Materials Production 3B03

Course Information 2016/2017

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CALENDAR DESCRIPTION:

Surface science and technology related to the preparation of fine particles and slurries of minerals, metals and ceramics for industrial production. Application of electrochemistry for diverse materials processing, such as electrometallurgy, thin film production and anodizing.

Three lectures second term – JHE 326H

Prerequisite: MATLS 2D03

COURSE OBJECTIVES:

"At the conclusion of this course, the student should be able to:"

Analyze materials flow issues in process flowsheets for low temperature materials processing.
Quantitatively describe the operation of the major processes for minerals and materials preparation, including attrition, flotation, flocculation, classification, hydrometallurgy and electrometallurgy.
Understand the concepts of solid state synthesis, wet chemical methods, sol-gel methods, self-assembly, precursors, electrosynthesis, colloidal stability, surface chemistry, adsorption and dispersion.

RELEVANCE TO OTHER COURSES:

This course is the first of the Materials Processing courses. It utilizes the thermodynamic principles introduced in the Thermodynamics of Materials courses.

This course examines the low temperature processing courses that may result in a final product, but more usually some high temperature processing is required to produce a metal of ceramic part. These processes are examined in the following courses.

EVALUATION (Method & Grade Distribution):

Tutorial Assignments	(20%)
Tests	(30%)
Presentation	(20%)
Final Year Examination	(30%)

SPECIAL DATES / DEADLINES:

Mid-term test 1	February 6
Assignment 1	February 23
Mid-term test 2	March 13
Assignment 2	March 23

REFERENCES:

M.N. Rahaman, Ceramic Processing and Sintering, Marcel Dekker, 2003.
P.C. Hayes, Process Principles in Minerals and Materials Production, Third Edition, Hayes Publishing, Sherwood, Queensland, Australia, 2003.
W.G.Davenport et al. Extractive Metallurgy of Copper, 4th Edn, Pergamon 2002.
C.Bodsworth, The Extraction and Refining of Metals, CRC Press 1994.
J.D. Gilchrist, Extraction Metallurgy, 3rd Edition, Pergamon Press, 1989.
G.Y. Onada and L.L. Hench, Ceramic Processing Before Firing, John Wiley and Sons, New York, USA, 1978.
T. Rosenqvist, Principles of Extractive Metallurgy, McGraw Hill, New York, 1983.
B.A. Wills, Mineral Processing Technology, Pergamon, 4th Edition, 1988.
A.K. Biswas and W.G. Davenport: *Extractive Metallurgy of Copper*, 3rd ed., Elsevier, 1994.

Academic Dishonesty Policy

"Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.
It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located

at http://www.mcmaster.ca/senate/academic/ac_integrity.htm

The following illustrates only three forms of academic dishonesty:

Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained. (Insert specific course information, e.g. style guide)
Improper collaboration in group work. (Insert specific course information)
Copying or using unauthorized aids in tests and examinations.
In this course we may at times use a software package designed to reveal plagiarism. Students may at times be required to submit their work electronically and in hard copy so that it can be checked for academic dishonesty."