

COURSE OUTLINE IDES 4101A • ADV. STUDIES IN MANUFACTURING • WINTER(2022)

Instructor: Paul Durocher

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Location: **In-Person (CB 5301)**

Office Hours: Following studio/lecture hours or by appointment.

Time and Location: Please refer to Carleton Central under Student Services – Registration – Search Schedule: https://central.carleton.ca/prod/bwysched.p_select_term?wsea_code=EXT

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 / Photogrammetry | 15% (Individual) |
| Lab 5: Technical drawing / Print reading | 20% (Individual) |
| Lab 6 Portfolio page / Report | 10% (Individual) |
| Participation / Engagement | 5% (individual) |

Student Access to Quiz, Test and Exam Papers

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

Required Materials

Materials required for the course are listed below. You may be asked by your instructor to refer to Brightspace for a more comprehensive list of required materials.

- An Autodesk student account must be setup to install Fusion 360 which will be used throughout the course.
- Access to a digital camera.

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 15% 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 which 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/>

- *Parental Leave*
- *Religious/Spiritual Obligation*
- *Academic Accommodations for Students with Disabilities*
- *Survivors of Sexual Violence*
- *Accommodations for Student Activities*

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, 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

IDES 4101A Appendix A – Course Schedule

| Week | Date | | | |
|---------|------------|--------------------------------|--|--|
| Week 1 | 11.JAN.22 | Manual Programming | Lab 1 Assigned | |
| Week 2 | 18.JAN.22 | 2.5D CAM | Lab 2 Assigned | Lab 1 Due (Sunday Jan. 16 by 6:00pm) |
| Week 3 | 25. JAN.22 | 3D CAM | Lab 3 Assigned | Lab 2 Due (Sunday Jan. 23 by 6:00pm) |
| Week 4 | 01.FEB.22 | Work holding + | | |
| Week 5 | 08.FEB.22 | RFQs | | |
| Week 6 | 15.FEB.22 | Workflow / Model building tips | | Lab 3 Due (Sunday Feb. 20 by 6:00pm) |
| Week 7 | 22.FEB.22 | FALL BREAK | NO CLASSES | |
| Week 8 | 01.MAR.22 | Cutting Parts | In LAB 1 (ME 2460) (in person if possible) | |
| Week 9 | 08.MAR.22 | 3D Scanning / Photogrammetry | Lab 4 Assigned | |
| Week 10 | 15.MAR.22 | Tech Drawings I | | Lab 4 Due (Sunday March 13 by 6:00pm) |
| Week 11 | 22.MAR.22 | Tech Drawings II | Lab 5 Assigned | |

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|---------|-----------|-------------------------------|-----------------------|--|
| Week 12 | 29.MAR.22 | 3D Printing | Lab 6 Assigned | Lab 5 Due (Sunday Mar 27 by 6:00pm) |
| Week 13 | 05.APR.22 | Inspection/Quality Control | | |
| Week 14 | 12.APR.22 | Review of Lab 6 | | Lab 6 Due (Sunday Apr 10 by 6:00pm) |