Syllabus

Course Numbers:	PPT 175-001 (Lecture) PPT 176-100 (Lab) PPT 176-101 (Lab)
Course Name:	Process Plant Sciences Lecture and Lab
Semester:	Spring 2021
Credits:	Lecture: 4, Lab: 1
Lecture Meetings:	B036: MTWR 1:50-2:50
Lab Meetings:	Section 100: A063: F 9:10-11:10 am Section 101: A063: F 12:40-2:40 pm
Instructor:	Andrew D. Sullivan
Phone:	247-3047
Email:	Andrew.Sullivan3@msubillings.edu
Faculty Website:	http://www.msubillings.edu/cotfaculty/sullivan/
Office:	A061
Office Hours:	See attached schedule.

Required Texts and Material:

There are no required textbooks to purchase. Required materials will be posted on D2L.

Course Description:

Provides the fundamentals necessary for an in-depth look at the distillation process. Examines the concepts of heat and thermodynamics, as well as the chemical bonds, organic chemistry, the periodic table and hydrocarbon concepts. Gives students the necessary tools for a better understanding of the process taking place in the refining and power industries.

Course Goals and Objectives:

Upon completing this course, students will be able to:

1. Explain the physical and chemical principles that govern a range of operations in a process plant.
2. Apply physical and chemical principles to effectively operate processing equipment, optimize unit operations, and address malfunctioning equipment.
3. Analyze complex process systems, interpret the function of processing equipment, and evaluate how changes in processing conditions will impact operations.
4. Safely collect process samples, use laboratory skills to accurately measure physical and chemical properties, interpret results, and develop plans to adjust unit operations to correct properties outside target range.

Academic Issues and Grading:

1. Late work is not accepted.
2. Final lecture grades will be calculated per the following scoring criteria:

Tests (average of 3 evenly split)	80%
Assignments	20%

3. Final lab grades will be calculated according to the following scoring criteria:

Lab Assignments	100%

Being on time, acting in a safe way, and participating in lab are required for full credit.

4. 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	Lab	Class and Lab Plan
1	Wed 01/13	1		Mechanical Aptitude
	Thu 01/14	2		Mechanical Aptitude
	Fri 01/15		1	Lab: SWS PFD
2	Mon 01/18			Martin Luther King Day NO CLASSES OFFICES CLOSED
	Tue 01/19	3		Strength of Materials
	Wed 01/20	4		Units, Dimensional Analysis, Scientific Notation, Significant Figures
	Thu 01/21	5		Units, Dimensional Analysis, Scientific Notation, Significant Figures
	Fri 01/22		2	Lab: Heat capacity
3	Mon 01/25	6		Atoms and the Periodic Table
	Tue 01/26	7		Atoms and the Periodic Table
	Wed 01/27	8		Molecules and Chemical Formula
	Thu 01/28	9		Molecules and Chemical Formula
	Fri 01/29		3	Lab: Flash Point
4	Mon 02/01	10		Molecules and Chemical Formula
	Tue 02/02	11		Molecules and Chemical Formula
	Wed 02/03	12		Naming Compounds
	Thu 02/04	13		Naming Compounds
	Fri 02/05		4	Lab: Freezing / Melting Point
5	Mon 02/08	14		Naming Compounds
	Tue 02/09	15		Chemical Reactions / Types of Reactions / Stoichiometry
	Wed 02/10	16		Chemical Reactions / Types of Reactions / Stoichiometry

