

COURSE OUTLINE IDES 3106A • ADVANCED COMPUTER APPLICATIONS • Fall (2023)

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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

Examination of complex product geometry utilizing 3D computer applications. Topics include spline, surface and solids construction, surface verification tools, and rendering tools and techniques. Workflow, robust design, reverse design techniques and 3D printing will be explored through exercises.

Includes: Experiential Learning Activity.

Prerequisite(s): IDES 2105. Third or Fourth Year standing or permission of the School of Industrial Design.

Lecture and tutorials three hours a week.

Learning Outcomes

- By the end of this course, students will be able to:
1. Achieve a higher competency in industrial design product development and planning, using 3D CAD software and rendering.
 2. Have a holistic understanding of solids and surface types feature creation methods in Solidworks (SW).
 3. Construct complex geometries in SW utilizing surface feature tools.

4. Edit various surface types including surface offsets and trims.
5. Use hybrid modeling techniques such as using surfaces to modify and create solids.
6. Utilize a planned workflow approach for achieving design intent for complex geometries and assemblies.
7. Create and control splines and curves in a 3D CAD environment.
8. Apply a more robust modeling strategy for part and feature creation by applying best practices in regards to SW sketches, dimensions, and feature creation and control.
9. Create thin-walled parts for injection molding and typical features such as ribs and bosses.
10. Be familiar with the design of small electronic housings.
11. Apply reverse designing techniques.
12. Create robust assemblies and multi-body parts.
13. Be familiar with surface transitions and radius of curvature issues such as CO, C1, and C2 Continuity.
14. Describe tolerances, allowances, and types of fit.
15. Render advanced photo-realistic representations of 3D CAD models in Keyshot and/or PhotoWorks and integrate context.
16. Apply technical drawing standards for injection molded parts.
17. Prepare a model for 3D printing.

Course Deliverables

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

Weekly Lab Exercises:	30% (10 labs, 3% each)
Quizzes:	20% (2 quizzes, 10% each)
Major Project Planning Report:	5%

Major Project:

45%

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.

Computer Software:

The latest versions of the following software (provided by the School of Industrial Design) must be installed on your personal laptop computer before the first scheduled class:

- SolidWorks
- Keyshot
- Photoshop

Computer Input Device:

- Computer mouse (minimum of left & right buttons and scroll wheel)

Measuring Tools:

- Caliper
- Ruler

Other Equipment:

- Camera (can be cell phone camera)

Project Specific Materials:

Other specific materials will be dependent upon each student's project. You must be prepared to purchase or acquire the appropriate materials necessary for you to complete your own work throughout the term.

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.

<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 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 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

Class #	Date	Topic	Activities	Major Project Deliverables
1	Mon, Sep 11	Introduction and Review	Lab	
2	Mon, Sep 18	SW - Curves	Lab	
3	Mon, Sep 25	SW - Surface Features	Lab	Submit Part for Approval (due in class)
4	Mon, Oct 2	SW - Surface Features	Lab	
<i>Mon, Oct 9</i>		<i>Stat Holiday - No Class</i>		
5	Mon, Oct 16	SW - Surface Features	Lab, Quiz 1	Project Planning Report (due at 6:00 pm)
<i>Mon, Oct 23</i>		<i>Fall Break - No Class</i>		
6	Mon, Oct 30	SW - Workflow and Strategy	Lab (Not Graded)	
7	Mon, Nov 6	SW - Surfacing	Lab	
8	Mon, Nov 13	SW - Surfacing	Lab	
9	Mon, Nov 20	SW - Part Internals	Lab	
10	Mon, Nov 27	Keyshot	Lab (Not Graded), Quiz 2	3D CAD (due at 6:00 pm) . Printed Part (due in class)
11	Mon, Dec 4	SW - Drawings	Lab	
12	Fri , Dec 8	Keyshot	Lab	Final Report (due at 6:00 pm)

Note that labs are due at the end of each class.