Montana Tech: Annual Program Review

Department: Petroleum Engineering

Degree: B.S. In Petroleum Engineering

Department Head: Burt J. Todd

Year Under Review: Fall 2014 – Spring 2015

Submitted: 1/11/2016

Assessment Committee Review: Spring 2016
Program Review

Department: Petroleum Engineering
Degree: Bachelor of Science

Program Educational Objectives: Program educational objectives are broad statements that describe what graduates are expected to attain within a few years of graduation. Program educational objectives are based on the needs of the program’s constituencies.

The objective of the Petroleum Engineering program is to produce graduates who successfully practice the Petroleum Engineering profession as demonstrated by:

a. continued professional employment
b. job promotion
c. expanding career responsibility,
d. and society membership and participation

Student Outcomes: Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program.

1. Students earning a BS in Petroleum Engineering will have met the outcomes set out by ABET for all engineering students. These are listed below:

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. Students earning a BS in Petroleum Engineering will additional demonstrate competency in these key areas:

a. Proficiency in mathematics through differential equations, probability, and general engineering coursework (fluid mechanics, strength of materials and thermodynamics)
b. Design and analysis of well systems and procedures for drilling and completing wells
c. Characterization and evaluation of subsurface geological formations and their resources using geoscientific and engineering methods
d. Design and analysis of systems for producing, injecting and handling fluids
e. Application of reservoir engineering principles and practices for optimizing resource development and management
f. Use of project economics and resource validation methods for design and decision making under conditions of risk and uncertainty.

Student Outcomes

Outcome (1): Students earning a BS in Petroleum Engineering will have met the outcomes set out by ABET for all engineering students

1. Performance Criteria: Establish a baseline and a target in the first round of data collection and analysis and then implement changes to create continuous improvement

(a) Strategies: The Petroleum Department is in the last semester of the implementation of a new assessment plan that focuses on quality data collection aimed at finding areas of improvement in both the ABET outcomes and the Petroleum Engineering outcomes listed above. The assessment plan provides a cycle to collect data, evaluate the results and make improvements. Each of the ABET objectives has at least three assessment methods. The assessment schedule is given in figure 1. For this first full assessment process, the cycles are a semester long, but the second and future cycles will be one year long.


(b) **Assessment Instrument(s):**

**Student ABET Outcome Assessment Method:** Each of the student ABET outcomes is assessed with about three performance indicators. The outcomes are tied to specific classes where those skills are taught, and the assessment coordinator sends a data collection instrument to each faculty member who is responsible for an assessment that cycle. An example of the assessment for student outcome (a): ‘the student will demonstrate and ability to apply knowledge of mathematics, science and engineering’ is given in Figure 2, and Figure 3 is the associated measurement rubric. Each of the student outcomes suggested by ABET has an appropriate set of performance indicators and rubrics.
The students will demonstrate an ability to apply knowledge of mathematics, science, and engineering

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Courses</th>
<th>Method of assessment</th>
<th>Length of cycle</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can choose a mathematical model or scientific principle to solve an engineering problem</td>
<td>PET 410, PET 372, PET 404</td>
<td>Performance on select questions on final exam, midterm, final project or homework</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
<tr>
<td>2. Executes calculations correctly by hand and using calculators and software</td>
<td>PET 404, PET 372</td>
<td>Performance on select homework and exam questions</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
<tr>
<td>3. Understands limitations of mathematical models when used to predict physical reality</td>
<td>PET 444, PET 410</td>
<td>History matching assignment, selected EOR assignments</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
</tbody>
</table>

Figure 2: Performance indicators and methods of assessment for student outcome (a)

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can choose a mathematical model or scientific principle to solve an engineering problem</td>
<td>Does not understand the connection between mathematical models and chemical processes and systems in petroleum</td>
<td>Chooses a mathematical model or scientific principle that applies to an engineering problem, but has trouble in model development</td>
<td>Chooses correct models and principles consistently, and develops them into solutions</td>
</tr>
<tr>
<td>2. Executes calculations correctly by hand and using calculators and software</td>
<td>Makes frequent errors in hand calculations, develops spreadsheets incorrectly</td>
<td>Makes few errors in hand calculations or spreadsheet development</td>
<td>Is consistently correct in hand calculations and spreadsheet solutions</td>
</tr>
<tr>
<td>3. Understands limitations of mathematical models when used to predict physical reality</td>
<td>Assumes models are true representations of reality, does not make connection between model assumption and error</td>
<td>Is overconfident in model and calculation applications</td>
<td>Has a clear understanding of uses and limitations of calculations, models and simulations of physical processes</td>
</tr>
</tbody>
</table>

Figure 3: Rubric for measuring performance indicator (a)

(c) Source of Assessment: Faculty measurement based on data collection tool

Each of the faculty members receives a specific data collection tool from the assessment coordinator in order to evaluate the outcomes in the current cycle. These contain the performance indicators and rubrics for the appropriate outcome with the specific course highlighted along with a place to collect data. Supporting documents are kept by the faculty member to resolve any questions. An example is shown in Figure 4.
Assessment worksheet – (customized for individual faculty members)

Please complete this assessment worksheet by filling in the appropriate numbers in each box based on the rubrics.

