Montana Tech: Annual Program Review

Department: Freshmen Engineering


Assessment Committee Review: Summer 2016
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1 FRESHMAN ENGINEERING PROGRAM (FEP) BACKGROUND

The Freshman Engineering Program (FEP) at Montana Tech started Fall semester 2014. The process of establishing the program began a number of years earlier and was spearheaded by the Dean of School of Mines and Engineering (SME). Montana Tech administration finally agreed to commit resources and a director was hired to establish the program.

Prior to FEP, incoming students interested in engineering chose one of the nine engineering programs as a major on day one. Students were then assigned an advisor from the department of the chosen major. Engineering departments typically offered one or two 1 credit introductory courses to introduce students to that major and the students were also required to take a 3 credit Introduction to Engineering (EGEN 101) class covering the basic skills required for engineering students.

Two primary motivations for establishing FEP were

1. Improving the advising process and
2. Increasing retention rates of beginning engineering students.

To help meet these objectives, individual department curricula were modified. In place of the typical two 1 credit departmental introductory courses, two new courses (EGEN 194 1 cr, EGEN 102 2 cr) were introduced which are required for all incoming engineering students. Also, all new students interested in engineering are now assigned the same major: Freshman Engineering. If the student already has a major interest, this major interest is preserved as a secondary major field in the student’s record.

One of the new courses, EGEN 194, is a 1 credit course containing content designed to help new students discover if, indeed, engineering is the best academic path for them and if so, which engineering major is the best choice for them. In addition, students are introduced to topics to help them manage the difficult transition from high school to college. The course is run as a seminar-type class meeting once per week. Alumni from the engineering programs at Montana Tech are brought into class to talk about careers in their particular major. Weekly assignments are given using the model and textbook developed by Raymond Landis and Steffen Peuker: “Studying Engineering – A Road Map to a Rewarding Career” culminating in a personal, final report on how to become a “World Class Engineering Student”.

The second new course, EGEN 102, is a 2 credit course with primary emphasis on programming using Matlab® as well as a continuation of major exploration. The major exploration is accomplished by bringing in four departments on a rotating basis to use the two lecture periods in a particular week to introduce the discipline and an engineering problem within that discipline (day 1) and then assign that problem and finish discussion on day 2. These major exploration weeks are distributed throughout the semester. In addition, at about week 5 of the semester, the students now fill out a form to choose the engineering major they desire. These forms go to Enrollment Service and the chosen major is designated in the student’s file. The student is assigned an advisor in the chosen major who will register his/her new advisee for the next semester. If students are still undecided on a major, they can delay their choice until later in the semester, or longer if desired.
1.1 FEP PROGRAM OBJECTIVES AND OUTCOMES

The Montana Tech Freshman Engineering Program will:

1. Recruit, advise, teach, and retain students for Montana Tech’s School of Mines and Engineering.
2. Provide engineering students with the skills necessary to succeed in a Montana Tech Engineering discipline.

1.2 ADVISING

At Fall 214 census, the director of FEP had 205 advisees assigned. These advisees were FEP proper and enrolled in either Precalculus or calculus (or higher). At the time, a ½ time assistant was assigned 43 advisees. This population was designated pre-FEP and comprised a group interested in engineering but testing into math levels below Precalculus.

At 20th day grade check, 91 students in FEP proper received at least one unsatisfactory (no letter grades for 20 day reports) while 18 students in pre-FEP received at least one unsatisfactory grade.

The ½ time assistant left Montana Tech and a full-time Assistant Director of FEP replacement was approved and hired. In addition, the FEP office also hired a full-time academic advisor with partial administrative assistant responsibilities for the Electrical Engineering department.

Advising meetings take place year round with crunch times during registration periods within the semester and registration of new students and transfer students throughout the summer.

