

CBM003 ADD/CHANGE FORM

Undergraduate Council
 New Course Course Change *2005*
 Core Category: 2005 Effective Fall 2008

or

Graduate/Professional Studies Council
 New Course Course Change
 Effective Fall __

1. Department: CHE ENG College: ENGR
 2. Person Submitting Form: Dr. Michael P. Harold Telephone: 34307

RECEIVED MAR 06 2008

3. Course Information on New/Revised course:
 • Instructional Area / Course Number / Long Course Title:
PETR / 3318 / Well Drilling and Completion I
 • Instructional Area / Course Number / Short Course Title (30 characters max.)
PETR / 3318 / WELL DRILL & COMPLT I
 • SCH: 3.00 Level: JR CIP Code: 14.2501.00 Lect Hrs: 3 Lab Hrs: 0

APPROVED OCT 22 2008

4. Justification for adding/changing course: To provide for new discipline areas

5. Was the proposed/revised course previously offered as a special topics course? Yes No

If Yes, please complete:

• Instructional Area / Course Number / Long Course Title:

___ / ___ / ___

• Content ID: ___ Start Date (yyyy3): ___

6. Authorized Degree Program(s): BS PETR ENGR

• Does this course affect major/minor requirements in the College/Department? Yes No

• Does this course affect major/minor requirements in other Colleges/Departments? Yes No

• Are special fees attached to this course? Yes No

• Can the course be repeated for credit? Yes No

7. Grade Option: Letter (A, B, C ...) Instruction Type: lecture ONLY (Note: Lect/Lab info. must match item 3, above.)

8. If this form involves a change to an existing course, please obtain the following information from the course inventory: Instructional Area / Course Number / Long Course Title

___ / ___ / ___

• Start Date (yyyy3): ___ Content I.D.: ___

9. Proposed Catalog Description: (If there are no prerequisites, type in "none".)

Cr: 3. (3-0). Prerequisites: MATH 3321, MECE 2334, PETR 2311 and PETR 3315. Co-requisite: CIVE 3334. Description (30 words max.): Drilling systems, fluids, pressure loss calculations, well cementing, ~~theoretical and laboratory~~ prediction of flow rates and pressure drop through conduits, calculation of static and flowing bottomhole pressures, well deliverability, artificial life.

10. Dean's Signature: [Redacted] Date: 3/6/08

Print/Type Name: Joseph Tedesco, Dean

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Cullen College of Engineering
CBM003 Supplement - B Fo
(New Course)

Must be attached to CBM003 form

Course: <u>PETR</u>	<u>3318</u>
<i>Subject Prefix</i>	<i>Course Number</i>

1. **Course Title:** Well Drilling and Completion I
Print course inventory screen using RARCAS/CATM and attach.
2. **Pre-requisite/Co-requisite:** MATH 3321, MECE 2334, PETR 2311 and PETR 3315 / CIVE 3334 (co-requisite).
3. **Rational for Course Format:** Standard university format
4. **Rational for Course Content:** Prepare students for more advanced topics in petroleum engineering
5. **ABET Constituents consulted:** Petroleum Engineering Advisory Board, several industry focus groups


State Course Outcomes: This course teaches the student the tools and techniques for drilling rig components design and operation, circulating, well control and well monitoring systems.

6. **Course Performance after implementing format and content changes:** _____¹
7. **Is course required?** X Yes No
8. **Required course outline attached?** X Yes No
9. **Estimated student demand** 50 _____ per semester
10. **Similar courses in other departments:** Yes X No
a. *If yes, list course(s)* _____
11. **Is course part of a sequence?** X Yes No
a. *If Yes, identify the sequence and comment on the relation to prior and subsequent courses: Subsequent course will cover more advanced aspects of the same subject*
12. **Textbook(s) and other required materials:** *Drilling Fluid Engineering Manual. Textbook prepared by M-I Drilling Fluids Co., 1998; SPE Monograph on Drilling, SPE Monograph on Recent Advances in Hydraulic Fracturing*

Note: Special Fees: If special fees requested, **Course Related Fee Request Form will be required.**

¹ Department reports will be requested about the effects of your new course on your curriculum both 12 and 24 months after the effective date for this new course.