Sample of data collection

<table>
<thead>
<tr>
<th>Performance outcome (c)</th>
<th>sample</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
<th>based on</th>
</tr>
</thead>
<tbody>
<tr>
<td>indicator 2</td>
<td>40</td>
<td>6</td>
<td>26</td>
<td>8</td>
<td>student peer evaluations pet 444 Spring 2015</td>
</tr>
<tr>
<td>indicator 3</td>
<td>30</td>
<td>1</td>
<td>18</td>
<td>10</td>
<td>observation of lab activities in pet 303 Spring 2015</td>
</tr>
</tbody>
</table>

**Outcome (a) – Indicators 1-3**

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Courses</th>
<th>Method of assessment</th>
<th>Length of cycle</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can choose a mathematical model or scientific principle to solve an engineering problem</td>
<td>PET 410</td>
<td>Performance on select questions on final exam, midterm, final project or homework</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
<tr>
<td>2. Executes calculations correctly by hand and using calculators and software</td>
<td>PET 404</td>
<td>Performance on select homework and exam questions</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
<tr>
<td>3. Understands limitations of mathematical models when used to predict physical reality</td>
<td>PET 410</td>
<td>History matching assignment, selected EOR assignments</td>
<td>2 years</td>
<td>Determined after first cycle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can choose a mathematical model or scientific principle to solve an engineering problem</td>
<td>Does not understand the connection between mathematical models and chemical processes and systems in petroleum</td>
<td>Chooses a mathematical model or scientific principle that applies to an engineering problem, but has trouble in model development</td>
<td>Chooses correct models and principles consistently, and develops them into solutions</td>
</tr>
<tr>
<td>2. Executes calculations correctly by hand and using calculators and software</td>
<td>Makes frequent errors in hand calculations, develops spreadsheets incorrectly</td>
<td>Makes few errors in hand calculations or spreadsheet development</td>
<td>Is consistently correct in hand calculations and spreadsheet solutions</td>
</tr>
<tr>
<td>3. Understands limitations of mathematical models when used to predict physical reality</td>
<td>Assumes models are true representations of reality, does not make connection between model assumption and error</td>
<td>Is overconfident in model and calculation applications</td>
<td>Has a clear understanding of uses and limitations of calculations, models and simulations of physical processes</td>
</tr>
</tbody>
</table>

**To fill in**

<table>
<thead>
<tr>
<th>Performance outcome (a)</th>
<th>sample</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
<th>based on</th>
</tr>
</thead>
<tbody>
<tr>
<td>indicator 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Selected work PET 404</td>
</tr>
<tr>
<td>indicator 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Selected work PET 404</td>
</tr>
<tr>
<td>indicator 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Selected work PET 444</td>
</tr>
</tbody>
</table>
(d) Time of data collection: One third of all outcomes have data collected at the end of each cycle. This is usually done towards the end of an academic semester or the time between semesters so that the most data are available.

(e) Person/group responsible for ensuring collection of assessment data: Faculty or advisors of courses selected to measure specific outcomes, and the assessment coordinator.

(f) Person/group responsible for evaluating results: Assessment coordinator (currently Dr. Sue Schrader)

(g) Summary of how data collected as well as the information obtained from the data: Specific to the outcome criteria.

Although the plan is new and targets will not be set until a baseline has been established, useful information has been obtained for the results of the first two rounds of data collection. For instance, one measure for student outcome (h) is student participation in professional societies on campus. The results of the data collected for this indicated that 44% of students have no involvement in either the Society of Petroleum Engineers or the American Association of Drilling Engineers. This high percentage indicates a need to promote these societies and encourage student participation.

(h) Based on the findings, actions taken:

The first actions taken under this new assessment plan will address the lack of participation in professional organizations. The advisors of the student chapters of the two main professional organizations, the Society of Petroleum Engineers and the American Association of Drilling Engineers, are working with the assessment coordinator on ideas to improve this number.

Second-Cycle Results: N/A as we are beginning a new assessment plan.

Outcome (2): Students earning a BS in Petroleum Engineering will additional demonstrate competency in these key areas (specific to Petroleum Engineering and listed above)

1. Performance Criteria:
(a) **Strategies:** These are also covered in the assessment plan described for Outcome (1)

(b) **Assessment Instrument(s):**

**Program Specific Student Outcome Assessment Method:** Each of the Petroleum program specific outcomes is assessed with about three performance indicators. The outcomes are tied to specific classes where those skills are taught, and the assessment coordinator sends a data collection instrument to each faculty member who is responsible for an assessment that cycle. An example of the assessment for program specific outcome (b): ‘the students will demonstrate proficiency in the design and analysis of well systems and procedures for drilling and completing wells’ is given in Figure 5, and Figure 6 is the associated measurement rubric. Each of these six outcomes has an appropriate set of performance indicators and rubrics.

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Courses</th>
<th>Method of assessment</th>
<th>Length of cycle</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student will demonstrate knowledge of drilling well construction methods</td>
<td>PET 301</td>
<td>Quiz 1, HW, 1 Exam 1</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
<tr>
<td>The student will demonstrate knowledge of formation pressure control with drilling fluids and BOP equipment</td>
<td>PET 301</td>
<td>Class quiz 6, HW 6, Simulation lab 3 and 4</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
<tr>
<td>The student will demonstrate knowledge of drilling fluid circulation system, hydraulics and ECD</td>
<td>PET 301</td>
<td>Class quic 7, HW 6, Sim lab 2 and 3</td>
<td>3 years</td>
<td>Determined after first cycle</td>
</tr>
</tbody>
</table>