1.3 FEP PERFORMANCE CRITERIA AND RESULTS

1.3.1 Outcome 1
Recruit, advise, teach, and retain students for Montana Tech School of Mines and Engineering.

1. Performance Criterion: At least **70%** of freshman engineering students who pass EGEN 101 and EGEN 194 will enroll the following fall semester in engineering.
   a. Assessment method: AY 14/15 EGEN 101 and 194 grades will be examined.
   b. Action: The Freshman Engineering Director, SME dean, and SME faculty will review program information and make recommendations.
   c. Recommendation: Fall 2014 is the first cohort of students to enter the SME through the Freshmen Engineering program. Further time is required to assess the success of this program in recruiting, advising, teaching and retaining students in engineering. The benchmark is met.
   d. Based on findings action taken: None, further time is required.
Results:

<table>
<thead>
<tr>
<th>Grades: 68% of the Freshman Engineering students passed both EGEN 101 and 194. 79% of these students returned in Fall 2015 in Engineering. (Fall 2014 Freshman Engineering Students)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed 101/passed 194</td>
<td>N 170</td>
</tr>
<tr>
<td>% 68%</td>
<td></td>
</tr>
<tr>
<td>Passed 101/did not pass 194</td>
<td>N 18</td>
</tr>
<tr>
<td>% 7%</td>
<td></td>
</tr>
<tr>
<td>Did not pass 101/passed 194</td>
<td>N 5</td>
</tr>
<tr>
<td>% 2%</td>
<td></td>
</tr>
<tr>
<td>Did not pass 101/did not pass 194</td>
<td>N 56</td>
</tr>
<tr>
<td>% 22%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>North ENGINEER</th>
<th>North NOT ENGINEER</th>
<th>South</th>
<th>Did Not Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed 101/passed 194</td>
<td>170</td>
<td>79%</td>
<td>8%</td>
<td>4%</td>
<td>9%</td>
</tr>
<tr>
<td>Passed 101/did not pass 194</td>
<td>18</td>
<td>56%</td>
<td>0%</td>
<td>0%</td>
<td>44%</td>
</tr>
<tr>
<td>Did not pass 101/passed 194</td>
<td>5</td>
<td>20%</td>
<td>0%</td>
<td>20%</td>
<td>60%</td>
</tr>
<tr>
<td>Did not pass 101/did not pass 194</td>
<td>56</td>
<td>30%</td>
<td>5%</td>
<td>2%</td>
<td>63%</td>
</tr>
<tr>
<td>Fall 2014 Freshman Engineering Students</td>
<td>249</td>
<td>65%</td>
<td>7%</td>
<td>3%</td>
<td>24%</td>
</tr>
</tbody>
</table>

2. Performance Criterion: At least 60% of freshman engineering students who don’t pass EGEN 101 and EGEN 194 will enroll the following fall semester in engineering.
   a. Assessment method: The cohorts determined in the fall semester with AY 14/15 EGEN 101 and 194 grades will be examined.
   b. Action: The Freshman Engineering Director, SME dean, and SME faculty will review program information and make recommendations.
   c. Recommendation: Fall 2014 is the first cohort of students to enter the SME thru the Freshmen Engineering program. Further time is required to assess the success of this program in recruiting, advising, teaching and retaining students in engineering. The benchmark is not met.
   d. Based on findings action taken: None, further time is required.
Results: 32% of the Freshman Engineering students did not pass both EGEN 101 and 194. 35% of these students returned in Fall 2015 in engineering. This performance criterion may need to be reviewed and modified to separate out those students in EGEN 095 who never attempted EGEN 101 during the academic year.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>North ENGINEER</th>
<th>North NOT ENGINEER</th>
<th>South</th>
<th>Did Not Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed 101/did not pass 194</td>
<td>18</td>
<td>56%</td>
<td>0%</td>
<td>0%</td>
<td>44%</td>
</tr>
<tr>
<td>Did not pass 101/passed 194</td>
<td>5</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
<td>60%</td>
</tr>
<tr>
<td>Did not pass 101/did not pass 194</td>
<td>56</td>
<td>30%</td>
<td>5%</td>
<td>2%</td>
<td>63%</td>
</tr>
<tr>
<td>Total Did not pass 101 and/or 194</td>
<td>79</td>
<td>35%</td>
<td>4%</td>
<td>3%</td>
<td>58%</td>
</tr>
</tbody>
</table>

1.3.2 Outcome 2
Provide engineering students with the skills necessary to succeed in a Montana Tech Engineering discipline.

1. Performance Criterion: At least 70% of students completing the EGEN 101/EGEN 102 sequence will rate 3 or higher (out of 5) on the extent ABET outcomes were met.
   a. Assessment method: Survey shown will be administered last week of class meeting of EGEN 102.
   b. Action: The Freshman Engineering Director, SME dean, and SME faculty will review survey results and make recommendations.
   c. Recommendation: Fall 2014 is the first cohort of students to enter the SME through the Freshmen Engineering program. Survey will be administered Fall 16 for first time. The benchmark is not met.
   d. Based on findings action taken: None, further time is required.

