

ME 2D03 Fall 2021 – Course Outline
Mechanical Engineering Design Elements

Instructor: Daniel Pinelli, M.Eng, P.Eng, pinelld@mcmaster.ca
Office Hours: JHE 308 (sessional office), Friday mornings or by appointment (virtual)

Teaching Assistants: Stacey Mark, marks1@mcmaster.ca
Georgina Kosanic, kosanicg@mcmaster.ca
Ashish Sahu, sahua1@mcmaster.ca
Edgar Vazquez Rodriguez, vazqueze@mcmastre.ca
Wenlin Zhang, zhanw9@mcmaster.ca

Lectures: Friday mornings 8:30 am – 9:20 am (virtual)
2 hours of pre-recorded (asynchronous) lecture material per week
1 hour of live (synchronous) lecture material per week

Tutorials: T01 Tuesdays 1:30 pm – 2:20 pm (in person, ETB 235)
T02 Wednesdays 1:30 pm – 2:20 pm (in person, ETB 235)
T03 Thursdays 3:30 pm – 4:20 pm (in person, ETB 235)

Exams: Midterm: Friday, October 29, 7 – 9 pm (virtual)
Final Exam: Date & Time TBD (virtual)

Course Description: Design synthesis, fundamental principles of standard design elements, mechanical and fluid power elements, component specification and optimization

Course Topics:

1. Design & Design Considerations
2. Materials & Manufacturing Processes
3. Shafts, Tolerances & Fits
4. Gears & Transmissions
5. Drives & Fluid Power
6. Cams & Cam Design
7. Mechanisms & Linkages
8. Connections (Joining & Fastening)
9. Bearings & Bearing Life

Course Materials: Textbook – None (Shigley's Mechanical Engineering Design is optional)
Calculator – McMaster standard calculator is required (Casio FX-991MS)
Drawing Instruments – Set containing ruler, compass & protractor is required

Evaluation: 25% Assignments (5 worth 5% each)
20% Tutorial Activities (10 worth 2% each)
25% Midterm Exam
30% Final Exam

Communication Methods

Please use email as the default communication method to get in touch with me. Note that while Microsoft Teams is an excellent collaboration tool, sending a message while I am not online is a less effective way to get your question answered as I do not get notified of these messages until the next time I open Teams. For this reason, please use email for any and all questions. During the week, I check my email twice a day, once in the early morning and then again after 8 pm. During the weekend, I often check email but with less consistency. Please allow at least 48 hours for a response before following up.

Communication Conduct

I expect all communications throughout the course to be made with integrity and purpose. Be polite and professional in your communications and you are much more likely to get a response. Be clear and concise about the purpose and goal of your request and you will find you more often get what you are looking for. Use a descriptive subject line to help the recipient understand immediately what you are talking about. Do not attempt to get a question answered within a few hours of a due date. Be proactive and reach out with questions early to address issues before they become imminent problems.

Submissions

All course submissions will be electronic through Avenue. This includes assignments, tutorials, and the midterm and final exams. The Avenue dropbox is the only acceptable location for submission. Do not email your work directly to the instructor or a TA (it will not be accepted or graded). The required format of most submissions will be PDF in a single file (multiple files are not permitted). Certain assignments or tutorial activities may also require the submission of a different file format such as excel. This will be clearly specified in the assignment or tutorial activity description.

A method for converting handwritten work to PDF will be required throughout the course and during the midterm and final exams. If available, a scanner can be used. Alternatively, mobile apps are available such as CamScanner and Microsoft Lens. Please ensure that you have the capability to reliably convert multiple images or sheets of handwritten work into a single PDF for submission.

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". An MSAF request must be submitted to the department and the instructor notified immediately. At this point, the instructor and student will engage in a dialogue about making up the missed work. In general, the preference is to extend the due date for the missed work to a mutually agreed upon later deadline. Other options will be considered under special circumstances only. The MSAF cannot be used on the midterm or final exam. If the student is unable to write the midterm or final exam during the planned time, they must engage in a dialogue with the instructor as early as possible in the term about deferring the midterm or exam to a later date. Deferral will be considered under special circumstances only.