*Figure 5: Performance outcomes for program specific outcome related to drilling and completions*
<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Unsatisfactory</th>
<th>Satisfactory</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student will demonstrate knowledge of drilling well construction methods</td>
<td>The student is unable to design a proper well plan under specific conditions</td>
<td>The student uses proper well construction methods and relationships to fit certain conditions</td>
<td>The student demonstrates understanding of well construction methods and adapts as conditions vary</td>
</tr>
<tr>
<td>The student will demonstrate knowledge of formation pressure control with drilling fluids and BOP equipment</td>
<td>The student does not demonstrate clear understanding of relationships for well pressure control</td>
<td>The student understands pressure control relationships and uses concepts for proper decisions</td>
<td>The student demonstrates clear pressure control understanding and adapts concepts to changing conditions</td>
</tr>
<tr>
<td>The student will demonstrate knowledge of drilling fluid circulation system, hydraulics and ECD</td>
<td>The student does not demonstrate clear understanding of circulation system relationships with hydraulic</td>
<td>The student understands and demonstrates circulation system relationships with hydraulic outcomes</td>
<td>The student demonstrates clear understanding of circulation systems with ability to predict and control hydraulic outcomes</td>
</tr>
</tbody>
</table>

Figure 6: Rubric associated with program specific outcome (b) given above

(c) **Source of Assessment:** These student outcomes are included as part of the faculty data collection tool, an example of which is shown in Figure 4

(d) **Time of data collection:** One third of all outcomes have data collected at the end of each cycle. This is usually done towards the end of an academic semester or the time between semesters so that the most data are available.

(e) **Person/group responsible for ensuring collection of assessment data:** Faculty or advisors of courses selected to measure specific outcomes, and the assessment coordinator.

(f) **Person/group responsible for evaluating results:** Assessment coordinator (currently Dr. Sue Schrader)

(g) **Summary of how data is collected as well as the information obtained from the data:**

Although the plan is new and targets will not be set until a baseline has been established, useful information has been obtained for the results of the first two rounds of data collection. For instance, one measure for student outcome (h) is student participation in professional societies on campus. The results of the data collected for this indicated that 44% of students have no involvement in either the Society of Petroleum Engineers or the American Association of Drilling Engineers. This high percentage
(h) Based on the findings, actions taken: N/A

(i) Second-Cycle Results: N/A
Information Required by our NWCCU Year One Report (YOR)

CORE THEME 1: Education and Knowledge

As found under Objective 1, Indicator of Achievement E in YOR: Describe direct measures of student knowledge (e.g., Licensing Exams, Capstone Course, Senior Projects)

Capstone course: All students are required to take a capstone course, Senior Design during their last semester of the program. This course consists of forming students into teams of 5-6 students, and each team tackles a problem typically provided by industry. Students take the lead in a specific area, such as drilling, surface facilities or reservoir modeling and work as a group to answer a question, such as ‘Does this field show good potential for an enhanced oil recovery project at current economic conditions?’ They present their work to faculty and industry representatives at the end of the semester and turn in a detailed report to the course instructor.

Licensing Exams: While the licensing exam for the engineering profession can only be taken after the graduate has significant work experience, our students typically take the Fundamentals of Engineering exam in the last year of their studies.

As found under Objective 2, Indicator of Achievement A in YOR: What extracurricular educational opportunities (and participation rate) are available to students in your program? (e.g., Undergraduate Research Program (URP), Seminar Activities, Conference Attendance, Guest Lectures, and Field Trips)

The petroleum department hosts a Symposium in the spring semester in which industry professionals, many who are Montana Tech alumni, give technical talks to the students and community. In addition, many students travel to the Society of Petroleum Engineers conference, the American Association of Drilling Engineers (AADE) conference, or the Society of Women Engineers conference. These organizations have student chapters at Tech, who also bring in guest speakers for lectures on a variety of relevant topics.

Many students participate in undergraduate research as well, often ending their project with a presentation at Montana Tech’s TechXpo, held at the end of every spring semester.

As found under Objective 3, Indicator of Achievement A in YOR: In what ways does your program prepare graduates for a successful career in addition to curricular preparation? (e.g., Internships, professional exam preparation, specialized training in software, and IAB feedback)

A significant number of our students are able to find summer internships with a variety of companies. Exact numbers are ambiguous, but approximately 50% have a meaningful summer work experience.
The students in our program also gain hands-on experience with key industry software. We have Petrel/Eclipse thanks to a generous donation from Schlumberger, and all students take a course which includes learning this software, which they then can apply to senior design or undergraduate research. We have Kappa software, and have a company instructor come down every year to teach a course to interested students. We also have the FracPro hydraulic fracturing software, and the Stim-Plan proppant conductivity calculators for use in our well stimulation classes.

In addition to software, the students have the opportunity to get their well control certification while still in school through the efforts of the AADE and the generosity of Wild Well Control.
CORE THEME 2: Student Achievement

As found under Objective 3, Indicator of Achievement A in YOR: What academic distinction opportunities are available to your students and what distinctions have been achieved over the last year? (e.g., Merit Scholarships, distinctions based on GPA (e.g. Dean’s List), and team competition)

In the 2014-2015 school year, scholarships were given to students from professional organizations, the department and a number of petroleum companies. For instance, 10 students were awarded a scholarship of $2000 from the AADE. These were among 49 students receiving external scholarships.

Petroleum students also received support from the school. Five of the 6 graduate students were funded with academic waivers and teaching assistantships, and 149 undergraduate students received institutional scholarships.