Results:
No results at present time.

1.4 STRENGTHS AND WEAKNESSES

Advising all students within FEP is a major part of the motivation for the program. Advising meetings take place year round with crunch times during registration periods during the semester and registering new students and transfer students throughout the summer.
1.4.1 Strengths

- Invasive, consistent advising for all students in FEP. Advising staff: director FEP, assistant director FEP, academic advisor dedicated to FEP.
- Exploratory approach to choices of engineering majors at Montana Tech through alumni presentations and department open houses.
- All incoming students interested in engineering assigned to FEP - students do not have to choose a major on day one.
- All FEP students required to take same set of courses for first two semesters. Courses suitable/required for any choice of engineering program at Montana Tech.
- All FEP EGEN (101, 102, and 194) courses offered both semesters.

1.4.2 Weaknesses

- EGEN 101 lecture section holds all FEP students. Too many students (~250) in one classroom setting for effective instruction. Need to have multiple sections for lectures.
- Student class headcount for director FEP is heavy on student numbers. Table shows headcount for Fall 2015/Spring 2016.

<table>
<thead>
<tr>
<th>Course</th>
<th>FALL 2015</th>
<th>SPRING 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGEN 101</td>
<td>232</td>
<td>51</td>
</tr>
<tr>
<td>EGEN 102</td>
<td>64</td>
<td>184</td>
</tr>
<tr>
<td>EGEN 194</td>
<td>248</td>
<td>53</td>
</tr>
</tbody>
</table>
2 FEP SURVEYS

2.1 SURVEY EXPLANATIONS

In order to track student responses to FEP overall and classes within FEP, we developed three survey instruments. These surveys were written to hand out and complete during class time at the end of the semesters.

2.1.1 EGEN 194

This survey was written for the 1 credit seminar type course. The survey contains 3 questions requiring responses on a scale of 1 to 10 and 3 comment boxes to accept unstructured comments on the class. It is designed to be administered at the semester end of the EGEN 194 class.

The objectives of the survey are to obtain student feedback on the usefulness of this class for helping students learn about the engineering programs available at Montana Tech and whether the information provided helped students choose their engineering major.

This survey was administered for the first time Spring 2016 semester. We expect that the survey will be useful in establishing longitudinal trends for the class.

2.1.2 FEP Survey I

This survey was written to obtain information for the FEP program in general as well as for the three introductory engineering classes (EGEN 101, 194, 102). The survey contains 11 questions requiring responses on a scale of 1 to 10 and 3 comment boxes to receive unstructured comments on FEP overall.

The objectives of this survey are to obtain student feedback on FEP in the areas of advising, preparation for engineering studies, being comfortable choosing an engineering major and learning about basic engineering skills.

This survey was also administered for the first time Spring 2016 semester with the goal of being useful for determining longitudinal trends for the class. The survey was given at the end of the EGEN 102 semester when students taking the survey have completed the trio of introductory engineering classes (EGEN 101, 194, 102).

2.1.3 FEP Survey II

This survey was written to obtain information on how the EGEN 101 and 102 courses address ABET a-k outcomes. The survey contains 11 areas (a-k). Each ABET outcome is represented on a row. A YES or NO is in already in place on the survey indicating whether the course is expected to meet this outcome. The students then indicate a response on a scale of 1 to 5 indicating the extent the outcome was met if it was addressed (YES). There is a space to respond for EGEN 101 and EGEN 102 separately. If a particular outcome was intended to be addressed within either of the classes, examples are listed which are intended to address the outcome.

The objectives of this second survey are to obtain longitudinal student feedback suitable for ABET assessment and to establish the level at which ABET outcomes are addressed. This survey will be useful
for assessing the success of Outcome 2 (*Provide engineering students with the skills necessary to succeed in a Montana Tech Engineering discipline*).

This survey was just developed and has not been administered yet. The survey will be given at the end of the EGEN 102 semester after students have completed the trio of introductory engineering classes (EGEN 101, 194, 102) before moving on to their major programs.
2.2 EGEN 194 SURVEY

Student Questionnaire for EGEN 194 – Spring 2016

Please use this questionnaire as a way to provide constructive feedback to your instructor about the EGEN 194 class. Please take a moment and think through your comments to be as specific as you can so that your instructor can determine what steps can be taken to make this class as effective for students as possible. Your answers to this questionnaire should be returned to your instructor. You will be asked to complete a different survey at the end of the semester that will be used for course and instructor evaluation for administrative purposes.

