PETR 4121— PETROLEUM DESIGN I – FALL 2016

Catalog Data: Design projects characteristic of petroleum engineering, including consideration of cost, design optimization, codes and standards, and ethics. (Writing Intensive including oral presentations)

This course is the FIRST PART of a two course sequence, PETR 4121 and PETR 4222. All students registered for this class must take PETR 4222 in the Spring of 2017. The project assigned will be carried into the second semester and all work, learnings and preliminary work will be built upon subsequently.

IN ADDITION TO THE ASSIGNED PROJECT A FORMAL REPORT ON A PROJECT WHICH HAS BEEN TECHNICALLY SOLVED WILL BE WRITTEN DURING THE FIRST SIX WEEKS OF THE SEMESTER.

Prerequisites: PETR majors only; 3.0 TTU GPA; C or better in PETR 3304, 3306 and 3401, MATH 3342 or IE 3341, IE 2311, GEOL 4324, 4334, CE 3303 or ME 3403, CE 3305 or ME 3370, CE 3302 or ME 2302, ENCO 3350, and 3 hrs. of oral communications.

Co requisites: 6 PETR elective hours in either PETR 4307, 4321, 4314, 4306 OR 4324.

Textbook Oil and Gas Property Evaluation, John D. Wright, (PETR 4300), ISBN: 978-0-9896749-0-4

Software / Web Sites PETRA PHDWIN ONE PETRO DRILLING INFO TEXAS RAILROAD COMMISSION WEBSITE


*Disclaimer: “Topics and/or dates may be changed during the semester at the instructor’s discretion because of scheduling issues, developments in the discipline, previous classes, or other contingencies.”

<table>
<thead>
<tr>
<th>Section</th>
<th>Time* [weeks]</th>
<th>Topics</th>
<th>Outcomes (Goals)</th>
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<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>GEOLOGICAL ANALYSIS AND PRELIMINARY VOLUME IN PLACE ESTIMATES</td>
<td>FORMATION TOPS – TARGET ZONE (Petra) STRATIGRAPHIC COLUMN - CROSS SECTION - LITHOLOGY (Petra) TARGET ZONE/ ANALOGY PRELIMINARY LOG ANALYSIS ANALOGY/ GEO DEPOSITIONAL ENVIRONMENT RECOVERY EFFICIENCY TYPE PRODUCTION PROFILE (IMPACT OF HORIZONTAL VS VERTICAL) TYPE OF PRODUCTION PROFILE (HISTORICAL VS NEW TECHNOLOGY) ORIGINAL HYDROCARBONS IN PLACE ESTIMATE</td>
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<td>PRESENTATION 1</td>
<td>GROUP ORAL PRESENTATION + REPORT</td>
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### PRELIMINARY COMPLETION PROGNOSIS

- Detailed Drilling Prognosis and AFE

### PRELIMINARY DESIGN FOR STIMULATION AND COMPLETION PROCEDURE + AFE
- Pore Pressure/Fracture Gradient Determination
- Casing Points Determination
- Casing Design
- Drilling Profile + Timeline + Cost Estimate + AFE

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**Presentation 2**

GROUP ORAL PRESENTATION + REPORT

### PRELIMINARY FIELD DEVELOPMENT /PRIMARY PHASE

- Plan of Development/Exploitation
- Cost Estimates
- Preliminary Cash Flow Analysis Leading to Project Financial Performance Including Financial Beacons/Metrics + Resource Assessment

**Presentation 3**

GROUP ORAL PRESENTATION + REPORT

### FORMAL REPORT PROJECT WRITE UP EXERCISE (it overlaps with first two sections)

- A formal report as per chapter 17 of textbook + report guideline
- Handout will be written using the technical data supplied. Only technical work required will be the economic analysis.

*Duration of topic is subject to changes depending on class performance*

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**Coordinators:**

**Marshall Watson, P.E. Ph.D.**

- Chair, Bob L. Herd department of Petroleum Engineering
- PE building, room 214C, [marshall.watson@ttu.edu](mailto:marshall.watson@ttu.edu)
- Office Hours: After class/by appointment

**Denny Bullard,**

- Instructor, Bob L. Herd department of Petroleum Engineering
- PE building, room 232, [denny.bullard@ttu.edu](mailto:denny.bullard@ttu.edu)
- Office Hours: After class/by appointment

**Steven Henderson, Ph. D.**

- Associate Professor of Practice. Bob L. Herd department of Petroleum Engineering
- P.E. engineering Building, room 222, [steven.henderson@ttu.edu](mailto:steven.henderson@ttu.edu)
- Office Hours: By appointment

**Alberto Giussani**

- Instructor, Bob L. Herd department of Petroleum Engineering
- PE building, room 223, [alberto.giussani@ttu.edu](mailto:alberto.giussani@ttu.edu)
- Office Hours: After class/by appointment

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**Grading**

Academic Integrity is described in Texas Tech University Undergraduate and Graduate Catalog 2012-13 pg. 56-57 and OP 34.12

The final grade for this course will be based on the following "participation formula":

- **CLASS ATTENDANCE**: 5% (LECTURE + DISCUSSION)
- **3 PRESENTATION + REPORT @ 25% EACH**
- **WRITTEN REPORT EXERCISE = 20%**

In addition, the following grade scale will be used to determine your letter grade:

- **90 - 100 = A**, **80 - 89 = B**, **70 - 79 = C**, **60 - 69 = D** and **0 - 59 = F**.

* Individual performance within the team will be evaluated by individual scorecard from each team member. Inconsistent/poor performance will be penalized by up to a drop of a letter grade.

