

# MET 426/526 - Steelmaking

MI 220

1:00 - 1:50 PM MWF

Dr. Howard

## Topics

1. Overview of Steel Industry (2 class)  
History, Integrated Mills, Mini Mills, Direct Reduction Plants
2. Solution Thermodynamics (7 classes)  
Alternative Standard States (1 wt % Standard State), Interaction Coefficients
3. Reduction Processes (12 classes)  
Oxygen Potential, Ellingham Diagrams, Blast Furnace, Kinetic Studies
4. Refining Processes & Principles (7 classes)  
Impurity Treatment, Oxidation Potential, Basic Oxygen Furnace, Alternative Methods
5. Deoxidation (3 classes)  
Deoxidant Addition, Sparging, vacuum
6. Mini Mill Processing (3 classes)  
Tramp Elements, Ladle Metallurgy, Quality
7. Direct Reduction Processes (3 classes)  
Tramp Elements, Ladle Metallurgy, Quality
8. Specialty Steels (3 classes)  
Stainless Steel, AOD Process
9. Continuous Casting (2 classes)
10. Carburization (3 classes)
11. Tests (3 classes)

## Reading Assignments

Provided in class

## Grading

Homework	10 to 40 points each	140*
3 Hour Exams	100 points each	300*
Final Exam		100*

\* approximate numbers

The final grade is based directly on the total points achieved. There is no additional weighting. On rare occasions a student's grade may be raised (but never lowered) for subjective considerations.

## Text

The Making Shaping & Treating of Steel (Steelmaking and Refining Volume) 11th ed., Iron & Steel Institute, Pittsburg. (get ordering details in class)  
<http://www.steelfoundation.org/publications/msts.htm> Stock Number R34, \$95.

## References

Turkdogan, E. T., Fundamentals of Steelmaking. The Institute of Materials, The University Press, Cambridge Eng, 1996.

David R. Gaskell, Introduction to the Thermodynamics of Materials, 4<sup>th</sup> ed, Taylor & Francis, Washington DC, ~2002.

## Policies

All exams sheets provided by the instructor MUST be turned in on top of each exam.

Selected homework is graded.

Computer assignments are made one week in advance so that there is plenty of time to complete them. No late assignments will be accepted.

Students are expected to attend class unless otherwise excused.

Students who are ill should not attend class.

Excused absences from short quizzes will result in the assignment of an estimated grade for the missed quiz. Unexcused absences will result in a zero. No quizzes or exams are thrown out.

Short quizzes will cover only material from the lecture.

Students who miss an hour exam for an excused reason will be given a make-up exam that will be designed to be more difficult and longer than the missed exam. Unexcused exam absences will result in an exam grade of zero.

Office hours are posted on my door (MI114). Students are welcome to call me at 394-1282.

**Course Web Site**

Important supplemental course information will be posted at this address:

<http://showard.sdsmt.edu>

**Freedom In Learning**

Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should contact the dean of the college which offers the class to initiate a review of the evaluation.

**ADA Statement**

Students with special needs or requiring special accommodations should contact the instructor, Dr. Howard at 394 1282 or the campus ADA coordinator at 394-2416 at the earliest opportunity.

**Instructor Contact Information**

Office: MI 114

Email: [stanley.howard@sdsmt.edu](mailto:stanley.howard@sdsmt.edu)

Telephone: 394 - 1282