CH EN 6171 Field Study (Credit or Non-Credit)

Overview
The Department of Chemical Engineering and the Energy & Geoscience Institute (EGI) at the University are offering an eleven-day field program exposing engineers and geoscientists to the principal aspects of petroleum field operating systems and petroleum geology. This is a required course for an MS degree in Petroleum Engineering (credit based) at the University of Utah. Information about this program and admission requirements are described in http://www.che.utah.edu/pe.

This course is also available to qualified and mature individuals who are interested in taking this as an accredited field course at another academic institution or as a non-credit continuing education experience.

This course will provide a first-hand experience in Petroleum Engineering activities such as exploration and production, pipeline, and refining operations. Petroleum geologic principles are best illustrated in the field; by surface exposures- outcrops. Each student will be required to spend two weeks in the summer in the Central Rocky Mountains and Colorado Plateau region on a field study. Specific localities will include the Paradox Basin, Uinta Basin, Central Utah Thrust Belt, Green River Basin, and Utah-Wyoming Thrust Belt.

2015 Meeting Times
Daily from May 10 – 22, 2015, inclusive including Saturday, May 16. There will be no class on Sunday May 17, 2015.

Instructors
The three course instructors are:

Tom Anderson
Senior Advisor to the Director and Research Scientist, EGI
Energy & Geoscience Institute - University of Utah
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Office Phone: 801-585-9178
Mobile Phone: 307-277-8031
Bill Keach  
Research Scientist - EGI; Visiting Associate Professor, Brigham Young University  
Energy & Geoscience Institute - University of Utah  
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Mobile Phone: 801-857-7728

Alan Walker  
Executive Director, Utah Energy Research Triangle  
Energy & Geoscience Institute, Senior Advisor  
E-Mail: alanjwalker@egi.utah.edu  
Mobile Phone: 801-864-5960

Registration Questions  
Please contact:

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Graduate Program Coordinator  
Department of Chemical Engineering  
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Office Phone: 801-587-3610

Catalogue Course Description

CH EN 6171 Field Study (3 credits)

This course will provide a first-hand experience in Petroleum Engineering activities such as exploration and production, pipeline, and refining operations. Petroleum geologic principles are best illustrated in the field; by surface exposures-outcrops. Each student will be required to spend two weeks in the summer in the Central Rocky Mountains and Colorado Plateau region on a field study. Specific localities will include the Paradox Basin, Uinta Basin, Central Utah Thrust Belt, Green River Basin, and Utah-Wyoming Thrust Belt.

Prerequisites
Department Permission Required
Costs
In addition to the tuition for three credit hours, students are expected to pay a course fee to cover the field-trip costs. These are $3,000/student for double occupancy. The fee for single occupancy is $3,750. This covers transportation in the field, accommodations, meals and incidentals for the 11-day trip. Personal safety equipment will be provided (hard hats, eye protection, and flame retardant coveralls). **Steel-toe safety shoes are required.** Students must supply this protective footwear themselves.

Attendees are requested to register by April 3, 2015. Any registration after that is subject to additional fees because of restricted accommodations in these areas. A non-refundable deposit of $440 is required by April 10, 2015.

Tentative Grading Scheme
The grading will be based on the following criteria.

25%  Active and engaged participation in the field program
25%  Petroleum geoscience exam
25%  Detailed journal submitted within three weeks of completion of the field study
25%  Two weekend exams on engineering principles

Topics
Students will be exposed to the following engineering operations and geologic features and topics and concepts.

1. Rock outcrops, comprising both clastic and carbonate exposures
2. Stratigraphy (reservoir, seal, source rocks)
3. Geologic structures (faults, folds, thrusts, unconformities, natural fractures)
4. Geologic history, tectonics, and landforms
5. Conventional and unconventional reservoirs
6. Drilling, logging, and well workover operations
7. Production gathering systems
8. Water management facilities and concepts, including reuse for secondary recovery
9. Hydraulic fracturing and completions
10. Gas processing and storage
11. Petroleum refining
12. Oil shale and coalbed methane
Texts
The following textbook will be provided.


Additional field guides will be provided by the instructors.