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(New Course)

	<u>2/21/08</u>	<input checked="" type="checkbox"/> Approved
Chair of Initiating Dept. Signature	Date	

PETR 3318: Well Drilling and Completions I
Credit 3

Description: Drilling systems, fluids, pressure loss calculations, well cementing, theoretical and laboratory prediction of flow rates and pressure drop through conduits, calculation of static and flowing bottomhole pressures, well deliverability, artificial life.

Prerequisites: MATH 3321, MECE 2334, PETR 2311 and PETR 3315.

Co-requisite: CIVE 3334

Textbook Required: *Drilling Fluid Engineering Manual*. Textbook prepared by M-I Drilling Fluids Co., 1998; *SPE Monograph on Drilling, SPE Monograph on Recent Advances in Hydraulic Fracturing*

Course Objectives:

1. Develop oil field vocabulary and familiarity with methods and materials used in drilling, completing and producing oil and gas wells.
2. Develop hands-on computation skills with drilling and completion fluids as well as modern production equipment and meters
3. Be able to calculate fluid pressure losses through basic drilling and production systems.
4. Introduce the systems analysis concept for optimization and backpressure techniques for monitoring well performance.

Topics and Hours:

Topic	Hours
1. The System Concept	1
2. Rheology of Drilling and Completion Fluids	1
3. Mud Systems- diagnostic tests, water and oil based muds, additives, handling system	1
4. Oil Field Tubulars and Hydrostatics – drill string/casing/tubing, material grades, burst	1
5. Cementing – function and types of cement, well construction process, gas migration	1
6. Drilling System Pressure Loss Calculation – hydrostatic, flow through pipe, annuli, bit	1
7. Introduction to Well Control – BOP's, barrier concept, overview of kill methods	1
8. Introduction to Directional Drilling – planning trajectory, kickoff methods, limitations	1
9. Reservoir Performance – representations of liquid, gas and multiphase flow	1
10. Completion and Stimulation Methods – fracturing fluids, proppants, foams, quality control	1
11. Fundamentals of Single Phase Fluid Flow in Pipe – gas, liquid and homogenous mixture	1
12. Multiphase Flow in Pipes – holdup, flow patterns, tubing design, production monitoring	1
13. Production Systems Analysis – optimization and evaluation of effects of components	1
14. Metering – Orifice, PD, turbine, vortex, coriolis, ultrasonic, multiphase	1
15. Monitoring Production Systems – bottomhole and surface backpressure analysis	1
16. Separation Methods – conventional vertical and horizontal separators, compact separators	1
17. Pressure Boosting - liquid pumps, gas compressors, ESP's, PCP's, multiphase pumps	1
18. Surface and Subsurface Safety Systems - safety device symbols, safety valves and pilots	1
19. Artificial Lift Methods – overview and selection of gas- lift injection rate	1
20. Production Systems – Deepwater Production	1
One midterm examination and one final examination	3
Total Classroom Hours	31
Total lab hours	11

Method of Evaluation:

Homework Assignments & Quizzes	20%
Classroom, Field Trip, Lab & Workshop Participation	10%
Laboratory Reports & Quizzes	25%
Examinations (mid-term & final)	45%
Total	100%

Contributions to Professional Component:

- 1. Petroleum Engineering:** Provides students with the vocabulary and hand-on equipment experience to be function in the modern oil field. Develops basic skills needed for more advanced senior level design classes.
- 2. General Education:** Equips students with laboratory skills and decision process of selecting from competing technologies.

Relationship of Course Outcomes:

Objective	Program Outcome
Develop oil field vocabulary and familiarity with methods and materials used in drilling, completing and producing oil and gas wells.	<p>Competency in math through differential equations, prob and statistics, fluid mathematics, strength of materials, and thermo.</p> <p>Competency in design and analysis of well systems and procedures for drilling completing wells.</p> <p>Competency in design and analysis of systems for producing, injecting and handling fluids.</p>
Develop hands-on testing skills with drilling and completion fluids as well as modern production equipment and meters.	Competency in design and analysis of systems for producing, injecting and handling fluids.
Be able to calculate fluid pressure losses through basic drilling and production systems.	Competency in design and analysis of systems for producing, injecting and handling fluids.
Introduce systems analysis concept for optimization and backpressure methods for monitoring well performance.	<p>Competency in design and analysis of systems for producing , injecting and handling fluids.</p> <p>Competency in application of reservoir engineering principles and practices for optimizing resource development and management.</p>