MET257 – Casting Processes, Course Syllabus

Catalog Description: (4) Theory and practice in green sand, shell core, permanent mold, no bake and evaporation casting processes. Two hours lecture and four hours laboratory per week. Formerly IET257. Students may not receive credit for both.

Course Content and Objectives: To instill in the student the understanding of the casting industry, processes and a chance to try their hand at it.

Student Learning Outcomes and Assessment: The student should show their ability to:
understand and perform basic casting processes through labwork, projects and examinations.
effectively use casting industry tools (real and virtual) via labwork and project work.
use technical methodology in analyzing a casting design in terms of casting parameters and cost estimates, via labwork and examinations.

Resources: Technology of Metalcasting, by Schleg; American Foundry Society Publ., 2003. ISBN#0-87433-257-5
Software: Net access, word processing, spreadsheet, & parametric solid modeling capability required.

Instructors: Dr. Craig Johnson, Hogue Technology Rm. 304, 963-1118 (Dept. 1756) cjohnson@cwu.edu
Hours: as posted on the office door, or set up an appointment!

Grading Policy:

HW /Quizzes	(5+)	35%	
Exams & Final	(3)	30%	
Lab Projects	(6)	25%	
Participation/involvement	(30)	10%	(weightings are approximate)

A(92-100), A-(90-92), B+(88-90), B(82-88), B-(80-82), C+(78-80), C(72-78), C-(70-72), D+(68-70), D(62-68), D-(60-62), F(<60)
NOTE: Extended absence is grounds for a failing grade. Late work may be refused or penalized.

Homework: Homework (and/or 'labs' or activities) is required in this class. You may wish to keep a copy of your homework so that you have a reference to use while studying for the tests.

Projects: Projects are required. More information will be handed out in class, but they are oriented toward using the course content in a technical area and.

CAD Lab: We will meet occasionally in the CAD Lab. Students are provided with access to a parametric, solid modeling software package and are expected to use it.

Conduct: *The instructor* is a facilitator. This role is two-fold. First, to facilitate the accomplishment of the course objectives. Do not expect to have the text read to you. Class time will be used for discussion of the assigned and any supplementary material, as well as reviewing homework, taking exams, etc. Second, you will be assessed on your progress in accomplishing course objectives, and be given timely feedback. *The student* is an active learner. You are personally responsibility for your learning. Strive to optimize your learning skills, and keep track of your outcomes. Be prepared (READ!) to participate in all activities.

ADA: Students who have special needs or disabilities that may affect their ability to access information and/or material presented in this course are encouraged to contact me or the ADA Compliance Officer, Director, ADA Affairs and Students Assistance at 963-2171, for disability related educational accommodations.

ETHICS: *Plagiarism* is considered a serious offense and will not be tolerated. Anyone not familiar with how to paraphrase, quote, or cite is encouraged to seek assistance from the Writing Lab on campus. Papers containing plagiarized material shall receive an "F." *Cheating* on exams will be dealt with in the same manner as cheating on an FAA test - the score for the exam will be a "0".

SAFETY: Casting Processes inherently involve hot liquids. Molten metal can vaporize dampness on equipment (spraying the melt up to the ceiling – check it out) and can lead to further 'explosive events' that have never occurred at CWU (i.e. the building is still standing). Please consider safety an issue you are responsible for.

MET257 – Casting Processes, Course Schedule for Spring 2006

Help	(from industry personnel, upper-classmen and others)		Quiz (Q#)
Week#	**Description:**		**Assignment:**
3/28	**1**	Introduction to Cast Metals, FEF, AFS: **Bob Mortenson**, Mortenson Foundry	Chapter 1&2
		Videos: 'Casting in Bronze', FEF 'Casting for a Career', 'Cast-It' (QIT).	
3/30		SAFETY, Common knowledge of foundries and operations: Casting, 10-Rules.	Chapter 3
Help		Lab Projects: Orientation, Safety, Clean-Up, Safety, Clean-Up, Sign-Up: Intro to Molding Flatbacks	
4/4	**2**	Sand (Foundry Sands, Clays, & Additives), Safety: **Robert Anderson**,Green Diamond	Chapter 4
4/6		Molding Process and Skills (flat back, cleaning**): Jerry Barton**, retired North Star Steel	Chapter 5 Q1
Help		Lab Work: Flat Back (Due 4/14)	__ Flat Back(1st)
		****FEF Accreditation Visit! ****	__ Uneven Parting
4/11	**3**	Lost Foam (prep, glue, coat): **Guest_____**, Shop_____ __ Lost Foam	Chapter 15-17
4/13		Gating and Risering (design, calculations): **Rick Thomas**, Thomas Mach. Foundry	Q2
Help		Lab Work: Matchplate (Due 4/28), Uneven Parting Line (Due 4/28), Investment Shell (start)	
4/18	**4**	Green Sand (matchplate, ram/flask, parting): **Robert Gilmore**, Romac Industries	
4/20		**EXAM 1**: then Lab Work (Investment, flasks, rams, list of projects to do)	__ Matchplate
Help		Lab Work: Flasks (Due 5/13), Investment in Mold and Pour (today!)	__ Flask / Ram
4/25	**5**	Cores, No-Bake (Pep Set, Chem Rez,Unibond): **David Ashbaugh**,/George Hanson	Chapter 6___Cores
4/27		Metal Alloys: Ferrous and Non-Ferous (Dr. J.) Also, SHM will visit to watch a pour.	Chapter 7-9,12 Q3
Help		Lab Work: Core Box (wedges) Due today! __ Cores	
5/6		Pattern Swap (1st Saturday in May) Meet teachers and industry personnel from around the state!	
5/2	**6**	Tooling (patterns, Solid modeling, Rapid Prototyping): **Tom Hoover**, Woodland Pattern	Chapter 3 again..
5/4		Field Trip to **D&L Foundry, Moses Lake: Jason McGowan**	
		We will need to car pool. Please consider helping to drive over. Dr. J.	
5/9	**7**	Melting and Pouring (alloys, furnaces, pour methods): Guest**: Jon Wilson**	Chapter 10, 11
5/11		FEF/AFS Open House (11AM) and Advisory Day Luncheon (12:15) at ? TBD_____	
Help		Lab Work: (Note: Flasks due today) (INDIVIDUAL PROJECT)	__ Ind. Project
5/16	**8**	Manufacturing Design (Theory of Constraint, Lean Manuf.) Guest: **Gary Hammons**, Cont. Improve. Conc.	
5/18		**EXAM 2**: then Lab Work: (see projects)	
Help		Lab Work: Ductile Casting Molds	
5/23	**9**	Casting Design (solidification, modeling, SolidCast™, Magma™): **Ken Sandell**, Atlas Foundry	Chap 20
5/25		Ductile Iron (gray, inoculated, austempered): **Jason McGowan**, D&L Foundry	Chapter 13 Q4
Help		Lab Work: Ductile Casting (today!)	__ Iron Casting
5/30	**10**	Non-destructive testing, AQS Life Cycle Analysis, www.asq.org Guest?_____	Chapter 18,19
6/1		Lab Day: CLEAN UP ALL OF OUR FOUNDRY!	
6/__		**FINAL** at ___AM / PM on _____. Comprehensive.	