Tentative General Schedule (for Summer 2015, subject to change)
The following tentative schedule is planned.

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Itinerary</th>
<th>Locations and Topics (subject to adjustment)</th>
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<tbody>
<tr>
<td>1</td>
<td>May 10</td>
<td>EGI</td>
<td>• Ice Breaker Dinner @ 6:00 PM</td>
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<td>• Geoscience Review</td>
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<td>2</td>
<td>May 11</td>
<td>Salt Lake City to Price, Utah</td>
<td>• Utah Hingeline, Wasatch Fault, Intermountain Seismic Belt</td>
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<td>• Eocene to Cretaceous stratigraphy; Green River Formation.</td>
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<td>• Coalbed Methane Operations – Drunkard’s Wash: ConocoPhillips</td>
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<td>• Castle Valley amine plant, CO₂ extraction: XTO</td>
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<td>3</td>
<td>May 12</td>
<td>Price to Moab</td>
<td>• Dalton Wells Dinosaur Quarry, lower Cretaceous dinosaurs</td>
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<td></td>
<td>• Buckhorn Draw: Mesozoic stratigraphy, petroglyphs</td>
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<td>• Oil ran trans loading facilities: Savage in Price</td>
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<td>• Arches National Park, development of arches, joints and fractures</td>
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<td>• San Rafael Swell Laramide structure; Sinbad Limestone</td>
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<td>4</td>
<td>May 13</td>
<td>Moab to Bluff</td>
<td>• Drilling operations in Cane Creek Shale: Fidelity</td>
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<td>• Dead Horse Point</td>
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<td>5</td>
<td>May 14</td>
<td>Bluff</td>
<td>• Anticline structures</td>
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<td>• Paradox Basin reservoir facies: Pennsylvanian algal buildups</td>
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<td>• Honaker Trail section raft trip “Icehouse Stratigraphy”</td>
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<td>6</td>
<td>May 15</td>
<td>Bluff to Richfield</td>
<td>• Nebo Thrust Fault</td>
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<td>• Faulted alluvial fans: Wasatch Fault</td>
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<td>• Aneth Oil Field, EOR, Montezuma Creek: Resolute Energy</td>
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<td>• Salt Valley Anticline; Paradox Basin salt tectonics</td>
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<td>• Dakota and Morrison channels</td>
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<td>• Salina Canyon angular unconformity</td>
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<td>• Covenant Oil Field: Wolverine Oil</td>
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<td>Date</td>
<td>May 16</td>
<td>Richfield to Salt Lake City</td>
<td>- Natural gas-fired power generation plant at Current Creek in Mona: Rocky Mountain Power: PacifiCorp</td>
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| 8    | May 18 | Salt Lake City to Vernal via Parley's Heber-Duchesne | - Produced water management, Duchesne  
- Uinta Basin oil & gas production: Crescent Point Energy  
- Drilling rig, possible hydraulic fracturing operations  
- Oil Shale Operations – RedLeaf |
| 9    | May 19 | Vernal to Rock Springs | - Oil & Gas Service, logging tools, stimulation equipment: Halliburton  
- Uinta Mountains; Precambrian to Cretaceous stratigraphy on flank  
- Clay Basin natural gas storage; Frontier formation production: Questar |
| 10   | May 20 | Rock Springs to Kemmerer | - Rock Springs Uplift and Laramide structures  
- Almond-Erickson tight gas sands  
- Green River “oil shale”  
- Sevier thrust faults; outcrops  
- Birch Creek Unit oilfield; 3D seismic  
  Setup for modeling and simulation course  
- Opal hub, pipeline operations: Williams |
| 11   | May 21 | Kemmerer to Salt Lake City | - Shute Creek processing plant (CO₂, H₂S, Helium, CH₄): ExxonMobil  
- Fossil Butte National Monument, Green River shale and fish fossils  
- Cretaceous clastic wedge sedimentation  
- Utah-Wyoming Thrust Belt play and discoveries (Pineview, etc.)  
- Echo Canyon conglomerate |
| 12   | May 22 | Salt Lake City | - Refinery Operations  
- Graduation |