

1-2015

## BME 127T.01: Low Pressure Boilers

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**MISSOULA COLLEGE of the  
UNIVERSITY OF MONTANA  
INDUSTRIAL TECHNOLOGY DEPARTMENT**

**COURSE SYLLABUS**

**COURSE NUMBER AND TITLE:** BME 127T Low Pressure Boilers

**DATE REVISED:** January 2015

**SEMESTER CREDITS:** 3

**CONTACT HOURS PER SEMESTER:** 45

Lecture hours per week: 3

**PREREQUISITES:** None

**INSTRUCTOR:** Bill Hillman  
**E-MAIL:** [william.hillman@umontana.edu](mailto:william.hillman@umontana.edu)  
**PHONE:** (406) 243-7645  
**OFFICE LOCATION:** T&T II, West Campus  
**OFFICE HOURS:** By appointment OR as posted on Faculty Office door

**RELATIONSHIP TO PROGRAM:**

This course gives the Building Maintenance Engineers the basic knowledge to operate and maintain low pressure boiler systems and to supervise professionals that are doing this type of contract work on the boiler. It will allow students to get the Montana State Boilers License with 40 hours of hands-on training.

**COURSE DESCRIPTION:**

The fundamentals of low pressure boiler operation and maintenance. Covers steam, feed-water, fuel, and draft systems. Includes boiler water treatment and hot water heating systems. Introduces safe mechanical operating procedures used in the industry.

**STUDENT PERFORMANCE OUTCOMES:**

Occupational Performance Objectives

Upon completion of this course, the student will be able to:

1. Understand the basic concepts of steam, hot water, feedwater, fuel, and draft systems.
2. Understand the basic boiler cycle and boiler water chemistry.
3. Know how to use the tools and equipment of the trade.
4. Describe and demonstrate the fundamentals of safe boiler operation and maintenance.

## STUDENT PERFORMANCE ASSESSMENT METHODS AND GRADING PROCEDURES:

### Grading Scale:

|               |     |
|---------------|-----|
| 90% - 100%    | = A |
| 80% - 89%     | = B |
| 70% - 79%     | = C |
| 60% - 69%     | = D |
| less than 60% | = F |

**NOTE: Courses must be passed with a 'C minus (C-)' or greater to count toward degree/certificate requirements.**

### Grade Breakdown:

|            |   |
|------------|---|
| Tests      | 90%   |
| Attendance | 10% (Attendance will be taken at the beginning of class. If the student is not present at that time they will be marked absent for the class that day.) |

### Note:

1. Tests will be as required.
2. Late tests will be reduced one letter grade.
3. Late tests will not be accepted after one week.

### HOW VARIOUS ASSESSMENT METHODS WILL BE USED TO IMPROVE THE COURSE:

1. Student course evaluations
2. Peer feedback
3. Advisory committee feedback

**ATTENDANCE POLICY:** Attendance will be taken at the beginning of class. If the student is not present at that time they will be marked absent for the class that day.

**REQUIRED TEXT:** High Pressure Boilers by Frederick M. Steingress

**ACADEMIC INTEGRITY:** All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/VPSA/index.cfm/page/1321>.

**DISABILITY ACCOMMODATION:** Eligible students with disabilities will receive appropriate accommodations in this course when requested in a timely way. Please contact me after class or in my office. Please be prepared to provide a letter from your DSS Coordinator. For more information, visit the Disability Services website at <http://www.umt.edu/dss/> or call 406.243.2243 (Voice/Text).

**NOTE: Faculty reserves the right to modify syllabi and assignments as needed based on faculty, student, and/or environmental circumstances.**

## **COURSE OUTLINE:**

- I. Low Pressure Boiler Fittings
  - A. Safety Valves
  - B. Surface and Bottom Blowdown
  - C. Pressure Controls
  - D. Water Column and Gauge Glass
  
- II. Feedwater Systems
  - A. Feedwater System
  - B. Makeup Water System
  - C. Low Water Fuel Cutoff
  
- III. Steam System
  - A. Main Steam Stop Valve
  - B. Steam Strainers and Traps
  - C. Steam Piping
  
- IV. Fuel System
  - A. Fuel Oil System and Burners
  - B. Natural Gas System and Burners
  - C. Combination Fuel Oil and Natural Gas Systems
  - D. Combustion Controls
  
- V. Draft System
  - A. Natural Draft
  - B. Forced Draft
  - C. Induced Draft
  - D. Stack Condensation
  
- VI. Boiler Water Treatment
  - A. Scale
  - B. Corrosion
  - C. Boiler Water Analysis
  - D. Boiler Water Treatment
  
- VII. Boiler Operation Procedures
  - A. Blowdowns
  - B. Low Water Fuel Cutoff
  - C. Flame Scanner
  - D. Boiler Start Up and Shut Down
  - E. Boiler Maintenance and Inspection
  - F. Boiler and Water Treatment Logs
  
- VIII. Hot Water Heating Systems
  - A. Safety Valves
  - B. Temperature Controls
  - C. Flow Control and Pressure Reducing Valves
  - D. One and Two Pipe System Piping

- IX. Boiler Operation Safety
  - A. OSHA
  - B. EPA
  - C. Confined Spaces
  - D. Hazardous Material
  - E. Personal Protective Equipment
  - F. Lockout/Tagout