Lectures

Lectures will be virtual with a blend of synchronous (live) and asynchronous (pre-recorded) delivery. Each week there will be ~2 hours of pre-recorded lecture videos hosted on MacVideo. Students are expected to watch these videos on their own time ahead of Friday morning's live lecture to be held on Microsoft Teams. In this live lecture I will summarize the content for the current week, give any relevant course updates, solve example problems and take any questions. For students who cannot attend the live lecture due to internet or time zone issues, it will be recorded live and posted on Avenue for later viewing.

The scheduled lecture times for the course are as follows:

- Tuesday 8:30 am to 9:20 am – No scheduled class
- Thursday 8:30 am to 9:20 am – No scheduled class
- Friday 8:30 am to 9:20 am – Live lecture session via Microsoft Teams (will be recorded live and posted on Avenue for later viewing)

Tutorials

Tutorials will be delivered in person by the TA's beginning Tuesday, September 14. There are 3 separate sections per week, each delivering the same content. Every tutorial will start with a short presentation or demonstration by the TA, illustrating the topic for that week. Then a tutorial activity will be introduced with a deliverable for the students to submit. The deliverable will be due on Thursday of the following week for all tutorial sections. This allows a minimum of 1 week for all students regardless of section to complete and submit the tutorial activity. There are 10 tutorial activities in total worth 2% each of the final grade. Submission for all tutorial activities will be electronic through Avenue.

For those who cannot attend in person, the tutorials will also be live streamed on Microsoft Teams. It is recommended to attend the tutorial in person as this will be your opportunity to interact in person with the TA's and discuss ideas and concepts hands on. For students who cannot attend the live stream due to internet or time zone issues, it will be recorded and posted on Avenue for later viewing.

Assignments

Assignments will be distributed through Avenue every other Friday and due the following Friday by 7 pm. There are 5 assignments in total worth 5% each of the final grade. The assignments will be an evaluation of the student's understanding of the content learned in the week preceding its release. Submission for all assignments will be electronic through Avenue.

Midterm & Final

The midterm and final exam will be completed virtually. At the start time of the exam, an assignment and dropbox will open on Avenue. The exam question paper will be accessible through the assignment and the completed exam will be submitted to the dropbox. Students will be required to copy a statement of Academic Integrity onto their exam submission paper and sign their name below. I will be available for questions on Microsoft Teams for the entire duration of the exam.

McMaster Policies

Academic Integrity

You are expected to exhibit honesty and ethical behaviour in all aspects of the learning process. The academic credentials you earn are to be rooted in principles of honesty and academic integrity. 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, including a 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. It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

- Plagiarism (submission of work that is not your own or for which other credit has been obtained)
- Improper collaboration in group work
- Copying or using unauthorized aids in tests and examinations

Academic Accommodations for Disability

Students requiring academic accommodation due to disabilities should contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail at sas@mcmaster.ca. For further information, consult McMaster University's Academic Accommodation of Students with Disabilities policy.

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 requiring a RISO accommodation 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.

Extreme Circumstances

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

Graduate Attributes

Graduate Attribute	Learning Outcomes
A01 Knowledge Base For Engineering	
1.03 Competence in Engineering Fundamentals	4, 5, 6, 8, 10, 11, 12, 13
A02 Problem Analysis	
2.01 Demonstrates an ability to identify reasonable assumptions that could or should be made before a solution path is proposed	8, 9, 13
2.03 Obtains substantiated conclusions as a result of a problem solution including recognizing the limitations of the solutions	5, 7, 10
A03 Investigation	
3.02 Selects appropriate model and methods and identifies assumptions and constraints	7, 8
A04 Design	
4.01 Recognizes and follows an engineering design process	1
4.02 Recognizes and follows engineering design principles including appropriate consideration of environmental, social and economic aspects as well as health and safety issues	2
4.03 Proposes solutions to open-ended problems	7, 9
4.04 Employs appropriate techniques for generation of creative ideas such as brainstorming and structured inventive thinking	3

COURSE OUTLINE – APPROVED ADVISORY STATEMENTS

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- 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.

