

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: DMFG 202		Number of Credits: 3 Course credit policy (105)															
Course Full Title: Material Science and Technology																	
Course Short Title: <i>(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)</i>																	
Faculty: Faculty of Applied and Technical Studies		Department (or program if no department): Digital Manufacturing															
Calendar Description: Fundamental knowledge of common materials including their physical and chemical properties. Materials handling safety such as toxicity, interactions, waste management, etc. Materials' machinability and acceptable process. Material failure and failure modes. Engineered materials vs. natural materials. Material selection considerations.																	
Prerequisites (or NONE):		Admission to the Digital Manufacturing diploma or department permission.															
Corequisites (if applicable, or NONE):		NONE															
Pre/corequisites (if applicable, or NONE):		NONE															
Antirequisite Courses <i>(Cannot be taken for additional credit.)</i> Former course code/number: Cross-listed with: Dual-listed with: Equivalent course(s): <i>(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)</i>		Special Topics <i>(Double-click on boxes to select.)</i> This course is offered with different topics: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <i>(If yes, topic will be recorded when offered.)</i>															
		Independent Study If offered as an Independent Study course, this course may be repeated for further credit: <i>(If yes, topic will be recorded.)</i> <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit															
		Transfer Credit Transfer credit already exists: <i>(See bctransferguide.ca.)</i> <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Submit outline for (re)articulation: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <i>(If yes, fill in transfer credit form.)</i>															
Typical Structure of Instructional Hours <table border="1" style="width: 100%;"> <tr> <td>Lecture/seminar hours</td> <td style="text-align: right;">20</td> </tr> <tr> <td>Tutorials/workshops</td> <td></td> </tr> <tr> <td>Supervised laboratory hours</td> <td style="text-align: right;">25</td> </tr> <tr> <td>Experiential (field experience, practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Supervised online activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td style="text-align: right;">Total hours</td> <td style="text-align: right;">45</td> </tr> </table>		Lecture/seminar hours	20	Tutorials/workshops		Supervised laboratory hours	25	Experiential (field experience, practicum, internship, etc.)		Supervised online activities		Other contact hours:		Total hours	45	Grading System <input checked="" type="checkbox"/> Letter Grades <input type="checkbox"/> Credit/No Credit	
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		Maximum enrolment (for information only): 20 Expected Frequency of Course Offerings: Annually <i>(Every semester, Fall only, annually, etc.)</i>															
Department / Program Head or Director:		Date approved: October 2018															
Faculty Council approval		Date approved: November 8, 2018															
Dean/Associate VP: John English		Date approved: November 8, 2018															
Campus-Wide Consultation (CWC)		Date of posting: January 18, 2019															
Undergraduate Education Committee (UEC) approval		Date of meeting: February 1, 2019															

Labs to be scheduled independent of lecture hours: No Yes

Learning Outcomes:

Upon successful completion of this course, students will be able to:

- Demonstrate a systematic approach to materials' analysis and selection;
- Distinguish different materials and their advantages over the others;
- Handle, process, and store materials properly;
- Explain the process and environmental consequences of material disposal;
- Analyze and troubleshoot materials' failure; and
- Evaluate the benefits and limitations of using engineered and natural materials.

Prior Learning Assessment and Recognition (PLAR)

Yes No, PLAR cannot be awarded for this course because

Typical Instructional Methods (*Guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion.*)

Lectures and Lab work with occasional guest lecture

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (*If more space is required, download Supplemental Texts and Resource Materials form.*)

Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	No textbook required – internal worksheets and lecture notes will be provided	<input type="checkbox"/>		
2.		<input type="checkbox"/>		
3.		<input type="checkbox"/>		
4.		<input type="checkbox"/>		
5.		<input type="checkbox"/>		

Required Additional Supplies and Materials (*Software, hardware, tools, specialized clothing, etc.*)**Typical Evaluation Methods and Weighting**

Final exam:	%	Assignments:	50%	Field experience:	%	Portfolio:	%
Midterm exam:	%	Project:	%	Practicum:	%	Other:	%
Quizzes/tests:	%	Lab work:	50%	Shop work:	%	Total:	100%

Details (if necessary):**Typical Course Content and Topics**

Unit 1: Atomic Structure and Interatomic Bonding

Unit 2: Structures of Metals and Ceramics

Unit 3: Polymer Structures

Unit 4: Imperfections in Solids

Unit 5: Diffusion

Unit 6: Mechanical Properties

Unit 7: Deformation and Strengthening Mechanisms

Unit 8: Failure

Unit 9 Phase Transformations

Unit 10: Electrical Properties

Unit 11: Types and Applications of Material

Unit 12: Synthesis, Fabrication, and Processing of Materials

Unit 13 Composites

Unit 14: Corrosion and Degradation of Material

Unit 15: Thermal Properties

Unit 16: Magnetic Properties

Unit 17: Optical Properties

Unit 18: Economic, Environmental, and Societal Issues in Materials Science and Engineering