Your class level (check one):

_________ Freshman
_________ Sophomore
_________ Junior
_________ Senior

1 = Disagree strongly; 10 = Agree strongly (place checkmark or ‘x’ in appropriate column)

<table>
<thead>
<tr>
<th>EGEN 194 Questionnaire</th>
<th>Spring 2016</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The open houses were helpful in learning more about the different engineering disciplines.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Comments:</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The speakers provided helpful comments on engineering.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. EGEN 194 was effective, overall, in helping me to select an engineering discipline.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Comments:

What did you like about the EGEN 194 class?

What suggestions would you give to improve the EGEN 194 class?

What other comments do you have concerning the EGEN 194 class?
2.3 FEP SURVEY I

Freshman Engineering Program Survey - Spring 2016

Background

The Freshman Engineering Program (FEP) at Montana Tech was designed using ideas from other successful programs at well-known universities in the country. Some of the hallmarks of FEP at Montana Tech are:

- FEP students are advised through the FEP office by the director, assistant director and the academic advisor in that office. All FEP students thus have access to comprehensive advising that is consistent for all students.
- FEP students do not have to declare their major program prior to or during first semester. Students are exposed to engineering programs/majors within the course EGEN 194 (1 cr) through visits from Montana Tech alumni from various engineering programs and through exploratory exercises within the class.
- Typically during the second semester, after completing EGEN 194, FEP students choose their desired major while enrolled in EGEN 102 (2 cr) and are assigned an advisor in their desired program.
- A primary goal of FEP at Montana Tech is to improve student retention and student success through comprehensive advising and providing expanded information about engineering careers in general and Montana Tech’s engineering programs in particular.

To help improve FEP at Montana Tech, it would be greatly appreciated if you could provide feedback from your FEP experience by answering the following questions.

Rate your advising experience within FEP

1. Rank availability of an FEP advisor when you needed one.

   1: poorest availability  10: highest availability (circle response)
   
   1  2  3  4  5  6  7  8  9  10

   Comments:

2. Rank effectiveness of FEP advising overall.

   1: poorest advising  10: best advising (circle response)
   
   1  2  3  4  5  6  7  8  9  10
Choosing engineering major at Montana Tech

3. Rank effectiveness of process for choosing your engineering major within EGEN 102 (2 cr) after completion of EGEN 194 (1 cr).

   1: least effective  10: highly effective (circle response)
   1   2   3   4   5   6   7   8   9   10

   Comments:

4. Rank effectiveness of EGEN 194 (1 cr) in providing useful information for choosing your major.

   1: least effective  10: highly effective (circle response)
   1   2   3   4   5   6   7   8   9   10

   Comments:

5. Rank effectiveness of EGEN 102 (2 cr) in providing useful information for choosing a major by bringing in 4 engineering departments for one week introductions to their disciplines.

   1: least effective  10: highly effective (circle response)
   1   2   3   4   5   6   7   8   9   10
EGEN 101 (3 cr) Introduction to Engineering Calculation and Problem Solving I

6. Rank overall effectiveness of EGEN 101 (3cr w/lab) for addressing basic skills required for all engineering students.

1: least effective 10: highly effective (circle response)

1 2 3 4 5 6 7 8 9 10

Comments:

7. Rank effectiveness of laboratory topics within EGEN 101 (3 cr) in providing useful information for engineering career.

1: least effective 10: highly effective (circle response)

1 2 3 4 5 6 7 8 9 10

Comments:

8. Rank usefulness of textbook for EGEN 101 (3 cr). Base your ranking on material in textbook and how useful MyEngineeringLab electronic assignments were to help your learning.

1: not useful at all 10: very useful (circle response)

1 2 3 4 5 6 7 8 9 10

Comments:
EGEN 102 (2 cr) Introduction to Engineering Calculation and Problem Solving II

9. Rank overall effectiveness of EGEN 102 (2 cr) for introducing Matlab programming. *Keep in mind logistics prevent having a 3 cr class with a weekly lab.*

1: least effective 10: highly effective (circle response)

1 2 3 4 5 6 7 8 9 10

Comments:

10. Rank effectiveness of Matlab programming exercise topics within EGEN 102 (2 cr) in providing useful skills for an engineering career.

