

COURSE OUTLINE IDES 2101A • DESIGN FOR MANUFACTURING A • Fall (2023)

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Location: **436 AP**

Office Hours: TBD in class

Teaching Assistant: Ben Tripp

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Office Hours: Laboratory Hours

Course Time and Location:

Course locations are no longer displayed on the public class schedule and are subject to change. For the latest information please refer to Carleton Central under Student Services – Registration – Student Timetable.

Course Description

Transformation techniques applied to manufacturing materials. Part-design requirements and cost factors for manufacturing processes. Influences and role of assembly, finishing, production tooling, and costing.

Includes: Experiential Learning Activity.

Prerequisite(s): IDES 1001, IDES 1301.

Lecture and tutorials three hours a week, laboratory three hours a week.

Learning Outcomes

By the end of this course, students will be able to:

1. Identify primary properties of wood, metals, and textiles and how they are extracted and transformed into raw materials.
2. Examine life cycle issues in regards to metals, wood, and textiles and demonstrate curiosity about evolving materials and processes.

3. Apply a systematic design process for comparing and contrasting different types of specific materials in terms of performance characteristics particular to their intended use.
4. Identify common manufacturing and fabrication processes for wood, metal, and textile products and how they relate to scales of production.
5. Describe common production scaling strategies, such as tooling and automation, as well as knock-down assembly.
6. Work safely in the lab under supervision by professional staff on laboratory projects.

Course Deliverables

These are the deliverables for this course. Please see 'Appendix A Course Schedule' for more detailed information.

Midterm	15	Lab and in class Assignments, quizzes	20%
Final Exam	35	Group Project	30%
50%		+	50% = 100%

Student Access to Quiz, Test and Exam Papers:

Examinations are for evaluation purposes only and will not be returned to the student.

Required Materials

All work on projects should be performed in the school's laboratories. A basic personal toolkit of hand-tools is recommended and will be discussed in class.

You will be required to buy wood and metal for your group project and all those materials are available through the school's laboratory inventory. Specialty materials or hardware for your project can be ordered from a variety of sources listed on Brightspace.

Additional Suggested Readings:

[Materiology: the creative's guide to materials and technologies](#)

Kula, Daniel ; Ternaux, Elodie ; Hirsinger, Quentin

2013

Prototyping and modelmaking for product design

Hallgrimsson, Bjarki author.

2020

Computer Requirements

Please refer to the computer requirements on the School of Industrial Design Website. You may be asked by your instructor to refer to Brightspace for other information or requirements related to computer work.

<http://www.id.carleton.ca/undergraduate/about-the-bid-program/computer-requirements>

Individual/Group Work

Courses may include individual and group work. It is important in collaborative work that students clearly demonstrate their individual contribution.

Review/Presentation Attendance

Attendance at scheduled SID Reviews/Presentations is mandatory. These are equivalent to exams when indicated in the course outline. Failure to attend the Review/Presentation without reasonable cause will result in a grade of F. Students arriving late for the Review/Presentation or not remaining for the complete session without approval from the instructor, will be addressed on a case-by-case basis at the discretion of the instructor.

If you are not able to attend a Review/Presentation, foresee arriving late, or need to leave before it is complete, please email your instructor in advance explaining the reason for the situation. It is important that you provide a reasonable rationale for your absence, late arrival, or early departure. In the event of an illness or death in the family, you will be required to sign a form verifying your claim and this form is available through the SID administration office.

Late Submission of Lecture & Studio Deliverables

Students who do not hand in deliverables on time will have their earned grade reduced by 20% per day up to a maximum of 3 days.

Participation and Professionalism

Active participation and professional conduct (e.g. class discussion, consultations with instructors, work ethic, etc.) are important in lecture and studio courses and may be formally evaluated by a grade. Professionalism also includes Carleton's Policy on Academic Integrity described in more detail below with links to content that you are required to review.