	Thu 02/11	17		Chemical Reactions / Types of Reactions / Stoichiometry
	Fri 02/12		5	Lab: Oil Recovery from Seed
6	Mon 02/15			Presidents' Day NO CLASSES OFFICES CLOSED
	Tue 02/16	18		Chemical Reactions / Types of Reactions / Stoichiometry
	Wed 02/17	19		Test #1
	Thu 02/18	20		Solutions and Concentrations
	Fri 02/19		6	Lab: Titration
7	Mon 02/22	21		Solutions and Concentrations
	Tue 02/23	22		Solutions and Concentrations
	Wed 02/24	23		Solutions and Concentrations
	Thu 02/25	24		Properties of Gasses - The Ideal Gas Law
	Fri 02/26		7	Lab: Heats of Reaction
8	Mon 03/01	25		Properties of Gasses - The Ideal Gas Law
	Tue 03/02	26		Vapor-Liquid Equilibrium and Steam Stripping
	Wed 03/03	27		Non-ideal Gases and Steam Tables
	Thu 03/04	28		Heat of reaction
	Fri 03/05		8	Lab: Steam Distillation
9	Mon 03/08	29		Heat of reaction / Registration for Fall 2021
	Tue 03/09	30		Nature of electrons. Ionic, covalent, & multiple covalent bonds
	Wed 03/10	31		Heat of Vaporization. Sensible and Latent Heat
	Thu 03/11	32		Surface tension, mixing, and soaps
	Fri 03/12		9	Lab: D-86 Distillation
10	Mon 03/15	33		Distillation
	Tue 03/16	34		Distillation
	Wed 03/17	35		Distillation
	Thu 03/18	36		Distillation
	Fri 03/19		10	Lab: Combustion Efficiency
11	Mon 03/22	37		Distillation
	Tue 03/23	38		Distillation
	Wed 03/24	39		Test #2
	Thu 03/25	40		Chemical Kinetics
	Fri 03/26		11	Lab: Biodiesel
12	Mon 03/29	41		Chemical Kinetics
	Tue 03/30	42		Chemical Kinetics
	Wed 03/31	43		Chemical Kinetics
	Thu 04/01	44		Chemical Kinetics
	Fri 04/02		12	Lab: Extraction - Caffeine from Tea
13	Mon 04/05	45		Solution Equilibrium
	Tue 04/06	46		Solution Equilibrium
	Wed 04/07	47		Industrial Caffeine Extraction
	Thu 04/08	48		Acids and Bases, pH

	Fri 04/09		13	Lab: Crystallization - Caffeine from Tea
14	Mon 04/12	49		Acids and Bases, pH
	Tue 04/13	50		Chemical Equilibrium
	Wed 04/14	51		Biodiesel
	Thu 04/15	52		Biodiesel
	Fri 04/16		14	Lab: PH Lab
15	Wed 04/21			Final Exam 1:00-3:00 pm

Safety:

Some hazards can't 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 may result in a written warning, a failing grade for the assignment or course, or loss of laboratory / activity privileges to protect other students. MSUB is not responsible for injury resulting from failure to follow rules or procedures.

Access, Assistance, and Advocacy:

A summary of services to help you succeed in a positive, supportive, and enjoyable learning environment is listed below.

- Academic Support Center. The City College branch is open M-F 9-5. Resources include tutoring and a writing center. Drop-in and by appointment. 247-3022.
- 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. 657-2153

- Veterans Services. For assistance activating your VA Educational Benefits, getting access to VA assistance for tutors, or even joining the veteran student organization, contact the VA Representative in the Military and Veterans Success Center at 657-2982. For assistance on the posting of your VA Educational benefits please contact the Business Services office at 657-1707.
- Veterans Upward Bound. Assistance for veterans from admission to graduation. 657-2075

Class and Lab Policies:

- We will follow all rules and guidance set by the University.
- Academic or personal misconduct will be managed per the procedures outlined in the MSU Billings Student Policies & Procedures Handbook.
- Phones, computers, and tablets are not allowed in class.
- Food and drinks are not allowed in classrooms or labs.
- Disruptive behaviors will result in final grade reductions up to 10% per occurrence.

Andy Sullivan's Spring 2021 Calendar

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00-9:00	PPT 211	PPT 212	PPT 211		
9:10-10:10	Office Hours		Office Hours		PPT 176
10:20-11:20	PPT 225	Office Hours	PPT 225		
11:30-12:30	Lunch	Lunch	Lunch	Lunch	Lunch
12:40-1:40	PPT 120	PPT 161	PPT 120	PPT 161	PPT 176
1:50-2:50	PPT 175	PPT 175	PPT 175	PPT 175	
3:00-4:00	PPT 212			Office Hours	
4:10-5:10					