Campus-wide USLG schedule:

- 2013-14  Communication
- 2014-15  Global Literacy & Human Culture
- 2015-16  Information Literacy
- 2016-17  Critical Thinking
- 2017-18  Values & Civic Engagement

Note: Degree programs should provide opportunities for students to practice and apply these competencies.

Goal Committee role

- May ask for evidence from degree programs and assess evidence for achievement across multiple years and disciplines
Feedback on Assessment Reports

All programs will receive feedback from Assessment Council using a simple **rubric**.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Score</th>
<th>Explicit</th>
<th>Measurable/Observable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning Goal</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A learning goal specifies what students will know or be able to do when they graduate from the academic degree program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td></td>
<td>Explicitly defines what student will know or do</td>
<td>Describes an observable and measurable behavior or product</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td></td>
<td>Does not explicitly define what students will know or do; states a broad outcome that needs to be further specified</td>
<td>Describes a potentially observable and measurable behavior or product</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td></td>
<td>Unclear or incorporates multiple outcomes</td>
<td>Describes something for which it is difficult to collect evidence</td>
</tr>
<tr>
<td><strong>1</strong></td>
<td></td>
<td>No learning goals, or focusses on program mission or processes</td>
<td>Does not identify something observable or measurable</td>
</tr>
</tbody>
</table>
GENERAL EDUCATION

The General Education program has adopted six USLGs:

– 2 Knowledge of Physical and Natural World
– 3 Global Literacy and Knowledge of Human Culture
– 4 Critical and Creative Thinking
– 5 Communication
– 6 Information Literacy
– 8 Values and Civic Engagement
General Education Assessment Process

- Goals are mapped onto Gen Ed program
  - Four core courses – Goals 3, 4, 5, 6, 8
  - HASS – Goals 3, 4, 5, 8
  - STEM – Goal 2

- Goal Committees will conduct the assessment of student work for that goal every year
  - Collect evidence of student achievement
  - Invite faculty teaching the courses to participate in assessment activity \( \rightarrow \) identify actions to improve
  - Reassess to close the loop
# Learning Goals

<table>
<thead>
<tr>
<th>GOALS</th>
<th>1 Disciplinary</th>
<th>2 Natural/Physical World</th>
<th>3 Global/Culture</th>
<th>4 Crit/Creat. Think</th>
<th>5 Comm</th>
<th>6 Info Lit</th>
<th>7 Tech</th>
<th>8 Values &amp; Civic Eng.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gen Ed Program</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Degree Program</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>Discipline</td>
<td>General Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Affairs</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Four Questions

1. What is assessment?
2. Why are we doing assessment?
3. How are we doing assessment?
   – General Education Assessment
   – Degree Program Assessment
   – Professional Accreditation
4. What support is available for assessment?
What support is available for assessment?

• Instructional Design & Assessment Specialist
  Jean DeClerck, jsdecker@mtu.edu
  - writing learning goals
  - developing curriculum maps
  - designing assignments for assessment
  - adapting rubrics
  - interpreting feedback

• Assessment Website: www.mtu.edu/assessment

• USLG Canvas Course:
  https://mtu.instructure.com/courses/837596

• CTL Workshops – announced in Tech Today

• COE – Leonard Bohmann, Associate Dean ljbohman@mtu.edu
  CSA – John Jaszczak, Associate Dean jazsczak@mtu.edu
A few more FAQs...
What about ABET?

A group is now working on how to align and integrate ABET assessment and University assessment.

- USLGs were created to align with ABET a-k
- Minimize duplication of effort
- Strengthen evidence for ABET reporting of “generalized”
- Chair – Jean Kampe, Engineering Fundamentals
Why do I need learning goals on my syllabus?

• So students will know your expectations
• So it is clear to reviewers how your course meets learning goals in your degree program or general education
Who assesses student work?

- Faculty in degree programs assess work in degree programs
- Faculty in goal committees and faculty teaching gen ed courses assess work in gen ed courses
What about confidentiality?

- Names of students and instructors are stripped from student work prior to assessment.
- All syllabi should have this link: http://www.admin.mtu.edu/usenate/policies/p312-1.htm

Student work products (exams, essays, projects, etc.) may be used for the purposes of university, program, or course assessment. All work used for assessment purposes will not include any individual student identification.
THANK YOU!