The department also put together a team to compete in the annual Petro Bowl, held at the Annual Technical Conference and Expo of the SPE. At the 2014 event, they placed fourth out of a field of approximately 25 teams from around the world.
## CORE THEME 3: Engaged Faculty

### Department Faculty

<table>
<thead>
<tr>
<th>Objective 1, Indicator of Achievement A:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of department faculty reviewed this year who met departmental standards in <strong>teaching</strong></td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective 2, Indicator of Achievement A:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of department faculty reviewed this year who met departmental standards in <strong>research, scholarly activity, and/or professional development</strong></td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective 3, Indicator of Achievement A:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of department faculty reviewed this year who met departmental standards in <strong>service</strong> to their profession, the campus, and/or the community</td>
</tr>
<tr>
<td>4</td>
</tr>
</tbody>
</table>
**CORE THEME 1: Education and Knowledge**

**Program Evaluation**

**Objective 1, Indicator of Achievement C: Strengths:**

1. **Wide range of faculty expertise and experience in Petroleum Engineering**
   - The petroleum faculty includes four members with terminal degrees, and three who are licensed professional engineers
   - New hires in the past two years have added strength in drilling, production and enhanced oil recovery

2. **Faculty commitment to quality teaching**
   - Faculty review student course surveys and develop improvement in course delivery based on student responses.
   - Faculty are developing more online course content, including a fully online course

3. **Solid foundation of scholarly activity**
   - Five graduate students completed their thesis, and most of these have or will lead to publications
   - Two research grants have been funded by the Montana Board of Oil and Gas, including a large project to investigate the use of enhanced oil recovery methods in the Bakken oil fields.
   - Additional research grants have been applied for
Objective 1, Indicator of Achievement D: How will the program maintain the strengths?
The program will maintain its strength in these areas by promoting research opportunities, growing and improving the Master’s program and continuing to improve the undergraduate program through ongoing curriculum review and through the new assessment plan described above.

Objective 1, Indicator of Achievement C: Weaknesses:
1. The school’s large undergraduate program provides only limited time for the pursuit of research
2. A limited offering of graduate courses and 400-level elective courses.

Objective 1, Indicator of Achievement D: How will the program address the weaknesses?
1. The recent hiring of additional faculty will allow for more research opportunities as they have time to become accustomed to their course load, begin working with graduate students, and develop research programs. The addition of a large new research space in a building set for completion next year will also allow for additional research opportunities.
2. The curriculum review and the plans to offer some graduate courses as online courses will allow for the development of more upper level courses.
Other actions leading to program improvement (e.g., develop a new course):

New courses:
   PET 305 – Completion design

New online offering
   PET 504 – Advanced Reservoir Engineering

Have hired four new faculty to improve our abilities in drilling, production, reservoir simulation, and oilfield chemistry.
Appendix A: Student Data

<table>
<thead>
<tr>
<th>Core Theme 1, Objective 1, Indicator of Achievement B:</th>
<th>Core Theme 4, Objective 1, Indicator of Achievement A:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAJOR: Petroleum Engineering</td>
<td>Student Diversity</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall 2018</td>
<td></td>
</tr>
<tr>
<td>Full Time F</td>
<td>38</td>
</tr>
<tr>
<td>Part Time F</td>
<td>2</td>
</tr>
<tr>
<td>Fall 2013</td>
<td></td>
</tr>
<tr>
<td>Full Time F</td>
<td>97</td>
</tr>
<tr>
<td>Part Time F</td>
<td>2</td>
</tr>
<tr>
<td>Fall 2012</td>
<td></td>
</tr>
<tr>
<td>Full Time F</td>
<td>74</td>
</tr>
<tr>
<td>Part Time F</td>
<td>1</td>
</tr>
<tr>
<td>Fall 2011</td>
<td></td>
</tr>
<tr>
<td>Full Time F</td>
<td>58</td>
</tr>
<tr>
<td>Part Time F</td>
<td>2</td>
</tr>
<tr>
<td>Fall 2010</td>
<td></td>
</tr>
<tr>
<td>Full Time F</td>
<td>71</td>
</tr>
<tr>
<td>Part Time F</td>
<td>1</td>
</tr>
</tbody>
</table>

Core Theme 1, Objective 1, Indicator of Achievement B:
Degrees Awarded - Assessment 2015

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
<th>Certificate</th>
<th>Associate</th>
<th>Bachelor</th>
<th>Master</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petroleum Engineering</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013-2014</td>
<td>70</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012-2013</td>
<td>64</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td>70</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010-2011</td>
<td>92</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td>59</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Faculty Data

### 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>Petroleum Engineering</td>
<td>F(a) - Full Time Tenure Track Faculty</td>
<td>6</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>F(b) - Full Time Non Tenure Track Faculty</td>
<td>2</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>38%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
# Faculty Analysis Courses Data - Assessment 2015

## Core Theme 3, Objective 1 Indicator of Achievement A:

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Course</th>
<th>Credits</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>David K Reichhardt</td>
<td>PET 302 01 Petroleum Production Eng</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>PET 402 01 Artificial Lift</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>PET 499 01 Capstone: Petroleum Eng Design</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>John G Evans</td>
<td>PET 304 01 ROCK PROPERTIES</td>
<td>3</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>PET 348 01 Petroleum Well Logging</td>
<td>3</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>PET 426 01 Reservoir Characterization</td>
<td>3</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>PET 427 01 Reservoir Characterization Lab</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>Leo A Heath</td>
<td>PET 505 01 PRESSURE TRANSIENT ANALYSIS</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Mary A North-Abbott</td>
<td>PET 201 01 Elements Petroleum Engr</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>PET 202 01 Petroleum Field Practices</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>PET 202 02 Petroleum Field Practices</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>PET 203 01 Pet Eng Industry Practices</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>PET 298 01 Internship</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>PET 298 02 Internship</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PET 372 01 PETROLEUM FLUID THERMODYNAMICS</td>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>PET 498 01 Internship in PET Engineering</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Richard J Schrader</td>
<td>PET 205 01 Petroleum Engr Lab I</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>PET 205 02 Petroleum Engr Lab I</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 205 03 Petroleum Engr Lab I</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>PET 205 11 Petroleum Engr Lab I</td>
<td>0</td>
<td>24</td>
</tr>
</tbody>
</table>
Faculty Analysis Courses Data - Assessment 2015

