2015-2016 Spring Semester Material and Energy Balance Introduction

Assist. Prof. Dr. Murat Alkan

16.02.2016

1st Week

Course Objective

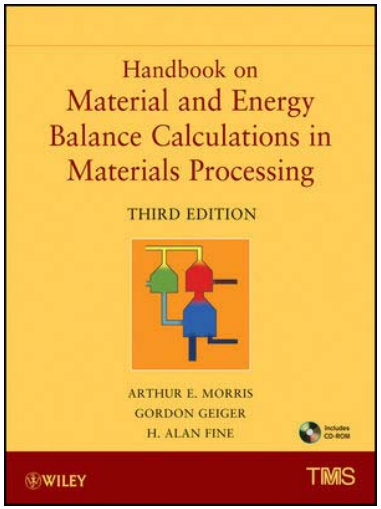
- This course covers the definitions of Dimensions, System of Units and Conversion Factors.
- Metallurgical production processes with calculations of materials and energy balances are covered within the framework of this course.
- The stages of the industrial processes in the field of Metallurgical Engineering are designed by using a thermodynamic and/or process simulation software.

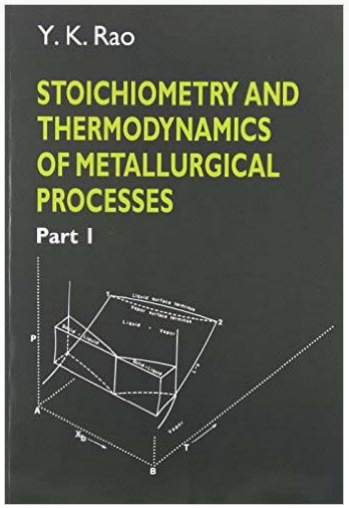
Assessment Methods

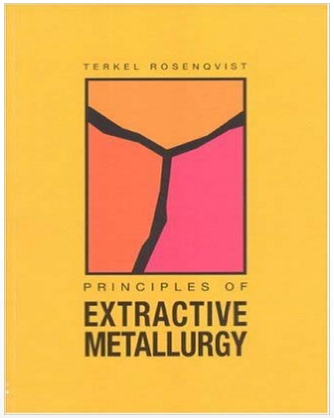
- Midterm exams and Final exam are closed books exams. The questions in the exams, and homework assignments are correlated with the Learning outcomes.
- 2 Mid-terms (2×15%)
- 1 Personal HW (5%) + 1 Team HW (7%) and Pres.(8%)
- Final Exams (50%)
- Active participation to the lecture required min 70%. (It may effect your final grades)
- Students **must** deliver their homework **on-time**. Group homework are presented in last two weeks within the class hours.
- Students that don't finish and deliver the homework **before deadline** and don't present their presentations are **Failed** (VF) for this course.

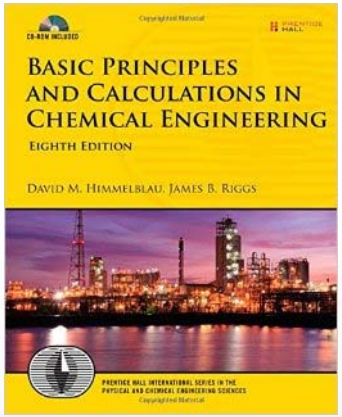
Suggested Sources for the Course

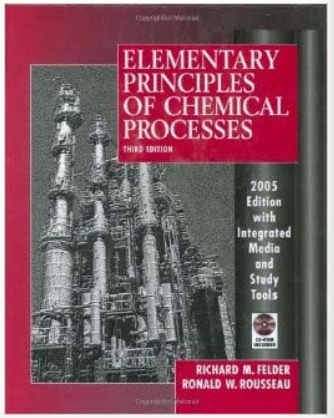
- A.E. Morris, G. Geiger, H.A. Fine. 2011. “Handbook on Material and Energy Balance Calculations in Materials Processing” Wiley.
- Y.K. Rao. 1985. “Stoichometry and Thermodynamics of Metallurgical Processes” Cambridge University Press
- T. Rosenqvist. 1974. “Principles of Extractive Metallurgy” McGraw Hill
- D.M. Himmelblau, JB. Riggs. 2012. “Basic Principles and Calculations in Chemical Engineering” Pearson Education
- R.M. Felder, R.W. Rousseau. 2005. “Elementar Principles of Chemical Processes” Wiley











Course Content

Week	Topics:
1.	Dimensions, System of Units and Conversion Factors
2.	Thermophysical and Related Properties of Materials
3.	Statistical Concepts Applied to Measurement and Sampling
4.	Fundamentals of Material Balances with Applications to Non-Reacting Systems
5.	Applications of Computer based Simulation/Modelling Programs with the Calculations of Material Balances
6.	Stoichiometry and the Chemical Equation
7.	Mid-Term I
8.	Reactive Material Balances
9.	Energy and the First Law of Thermodynamics
10.	Enthalpy Balances in Non-Reactive Systems
11.	System Balances on Reactive Processes
12.	Mid-term II
13.	Mass and Energy Balance Calculations in Metallurgical Processes & Students Presentations
14.	Mass and Energy Balance Calculations in Metallurgical Processes with Case Studies & Students Presentations

Course Content Descriptions

- 2nd week – Students are requested to form teams for group HW
- 3rd week – Completion of students teams (groups)
- 4th week – Assignments of individual (personal) and group HWs
- Deadline for Individual HWs is during I.Mid-term.
- Deadline for Group HWs is during II.Mid-term.
- 13th and 14th weeks – Student presentations