

California State University, Chico
Department of Mechanical and Mechatronics Engineering and Sustainable
Manufacturing

SMFG 464 –FLUID METALLURGY (3.0 UNITS)
COURSE SYLLABUS – Spring 2018

COURSE OBJECTIVE: To give the student a comprehensive overview of the study of metal casting technology. Students will learn about the properties of casting alloys, casting processes, pattern design, pattern making, mold making, core design, core making, heat treating, finishing of castings, and sand testing.

COURSE TIME: LECTURE – MONDAY & WEDNESDAY 1:00-1:50PM (PLMS 116)
LAB – FRIDAY 2:00PM-4:50PM (PLMS 116)

INSTRUCTOR: Scott Brogden EMAIL: sbrogden@csuchico.edu
TELEPHONE: Office 898-5097, Cell 680-2521, MMEM Office 898-5346
OFFICE HOURS: PLMS 114B, M 4-5PM, T 9-10AM, W & TH 5-6PM

See course schedule for reading assignments on the following sources:

TEXT: Metalcasting Principles & Techniques, published by the American Foundry Society.

OTHER REFERENCES:

- Aluminum Casting Technology, AFS, Inc. (Classroom Reserve)
- Exploring Patternmaking and Foundry, Miner (Classroom Reserve)
- Iron Casting Handbook, (Classroom Reserve)
- Steel Casting Handbook, (Classroom Reserve)
- Matched Tool and Die Steel Manual, Carpenter Steel Co. (Classroom Reserve)
- ASM Handbook, Vol. #15, General reference (Classroom Reserve)
- Forming, Vol. #2, SME, General reference (Classroom Reserve)
- Cost-Effective Casting Design, AFS, Inc. (CD-ROM)

EVALUATION PROCEDURES

Lab Requirements	30%
Quizzes	5%
Mid-term	15%
Final Exam	15%
Technical Paper	15%
Article Reviews	5%

Oral Presentation 15%
Laboratory Responsibility/Cleanup +/-

LAB REQUIREMENTS - Safety glasses required

Metal Casting: (All castings and cores must be assigned by the instructor)

- _____ 2 each Sand Molds (resulting castings must be salable)
- _____ 2 each H/W Drum Shell Molds (resulting castings must be usable)
- _____ 8 each Hoist/Winch Drum Cores (for Shell Molds)
- _____ 1 each Sand Testing Series (teams of two)

Pattern Drawings:

- _____ 1 each Part Design (hand-drawn sketch)
- _____ 1 each Pattern Working CAD Drawing (part portion only, with dim's)
- _____ 1 each Match Plate Layout (hand sketch of part with gating system)
- _____ 1 each Match Plate Layout CAD Drawing (part with gating system, dim's)

Pattern Making:

- _____ 1 each Pattern
- _____ 1 each Match Plate (using above pattern)
- _____ 1 each Core Box (optional)

Heat Treating: (teams of four)

- _____ 1 each Aluminum Heating Treating Experiment

Clean-up Assignment:

- _____ 1 each Clean-up Area (_____)

FIELD TRIP (BAY AREA) - 2 page typed report (If you cannot attend the field trip, an eight page paper on an assigned topic will be an acceptable substitute.)

ADDITIONAL ASSIGNMENTS

Text and reserved book readings as assigned

Oral Presentation: (_____, 2018)

Technical Paper: 8-10 pages of text (due at time of oral presentation)

Provide electronic file of paper and test questions for posting on Web CT/Vista.

Test Questions: 5 T/F & 5 Multiple Choice (due at time of oral presentation and drawn from your technical report material.)

Article Reviews (2): Casting-related article 2 years old or less, 2 pages, double-spaced with copy of article attached.

TESTS

MID-TERM: Thursday 3/25 9:00 – 11:00 AM

FINAL EXAM: Tuesday 5/18 10:00 AM – 11:50 AM

Assignments & Grade Sheet

Name: _____ E-mail: _____

Lab # : _____ Local Phone # : _____ Permanent Phone # : _____

Report Topic: _____

Castings (cleaned-up)

1. _____

2. _____

3. _____

4. _____

NOTE: Only assigned castings
will be accepted.

Cores _____

Sand Test Series _____

Return Olivine Sand Handbook _____

Return PetroBond Sand Handbook _____

Return Pattern Hardware _____

Oral Presentation Evaluations _____

Article Review #1 _____

Article Review #2 _____

Clean-up Assignment _____

Pattern Design Sketch _____

Pattern Working CAD Drawing _____

Match Plate Design Sketch _____

Match Plate Working CAD Drawing _____

Match Plate (with casting) _____

Core Box (optional) _____

Aluminum H.T. Experiment _____

Reference List _____

Presentation Outline _____

Technical Paper _____

Test Questions _____

Oral Presentation _____ / _____

Field Trip Report _____

Midterm Exam _____

Final Exam _____

Quizzes _____

Final Grade _____

In case of emergency notify: Name: _____ Phone # : _____

COURSE SCHEDULE

WEEK	DATE	DEMONSTRATION	FILM
(1)	1/22 1/24 1/26	Introduction Chapter 1 Lab Tour / Ramming Review	The Process of Metalcasting Steel In America
(2)	1/29 1/31 2/2	Chapter 1 Chapter 1 LAB	Cast Iron – The Biography of a Metal
(3)	2/5 2/7 2/9	Chapter 2 Chapter 2 LAB	
(4)	2/12 2/14 2/16	Pattern Making TBD LAB	
(5)	2/19 2/21 2/23	Casting Clean-up TBD LAB	
(6)	2/26 2/28 3/2	Risering TBD LAB	
(7)	3/5 3/7 3/9	Gating/Test Preview Gating/LAB LAB	
(8)	3/12 3/14 3/16	Mid-Term Exam Plant Visitation (Field Trip)	
(9)	3/19-3/23	Spring Break – No Classes	
(10)	3/26 3/28 3/30	Heat Treating TBD Cesar Chavez Day – No Classes	
(11)	4/2 4/4 4/6	TBD Class Reports Begin LAB	
(12)	4/9 4/11 4/13	Class Reports Class Reports LAB	
(13)	4/16 4/18 4/20	Class Reports Class Reports LAB	
(14)	4/23	Class Reports	

	4/25 4/27	Class Reports LAB	
(15)	4/30 5/2 5/4	LAB	<u>Pattern & Match Plate Drawings (CAD) Due</u> <u>Casting with Gating System Attached Due</u>
(16)	TBD	Final Exam	<u>Presentation Evaluations (Rank Ordered) Due</u>