1: least effective 10: highly effective (circle response)

1 2 3 4 5 6 7 8 9 10

Comments:

11. Rank usefulness of zyBook for EGEN 102 (2 cr). Base your ranking on material in textbook and how useful topics are for Matlab exercises.

1: not useful at all 10: very useful (circle response)

1 2 3 4 5 6 7 8 9 10
Freshman Engineering Program - overall

12. Comment on what you do like about the FEP/ or your class(es)?

Comments:

13. Comment on what you would like to change about the FEP/ or your class(es)?

Comments:

14. Do you have any suggestions on how to improve the FEP/ or your class(es)?

Suggestions:
2.4 **FEP SURVEY II**

Examples of activities in EGEN 101 and EGEN 102 that address ABET a-k outcomes. Note: 1 means objective least met; 5 means object completely met. (MEL refers to *MyEngineeringLab* – the platform for the online homework companion to the textbook.)

Circle the number for your response for both classes.

<table>
<thead>
<tr>
<th>Does the course contribute to this outcome:</th>
<th>EGEN 101</th>
<th>EGEN 101 examples</th>
<th>EGEN 101 student feedback on extent outcome was met</th>
<th>EGEN 102</th>
<th>EGEN 102 examples</th>
<th>EGEN 102 student feedback on extent outcome was met</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(a)</em> Ability to apply mathematics, science and engineering principles.</td>
<td>YES</td>
<td>MEL homework problems</td>
<td>1 2 3 4 5</td>
<td>YES</td>
<td>Four departmental engineering problems</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(b)</em> Ability to design and conduct experiments, analyze and interpret data.</td>
<td>NO</td>
<td>N/A</td>
<td>1 2 3 4 5</td>
<td>NO</td>
<td>N/A</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(c)</em> Ability to design a system, component, or process to meet desired needs.</td>
<td>YES</td>
<td>Two design projects, chapter 3 textbook</td>
<td>1 2 3 4 5</td>
<td>NO</td>
<td>N/A</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(d)</em> Ability to function on multidisciplinary teams.</td>
<td>YES</td>
<td>Design project teams/ethics hw teams</td>
<td>1 2 3 4 5</td>
<td>NO</td>
<td>N/A</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(e)</em> Ability to identify, formulate and solve engineering problems.</td>
<td>YES</td>
<td>MEL homework problems</td>
<td>1 2 3 4 5</td>
<td>YES</td>
<td>Four departmental engineering problems</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(f)</em> Understanding of professional and ethical responsibility.</td>
<td>YES</td>
<td>Homework 4, guest lecture, class lecture, chapter 2 textbook</td>
<td>1 2 3 4 5</td>
<td>NO</td>
<td>N/A</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(g)</em> Ability to communicate effectively.</td>
<td>YES</td>
<td>Writing assignment/guest lecture on presenting technical information</td>
<td>1 2 3 4 5</td>
<td>NO</td>
<td>N/A</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(h)</em> The broad education necessary to understand the impact of engineering solutions in a global and societal context.</td>
<td>YES</td>
<td>Chapters one and three in textbook</td>
<td>1 2 3 4 5</td>
<td>YES</td>
<td>Four departmental engineering problems and lectures</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td><em>(i)</em> Recognition of the need for and an ability to engage in life-long learning.</td>
<td>NO</td>
<td>1 2 3 4 5</td>
<td>YES</td>
<td>Four departmental engineering problems and lectures</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>(j) Knowledge of contemporary issues.</strong></td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chapters one and three in textbook, guest lecture on ethics and communicating technical information</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.</strong></td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS Excel spreadsheets and AutoCAD lab exercises, calculators</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Programming using Matlab</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3 CORE THEMES

3.1 FACULTY

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Rank</th>
<th>Type of Academic Appointment</th>
<th>FT or PT</th>
<th>Highest Degree Earned</th>
<th>Government/Industry Experience</th>
<th>Teaching</th>
<th>This Institution</th>
<th>Professional Registration / Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link, Curtis A</td>
<td>Director</td>
<td>NTT</td>
<td>F</td>
<td>PhD</td>
<td>6</td>
<td>24</td>
<td>22</td>
<td>N/A</td>
</tr>
<tr>
<td>Oppong Anane, Akua</td>
<td>Assist. Director</td>
<td>NTT</td>
<td>F</td>
<td>PhD</td>
<td>2</td>
<td>5</td>
<td>0.5</td>
<td>N/A</td>
</tr>
</tbody>
</table>

