

**COUNCIL OF CHAIRS  
CURRICULUM & CATALOG CHANGES  
APPROVED 2/18/14**

**ENGINEERING SCIENCE**

ES 110

Introduction to Engineering Design 2 credits: 1 class hour, 3 lab hours

*Co-requisite: MATH 103*

Students will be introduced to the profession of engineering and gain fundamental engineering skills with an emphasis on engineering design and problem solving. Topics covered include: problem definition and presentation of solution; the engineering design process; working in a team environment, engineering graphics by hand and in SolidWorks; graphical solutions and simple modeling in Microsoft Excel. Students will learn the process of designing, building, modeling, and optimizing a system through a semester long design project.

ES 316, Engineering Economics, 3 cr, 3 cl hrs

Prerequisite: ~~ES 111~~, [Junior standing](#)

Professional ethics. Economic decision-making for engineering alternatives. Use of compound interest and depreciation calculations to compare the relative economy of investments and procedures. The application of economic principles such as return on investment, leverage, and present worth to engineering problems. Use of PC computer programs. This course is not available for social science credit.

ES 350, Heat and Mass Transfer, 3 cr, 3 cl hrs

Prerequisite: ES 216, [ES 347](#)

Corequisite: MATH 335

Fundamentals of heat transfer, steady- and unsteadystate conduction, convection and radiation. Fundamentals of mass transfer, steady and unsteady state, diffusion, and convection. Dimensionless analysis, equipment

**Programming requirements**

For ES 302, 303, 347

Revise to ES 111, PET 111, or CSE 113

## **PETROLEUM ENGINEERING**

### **Undergraduate level**

Modify course description (bold, blue font) PETR 450, Well

Testing, 2 cr, 2 cl hrs

*Prerequisite: PETR345*

Design well testing program to meet specific guidelines. Apply conventional well test data to estimate the reservoir's capacity to transmit fluids, the reservoir's energy, and the effectiveness of the well completion. **Both Pressure Transient (PTA) and Rate Transient (RTA) analysis will be studied.**

Add new required course

PETR 4xx, Applied Reservoir Simulation, 3 cr, 2 cl hrs, 3lab hrs

*Prerequisite: PETR 345*

Use reservoir simulator for numerical modeling of petroleum engineering problems beyond classical approaches. Introduction to simulation fundamentals, work with post- and pre processing software, design and construct black oil, compositional and thermal models. History matching, predict and optimize well performance.

Remove course from required to elective

PETR 441- Natural Gas Reservoir Engineering

## **MANAGEMENT**

1. **Remove BA 315 and BA 317** (Business Law 1 and 2) from the catalog.
2. Insert **new course MGT 476 Project Management** as a requirement for Management and Management of Technology BS degrees. The new course description:

MGT 476, Project Management, 3 cr, 3 cl hrs

*Prerequisite: MATH 283, MGT 472 or consent of instructor*

Development of work breakdown structures and multi-factor project simulations to be used in dynamic resource allocations. Assessment and evaluation of project models over time.

3. **Change MKT 335** catalog listing from

**MKT 335, Principles of Marketing, 3 cr, 3 cl hrs**

*Prerequisite: ECON 252; BCS 283; or upper-class standing and consent of instructor*

Process, principles, and functions in current marketing systems.

To (note change from MKT to MGT):

**MGT 335, Marketing of New Products and Innovations, 3 cr, 3 cl hrs**

*Prerequisite: ECON 252; BCS 283; or upper-class standing and consent of instructor*  
Application of marketing theory and practice to developing new products and innovations.  
Focus on marketing early stage technology innovations and products from concept to implementation.

4. **Change FIN 302 catalog listing from**

**FIN 302, Principles of Finance, 3 cr, 3 cl hrs**

*Prerequisites: ACCT 202; BCS 283; ECON 252; or consent of instructor*

Theory and techniques of financial management for business.

To (note change from FIN to MGT):

**MGT 302, Introduction to Financial Economics, 3 cr, 3 cl hrs**

*Prerequisites: ACCT 202; BCS 283; ECON 252; or consent of instructor*

Introduction to cost analyses, financial management and planning, introduction to financial investments including debt, and capital budgeting models with examples of applications.