Academic Integrity

Carleton's Policy on Academic Integrity is available at: <https://carleton.ca/registrar/academic-integrity/> and covers the following topics:

Plagiarism (e.g. submitting work in whole or in part by someone else, failing to acknowledge sources through the use of proper citations when using another's work).

Test and Exam Rules (e.g. attempting to read another student's exam paper, speaking to another student even if the subject matter is irrelevant to the text, using material not authorized by the examiner).

Other Violations (e.g. improper access to confidential information, disruption in classroom activities, misrepresentation of facts for any academic purpose).

This policy governs the academic behavior of students. In industrial design, ideas and concepts come from a multitude of sources and may be modified and utilized in the design and development process. The student should reference such sources appropriately and it is strongly advised that you read Carleton's Policy on Academic Integrity prior to conducting any work at the University.

Requests for Academic Accommodation

You may require special arrangements to meet your academic obligations during the term. For an accommodation request for any of the following topics below, refer to the link provided for more information: <https://students.carleton.ca/course-outline/>

- **Pregnancy obligation:** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, please review the [Student Guide to Academic Accommodation \(PDF, 2.1 MB\)](#) For accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form ([click here](#)).
- **Religious/Spiritual Obligation:** Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for

accommodation is known to exist. For more details, please review the [Student Guide to Academic Accommodation \(PDF, 2.1 MB\)](#)

- **Academic Accommodations for Students with Disabilities:** The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre website](#).
- **Survivors of Sexual Violence:** As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit the [Equity and Inclusive Communities website](#).
- **Accommodations for Student Activities:** Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the [Senate Policy on Accommodation for Student Activities \(PDF, 25KB\)](#).
- **The Use of Self-Declaration Forms:** In place of a doctor's note or medical certificate, students may complete the [self-declaration form](#) available on the Registrar's Office website to request academic accommodation for missed course work including tests and assignments. Students are also encouraged to connect directly with their instructors to discuss required accommodations arising from the COVID-19 situation.

Statement on Student Mental Health

As a university student, you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. Here is a list that may be helpful:

Emergency Resources (on and off campus): <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>

Carleton Resources:

- Mental Health and well-being: <https://carleton.ca/wellness/>
- Health & Counselling Services: <https://carleton.ca/health/>
- Paul Menton Centre: <https://carleton.ca/pmc/>
- Academic Advising Centre (AAC): <https://carleton.ca/academicadvising/>
- Centre for Student Academic Support (CSAS): <https://carleton.ca/csas/>
- Equity & Inclusivity Communities: <https://carleton.ca/equity/>

Off-Campus Resources:

- Distress Centre of Ottawa and Region: (613) 238-3311 or TEXT: 343-306-5550, <https://www.dcottawa.on.ca/>
- Mental Health Crisis Service: (613) 722-6914, 1-866-996-0991, <http://www.crisisline.ca/>
- Empower Me: 1-844-741-6389, <https://students.carleton.ca/services/empower-me-counselling-services/>
- Good2Talk: 1-866-925-5454, <https://good2talk.ca/>
- The Walk-In Counselling Clinic: <https://walkincounselling.com>

Student Responsibility

The student is responsible for knowing the content of this course outline; the schedule of classes, assignments, and/or Reviews; and the material that was covered when absent. The studio and laboratories are professional environments and students should be working during the scheduled hours.

Unless otherwise arranged, the class will meet during scheduled class hours. Please note that attendance is important since issues and questions may be raised in class, and announcements made, along with information disseminated through Brightspace. As external professionals are often involved in our work, scheduling changes for guest lectures, presentations, and Reviews may occur at short notice, requiring students to stay informed.

Changes to the Course Outline

The course outline may be subject to change in the event of extenuating circumstances.