3.2 CORE THEME 4

Full Time Faculty Assessment 2015
Core Theme 4, Objective 1 Indicator of Achievement A: Faculty Diversity (Fall 2014)

<table>
<thead>
<tr>
<th>Department</th>
<th>Type</th>
<th># of Faculty</th>
<th>% Female</th>
<th>% Non-Resident Alien</th>
<th>% Under Represented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman Engineering</td>
<td>F(b) - Full Time Non Tenure Track Faculty</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>2</td>
<td>50</td>
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<td>50</td>
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</table>
3.3 **CORE THEME 1**

<table>
<thead>
<tr>
<th>MAJOR: FE - Freshman Engineering</th>
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</thead>
<tbody>
<tr>
<td><strong>Assessment Year - 2015</strong></td>
</tr>
<tr>
<td><strong>Student Diversity</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Full Time</th>
<th>Part Time</th>
<th>Total Undergrad</th>
<th>Underrepresented Minority</th>
<th>Montana Students</th>
<th>School-Based Students</th>
<th>Students Local</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall 2016</strong></td>
<td>220</td>
<td>17</td>
<td>4</td>
<td>4</td>
<td>249</td>
<td>17%</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Fall 2015</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Fall 2014</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Fall 2013</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Fall 2012</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Fall 2011</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Fall 2010</strong></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>
4 RESUMES

Dr. Akua B. Oppong-Anane
Assistant Director
Freshman Engineering Program

Education:
M.S. (2007) University of Florida Chemistry
Ph.D. (2014) University of Florida Environmental Engineering Sciences

Work Experience:
Montana Tech, Assistant Director, Freshman Engineering Program (2016-Present)
Santa Fe College, Florida, Assistant Professor of Chemistry, Adjunct (2014-2015)
Cornerstone Academy & Ministries Inc., Teacher (2014-2015)
University of Florida, Community Assistant at Corry Village (2011-2013)
University of Florida, Graduate Research Assistant (2008-2011)
University of Florida, Graduate Teaching Assistant (2004-2007)
Water Research Institute, Ghana Assistant Research Scientist (2003-2004)

Professional Affiliations:
American Society for Engineering Education (2016)
Graduate Women in Science (2012)
Society of Women Engineers (2013-2014)

Honors and Awards:
University of Florida Outstanding International Student Award (2013)
Cathie Povnikvar Award, University of Florida (2013)
ESSIE Outstanding Graduate Student/Leadership Award, University of Florida (2013)
Presidential Service Award, University of Florida (2013)
National Residence Hall Honorary (2012)
University of Florida Division of Student Affairs Outstanding Graduate Student Award (2012)
HDR Engineering Inc. Scholarship, University of Florida (2012)
International Honorary for Leaders in University Apartments Committee (2012)
Marilyn Little Altrusa Scholarship, Altrusa International of Gainesville, Florida (2012)
Melnik Award, University of Florida (2011)
HDR Engineering Scholarship, University of Florida (2008)

Publications:

Service:
MINES Summer Camp for Women, Montana Tech, Session Leader (2016)
Admitted Students Day, Montana Tech, Speaker, (2016)
Spring Fling, Graduate and Family Housing, University of Florida, Volunteer (2014)
Sustainability Hut, Office of Sustainability, University of Florida, Volunteer (2014)
Area Coordinator, University of Florida Graduate and Family Housing Search Committee, Member, (2013)
Assistant Director, University of Florida Graduate and Family Housing Search, Panel Member (2013)
Graduate Student Advisory Group, ESSIE, University of Florida, Member (2012-2013)
Howard Bishop Middle School, Gainesville, Florida, Science Fair Judge (2012)
Alachua County Library Headquarters, Gainesville, Florida, Family Literacy Festival, Volunteer (2012)
Water Symposium, Water Institute, University of Florida, Volunteer (2012)
Alachua County Library Headquarters, Gainesville, Florida, Computer Aide (2011-2013)
Howard Bishop Middle School, Gainesville, Florida, Science Fair Judge (2011)
Alachua County Library Headquarters, Gainesville, Florida, Family Literacy Festival, Volunteer (2011)
Curtis A. Link, Ph.D.
Director Freshman Engineering Program
Professor Emeritus, Geophysical Engineering

Education:
B.A. (1971) University of Iowa Physics
Secondary teaching cert. (1972) University of Iowa Science/math
Ph.D. (1993) University of Houston Geophysics

