



Syllabus

Course No.:	PPT 207-001
Course Name:	Boilers, Accessories, and Basic Operations
Semester:	Fall 2020
Credits:	3
Class Meetings:	Tech B036: MTW 10:20-11:20 pm
Instructor:	Andrew D. Sullivan
Phone:	247-3047
Email:	Andrew.Sullivan3@msubillings.edu
Faculty Website:	http://www.msubillings.edu/cotfaculty/sullivan
Office:	A061 – Tech Building
Office Hours:	See faculty website link above

Required Texts and Material:

1. ISBN 9780826943729 Low Pressure Boilers Fifth Edition by Steingress, Frederick M. / Walker, Daryl R.
2. ISBN 9780826943316 High Pressure Boilers Sixth Edition by Steingress, Frederick M. / Frost, Harold J. / Walker, Daryl R.

Course Description:

Offers an introduction to boiler equipment, controls, and systems. Instruction includes the function and operation of all major components and control devices, common troubleshooting problems, and common maintenance concerns.

Course Goals and Objectives:

1. Identify and describe the purpose and function of boiler equipment and systems including: fittings, accessories, feed water systems, steam systems, combustion equipment, draft systems, and fuel systems.
2. Demonstrate the safe and efficient operation of high-pressure boilers and related equipment including startup, shutdown, normal, and emergency operations.
3. Explain the function of boiler control systems.
4. Assess boiler operations and determine safe and effective options to further improve boiler operations in terms of safety, efficiency, and reliability.
5. Analyze abnormal operations, devise logical explanations that explains the abnormal operation in terms of plausible failures, and plan troubleshooting activities to test and resolve the failure.

Access, Assistance, and Advocacy:

Your success in a positive, supportive, and enjoyable learning environment is my primary objective and the University's. Please let me know if there are barriers that I can help to address. We have a great support network to help. A summary of services is listed below. You can work with them directly or involve me as you prefer.



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- [Academic Support Center](#). Resources include tutoring and a writing center. Drop-in and by appointment.
- [Disability Support Services \(DSS\)](#). MSU Billings is committed to providing equal access. Please meet with me to discuss ways to ensure your full participation if you anticipate barriers. DSS will help us (247-3029, Tech Building A011).
- [TRIO/Student Support Services](#). Support for low income, first generation, and disabled students enrolled in a 4 year program (or 2+2 at City College). 657-2162
- [Native American Achievement Center](#). Advocacy and assistance for American Indian students. 657-2144
- [Student Health Services](#). Student Health Services provides medical care, mental health counseling, wellness services and education, and violence advocacy and prevention services. Located above the Academic Support Center at City College. Students can use Health Services even if they waive the student health insurance plan. 657-3027.
- [Veterans Services](#). For assistance activating your VA Educational Benefits, getting access to VA assistance for tutors, or joining the veteran student organization, contact the VA Representative in the Military and Veterans Success Center, Dawn Githens, at 657-2968. For assistance on the posting of your VA Educational benefits please contact Renee Haefer in the Business Services office at 657-1707.
- [Veterans Upward Bound](#). Assistance for veterans from admission to graduation. 657-2075

Academic Issues and Grading:

1. Late work is not accepted. It is not fair to the rest of the class to make exceptions. It is possible that a due date might be extended for the whole class beforehand with appropriate class discussion.
2. Final lecture grades will be calculated per the following scoring criteria:

Tests (average of 3 evenly split)	60%
Assignments	40%

3. Grade Scale:

Grade	Percentage	GPA		Grade	Percentage	GPA
A	93 - 100	4.0		C	73 - 77	2.0
A-	90 - 93	3.7		C-	70 - 73	1.7
B+	87 - 90	3.3		D+	67 - 70	1.3
B	83 - 87	3.0		D	63 - 67	1.0
B-	80 - 83	2.7		D-	60 - 63	0.7
C+	77 - 80	2.3		F	0 - 60	0.0

Course Outline:

The following plan is a guideline that will be adjusted to meet the needs of the class.

Week	Day	Class	Topic / Plan	Reading Due
1	Wed 08/19	1	Intro / Why learn about boilers?	
2	Mon 08/24	2	Boiler Types and Construction	HP Ch 1 - Steam Boilers
	Tue 08/25	3	Boiler Types and Construction	LP Ch 1 - Boiler Operation Principles
	Wed 08/26	4	Boiler System overview	HP Ch 2 - Boiler Systems