Appendix A - Course Schedule

(See Brightspace)

<p>Week 1 Sep 7</p>	<p>Welcome</p> <ul style="list-style-type: none"> • Learning Outcomes • Schedule • Deliverables • Brightspace 	<p>Shop Orientation/ Health and Safety</p> <p>Theoretical Lab 1 (Walter and Paul)</p>
<p>Week 2 Sep 14</p>	<p>Wood</p> <ul style="list-style-type: none"> • Types of wood and how it is sold • Properties of wood • Manufacturing in wood • Joinery • Finishing • Sustainable practices 	<p>Shop Orientation/ Health and Safety</p> <p>Theoretical Lab 2 (Walter and Paul)</p>
<p>Week 3 Sep 21</p>	<p>Ferrous Metals</p> <ul style="list-style-type: none"> • Iron • Steel and Alloys • Stainless Steel <p>(samples: steel stock, Kettles)</p> <p>Structure</p> <ul style="list-style-type: none"> • Loads • Beams • Failure • Stress and Strain 	<p>Laboratory Project Handouts</p> <ul style="list-style-type: none"> • Butterknife Project • Group Project <p>Work on Group Project</p>
<p>Week 3 Sep 28</p>	<p>Non-Ferrous Metals</p> <ul style="list-style-type: none"> • Aluminum • Extrusion rules • Extrusion systems (80 80, • Titanium • Copper, Brass and Bronze • Tin and Zink <p>(samples: Aluminum stock, Michael Santella extrusions, Play-Doh Extruder)</p>	<p>Group Project</p> <p>Work in Studio or lab</p>
<p>Week 4 Oct 5</p>	<p>Metal Fabrication</p> <ul style="list-style-type: none"> • Stock (angles, rod, pipe, tubing, bar, sheet) • Cutting and sawing • Milling • Drilling • Turning • Tube Bending • <p>Assembly</p> <ul style="list-style-type: none"> • Fasteners (screws and bolts and rivets) • Welding • Galvanic Corrosion 	<p>Group Project</p> <p>Technician consultations</p>
<p>Week 5 Oct 12</p>	<p>Sheet Metal Fabrication</p> <ul style="list-style-type: none"> • Look for product in public space on campus that is primarily made from Sheet Metal (SM). <ul style="list-style-type: none"> ○ Draw it and measure ○ Draw details of manufacture ○ What are other non SM parts and why are they not SM? <p>Structure</p> <ul style="list-style-type: none"> • Forces • Force Distribution-Free Body Diagrams • balance 	<p>Group Project</p> <p>Work in Laboratory</p>

Wednesday, August 16, 2023

Appendix A: IDES-2101 23F

Week 6 Oct 19	Digital Fabrication and Prototyping <ul style="list-style-type: none"> Additive and Subtractive Prototyping vs Production CNC Sintering <p>(samples: Carbide Nomad)</p>	Group Project Work in laboratories
	Butterknife Celebration	Group Project: Shop Drawings due
Week 7 Oct 26	<i>Fall Break no classes</i>	<i>Fall Break-Laboratories Open</i>
Week 8 Nov 2	Textiles 1: Guest Lecture Walter Sailrite Website and Sourcing <ul style="list-style-type: none"> Outdoor fabrics (Cordura, vinyl) Stitch details patterning Sourcing of buckles etc. 	
	Mid Term Exam	
Week 9 Nov 9	Field trip House of Canvas	Group Project Work in laboratories
Week 10 Nov 16	Ceramics and Glass <ul style="list-style-type: none"> Earthenware, Stoneware and Porcelain Soda Lime Glass (window glass) Lead Oxide Glass (crystal) Tempered Glass Fiberglass Slip Casting Glass Blowing 	
		Group Project- Hand in Physical Model by 4pm
Week 11 Nov 23	Mass Manufacturing 1 <ul style="list-style-type: none"> Fixturing and Jigs Deep Drawing Stamping Forging Metal Spinning <p>(samples: Chinese Lantern)</p>	Lab 3: Softgood cover (Walter)
Week 12 Nov 30	Mass Manufacturing 2 <ul style="list-style-type: none"> Molds and Dies Sand Casting Die Casting Investment casting Implications (quality assurance, packaging) <p>(samples: Castings)</p>	
Week 13 Dec 7	<ul style="list-style-type: none"> Discussion and question period for Final Exam 	
		Group Lab Presentations

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