CARLETON UNIVERSITY
SCHOOL OF INDUSTRIAL DESIGN

COURSE OUTLINE IDES 4101A • ADV. STUDIES IN MANUFACTURING • Winter (2025)

Instructor: **Paul Durocher**

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Location: 2460 ME

Office Hours: **Available upon request**

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

Advanced manufacturing concepts and workflows are examined through a series of workshops and minor projects utilizing state-of-the-art equipment.

Includes: Experiential Learning Activity.
Prerequisite(s): IDES 2101 and IDES 2102.
Lectures or laboratory three hours a week.

Learning Outcomes

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

1. Understand CNC hardware and use CAM software to generate programs to manufacture basic parts using appropriate machining strategies.

2. Demonstrate advanced workflow utilizing various digital and analog tools in a DFM project.

3. Understand the tools and process of capturing a 3D scan of an existing object and manipulating that scan for various workflows e.g. reverse engineering, renderings, redesign, underlays, etc.

4. Create a typical package of documentation to be used in the request for quote (RFQ) process and better understand communication between designer and manufacturer.

5. Document their process-work to enhance their portfolio and demonstrate their skills in specialized areas of design.

Course Deliverables

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

Assignment	Grading
Lab 1: Manual CNC programming	10% (Individual)
Lab 2: 2.5D CAM programming	15% (Individual)
Lab 3: 3D CAM programming (CNC)	25% (Group)
Lab 4: 3D scanning	10% (Group / individual)
Lab 5: Technical drawing	20% (Individual)
Lab 6 Portfolio page / Report	10% (Individual)
Attendance / Participation	10% (individual)
Total	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 Materials required for the course and their costs are listed below. Please note some materials costs are dependent on the project and the materials chosen so a range listing minimum and maximum values will be given.

Students are not required to purchase textbooks or other learning materials for this course.

An Autodesk student account (free) must be set up to install Fusion 360 which will be used throughout the course. Details will be provided in class.

Technology Requirements

Please refer to the technology 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 coursework.

https://carleton.ca/id/student-info/computer-it-support/computer-requirements/

Individual/Group Work

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

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 instructor's discretion.

If you are unable 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.

Late Submission of Assignments

Students who do not hand in assignments on time will have their earned grade reduced by 15% per day at the instructor's discretion. If you foresee not meeting the submission due date and are requesting an extension, please provide your instructor with a minimum of 24 hours' notice.

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.

Health and Safety

Students must participate in training to access all the SID Labs and Maker Space. Apart from this training, students are required to follow the health and safety standards of the School of Industrial Design as well as Carleton's health and safety standards. All materials related to SID health and safety are available here Health and Safety and it is expected that students review and understand these materials and apply these standards throughout their studies.

Use of Studio Spaces

Access to studio space to attend courses and complete assignments is an important part of student success. To support access, specific studios have been designated to certain years and/or sections.

1st Year Studio Section A – Studio A
1st Year Studio Section B – Studio B
2nd Year Studio Section A – Studio A
2nd Year Studio Section B – Studio B
3rd Year Studio Section A & B – Studio C
4th Year Studio All Sections (Capstone and Minor) – Studio D
MDes Studio – MDes Studio

Students are welcome and encouraged to use their designated spaces to work during non-studio hours. Out of respect for your colleagues, instructors, and Carleton cleaning staff, ensure you leave the space in good condition. This includes cleaning your area and storing your items in your designated storage space. The School will not be responsible for items that are not stored properly.

Academic Integrity

Carleton's Policy on Academic Integrity is available at: https://carleton.ca/registrar/academic-integrity/ and covers the following violations, but is not limited to:

- *Plagiarism*
  - *Submitting work written 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*
  - *Attempting to read another student's exam paper*
  - *Speaking to another student (even if the subject matter is irrelevant to text)*
  - *Using material not authorized by the examiner*
- *Other Violations*
  - *Improper access to confidential information such as exams or test questions*
  - *Disruption of classroom activities or periods of instruction*
  - *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 before conducting any work at the University.

Use of Artificial Intelligence (AI) Technologies

To effectively address the incorporation of AI technologies, specifically generative AI tools, into courses, we have instituted the following guidelines. Further information can be found here - https://carleton.ca/tls/teachingresources/generative-artificial-intelligence/recommendations-and-guidelines/. Another useful resource is the Library's guide on AI tools - https://library.carleton.ca/guides/subject/artificial-intelligence-ai-tools.

1. Academic Integrity Standards: In the absence of explicit permission from the instructor within a given course, the use of generative AI tools to create content, (e.g., text, code, images, summaries, videos, etc.), is deemed a breach of academic integrity standards.

2. Instructor's Discretion: Instructors have the authority to grant permission for the use of generative AI tools, (e.g., ChatGPT and similar tools), based on alignment with the course's educational objectives

and learning outcomes. Assignment and examination guidelines will be written to explicitly reflect this granted permission.

3. Clear Instructions: Should instructors choose to permit the use of generative AI tools, an assessment guideline will provide students with clear and detailed direction, including;

    i. Identification of specific generative AI tools that are acceptable for use.
    ii. Clarity on the approved applications of these tools.

These measures aim to create a balanced and transparent educational environment, ensuring both academic integrity and the responsible integration of AI technologies into the learning experience.

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 below topics, refer to this link - https://students.carleton.ca/course-outline/ and open the needed section.

Topics:

- *Pregnancy Obligations*

- *Religious/Spiritual Obligation*

- *Academic Accommodations for Students with Disabilities*

- *Survivors of Sexual Violence*

- *Accommodations for Student Activities*

- *Academic Considerations for Medical and Other Extenuating Circumstances*

- *Scheduling and Examination Support*

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, refer to this link - https://wellness.carleton.ca/ and open the needed section.

Topics:

- *Counselling*

- *Resource Guide*
    - *Thriving on Campus*
    - *Everyday Stress*
    - *Mild Mental Health Concerns*
    - *Moderate Mental Health Concerns*
    - *Complex Mental Health Concerns*

- *Umbrella Project*

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 is a professional environment, 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, or valuable information may be shared, all of which can greatly benefit the student's learning experience. As external professionals may be 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.

Course Schedule

WEEK	DATE	TOPIC		
WEEK 1	06.JAN.2025	Manual Programming	Lab 1 Assigned	
WEEK 2	13.JAN.2025	2.5D CAM	Lab 2 Assigned	Lab 1 Due (Sunday Jan. 12 by 8:00pm)
WEEK 3	20.JAN.2025	3D CAM	Lab 3 Assigned	Lab 2 Due (Sunday Jan. 19 by 8:00pm)
WEEK 4	27.JAN.2025	Workholding +		
WEEK 5	03.FEB.2025	RFQs		
WEEK 6	10.FEB.2025	3D Printing		Lab 3 Due (Sunday Feb. 9 by 8:00pm)
WEEK 7	17.FEB.2025	WINTER BREAK	NO CLASS	
WEEK 8	24.FEB.2025	Cutting Parts	ME 2460	
WEEK 9	03.MAR.2025	3D Scanning / Photogrammetry	Lab 4 Assigned	

WEEK 10	10.MAR.2025	Tech Drawings I		Lab 4 Due (Sunday Mar. 9 by 8:00pm)
WEEK 11	17.MAR.2025	Tech Drawings II	Lab 6 Assigned	
WEEK 12	24.MAR.2025	Lab 5 Test (In Class)		Lab 6 Due (Sunday Mar. 30 by 8:00pm)
WEEK 13	31.MAR.2025	Workflow / model building tips		
WEEK 14	07.APR.2025	Review of Lab 6 (in class)		