Course Outline

1. COURSE INFORMATION

Session Offered	Fall 2021
Course Name	Computer Aided Design
Course Code	AUTOTECH 2CD3
Date(s) and Time(s) of lectures	Mondays (C01) 8:30am-11:30am Mondays (C02) 11:30am-2:30pm Mondays (C03) 2:30pm-5:30pm Sept 7 – Dec 8, 2021
Program Name	Automotive and Vehicle Engineering Technology
Calendar Description	Drafting: Engineering two-dimensional drawings; orthographic sketching and standard orthographic projections; standard views, selection and positioning of views; conventions used in views representations; auxiliary views; section views and hatching rules; text and dimensioning rules, continuous-, chain-, and ordinate-dimensioning; title block and bills of materials; detail and assembly drawings Solid Modeling: Three-dimensional solid modeling in engineering; creation of prismatic parts; sketch tools, geometric and dimensional constraints; parametric modeling using design tables; creation of two-dimensional drawings from three-dimensional models; creation of full assemblies from parts and geometric constraints; interference detection, solid model part editing; assembling animation
Instructor(s)	Dr. Lucian Balan	Phone: MARC 289-674-0250 ext.59102 (restricted due Covid-19) E-Mail: balanl@avenue.cllmcmaster.ca; balanl@mcmaster.ca Office: Virtual classroom

2. COURSE SPECIFICS

Course Description

Instruction Type

Code	Type	Hours per term
C	Classroom instruction	
L	Laboratory, workshop or fieldwork	36
T	Tutorial	
DE	Distance education	
	Total Hours	36

Resources

ISBN	Textbook Title & Edition	Author & Publisher
9780176501709	Interpreting Engineering Drawings (optional)	Jensen, Cecil H Nelson Publishing
9780073521510	Engineering Drawing and Design (optional)	Jensen, Cecil H., Helsel, Jay D., and Short, Dennis R. McGraw-Hill Publishing

Other Supplies	Source
PC/Laptop with webcam	Students must have own computer and adequate internet bandwidth for remote access of software for on-line lecture, tutorials, tests, and exam

Prerequisite(s)	Registration in level II or above of the Automotive and Vehicle Engineering Technology program
Corequisite(s)	
Antirequisite(s)	
Course Specific Policies	- This course will be delivered on-line using Zoom platform - E-mail communication for this course is through Avenue Mail (balanl@avenue.cllmcmaster.ca) - Students must provide their own USB flash drive with enough space for storing their in-class course work. No student work should be left on lab computers accessed remotely. - Licensed software (AutoCAD and SolidWorks) is provided in computer lab to be accessed remotely. The university is not responsible for providing individual software licenses to students or for installation support of the software on personal laptops. - The computer lab has open access intervals during regular hours to allow students to complete their homework remotely. The instructor will communicate accessibility and availability times. - Students must attend virtual labs/lectures and submit the required in-class proof of work where required. - Assignments must be submitted by due dates posted on Avenue. Once an assignment solution is posted, or discussed in the class, late submissions cannot be accepted. When an "msaf" is submitted for an assignment after the solution has been disclosed, the student must contact the instructor immediately to discuss alternate relief. - Students may use their own laptops to complete coursework as long as their submitted files are compatible with software versions installed in the lab. The instructor will not attempt to convert any work submitted in a wrongful format. - If issues are encountered with assignment submissions on Avenue, students should email the instructor immediately with attached completed work as proof. At the earliest lab time, the instructor will extend the drop box to allow for proper submission. - All term tests and exams should be performed on PCs in the computer lab through remote access. Term tests and final examination on this course are time-constrained; both proficiency and speed of completion are evaluated and graded. - If students decide to use own computers for tests or exam, they must accept fully responsibility when their own PCs may not be able to handle properly the software used in this course. Also, the exam or test files submitted should be compatible with software versions installed in the lab. - When no TA is available for the course, the instructor may decide to pick only few assignments for grading. The selection of graded work will be equally split between the AutoCAD and SolidWorks sections of the course.
Departmental Policies	Students must maintain a GPA of 3.5/12 to continue in the program. In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of "out-of-class" work for every scheduled hour in class. "Out-of-class" work includes reading, research, assignments and preparation for tests and examinations. Where group work is indicated in the course outline, such collaborative work is mandatory. The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception. Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class.