Core Theme 3, Objective 1 Indicator of Achievement A:

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Course</th>
<th>Credits</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PET 205 12 Petroleum Engr Lab I</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 205 13 Petroleum Engr Lab I</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>PET 303 01 Drilling Fluids Lab</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 303 02 Drilling Fluids Lab</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 303 11 Drilling Fluids Lab</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 303 12 Drilling Fluids Lab</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 307 01 Petroleum Production Lab</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>PET 307 11 Petroleum Production Lab</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>PET 307 13 Petroleum Production Lab</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>PET 453 01 Natural Gas Lab</td>
<td>1</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>PET 453 12 Natural Gas Lab</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>PET 453 13 Natural Gas Lab</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>PET 453 14 Natural Gas Lab</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Susan M Schrader</td>
<td>PET 495 03 Special Topics</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>PET 404 01 Reservoir Engineering</td>
<td>3</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>PET 444 01 WATERFLOODING &amp; EOR</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>PET 504 01 ADV RESERVOIR ENGINEERING</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>PET 599 01 Thesis Research</td>
<td>variable</td>
<td>4</td>
</tr>
<tr>
<td>Todd B Hoffman</td>
<td>PET 410 01 Reservoir Simulation</td>
<td>3</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>PET 410 11 Reservoir Simulation</td>
<td>0</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>PET 410 12 Reservoir Simulation</td>
<td>variable</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>PET 452 01 Natural Gas Operations</td>
<td>3</td>
<td>45</td>
</tr>
</tbody>
</table>

Spring 2015

Burt Todd

|                  | PET 302 01 Petroleum Production Eng | 3     | 56   |
|                  | PET 452 01 Natural Gas Operations   | 3     | 65   |
|                  | PET 495 04 Special Topics           | 3     | 1    |
|                  | PET 499 01 Capstone: Petroleum Eng Design | 3 | 44 |
|                  | PET 599 01 Thesis Research           | variable| 3   |

David K Reichhardt
# Faculty Analysis Courses Data - Assessment 2015

Core Theme 3, Objective 1 Indicator of Achievement A:

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Course</th>
<th>Credits</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>John G Evans</td>
<td>PET 304 01 ROCK PROPERTIES</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>PET 348 02 Petroleum Well Logging</td>
<td>3</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>PET 426 01 Reservoir Characterization</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>PET 427 11 Reservoir Characterization Lab</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 427 12 Reservoir Characterization Lab</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>PET 526 01 Adv Reservoir Characterization</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>PET 548 01 Petroleum Well Logging</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>PET 502 01 Stimulation Design</td>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>Leo A Heath</td>
<td>PET 301 01 Well Drilling</td>
<td>3</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>PET 401 01 ADVANCED DRILLING</td>
<td>3</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>PET 446 01 PET Project Evaluation</td>
<td>3</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>PET 446 11 PET Project Evaluation</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Mary A North-Abbott</td>
<td>PET 201 01 Elements Petroleum Engr</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>PET 372 01 PETROLEUM FLUID THERMODYNAMICS</td>
<td>3</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>PET 503 01 Surface Production Facilities</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>Richard J Schrader</td>
<td>PET 205 01 Petroleum Engr Lab I</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>PET 205 02 Petroleum Engr Lab I</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 205 11 Petroleum Engr Lab I</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>PET 205 12 Petroleum Engr Lab I</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 303 01 Drilling Fluids Lab</td>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>PET 303 02 Drilling Fluids Lab</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>PET 303 11 Drilling Fluids Lab</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>PET 303 12 Drilling Fluids Lab</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>PET 307 01 Petroleum Production Lab</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>PET 307 02 Petroleum Production Lab</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>PET 307 11 Petroleum Production Lab</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>PET 307 12 Petroleum Production Lab</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>PET 453 01 Natural Gas Lab</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>PET 453 02 Natural Gas Lab</td>
<td>1</td>
<td>31</td>
</tr>
</tbody>
</table>

Core Theme 1, Objective 2, Indicator of Achievement B: Distance Delivery
Faculty Analysis Courses Data - Assessment 2015

Core Theme 3, Objective 1 Indicator of Achievement A:

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Course</th>
<th>Credits</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET 453 11 Natural Gas Lab</td>
<td></td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>PET 453 12 Natural Gas Lab</td>
<td></td>
<td>0</td>
<td>31</td>
</tr>
</tbody>
</table>

Susan M Schrader

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET 404 01 Reservoir Engineering</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>PET 444 01 WATERFLOODING &amp; EOR</td>
<td>3</td>
<td>69</td>
</tr>
<tr>
<td>PET 444 02 WATERFLOODING &amp; EOR</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>PET 495 03 Special Topics</td>
<td>variable</td>
<td>4</td>
</tr>
<tr>
<td>PET 511 01 Adv Reservoir Simulation</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>PET 599 03 Thesis Research</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