- Assessment webpage: http://www.mtu.edu/assessment/
- University Student Learning Goal Help Resources https://mtu.instructure.com/courses/837596
- HLC Criteria
  - HLC direct link http://www.hlcommission.org/Information-for-Institutions/criteria-and-core-components.html
For more information, read on.
<table>
<thead>
<tr>
<th>Year</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-11</td>
<td>Assessment Council reconvened and reconstituted to address AQIP/accreditation assessment deficiencies.</td>
</tr>
<tr>
<td></td>
<td>Assessment and Gen Ed Councils jointly developed USLGs – approved by President June 2011.</td>
</tr>
<tr>
<td>2011-12</td>
<td>Assessment Council conducted workshops on assessment.</td>
</tr>
<tr>
<td></td>
<td>College of Sciences &amp; Arts established program learning goals.</td>
</tr>
<tr>
<td></td>
<td>AQIP Quality Checkup March 2012 – reaffirmation August 2012.</td>
</tr>
<tr>
<td>2012-3</td>
<td>College of Sciences &amp; Arts assessed selected program learning goals.</td>
</tr>
<tr>
<td></td>
<td>Annual Assessment Reporting for all degree programs now required.</td>
</tr>
<tr>
<td></td>
<td>Schedule of assessment of non-disciplinary learning goals is published: Communication in 2013-4.</td>
</tr>
<tr>
<td></td>
<td>Communication &amp; Global Learning Committees established.</td>
</tr>
<tr>
<td></td>
<td>AAC&amp;U LEAP rubrics begin to be adapted for Michigan Tech assessment.</td>
</tr>
</tbody>
</table>
A little history...

<table>
<thead>
<tr>
<th>Year</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-4</td>
<td>Associate Dean for Undergraduate Education with responsibility for assessment is appointed in College of Sciences &amp; Arts.</td>
</tr>
<tr>
<td></td>
<td>Assessment specialist is hired for Jackson Center for Teaching &amp; Learning.</td>
</tr>
<tr>
<td></td>
<td>Workshops &amp; Coffee Chats on assessment.</td>
</tr>
<tr>
<td></td>
<td>New Website on Assessment at Michigan Tech: <a href="http://www.mtu.edu/assessment">www.mtu.edu/assessment</a></td>
</tr>
<tr>
<td></td>
<td>Information Literacy Committee established. Planning to establish Goal Committees for</td>
</tr>
<tr>
<td></td>
<td>• Knowledge of Physical and Natural Sciences</td>
</tr>
<tr>
<td></td>
<td>• Critical and Creative Thinking</td>
</tr>
<tr>
<td></td>
<td>• Values and Civic Engagement</td>
</tr>
<tr>
<td></td>
<td>Aligned General Education program with USLGs.</td>
</tr>
</tbody>
</table>
HLC – 2009 AQIP Evaluation of our Systems Portfolio for Cat. 1 “Helping Students Learn”

O = Opportunity (aka weakness)

• 1P1b O The General Education program underwent significant revision about ten years ago and was to be reviewed periodically. However, there is no indication of a systematic review process being established. There is an opportunity here to put into place a formal review process for the General Education program. Regularly scheduled reviews may offer an opportunity to address relevant matters in a more timely manner.

• 1P2c O While it is positive that MTU recognizes the independence of its programs to determine learning outcomes, academic assessment at Michigan Technological University may be strengthened by sharing best practices in assessment between units and developing a common framework and protocol that may enable regular, system-wide assessment to occur and ensure that institutional objectives are reached.
HLC – 2009 AQIP Evaluation of Cat. 1
“Helping Students Learn”

O = Opportunity (aka weakness)

• 1P17 O Currently, assessment of student learning at Michigan Technological University has focused on program review and has been unit driven. Though program assessment of culminating work, where used, is an important aspect of ensuring student learning, Michigan Technological University has an opportunity to correlate student achievement of learning and development objectives across all units, thus ensuring that student achievement of expected (institutional) learning outcomes is central to awarding of a degree.

• 1I2b O While the institution declares its commitment to creating a culture in which students learn, it has an opportunity to clearly identify improvements in culture and infrastructure based on appropriate data for improved performance results for helping students learn.
HLC – 2009 AQIP Evaluation of Cat. 1 “Helping Students Learn”

O = Opportunity (aka weakness)

- 1P18b O  Michigan Technological University indicates that they have a faculty driven process for assessing student learning at the course, program and General Education level, however, no examples or specific information is provided to fully explain these processes.

- 1R3b OO  While there are noteworthy efforts being made to assess student learning in the colleges of engineering and technology, there is no evidence to indicate that the other three colleges have similar or comparable initiatives in place at this time. The institution should look at how to develop similar tools for the non-nationally assessed disciplines.
# How we developed USLGs