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.

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

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STUDENT SUPPORTS

WELLNESS

Student Wellness Centre

On-Campus Support for Medical and Mental Health Concerns. Doctors and Counsellors available. Located in PGCL, 2nd Floor.

Mon-Fri 9AM-5PM 905-525-9140 ext. 27700
<https://wellness.mcmaster.ca/contact-us/>

Main St. West Urgent Care Centre

For immediate health concerns that do not require the emergency room.

690 Main St W - Mon-Sun 9AM-9PM

Emergency Rooms

For **immediate, serious** health concerns.

St. Joseph's Healthcare Hamilton
50 Charlton Ave E

McMaster Children's Hospital
Students 17 and under

Telehealth Ontario

Telehealth Ontario is a free, confidential service you can call to get health advice or information. A Registered Nurse will take your call 24 hours a day, seven days a week.

Toll-free: 1-866-797-0000 Toll-free TTY: 1-866-797-0007

Phone Lines

Good2Talk

Confidential helpline providing professional counselling, info and referrals for mental health, addiction, and well-being

1-866-925-5454

LGBT Youthline

Confidential, non-judgemental & informed LGBTQQ2SI peer support.

Sun-Fri, 4-9:30 PM, Text 647-694-4275

SACHA (SEXUAL ASSAULT CENTRE - HAMILTON AREA)

Confidential, anonymous 24-hour nonjudgmental telephone support for adults who have experienced sexual violence at any point in their lives; will provide accompaniment to hospital or police station for survivors wishing to seek medical attention or report; counselling services & public education

905-525-4162

Empower Me (Graduate Students)

24/7 accessible counselling services to empower you to thrive, crisis support, mental health and well-being services.

1-844-741-6389

Bounceback

CBT skills-building for mild to moderate depression and anxiety for people 15 or older. If accessed through self-referral, the client's primary care provider will be notified.

1-866-345-0224

INDIGENOUS STUDENTS

Indigenous Student Services

Academic & social counselling, employment aid
LRW 1010

ext. 23788

indigenous.admin@mcmaster.ca
indigenous.mcmaster.ca

INTERNATIONAL STUDENTS

International Student Services

Advising services for international students and exchange students
GH 104

ext. 24254

iss@mcmaster.ca
iss.mcmaster.ca

STUDENT SUPPORTS

ACADEMIC

Student Success Centre

Academic skills assistance, job search, volunteering
GH 110
ext. 24254
studentsuccess@mcmaster.ca

Student Accessibility Services

Disability services, assistive technology support
MUSC B107
ext. 28652
sas@mcmaster.ca

TutorOcean

Student to Student Tutoring Services
<https://mcmaster.tutorocean.com/>

FINANCIAL

Office of Student Financial aid and Scholarships

Emergency funding, government funds, OSAP assistance, scholarships, work programs
GH 120
ext. 24319
<https://registrar.mcmaster.ca/aid-awards/>

FOOD

Food Collective Centre (FKA Mac Bread Bin)

The Food Collective Centre is a service run by students dedicated to cultivating stronger food systems in the McMaster and surrounding community. (MSU Service)
macbreadbin@msu.mcmaster.ca
<https://www.msumcmaster.ca/services-directory/14-food-collective-centre>

Neighbour 2 Neighbour

Food bank, community kitchen, community counselling, help with paying for utilities, and more. Hamilton Mountain.
905-574-1334 <http://www.n2ncentre.com/>