Todd B Hoffman

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET 410 01 Reservoir Simulation</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>PET 410 11 Reservoir Simulation</td>
<td>0</td>
<td>48</td>
</tr>
<tr>
<td>PET 410 12 Reservoir Simulation</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>PET 495 02 Special Topics</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>PET 544 01 Adv. Enhanced Oil Recovery</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>PET 599 05 Thesis Research</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Abbreviated Faculty Resumes

Dr. Burt J. Todd
Assistant Professor/Department Chairman
Department of Petroleum Engineering

Education:

B.S. (1979) Montana Tech Petroleum Engineering
Ph.D. (1990) University of Kansas Chemical and Petroleum Engineering

Professional Registrations and Licenses:

EIT (1980)

Work Experience:

Montana Tech Assistant Professor (2008-present)
ConocoPhillips Corporation Research Reservoir Engineer (1990-2008)
Montana Tech Adjunct Professor (1983-1986)
Marathon Oil Reservoir/Production Engineer (1980-1982)
Marathon Oil Summer Intern (1979)
Amerada Hess Summer Intern (1978)
Union Oil Summer Intern (1977)
Shell Oil Summer Intern (1976)

Professional Affiliations:

Society of Petroleum Engineers
Phi Kappa Phi
Mu Beta Pi

Honors and Awards:

Outstanding PhD Research (University of Kansas, 1990)

Research Areas

Reservoir Modeling
EOR in Unconventional Reservoirs
Multiphase Flow and Liquid Loading
Funded Grants:
Montana Board of Oil and Gas Elm Coulee Study - $500,000

Service:
Montana Tech Petroleum Department Chairman, 2014-present
Montana Tech Petroleum Department Master’s Committee, 2009-2016
Montana Tech Petroleum Department Curriculum Review Committee, 2011-2016
Served as Publicity Chairman for the Bartlesville Section of the Society of Petroleum Engineers, 2004-2008
Dr. B. Todd Hoffman, P.E.
Assistant Professor
Petroleum Engineering Department

Education:
Ph.D. Petroleum Engineering; Stanford University: June 2005
M.S. Petroleum Engineering; Stanford University: June 2002
B.S. Petroleum Engineering, Montana Tech: December 1999

Work Experience:
Montana Tech Assistant Professor (2014-Present)
Colorado School of Mines Assistant Professor (2011-2014)
Golder Associates Senior Reservoir Engineer (2009-2011)
DRC Consulting Consulting Reservoir Engineer (2006-Present)
Montana Tech Assistant Professor (2005-2008)
Chevron ETC Reservoir Engineer (2003, 2004)
Anadarko Reservoir Engineer (2000)

Professional Affiliations:
Society of Petroleum Engineers
Order of Engineers
Tau Beta Pi Engineering Honors Society
Pi Epsilon Tau Petroleum Honors Society

Honors and Awards (Last Five Years):
2015 Montana Tech - Rose and Anna Busch Faculty Achievement Award – Nominated
2014 Colorado School of Mines - Order of Omega Teaching Award
2013 Colorado School of Mines - Alumni Teaching Award – Nominated
2013 Colorado School of Mines - Order of Omega Teaching Award

Patents:
Patent Serial No. 61/162,962 - “A System for Characterizing Fractures in a Subsurface Reservoir”

Registration:
Montana, May, 2006, #14114

Service:
SPE Education and Accreditation Committee (2013-2016)
SPE Petroleum Faculty Committee Member
Petroleum Curriculum Review Committee – Chair
Faculty advisor for Petrobowl Team Club (2014-2015)
Petroleum Engineering Graduate Admissions Committee (2012-2015)
Petroleum Engineering Undergraduate Curriculum (2012-2015)
Faculty representative for Petroleum Engineering at Mines Preview (2013)
PNW SPE Section President (2010-2011)
Research Areas:
Reservoir Engineering
History Matching
Naturally Fractured Reservoirs
Enhanced Oil Recovery
EOR for Unconventional Reservoirs

Peer Reviewed Publications (Last Five Years):

Research Funding Received:

<table>
<thead>
<tr>
<th>Title</th>
<th>Date</th>
<th>Funding Source</th>
<th>Amount Requested (my portion)</th>
<th>Other PIs / Collaborators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modeling the Frontier Formation, WY</td>
<td>May 2015</td>
<td>SM Energy</td>
<td>$59,391</td>
<td>M. Hofmann, U Montana</td>
</tr>
<tr>
<td>Primary Recovery for the Bakken Formation</td>
<td>Dec. 2012</td>
<td>Whiting Petroleum Co.</td>
<td>$107,500</td>
<td>-</td>
</tr>
<tr>
<td>Modeling Complex Hydraulic Fractures</td>
<td>Feb. 2012</td>
<td>UNGI Research Consortium</td>
<td>$195,000</td>
<td>A. Tutuncu</td>
</tr>
<tr>
<td>Vaca Muerta Consortium</td>
<td>Jan. 2012</td>
<td>Petroleum Companies</td>
<td>$240,000</td>
<td>Sonnenberg, et al. geo/pet faculty</td>
</tr>
<tr>
<td>History Matching Naturally Fractured Res.</td>
<td>March 2006</td>
<td>Chevron</td>
<td>$45,000</td>
<td>-</td>
</tr>
</tbody>
</table>

Time Distribution:
40% Scholarship and Research
40% Teaching
20% Service
Mary North-Abbott  
Associate Professor  
Department of Petroleum Engineering

Education:

B.S. (1985)  
MT College of Mineral Science & Technology  
Petroleum Engineering

M.S. (2000)  
MT Tech & MT State University  
Project Engineering & Mgmt

Work Experience:

Montana Tech  
Associate Professor in Petroleum Engineering (2015-present)

Montana Tech  
Assistant Professor in Petroleum Engineering (2004-2015)

MANA Consulting  
Consultant (2006-present) – Concurrent with above

MSE Technology Applications, Inc.  
Project Manager/Senior Petroleum Engineer (1998-2004)

MSE Technology Applications, Inc.  

