

## **Met/MSE 414 Syllabus: Process Design Spring Semester**

### **Course Information:**

Course title: Process Design

Course number: Met MSE 414

Credit hours: 3 credits

Prerequisites by topic: Engr 352, Met 308 309 310 341 and 344, all Engineering core courses must be completed

Classroom: McClure Hall 315

### **Instructor Information:**

Instructor: Keith Prisbrey, Professor of Metallurgy, PE

Office: McClure 407C

Office phone: 885-6743

Office hours: M-F 9:30-11:30 or by appointment

E-mail: pris@uidaho.edu

### **Textbook:**

Class notes will be provided prior to class meetings.

### **Supplementary reading:**

*Plant Design and Economics for Chemical Engineers, Fifth Edition*, Peters et al., McGraw-Hill Science (2002).

### **Course Objectives**

This course will use teams and incorporate service learning to focus on problem definition, flowsheet synthesis, equipment design, economic analysis, optimization and reporting; heuristic and open-ended design problems based on prior minerals, materials, and extractive process courses, economics, and basic and engineering science.

### **Learning Objectives:**

Upon the completion of this course, students should have the ability to:

1. Define process design.
2. Have knowledge of and be able to properly apply general design considerations.
3. Understand and apply basic principles of cost analysis.
4. Be able to perform cost estimation; calculate interest, investment, taxes, insurance, and depreciation costs.
5. Perform a profitability analysis.
6. Compile research into an engineering design report.
7. Ability to perform in teams and communicate effectively to accomplish the assigned task.

**Grading System:**

All design projects must be presented professionally, i.e. at the Engineering Design Expo, in May . In addition there will be three oral progress reports and project presentations, several written intermediate progress report, and the final design report. In addition there will be quizzes and short assignments on the design procedures, concepts, and tools presented.

In-class oral presentations on project progress (3)	30%
Final written design report	20%
Presentation at Engineering Design Expo	20%
Quizzes and short assignments	20%
Written progress reports (3)	10%

**Course Calendar:**

Class	Topic
1	Introduction and overview
2	Organize a design team
3	Pick a semester long design project
4	
5	Begin developing the design project procedure
6	
7	Report on progress
8	Obtain design information from the literature
9	
10	Material and energy balances and basic design
11	Equipment selection
12	Scale up
13	Exam
14	Revise and improve problem statements, material and energy balances, equipment selection, and comparisons of different choices.
15	
16	Time value of money, capital and operating cost estimation
17	
18	Profitability analysis
19	Exam
20	Report equipment specifications (identification, function, operation, materials, basic design data, essential controls, allowable tolerances, special information), scale-up calculations, safety factors, fire, explosion, and other hazards, waste disposal, and environmental protection plans.
21	
22	
23 – end of semester	Report on ethical responsibilities and considerations (better vs. best), and how the Engineering Ethics Code can best be followed. Make final presentations, final design report, and professional presentation.

**Disability Support Services Reasonable Accommodations Statement:**  
Reasonable accommodations are available for students who have a documented disability. Please notify the instructor during the first week of class of any accommodation(s) needed for the course. Late notification may mean that requested accommodations might not be available. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 333.

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