CRISIS SUPPORT

Barrett Centre for Crisis Support

Provides a safe environment in the community and responds to the needs of individuals, 16 years of age or older, who experience a mental health crisis and do not require a hospital stay. Confidential and free services 24/7/365
24 Hour Crisis Line: 905-529-7878, Toll Free: 1-844-777-3571

COAST (Crisis Outreach and Support Team)

Hamilton's crisis line is answered 24 hours a day, 7 days a week. The COAST mobile team, consisting of a mental health worker, and a police officer, will respond to crisis calls between the hours of 8 a.m. and 1 a.m. daily.
905-972-8338

Oakville Distress Centre

Distress Centre Halton provides telephone and online support to people to better cope with crisis, loneliness, and emotional stress. Also serves the Hamilton area.
905-849-4541

Assaulted Women's Helpline

Free, anonymous and confidential telephone and TTY crisis telephone line to all women in the province of Ontario who have experienced any form of abuse. Provides crisis counselling, safety planning, emotional support, information and referrals accessible 24/7/365.
Toll-free: 1-866-863-0511 TTY: 1-866-863-7868

Crisis Resources in the GTA

The CAMH Distress Crisis Resources web page lists a number of phone lines, response teams and hospitals in the GTA.
<https://www.camh.ca/en/health-info/crisis-resources>

STUDENT SUPPORTS

OTHER

Student Assistance Plan (Undergraduate)

Psychological counseling (offered in-person, over the phone, or over secure video) and academic-life services (legal consultation, financial consultation, life coaching, nutrition consultation and wellness resources offered virtually or in-person)

<https://www.msumcmaster.ca/services-directory/36-health-and-dental-insurance/student-assistance-plan>

Ombuds Office

Advice for students, staff, and faculty regarding academic and non-academic concerns.

MUSC 210

ext. 24151

ombuds@mcmaster.ca

mcmaster.ca/ombuds

SWHAT - Walk Safe Program

The Student Walk Home Attendant Team (SWHAT) is a volunteer service within the McMaster Students Union that will walk or bus with students during the evening hours 7 days a week, in all kinds of weather! (MSU Service)

Ext. 27500

swhat@msu.mcmaster.ca

Student Support and Case Management

Student rights & responsibilities

GH 207

ext. 23845

studentconduct.mcmaster.ca

Chaplaincy Centre

Pastoral support with personal counselling and bereavement support groups.

MUSC 231

ext. 24207

McMaster Engineering Society

Support from other McMaster Engineering Students

<https://www.macengsociety.ca/>

MSU PEER SUPPORT SERVICES

MSU Maccess

Maccess is a service that aims to build and maintain a campus that celebrates, advocates, and ensures inclusivity in the area of disability. A central aspect to Maccess is the provision of peer support by trained volunteers with lived experiences with disability such as chronic illness, mental illness, mental health concerns, neurodivergence, and additional identities.

Student Health Education Centre

SHEC is a peer-run health promotion, education, and referral service for McMaster University students. SHEC focuses on engaging with students about health-related issues through performances, peer support, fundraisers, and events. The service offers peer support, anonymous and confidential pregnancy testing, a resource library, condoms, lubricant, and menstrual products. SHEC's space is located in MUSC 202.

Women + Gender Equity Network

WGEN is a service that caters to women, transfolk, people who identify outside the gender binary, and all survivors of sexual assault. WGEN provides a safe(r) space and resource library on campus in MUSC 204. Volunteers in the space offer peer support and the service also runs a support group for survivors of domestic and intimate partner violence.

Pride Community Centre

The Pride Community Centre is a service of the McMaster Students Union. We provide a contact point for McMaster students that may identify as gay, lesbian, bisexual, transgender, queer, and/or any of the other diverse identities that make up our community. We offer educational programming and access to resources of interest, as well as peer support and a physical space for students to meet and socialize with each other. As advocates for gender & sexual diversity, the PCC's mandate upholds that LGBTQ+ students are entitled to a safe and supportive campus, absent of homophobia and transphobia, where the expression of one's gender & sexual identity is welcomed and respected.