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3	Mon 08/31	5	Boiler System overview	
	Tue 09/01	6	Boiler fittings and components	HP Ch 3 - Steam Boiler Fittings
	Wed 09/02	7	Boiler fittings and components	LP Ch 2 - Steam Boiler Fittings
4	Mon 09/07		Labor Day NO CLASSES OFFICES CLOSED	
	Tue 09/08	8	Steam Systems	HP Ch 4 - Steam Systems
	Wed 09/09	9	Steam Systems	LP Ch 4 - Steam System
5	Mon 09/14	10	Feedwater Systems	HP Ch 5 - Feedwater Systems
	Tue 09/15	11	Feedwater Systems	LP Ch 3 - Steam Boiler Feedwater Systems
	Wed 09/16	12	Water Treatment	HP Ch 6 - Water Treatment
6	Mon 09/21	13	Water Treatment	LP Ch 7 - Boiler Water Treatment
	Tue 09/22	14	Test #1	
	Wed 09/23	15	Combustion Equipment	HP Ch 7 - Combustion Equipment
7	Mon 09/28	16	Combustion Equipment	
	Tue 09/29	17	Fuel Systems	HP Ch 8 - Fuels and Combustion
	Wed 09/30	18	Fuel Systems	LP Ch 5 - Fuel Systems
8	Mon 10/05	19	Fuel Systems	
	Tue 10/06	20	Boiler Controls	HP Ch 9 - Combustion and Boiler Controls
	Wed 10/07	21	Boiler Controls	
9	Mon 10/12	22	Draft Systems	HP Ch 10 - Draft Systems
	Tue 10/13	23	Draft Systems	LP Ch 6 - Draft Systems
	Wed 10/14	24	Draft Systems	
10	Mon 10/19	25	Boiler Instrumentation	HP Ch 11 - Instrument and Control Systems
	Tue 10/20	26	Operating a boiler	HP Ch 12 - Steam Boiler Operation
	Wed 10/21	27	Operating a boiler	LP Ch 8 - Boiler Operation Procedures
11	Mon 10/26	28	Operating a boiler	
	Tue 10/27	29	Licensing	HP & LP Ch 13 – Licensing
	Wed 10/28	30	Test #2	
12	Mon 11/02	31	Hot water boilers and fittings	LP Ch 9 - Hot Water Boilers and Fittings
	Tue 11/03		Election Day NO CLASSES OFFICES CLOSED	
	Wed 11/04	32	Hot water boilers and fittings	
13	Mon 11/09	33	How water accessories	LP Ch 10 - HW Accessories and Piping Systems
	Tue 11/10	34	How water accessories	
	Wed 11/11		Veterans Day NO CLASSES OFFICES CLOSED	
14	Mon 11/16	35	Cooling systems	LP Ch 11 - Cooling Systems
	Tue 11/17	36	Cooling systems	
	Wed 11/18	37	Boiler Safety Considerations	LP Ch 12 - Boiler Operation Safety
15	Wed 11/25		Final Exam 9-11 am in B036	

Maintaining an educative and safe learning environment

It is important that we work together to maintain classroom and lab environments where all students can safely and effectively learn. The following are some base expectations.

Misconduct:

Academic or personal misconduct will be managed per the procedures outlined in the [MSU Billings Student Policies & Procedures Handbook](#).

Instances of academic dishonesty or cheating on homework, exams, or assignments may result in written reprimand, a grade of "F" for the assignment or test involved, or a grade of "F" for the course. Examples of cheating include:



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- Sending someone the spreadsheet or Visio drawing you prepared for homework. Taking someone else's file and handing it in if it has been modified or not.
- Informing someone of your homework answers or submitting answers you received. Homework done in groups where one or more individuals are receiving answers without doing the work is cheating for all involved.

Cell Phones and Electronic Devices:

Electronic devices including phones, computers, and tablets are distracting and not allowed in class or lab except where properly authorized.

Food and Drinks:

Food and drinks are not allowed in classrooms or labs. They are dangerous in a lab environment, create messes in classrooms, and they interfere with the intent of COVID-19 face covering requirements.

COVID-19:

We need to work together on this to protect the members of our community. We will follow guidance in the [Montana State University Billings Back to Business Fall 2020 Action Plan](#) which may be updated throughout the semester.

We are required to wear face coverings properly in classrooms, labs, and other inside areas. We view this as good citizenship and protecting our fellow community members. Failure to wear face coverings when required creates an unsafe environment. The face coverings we are required to wear are simple and comfortable compared to the Personal Protective Equipment (PPE) you will be required to wear in industry.

Safety:

Some hazards cannot be eliminated in a process plant or academic setting and must be managed to prevent serious injury. A discussion of hazards and how to mitigate them will be part of lectures, labs, and other activities and will include safety equipment checks, personal protective equipment requirements, and training. Student responsibilities include:

- Be fully engaged so you understand the hazards and are prepared to manage them.
- Be in a suitable physical and mental state to perform safely and determine if you are prepared to engage in an activity.
- Wear all required PPE. Safety glasses are always required in the lab. No open-toe shoes are allowed in the lab.
- Perform safely and professionally. Horseplay gets people hurt.
- Follow all rules and procedures.

Failure to follow safety rules will negatively impact grades and could result in losing laboratory privileges to maintain a safe environment. MSUB is not responsible for injury resulting from failure to follow rules or procedures.



Coaching, Mentoring, and When They Don't Work:

Lapses in conduct will be addressed with mentoring and coaching to prepare individuals for success in the workplace if the lapses are infrequent, accidental, and are minor in potential consequence.

Repeated or intentional disruptive or unsafe behaviors will be reported to the Dean of Student Engagement and result in final grade reductions up to 10% per occurrence depending on severity.