5. **Change numbering for BA 490 to MGT 486.**

6. **Change requirements for the Associates degree as follows:**

Delete BA 315 and BA 317

Add MGT 330

7. **Change Catalog listing for Minor in Management from**

**Minor in Management**

Minimum credit hours required—18

The following courses are required:

- FIN 302 (3)
- MGT ~~302(3)~~, 330 (3), ~~335 (3)~~, 472 (3)
- MKT 335 (3)
- Six (6) credit hours of Management Department courses numbered 300 or above.

Note: ECON 252 and BCS/MATH 283 are prerequisites for FIN 302 and MKT 335.  
Non-majors must obtain instructor consent in lieu of the prerequisites of ACCT 202 for ~~FIN~~ MGT 302

8. **Delete catalog listings for Business Administration and Marketing**

Catalog requirements with proposed changes:

**Undergraduate Program**  
**Associate of Science in Business**

Minimum credit hours required—65

*The following courses are required:*

- ACCT 201 (3), 202 (3), 371 (3)
  - BA ~~315 (3), 317 (3)~~
  - ECON 251 (3), 252 (3)
  - ENGL 111 (3), 112 (3)
  - [MGT 330](#)
  - Mathematics: Six credit hours chosen from MATH 103 (3), 104 (3), 105 (5), 131 (4)
  - TC 151 (3)
  - Business Electives: Nine credit hours selected in consultation with the faculty advisor
  - Humanities and Social Science Elective: Three credit hours chosen from Area 4 or Area 5 of the General Education Core Curriculum (page 5)
  - A total of eight credit hours in courses with associated laboratories from the disciplines of biology, chemistry, earth science, or physics
  - Electives to complete 65 credit hours
- Students must achieve a minimum GPA of 2.0 in required courses in order to graduate.

### **Core Requirements for the Bachelor of Science in Management**

*In addition to the General Education Core Curriculum (page 5), the following core of business and economics courses is required of all Management students:*

- ACCT 201 (3), 202 (3); ACCT 350 is recommended
- BA ~~315 (3), 490 (3)~~
- BCS 283 (3)
- CSE 113 (4) or ES 111 (3)
- ~~FIN 302 (3)~~
- MGT 101 (1), [302\(3\)](#), 330 (3), [335\(3\)](#), 462 (3), 472 (3), [476 \(3\)](#), 481 (3), [486 \(3\)](#)
- ~~MKT 335 (3)~~
- ECON 251 (3), 252 (3). *These courses may be used to fulfill the Area 4 of the General Education Core Curriculum, page 5.*
- At least two semesters of a single approved foreign language are strongly suggested but not required.
- Electives to complete 130 credit hours. To be selected in consultation with a faculty advisor.

Any required class or technical elective used toward a B.S. in Management or a B.S. in Management of Technology may not be taken on an S/U basis. Management majors must achieve a minimum GPA of 2.0 in required courses in order to graduate.

## **MATHEMATICS**

Changes to Degree Requirements (changes underlined)

- *Basic Mathematics:* MATH ~~221(3)~~, 231 (4), 254 (3), 335 (3), [336 \(3\)](#), 352 (3), 372 (3), 382 & 382L (4), 454 (3)

- *Mathematics Electives:* Four courses from at least two of the following areas:
  1. Applied Mathematics: ~~336 (3)~~, 410 (3), 411 (3), 435 (3), 436 (3), 437 (3), 438 (3)
  2. Pure Mathematics: 442 (3), 455 (3), 456 (3), 461 (3), 471 (3), 472 (3)
  3. Operations Research and Statistics: 415 (3), 483 (3), 484 (3), 486 (3), 488 (3)
- *Electives:* Four courses from at least two of the following areas:
  1. A minor in another department or a sequence of at least 18 related credit hours outside mathematics approved by the advisor.
  2. Eight (8) credit hours ~~with associated laboratories from the disciplines of: Biology, Earth Science, Engineering, Computer Science Engineering~~ from the science and engineering disciplines beyond the general degree requirements.

Curriculum Changes (changes underlined)

1. MATH 335, Ordinary Differential Equations  
~~Ordinary differential equations, series solutions, transform calculus.~~ Solution methods for first order ordinary differential equations of various types, including separable, linear, Bernoulli and exact. Solution methods for second (and higher) order linear differential equations with constant coefficients. Series solutions. Laplace transforms. Applications.
2. MATH 372, Basic Concepts of Analysis  
~~Dedekind cuts, sequences, limits, differentiation, integrals, infinite series.~~ Real numbers, sequences, limits, continuity, uniform continuity, differentiation, Riemann integral.