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grounded in science, engineering, technology, sustainability, the business of innovation, and an understanding of the social and cultural contexts of our contemporary world</td>
<td>Knowledge</td>
<td>Knowledge of broad range of topics and disciplines complementary to their major</td>
<td>apply knowledge of mathematics, science, and engineering</td>
<td>Appropriate mastery of the knowledge, techniques, skills, and modern tools of their Disciplines</td>
<td>technical skills and subject areas</td>
<td>Use of information technology</td>
<td>Disciplinary Knowledge</td>
</tr>
<tr>
<td>Cultivate intellectual diversity and a worldview adapted to the needs and challenges of the 21st century</td>
<td>Human Cultures</td>
<td>Knowledge of human cultures</td>
<td>Knowledge of contemporary issues</td>
<td>Knowledge of contemporary issues</td>
<td>cultural awareness</td>
<td>Knowledge of human cultures and the physical and natural world</td>
<td>Knowledge of human cultures</td>
</tr>
<tr>
<td>Develop students’ global skills through study of other languages and cultures</td>
<td>Physical &amp; Natural World</td>
<td>Modes of inquiry – assumptions, methods, values and goals of…</td>
<td>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</td>
<td>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</td>
<td>apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology</td>
<td>Dynamics of the global economy</td>
<td>Global Literacy</td>
</tr>
<tr>
<td>Encourage participation in international experiences</td>
<td>Sciences</td>
<td>Literature and language Visual arts…</td>
<td>conduct, analyze and interpret experiments</td>
<td>apply creativity in the design of systems, components, or processes</td>
<td>conduct, analyze and interpret experiments</td>
<td>Multicultural and diversity understanding</td>
<td>Critical &amp; Creative Thinking</td>
</tr>
<tr>
<td>Understand, develop, apply, manage and communicate science and technology</td>
<td>Mathematics</td>
<td>Social and behavioral analysis Economic institutions</td>
<td>use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td>Mathematics content must provide students with the skills to solve technical problems</td>
<td>use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td>Prepare for a business environment that is global in scope</td>
<td>Communication</td>
</tr>
<tr>
<td>Prepare students to create the future</td>
<td>Natural and physical science</td>
<td>Epistemology and cognition Ethics and moral philosophy Historical studies</td>
<td>conduct, analyze and interpret experiments</td>
<td>apply creativity in the design of systems, components, or processes</td>
<td>conduct, analyze and interpret experiments</td>
<td>Global, environmental, political, economic, legal and regulatory context for business</td>
<td>Information Literacy</td>
</tr>
<tr>
<td>Distinctive and rigorous discovery-based learning experience</td>
<td>Mathematical modeling and problem solving in sciences, math, engineering, economics, computer science</td>
<td>Modes of inquiry – assumptions, methods, values and goals of…</td>
<td>use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td>Mathematics content must provide students with the skills to solve technical problems</td>
<td>use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td>Global, environmental, political, economic, legal and regulatory context for business</td>
<td>Technology</td>
</tr>
<tr>
<td>New and emerging interdisciplinary areas</td>
<td>Quantitative skills</td>
<td>Knowledge of contemporary issues</td>
<td>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</td>
<td>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</td>
<td>use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
<td>Values and Civic Engagement</td>
<td>Engagement with big questions, both contemporary and enduring</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>Statistical techniques</td>
<td>Knowledge of broad range of topics and disciplines complementary to their major</td>
<td>apply knowledge of mathematics, science, and engineering</td>
<td>apply knowledge of mathematics, science, and engineering</td>
<td>apply knowledge of mathematics, science, and engineering</td>
<td>Social Sciences/Humanities: understanding of diversity and the global and societal impacts of technology.</td>
<td>Michigan Tech Learning Goals</td>
</tr>
</tbody>
</table>
## How we developed USLGS