MSE Technology Applications, Inc.  
Training Director (1991-1995)

Montana Technologies, Inc.  
Researcher/Laboratory Assistant (1989-1991)

Conoco, Inc.  
Control Person/Operator – Condensate Unit (1987-1989)

Conoco, Inc.  
Operator/Pumper/Special Projects (1985-1987)

Professional Affiliations:

Professional Engineering License, Montana (2008)

Society of Petroleum Engineers

Society of Women Engineers

Honors and Awards:

Montana Tech Faculty Merit Award (2015)

Advisor of the Year (2015)

Funded Grants:

Cunningham, A. (Montana State University), Holben, W. (University of Montana), North-Abbott, M. (Montana Tech-Petroleum Engineering Department), and Apple, M. (Montana Tech-Departments of Biological Science & Geophysics)), Environmental Responses to Carbon Mitigation through Geological Storage, DOE EPSCoR Implementation Grant, Total Funding $1,310,000 (Petroleum Engineering Department Funding $189,167 (2008-2012).


Publications:

North-Abbott, M., MT Tech of the University of MT, Core Sample Flow Properties Changes due to Supercritical CO₂ Exposure, presented at the American Association of Petroleum Geologist

Service:

Advisor/Manager for Montana Tech Hockey Team (2009-Present)
Member of Montana Tech Library Committee (2004-Present), current Secretary
Member of Petroleum Engineering Industrial Advisory Board (2004-Present)
Advisor to 120+ Petroleum Engineering undergraduate students
Member of Petroleum Engineering Department Curriculum Committee (2011-Present)
Faculty Lead for PET 202 Field Practices Course-weeklong field trip (2011-2014)
Member of Faculty Senate (2011-2014), served on two subcommittees
Advisor to Montana Tech Student Chapter of Society of Women Engineers (2005-2014)
Volunteer for Economic Summit (2007 & 2013)
Member of Montana Tech Safety Committee (2004-2012)
Member of Petroleum Engineering Masters Advisory Committee (2009-2010)
Advisor to Montana Tech Student Chapter of American Society of Black Engineers (2007-2008)
Member of Montana Tech Research Advisory Committee (2004-2007)
Butte Amateur Hockey Association Board Member and Registrar (1999-2011)

Graduate Committees/Mentorships:

Claude Boiteau (Advisor), 2012-2016 (incorporating comments for final thesis document)
Brandon Overland, 2009-2013
Segun Olorunsola, 2011-2012
Keith Hawk (Advisor), 2010-2011
Adegbenga Sobowale, 2006-2009
Lucas Paugh, 2012-2014 (unfinished)
Mentor for three Undergraduate Research Projects
David A. Nugent
Assistant Professor
Petroleum Engineering Department

Education:

B.S. (1980) University of Southwestern Louisiana Petroleum Engineering

Work Experience:

Academia
Montana Tech Assistant Professor (2015-Present)
University of Alaska Fairbanks Adjunct Faculty Petroleum Engineering (2010-2012) part time
Nicholls State University Adjunct Faculty Petroleum Services (2009-2010) part time
Houston Community College Adjunct Faculty Petroleum Technology (1987-1988) part time

Industry
Smith Services Sr. Executive Sales Representative (2004-2005)
Superior Energy Services Staff Engineer (2002-2004)
Wink Engineering Project Manager (1989-1993)
Robertson-Findley Operating Co Vice President Oil and Gas Operations (1988-1989)
Mobil/Superior Oil Company Reservoir Engineer/Project Engineer (1980-1984)

Professional Affiliations:

Society of Petroleum Engineers
American Association of Drilling Engineers

Research Areas of Interest:

Petroleum Economics
Arctic Drilling and Blowout Prevention
Mr. David Reichhardt  
Assistant Professor  
Department of Petroleum Engineering

**Education:**

  Geology
  Geophysics

**Work Experience:**

- Montana Tech  
  Assistant Professor (2007-2016)
- Montana Tech  
  Adjunct physics instructor (1999 – 2007 summers)
- MSE Technology Applications, Inc.  

