Montana Tech
Metallurgical and Materials Engineering Department
Fall and Spring 2018

COURSE SYLLABUS

COURSE NUMBER AND TITLE: EMET 489W and EMET 499W Senior Design

DATE REVISED: Fall, 2018 **SEMESTER CREDITS**: 3

INSTRUCTORS NAME: Avimanyu Das **EMAIL**: adas@mtech.edu
PHONE NUMBER: 496-4794
OFFICE LOCATION: ELC 213
OFFICE HOURS: MWF 1.00-2.00 or by appointment

DESIGNATION: Required – Metallurgical & Materials Engineering

COURSE (CATALOG) DESCRIPTION:
This course requires students to form teams and solve real world engineering problems. Teams must design a system, component or process, design and conduct experiments in the laboratory to test the concept; collect and evaluate data; perform first order cost analyses; and communicate a first class final report (both spoken and written). Examples of past projects include: development of a beneficiation process including sizing of equipment, selection of an extraction process or unit operation, evaluation of an industrial failure and materials selection for casting molds.

PREREQUISITE: M&ME major. Must be within three semesters of graduation

CO-REQUISITE: NA

TEXTBOOK: NA

REFERENCES: NA

OUTCOMES: Students of this course will or will be able to:
- Organize their professional/engineering thinking and skills to design and plan a design project
- Recognize the total volume of the work and plan accordingly to complete the work in a timely manner
- Be prepared for success in industry and professional societies where oral and written communication skills are critical.
- Organize their thinking and use Word and Powerpoint to prepare effective presentations
- Recognize the audience to determine the detail and level of their presentations

TOPICS COVERED: As one of the "W" courses in the curriculum, this year-long course combines the design, planning and execution of planned experiments with writing and oral presentation skills to produce a comprehensive, group project related to metallurgical/materials engineering. Students must define objectives, develop a basic work plan and standard-based SOP's

to accomplish the stated objectives, assign tasks to execute the project, review progress and manage timetables. A comprehensive written report must be generated by the group and a time-limited oral presentation developed from the report. The oral presentation is then given to faculty, students, the Department Advisory Board and other community members. Students will also be required to prepare a paper and presentation on a topic of metallurgical importance, following SME/TMS guidelines.

COURSE SCHEDULE: Varies during semesters

CONTRIBUTION TO PROFESSIONAL COMPONENT: Engineering Topics (3 credits)

RELATIONSHIP OF COURSE TO PROGRAM OUTCOMES: Students completing this course will have:

- the ability to design and conduct experiments as well as to analyze and interpret data.
- the ability to design a system, component, or process to meet desired needs
- the ability to present their own designed system in a comprehensive manner
- the ability to write a comprehensive and structured report on their system

SAFETY POLICY:
No student will be allowed in the lab without covered shoes and full length pants. Eye protection is mandatory at all times in the lab area. Ask your instructor or any other faculty when in doubt.

ABET Criteria covered: 1, 2, 3, 4, 5, 6, 9 and 10

1. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. communicate effectively with a range of audiences
4. recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
9. integrate the understanding of the scientific and engineering principles underlying the four major elements of the field: structure, properties, processing and performance related to metallurgical and materials systems appropriate to the field, and
10. apply and integrate knowledge from each of the above four elements of the field using experimental, computational and statistical methods to solve materials problems including selection and design consistent with the program educational objectives.

Prepared by: Avimanyu Das **Date**: 12th November, 2018