You must sign the acknowledgement form to pass the class.
**Attendance Policy:** Absence and tardy policy - Excessive or unexcused absences or tardiness will result in being dropped from the class or result in a lower grade. You are subject to being dropped from the class after three or more unexcused absences.

Absence due to religious observance OP 34.19- The Texas Tech University Catalog states that a student may be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused for this purpose may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused.

Absence due to officially approved trips – The Texas Tech University Catalog states that the person responsible for a student missing class due to a trip should notify the instructor of the departure and return schedule in advance of the trip. The student may not be penalized and is responsible for the material missed.

Whether an absence is excused or unexcused is determined solely by the instructor with the exception of absences due to religious observance and officially approved trips described above. The Center for Campus Life will notify faculty, at the student’s request, when a student is absent for four consecutive days with appropriate verification of a health related emergency. This notification does not excuse the student from class, it is provided as a courtesy. The service is explained on the Center for Campus Life website.

**Individual performance within the team will be evaluated by an individual scorecard from each team members. Consistent poor performance will be penalized by up to a drop of a letter grade.**

**Class Time & Location:**

<table>
<thead>
<tr>
<th>Lecture Time:</th>
<th>M 4:00 - 4:50 PM in PE 110+208</th>
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<tbody>
<tr>
<td>Discussion Time:</td>
<td>Section 1 M 11.00-11.50 AM, PE 204</td>
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<td>Section 2 M 1.00-1.50 PM, PE 204</td>
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<td>Section 3 M 2:00-2:50 PM, PE 204</td>
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<td>Section 4 M 3:00-3:50 PM, PE 204</td>
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| Course Web Site: | The University web site “blackboard” will be used for communications, data sharing and assignments. |

**Notes:**

**ADA Compliance:**
Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as possible to make necessary arrangements. Students must present appropriate verification from Student Disability Services during the instructor’s office hours. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from Student Disability Services has been provided. Accommodation for Students requiring service animals. For additional information, please contact Student Disability Services office in 335 West Hall or call 806-742-2405.

**Academic Integrity:**
Academic Integrity is described in the Bulletin of Texas Tech University Undergraduate and Graduate Catalogue and OP 34.12. The penalty for Academic dishonesty will be a grade of “F” for the course. This includes all form of dishonesty including signing in for another student or texting TopHat info to another student.

**Policy Classroom Citizenship:**
All students are expected to come to class alert and ready to participate. If you must leave the class before the end of the session, do not return. Sleeping, reading newspapers, surfing the net and doing homework for other classes are not allowed during class. Students are expected to assist in maintaining a classroom environment that is conducive to learning. PDA’s, cell phones, beepers and other electronic devices are distracting and should be silenced during class time. No Tobacco products are allowed. When exiting the classroom, place your trash in the waste can, the next student will appreciate your diligence. *For presentation a proper professional attire is required.*

**Methods of Assessment of Learning Outcomes (Specific Course Requirements and Policies):**

- ORAL PRESENTATION
  - Individual presentations, each team member will have one presentation
  - Team presentation
- WRITTEN REPORTS
  - 1 INDIVIDUAL TECHNICAL REPORT
  - 2 TEAM REPORTS, a) Formal report project, b) Primary phase development

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Marshall Watson, Denny Bullard and Alberto Giussani /AUGUST 2016
ABET: On a scale from 0 (no contribution) to 5 (maximum contribution)

Contribution
(a) mathematics & basic sciences - 5
(b) engineering topics - 5

Meeting the Professional Component
(c) engineering design - 4
(d) general education - 2
(e) other - 0

On a scale from 0 (no contribution) to 5 (maximum contribution)

Relationship
(a) mathematics, science, & engineering - 5
(b) design & conduct experiments, analyze & interpret data - 0

Program Objectives
(c) analyze & interpret data - 5
(d) design a system, component or process - 4
(e) Function on multi-disciplinary teams - 5
(f) Identify, formulate and solve engineering problems - 5
(g) Understanding of professional and ethical responsibility - 4
(h) Ability to use techniques, skills and modern engineering tools necessary for engineering practice - 5
(i) Communicate effectively - 5
(j) Knowledge of contemporary issues - 3
(k) Impact of engineering in the global and society context - 3

Objectives: PETR 4121 provides students an insight to all aspects of Petroleum systems, which might include, geological evaluation, formation evaluation, drilling & completion, decline analysis, production forecasts, reserve and risk analysis and facility design. Emphasis is placed on evaluating hydrocarbon properties and making investment decision. The objective is to expose students to practical design problems based on real field data with all of the associated shortcomings and uncertainties.
PETR 4121

PETROLEUM DESIGN I

DATE: ___________________________

I, ____________________________________________ HAVE RECEIVED A COPY OF

FIRST NAME, FAMILY NAME

THE SYLLABUS FOR THIS COURSE. FURTHERMORE, THE INSTRUCTORS HAVE

REVIEWED IN CLASS ALL THE CONTENTS OF THE SYLLABUS AND EXPLAINED IN

DETAIL

1) THE GRADE POLICY. 
2) THE PENALTIES FOR ACADEMIC DISHONESTY. 
3) INDIVIDUAL PERFORMANCE WITHIN A TEAM. 
4) ATTENDANCE TO THE DISCUSSION PORTION OF CLASS. 
5) INDIVIDUAL PRESENTATIONS/REPORTS. 
6) PROJECT REQUIREMENTS.

____________________________________
Student Signature

Texas Tech ID number: ______________________________
Email address: ________________________________

NOTE: This document will be kept on record at the Petroleum Engineering Office.