**Professional Affiliations:**

- Society of Petroleum Engineers

**Honors and Awards:**

- SPE Regional Distinguished Achievement Award for Petroleum Engineering Faculty (2014)

**Research Areas**

- Reservoir Characterization

**Research Funding Received**

- None

**Accreditation Visits**

- None

**Service:**

- Montana Tech SPE Advisor 2009 - 2015
Dr. Lee A. Richards
Assistant Professor
Department of Petroleum Engineering

**Education:**

**Work Experience:**
Montana Tech Assistant Professor (2015- Present)
BP America Assistant Subsea Supervisor (2014-2015)
BP America Wellsite Leader of the Future (2013-2014)
Halliburton Energy Services Field Professional (2006-2013)
Golden Helix Inc. Sales Associate (2005-2006)
Bioscience Inc. Director of Biofilms Laboratory (2004-2005)
Montana State University Research Experience For Undergraduates (2001)
Washington State University Undergraduate Researcher (1998-2001)

**Professional Affiliations:**
Society of Petroleum Engineers

**Research Areas**
Remediation of Hydrocarbons
Biological Interactions within Drilling Fluids

**Service:**
Mining Engineering M.S. Committee Member for Kevin Dill, Directional Drilling in Open Pit Mines, (2015-Present)
Society of Petroleum Engineers, Montana Tech Chapter, Faculty Advisor, 2015- Present.
Eagle Mount Adaptive Ski Program, Teaching Team Member, 2002-Present
Richard J. Schrader  
Instructor I / Laboratory Director  
Department of Petroleum Engineering

Education:

B.S. (1985)  New Mexico Institute of Mining and Technology  Petroleum Engineering

Work Experience:

Montana Tech  Instructor/Lab Director (2010 – present)  
Montana Tech  Laboratory Consultant (2009 – 2010)  
New Mexico Tech  Senior Laboratory Associate (1985-2006)

Professional Registrations and Licenses:

Professional Affiliations:

Society of Petroleum Engineers  
Member of Order of the Engineer

Publications:


URP mentorships:

Kyle Haustveit 2012-2013

Service:

API testing standards committee for API RP 19D “Procedures for measuring long-term conductivity of proppants”
Dr. Susan M. Schrader  
Associate Professor  
Department of Petroleum Engineering  

Education:  
M.A. (1993) University of New Mexico Applied Mathematics  

Professional Registrations and Licenses:  
P.E. (2007) State of Texas (License No. 100571), State of Montana (License No. 19748)  

Work Experience:  
Montana Tech Associate Professor of Petroleum Engineering (2015-present)  
Montana Tech Assistant Professor of Petroleum Engineering (2008-2015)  
UT of the Permian Basin Assistant Professor of Petroleum Technology (2006-2008)  
New Mexico Tech Graduate Research Assistant (2001-2004)  
ENMU-Roswell Faculty (tenured) – Mathematics (1996-2003)  

Professional Affiliations:  
Society of Petroleum Engineers  
Society of Women Engineers  
American Association of Petroleum Geologists  
Society of Industrial and Applied Mathematics  

Honors and Awards:  
Tenure, Montana Tech (2014)  
First Place, SPE Rocky Mountain Student Paper Competition, Ph.D. Division (2004)  
Kosa Faculty Merit Award, ENMU-R (1999)  

Dr. Susan M. Schrader  
Associate Professor  
Department of Petroleum Engineering  

Education:  
M.A. (1993) University of New Mexico Applied Mathematics  

Professional Registrations and Licenses:  
P.E. (2007) State of Texas (License No. 100571), State of Montana (License No. 19748)
**Work Experience:**

Montana Tech  
Associate Professor of Petroleum Engineering (2015-present)
Montana Tech  
Assistant Professor of Petroleum Engineering (2008-2015)
UT of the Permian Basin  
Assistant Professor of Petroleum Technology (2006-2008)
New Mexico Tech  
New Mexico Tech  
Graduate Research Assistant (2001-2004)
ENMU-Roswell  
Faculty (tenured) – Mathematics (1996-2003)

**Professional Affiliations:**

Society of Petroleum Engineers  
Society of Women Engineers  
American Association of Petroleum Geologists  
Society of Industrial and Applied Mathematics

**Honors and Awards:**

Tenure, Montana Tech (2014)  
First Place, SPE Rocky Mountain Student Paper Competition, Ph.D. Division (2004)  
Kosa Faculty Merit Award, ENMU-R (1999)

**Selected Publications:**


**Service:**

Montana Tech Faculty Senate Chair (2015-2016) Academic Year  
Reviewer: SPE Journal of Reservoir Evaluation and Engineering  
President: New Mexico Tech Student Chapter of the SPE (2003-2004)
George P. Williams  
Instructor II  
Petroleum Department  

Education:  
**Bachelor of Science in Geology**  
Emphasis: Environmental Geochemistry  
July 1995, The University of Montana, Missoula, MT  

**Post Baccalaureate Study in Chemistry**  
The University of Montana, Missoula, MT  
September 2002 – June 2005  

**Masters of Geochemistry**  
December 2014, Montana Tech of the University of Montana, Butte, MT  

Work Experience:  
**Fall 2016 – Present**  
Lab Instructor, Petroleum Department  
Montana Tech, Butte, MT  
**Fall 2010 - Spring 2015**  
Visiting Instructor, Chemistry Department  
Montana Tech, Butte, MT  
08/08 – 05/10  
Chemistry Teacher  
Cotter High School, Winona, MN  
01/07 – 07/08  
Director of Operations  
Boys and Girls Club of Rochester, MN  
Director of operations and programs at three Club sites in the area  
09/02 – 06/05  
Teaching Assistant  
The University of Montana, Missoula, MT  

Professional Associations:  
Society of Petroleum Engineers  

Honors and Awards:  
Rose and Anna Bush Excellence in Teaching Award, May 2012  
Second place award for best presentation, October 2013; American Waters Resource Association, Montana Chapter  

Publications:  
Article in review: Biogeochemical and microbial dynamics between water column and sediment processes in a productive mountain lake: Georgetown Lake, MT, USA.  

Research Areas:  
Baseline water quality studies, Water sampling and monitoring and assessment, and Solutions and treatment of produced water.  

Service:  
Lab Safety Committee