**Resources for Petroleum Engineering Students**

* **Adapted from the Departmental Assessment, these goals/learning outcomes and senior seminar competencies which will assist you in preparing strong resumes & cover letters.**
* **In addition, reviewing these documents should also help you to provide solid examples in your upcoming interviews!**

**Program Educational Objectives:** A graduate of Marietta College’s Petroleum Engineering program who has been working in the industry for approximately five years should demonstrate:

1. Technical competency in the area of petroleum engineering and an understanding of geology, geophysics,land, marketing, and accounting principles as they relate to the business;
2. The ability to undertake and complete projects with limited guidance;
3. Integrity and professionalism in the practice of engineering and a commitment to social responsibility;
4. Effective teamwork skills necessary to promote the advancement of corporate vision, mission, and goals; and
5. The ability to effectively communicate technical ideas to peers and supervisors.

**Program Educational Goals:** The following educational goals are tied to our student outcomes and are critical to helping us achieve our vision and mission. The goals of our program are to:

1. Provide students with a fundamental knowledge of petroleum engineering in the areas of drilling, production, and reservoir engineering, and formation evaluation;
2. Provide students with an integrated, comprehensive design experience beginning with exposure to industry practice and exercises in the freshman year, leading to a capstone design experience in the senior year;
3. Provide students with opportunities throughout the curriculum to develop good written and oral communication skills; problem solving and decision making skills; and computational and technological literacy;
4. Provide students with a recognition and understanding of the professional and societal responsibilities associated with being a petroleum engineer; and
5. Provide students with opportunities to address global and multi-cultural issues, investigate models of social behavior and leadership, sharpen their aesthetic sense, and embrace their own social and personal development.

Student Outcomes: In order to achieve the five program goals of the Petroleum Engineering program, students should the following competencies:

1. an ability to apply knowledge of mathematics, science, and engineering;
2. an ability to design and conduct experiments, as well as to analyze and interpret data;
3. an ability to design a system, component, or process to meet desired needs;
4. an ability to function on multi-disciplinary teams;
5. an ability to identify, formulate, and solve engineering problems;
6. an understanding of professional and ethical responsibility;
7. an ability to communicate effectively;
8. the broad education necessary to understand the impact of engineering solutions in a global and societal context;
9. a recognition of the need for, and an ability to engage in life-long learning;
10. a knowledge of contemporary issues; and
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Specifically related to petroleum engineering, our graduates must demonstrate competency in:

1. mathematics through differential equations;
2. probability and statistics;
3. fluid mechanics;
4. strength of materials;
5. thermodynamics;
6. design and analysis of well systems;
7. procedures for drilling and completing wells;
8. characterization and evaluation of subsurface geological formations and their resources using geoscientific and engineering methods;
9. design and analysis of systems for producing, injecting, and handling fluids;
10. application of reservoir engineering principles and practices for optimizing resource development and management; and
11. use of project economics and resource evaluation methods for design and decision making under conditions of risk and uncertainty.

The following are competencies broken down by area specifically assessed in the senior seminar:

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| **Reservoir Characterization:** |  |  |
| 1. Seismic Analysis |  |  |  |
| 2. Log Correlation/Fault Cut Identification |  |
| 3. Cross Section Construction |  |  |
| 4. Structure Map Evaluation |  |  |
| 5. Isopach Map Construction |  |  |
| 6. Log Analysis: |  |  |  |
|  a. Rw Determination |  |  |
|  b. Sw Determination |  |  |
|  c. Net Pay Thickness Determination |  |
| **Drilling Engineering:** |  |  |
| 1. Drilling Program (Wellbore Diagram) |  |
| 2. Drilling Time Evaluation |  |  |
| 3. Casing Program |  |  |  |
| 4. Cementing Program |  |  |
| 5. Completion Program |  |  |
| 6. Perforation Optimization Analysis |  |
|  |  |  |  |  |
| **Reservoir Engineering/Characterization:** |
| 1. Reservoir Thickness Calculation |  |
| 2. Reservoir Fluid Evaluation |  |  |
| 3. Routine Core Analysis Evaluation |  |
| 4. Special Core Analysis Evaluation |  |
| 5. Pressure Buildup Test Analysis |  |
| 6. Gas Material Balance Calculations |  |
|  a. P/Z Plot |  |  |  |
|  b. Volumetric |  |  |  |
| 7. Gas Sales Contract Analysis |  |  |
| 8. Gas Well Deliverability Calculation |  |
| 9. Oil Material Balance Calculation |  |
| 10. Oil Volumeteric Analysis |  |  |
| 11. Oil Volumetric Analysis Monte Carlo Simulation |
| 12. Waterflood Design |  |  |
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| **Production Engineering:** |  |  |
| 1. Production Data Evaluation |  |  |
| 2. Oil Well Deliverability Analysis |  |
|  a. Inflow Performance Relationship |  |
|  b. Vertical Lift Performance |  |  |
| 3. Flowing Well Analysis |  |  |
| 4. Gas Lift Analysis |  |  |  |
|  a. Optimum Gas Lift Rate |  |  |
|  b. Limited Gas Supply Rate |  |  |
|  c. Gas Lift Valve Design |  |  |
| 5. Electric Submersible Pump Design |  |
| 6. Matrix Acid Stimulation Program |  |
| 7. Production Facilities |  |  |
|  a. Line Heater Design |  |  |
|  b. Horizontal Three-Phase Separator Design |
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| **General Engineering Design Criteria:** |  |
| 1. Economic |  |  |  |
|  a. Casing Program |  |  |
|  b. Matrix Acid Stimulation Program |  |
|  c. Waterflood Evaluation |  |  |
| 2. Environmental - Operation Log |  |
| 3. Ethical - Rig Contract Bid Package |  |
| 4. Health and Safety - H2S Evaluation |  |
| 5. Social - Your Role |  |  |
| 6. Political - Strike Scenario |  |  |

***Don’t forget about the benefits of marketing your broad based liberal arts education, a hallmark of your MC education. Here are some skills to stimulate your writing and interviewing skills so that you can market yourself dynamically!***

*Computer:* Microsoft Office, including advanced Excel skills
*Communication:* Public speaking; presentation, writing & technical writing
*Laboratory*: Safety measures; chemical preparation; sample preparation; titrations, documentation
*Research Methodology*: Scientific method; hypothesis development; experimental design; quantitative and qualitative analysis

*Interpersonal:* Individual; collaborative; ethics; understanding of multiple perspectives; global and diversity
*Project Management*: Time management, problem solving, leadership, decision-making, prioritizing