



ORIGINAL COURSE IMPLEMENTATION DATE: September 2019
 REVISED COURSE IMPLEMENTATION DATE: September 2024
 COURSE TO BE REVIEWED (six years after UEC approval): February 2025
 Course outline form version: 28/10/2022

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: Material Science & Technology											
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):	ELTR 190.										
Corequisites (if applicable, or NONE):											
Pre/corequisites (if applicable, or NONE):											
Antirequisite Courses <i>(Cannot be taken for additional credit.)</i> Former course code/number: Cross-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>	Course Details Special Topics course: No <i>(If yes, the course will be offered under different letter designations representing different topics.)</i> Directed Study course: No <i>(See policy 207 for more information.)</i> Grading System: Letter grades Delivery Mode: Face-to-face only Expected frequency: Fall only Maximum enrolment (for information only): 20										
Typical Structure of Instructional Hours <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 80%;">Lecture/seminar</td> <td style="width: 20%; text-align: center;">20</td> </tr> <tr> <td>Supervised laboratory hours (science lab)</td> <td style="text-align: center;">25</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td style="text-align: right;">Total hours</td> <td style="text-align: center;">45</td> </tr> </table>	Lecture/seminar	20	Supervised laboratory hours (science lab)	25					Total hours	45	Prior Learning Assessment and Recognition (PLAR) PLAR is available for this course.
Lecture/seminar	20										
Supervised laboratory hours (science lab)	25										
Total hours	45										
Scheduled Laboratory Hours Labs to be scheduled independent of lecture hours: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	Transfer Credit <i>(See bctransferguide.ca.)</i> Transfer credit already exists: No Submit outline for (re)articulation: No <i>(If yes, fill in transfer credit form.)</i>										
Department approval	Date of approval: October 27, 2023										
Faculty Council approval	Date of meeting: December 2023										
Undergraduate Education Committee (UEC) approval	Date of meeting: March 1, 2024										

Learning Outcomes *(These should contribute to students' ability to meet program outcomes and thus Institutional Learning Outcomes.)*

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

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

Recommended Evaluation Methods and Weighting *(Evaluation should align to learning outcomes.)*

Assignments:	50%	Lab work:	50%	%
	%		%	%

Details:

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 Instructional Methods *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Texts and Resource Materials *(Include online resources and Indigenous knowledge sources. [Open Educational Resources](#) (OER) should be included whenever possible. If more space is required, use the [Supplemental Texts and Resource Materials form](#).)*

Type	Author or description	Title and publication/access details	Year
1.	No textbook required – internal worksheets and lecture notes will be provided		
2.			
3.			
4.			
5.			

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