<table>
<thead>
<tr>
<th><strong>Michigan Tech Goals and Strategic Plan</strong></th>
<th><strong>LEAP Categories &amp; Essential Learning Outcomes</strong></th>
<th><strong>Michigan Tech General Education Goals 1998</strong></th>
<th><strong>ABET Eng</strong></th>
<th><strong>ABET Eng Tech</strong></th>
<th><strong>SAF</strong></th>
<th><strong>AACSB</strong></th>
<th><strong>Michigan Tech Learning Goals</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare students to create the future</td>
<td>Intellectual and Practical Skills</td>
<td>Fundamental scholastic habits of careful reading, communication, critical reasoning, balance, analysis and argument.</td>
<td>design and conduct experiments, as well as to analyze and interpret data</td>
<td>apply creativity in the design of systems, components, or processes</td>
<td>Oral and written Communication.</td>
<td>Communication abilities and Analytical skills</td>
<td>Communicate effectively oraly and in writing to a wide variety of audiences</td>
</tr>
<tr>
<td>Understand, develop, apply, manage and communicate science and technology</td>
<td>Critical &amp; creative thinking</td>
<td>Critical and argument Intellectual habits and values: the nature of inquiry, evidence and informed reasoning critical reasoning etc.</td>
<td>communicate effectively function on multidisciplinary teams</td>
<td>communicate effectively function effectively on teams</td>
<td>Human behavior: leadership; team building and dynamics;</td>
<td>Reflective thinking skills Problem-solving abilities</td>
<td>Work effectively in groups</td>
</tr>
<tr>
<td>Innovate</td>
<td>Inquiry &amp; analysis Written &amp; oral communication</td>
<td>Learning as a social process Skills: DM, goal setting, communication, problem solving</td>
<td>identify, formulate, and solve engineering problems engage in life-long learning</td>
<td>identify, analyze and solve technical problems engage in lifelong learning</td>
<td>Statistical data analysis &amp; decision-making</td>
<td>Ethical understanding and reasoning abilities</td>
<td>[critical thinking: understand broad impacts analyze reason logic use evidence reflective synthesize creative]</td>
</tr>
<tr>
<td>Enhance communication skills...and creative processes</td>
<td>Quantitative literacy Information literacy</td>
<td>Respect for diversity and awareness of complex contexts of their study and work</td>
<td>Design a system ... within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Understand professional, ethical and social responsibilities respect for diversity and a knowledge of contemporary professional, societal and global issues</td>
<td>Environmental ethics and values</td>
<td>Ethical understanding and reasoning abilities</td>
<td>Be able to address moral and ethical questions</td>
</tr>
<tr>
<td>Strong leadership and team-building capabilities, critical thinking skills</td>
<td>Teamwork &amp; problem solving</td>
<td>Understanding the whole person - wellness education</td>
<td>Design a system ... within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Understand professional, ethical and social responsibilities respect for diversity and a knowledge of contemporary professional, societal and global issues</td>
<td>Be able to address moral and ethical questions</td>
<td>Ethical understanding and reasoning abilities</td>
<td>Be able to address moral and ethical questions</td>
</tr>
<tr>
<td>Prosperous, sustainable world</td>
<td><strong>Personal and Social Responsibility</strong></td>
<td>Moral and ethical reasoning Environmental awareness Social and cultural awareness</td>
<td>Design a system ... within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Understand professional, ethical and social responsibilities respect for diversity and a knowledge of contemporary professional, societal and global issues</td>
<td>Be able to address moral and ethical questions</td>
<td>Ethical understanding and reasoning abilities</td>
<td>Be able to address moral and ethical questions</td>
</tr>
<tr>
<td>Ethical awareness</td>
<td>Civic knowledge &amp; engagement</td>
<td>Environmental awareness Social and cultural awareness</td>
<td>Design a system ... within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Understand professional, ethical and social responsibilities respect for diversity and a knowledge of contemporary professional, societal and global issues</td>
<td>Be able to address moral and ethical questions</td>
<td>Ethical understanding and reasoning abilities</td>
<td>Be able to address moral and ethical questions</td>
</tr>
<tr>
<td>Leadership Service</td>
<td>Intercultural knowledge &amp; competence</td>
<td>Environmental awareness Social and cultural awareness</td>
<td>Design a system ... within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Understand professional, ethical and social responsibilities respect for diversity and a knowledge of contemporary professional, societal and global issues</td>
<td>Be able to address moral and ethical questions</td>
<td>Ethical understanding and reasoning abilities</td>
<td>Be able to address moral and ethical questions</td>
</tr>
<tr>
<td>Civic responsibility and connections to public policy issues</td>
<td>Ethical reasoning &amp; action Foundations and skills for lifelong learning</td>
<td>Environmental awareness Social and cultural awareness</td>
<td>Design a system ... within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability</td>
<td>Understand professional, ethical and social responsibilities respect for diversity and a knowledge of contemporary professional, societal and global issues</td>
<td>Be able to address moral and ethical questions</td>
<td>Ethical understanding and reasoning abilities</td>
<td>Be able to address moral and ethical questions</td>
</tr>
<tr>
<td>Foster economic growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Underst</td>
</tr>
</tbody>
</table>
Michigan Tech’s Assessment Program

– General Education - 6 USLGs
– Degree Program Goals
  • College of Engineering – ABET
  • School of Technology – ABET
  • School of Business & Economics – AACSB
  • School of Forest Resources & Environmental Sciences - SAF
  • College of Sciences & Arts – new program goals 2012/3
– Course Goals
  • Senate → Course Syllabus requirement includes learning outcomes/objectives and IRB assessment language
  • Should map onto Program Goals or Gen Ed Goals
– Student Affairs Learning Outcomes
Michigan may become a LEAP state

American Association of College & Universities (AAC&U) developed LEAP program (Liberal Education & America’s Promise)

- LEAP Campus Network – Michigan Tech is a LEAP Campus
- LEAP States Initiative – Michigan Tech is working with other Michigan public universities to make Michigan a LEAP state
  - Coordinated workshops
  - Share resources
  - Benchmarking Opportunity