



McGill

Department of Civil Engineering

**CIVE 202 – Construction Materials
Winter 2013**

Instructor:	Prof. Andrew J. Boyd E-mail: andrew.boyd@mcgill.ca
Lectures:	M W 8:35 am – 10:25 am [ENGMC 13]
Tutorial:	T 8:35 am – 9:25 am [REDMUS AUD]
Labs:	W 1:35 pm – 3:25 pm [ENGMD 177] R 2:35 pm – 4:25 pm [ENGMD 177]
Office Hours:	By appointment [ENGMD 482]
Course Description:	Classification of materials; atomic bonds; phase diagrams; crystallography; imperfections; mechanical behaviour; engineering properties and uses of ferrous metals, cement, concrete, timber and timber products, polymers, composites; durability and deterioration; prevention and protection; environmental influences; group laboratory projects
Required Text:	There is no required text for this course. Lectures, lab manuals and other handouts will be made available via website posting
Grading:	Test 1: 40% (February 27, 2013) Test 2: 40% Laboratory Reports: 10% Assignments/Quizzes: 8% WHMIS Certification 2% (February 6, 2013)
	NOTE: Students must obtain a passing grade on quizzes and lab reports in order to pass the course.
Course Policies:	Make-up exams will be granted upon presentation of a legitimate and relevant physician's certification. Other requests will be considered IF requested prior to scheduled week of test.
Attendance Policy:	Students are responsible for all information covered in class or tutorial sessions, regardless of whether it appears in the lecture notes or other handouts. Attendance and participation in laboratory and tutorial sessions is mandatory.

Tentative List of Topics to be Covered

Materials and the Engineer – Materials usage, sustainable development; natural resources; the 3 Rs; protection; renovation and rehabilitation.

Nature of Materials – Atomic structure, scale, and bonding; crystallography; defects; phase diagrams; mechanical testing.

Cement and Concrete –Aggregates (classification, properties, gradation, moisture conditions, nonstandard aggregate); portland cement (composition, chemistry, manufacturing, properties); supplementary cementing materials; admixtures; concrete (composition, hydration, ITZ, fresh & hardened properties, curing, durability).

Structural Steel – Production; classifications; properties; products; construction applications, alloying; treatments; durability; welding.

Wood – Classifications; microstructure; grain; defects; grading; moisture, shrinkage; properties; design; durability; wood based composites.

Polymers – Classifications; structure; properties; applications.

Composites – Classifications; applications; components (matrix, fibres; interface, additives); fabrication; properties.

Asphalt – Classifications; properties; durability; additives & fillers; recycling.

Useful References

- Brady, G.S., Materials Handbook, McGraw-Hill Book Company, Latest Edition
- Canadian Portland Cement Association, Design and Control of Concrete Mixtures, Canadian Metric Edition, 1984
- Illston, J.M. and Domone, P.L.J., Construction Materials – Their Nature and Behaviour, 3rd Edition, SPON Press, London, 2001
- Young, J.F., Mindess, S., Gray, R.J., and Bentur, A., The Science and Technology of Engineering Materials, Prentice-Hall, 1998

McGill Policy Statements

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (for more information, see www.mcgill.ca/students/srr/honest/).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

© Instructor generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.