	Instructor has the right to submit work to software to identify plagiarism.	
3. SUB TOPIC(S)		
Week 1	No classes, school starts on a Tuesday	
Week 2	Drafting: o Introduction to CAD Basic drawing commands	
Week 3	Engineering Drawings o Drawing commands o Drawing settings Plotting output	
Week 4	Engineering Drawings o Drawing editing o Drawing environment o Dimensions and tolerances Title block and bill of materials	
Week 5	Shape descriptions o Standard views. Rules. o Orthographic projections o Sectional views. Hatching Auxiliary views	
Week 6	*Quiz #1 and Term-test #1. (2 hours)*	
Week 7	Solid Modeling: o Concept of 3-D Modelling o Sketches o Geometric constraints Dimensional constraints	
Week 8	Building a simple 3D parametric model o Parametric modeling Design table with dimensional parameters	
Week 9	Assemblies o Inserting parts into assemblies Adding mechanical constraints	
Week 10	From 3D models to 2D drawings o Generate two-dimensional drawings from part model Linked dimensioning	
Week 11	*Quiz #2 and Term-test #2. (2 hours)*	
Week 12	Assemblies o Interference check Part editing	
Week 13	Advanced 3D parametric assemblies o Assembling operation animations o Explode / collapse assemblies Introduction to kinematics in assemblies	
Week 14		

Classes end: Wednesday, December 8th, 2021 Final Examination Period: Thursday, December 9 to Wednesday, December 22 All examinations MUST be written during the scheduled examination period.	
List of experiments	
Week 1	No lab in first week, school starts on a Tuesday
Lab 1, week 2	Introduction to AutoCAD software interface. Replicate a set of simple geometrical shapes as practice exercise. Learn to represent objects in orthographic projections as required by technical standards. Isometric views. Orthographic views. Standard views. First Angle and Third Angle orthographic projections. (3 hours)
Lab 2, week 3	Learn to represent objects using sectional views beside orthographic projections as required by technical standards. Learn to add auxiliary views to technical drawings where required. (3 hours)
Lab 3, week 4	Learn to produce and organize orthographic views and sectional views using separate layers concept. (3 hours)
Lab 4, week 5	Learn concepts, practices, and rules for dimensioning as specified by technical standards. Practice various dimensioning methods. Create dimensional drawings using separate layers. (3 hours)
Lab 5, week 6	*Quiz #1 and Term-test #1. (2 hours).*
Lab 6, week 7	Understand the concept of solid modeling. Introduction to SolidWorks interface. Get familiar with SolidWorks menu and commands. Build the solid model of a prismatic part using systematic instructions. (3 hours)
Lab 7, week 8	Build a solid model for a prismatic part. Learn to use the Sketch feature and other software commands necessary for part construction. (3 hours)
Lab 8, week 9	Create solid models for revolute parts. Learn to use the revolve feature of SolidWorks. Insert interior and exterior threads on a part. Cosmetic threads. (3 hours)
Lab 9, week 10	Create 2D drawings from solid models previously created. (3 hours)
Lab 10, week 11	*Quiz #2 and Term-test #2. (2 hours).*
Lab 11, week 12	Create realistic threads. Thread specifications: inside diameter, outside diameter, pitch, thread profile. Methods of creating threads: adding or removing material. (3 hours)
Lab 12, week 13	Create assemblies in SolidWorks starting from solid model parts. Learn to position assembly components relatively to each other. Modify parts from within an assembly. Check for interferences and make corrections. Create exploded views and insert exploded view sketch. Animate the collapse of exploded view. (3 hours)

Note that this structure represents a plan and is subject to adjustment term by term.

The instructor and the University reserve the right to modify elements of the course during the term. The University may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.

4. ASSESSMENT OF LEARNING *including dates*	Weight
Assignments – *weeks 2,3,4,5,7,8,9,10*	10
Quiz 1 – *week 6*	7
Quiz 2 – *week 11*	7
Term Test 1 (Drafting) – *week 6*	18
Term Test 2 (Solid Modeling) – *week 11*	18
Final examination (tests cumulative knowledge)	40
TOTAL	100%

Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. Read, understand, and interpret two-dimensional engineering drawings
2. Produce orthographic view, auxiliary views , section view, detail and assembly drawings of engineering parts and assemblies
3. Develop engineering drawings in agreement with standardized conventions for dimensioning, text, and views placing, as well as necessary documentation such as title block and bills of materials
4. Produce three-dimensional parametric models of prismatic parts and assemblies of medium complexity using existing solid-modeling software available on the market
5. Create two-dimensional drawings from three-dimensional solid models; the generated drawings include dimensions and title block information.
6. Perform interference analysis on static assemblies, and edit model parts if necessary to fit design requirements.

6. COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

ANTI-DISCRIMINATION

The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

http://www.mcmaster.ca/policy/General/HR/Discrimination_Harassment_Sexual_Harassment-Prevention&Response.pdf

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. It is your responsibility to understand what constitutes academic dishonesty.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty: The following illustrates only three forms of academic dishonesty:
- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

AUTHENTICITY / PLAGIARISM DETECTION

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com, please go to www.mcmaster.ca/academicintegrity.

COURSES WITH AN ON-LINE ELEMENT

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

ONLINE PROCTORING

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

COMMUNICATIONS

It is the student's responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the University provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University
   communications are considered received if sent by postal mail, by fax, or by e-mail to the student's designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student's @mcmaster.ca alias.
- Check the McMaster/Avenue email and course websites on a regular basis during the term.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the Code of Student Rights & Responsibilities (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, whether in person or online.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK

McMaster Student Absence Form (MSAF): In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests. http://www.mcmaster.ca/policy/Students-AcademicStudies/Studentcode.pdf

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.