Work Experience:
Montana Tech 2014-pres. Director Freshman Engineering
Geolex 2013-2013 Senior geophysicist
Montana Tech 2008-2013 Department chair
Montana Tech 2002-pres. Full professor
Montana Tech 1999-2002 Department chair
Montana Tech 1997-2002 Associate professor
Montana Tech 1994-1997 Assistant professor
University of Houston 1990-1993 Research assistant,
HGS, Houston 1988-1990 3-D land seismic data processing
GSI 1985-1988 Seismic data acquisition and processing, Peoples
Republic of China

Professional Registrations and Licenses:
N/A

Professional Affiliations:
American Society Engineering Education
Sigma Xi
Montana Geological Society
Billings Geophysical Society

Honors and Awards:
Rose and Anna Busch Faculty Achievement Award 2002, 2005, 2010, 2013

Funded Grants:
ASF/NASA 2008 – 2011 $7k Derivation of soil moisture and snow liquid water
content for soil and snow in Montana using RADARSAT-1 SAR imagery
Dept. of State 2007-2008 $5k Seismic refraction for monitoring zones of water table
fluctuation in a shallow tropical aquifer
Dept. of State 2007-2008 $5k Characterization of reservoir response to co2 injection
using seismic physical modeling
DMA 2008-2010 $75k Study improved methods for discrimination of UXO in
Montana
NIOSH 2006-2009 $25k CDC/NIOSH grant to study depth of blast induced
damage in mine walls
DURIP 2003 $142k Army Research Office Equipment Grant for seismic
source and land streamer recording system
Design of Rapid Deployment 3-D Seismic Reflection System with PFM Manufacturing, Townsend, MT

Design of Rapid Deployment 3-D Seismic Reflection System with PFM Manufacturing, Townsend, MT

Design of Rapid Deployment 3-D Seismic Reflection System with PFM Manufacturing, Townsend, MT

Mine Waste Technology Program data analysis (neural network analysis for data mining of geochemical data sets)

Rockburst research applied to nuclear event discrimination (neural network analysis, 3-D seismic tomography, source mechanism investigation, seismic energy source comparison)

Seismic attenuation estimation using wavelet transforms (wavelet transform spectral decomposition applied to attenuation estimation)

Petroleum reservoir characterization (neural network data analysis, neural network development, crosswell tomography, reflection imaging)

Publications:


J. A. Singer, C. A Link, and S. R. Iverson, 2009, High Resolution Seismic Refraction Tomography for Determining Depth of Blast Induced Damage in a Mine Wall, Blasting and Fragmentation, 3, no. 2, 115-140.


**URP mentorships:**

- Coyle, Christine, Detection of Beaver Dens in Earthen Levees Using Ground Penetrating Radar
- Schwenesen, Heidi, Investigation of Seismic Features in 3-D Data Volumes using Self-Organizing Feature Maps (SOFM)
- Kunstek, Nicholas, Analysis of Seismic Attributes within an Offshore Three Dimensional Seismic Volume using Kingdom Suite, Seismic Micro-Technologies, for a Better Determination of Hydrocarbon Production Zones
- Singer, Janae and Merchant, Daniel, MASW at Centennial Ave. and Mike Horse Dam
- Prokop, Amy, Validation of Shear Wave Velocity Measurements at Soft Soil Sites in Montana
- Zeiler, Cleat and Hess, Scott, Displaying and Recording Seismic Data
- Zeiler, Cleat and Hess, Scott, Down-hole Seismic Source Comparison
- Hewett, Thomas, Conventional Interpolation Techniques vs. Neural Network Predictions
- Webster, Cy, MASW vs. Standard Shear Wave Analysis for Modulus of Resilience

**Graduate Committees:**

>40 committees

MS advisees:
Smith, Debbie
Brian Brunette
Shane Mogensen
Kevin Dorrington
Matthew Casey
Aaron Wandler
Ufuk Celik
Matthew Bray
Michael Beecher
Devin Vignali
Doug Desper
Phillip Himmer
Raul Miranda
Whitney Harris
Greg Sheridan
Brian Church
Kim Churchill
Chris Crowell
Janae Singer
Taylor Stipe

**Service:**
Past service:
  Instructional Improvement Committee
  Advising/Retention Committee
  Academic Standards Committee
  High Performance Computing Committee
  Mission Statement Committee
  NORCHE
  Strategic Planning Committee
  Department Chair Geophysical Engineering