ENGINEERING
McMaster-Mohawk
Bachelor of Technology
Partnership

McMaster University

Course Outline

1. COURSE INFORMATION

Session Offered	Fall 2021	
Course Name	Engineering Statistics	
Course Code	ENGTECH 2ES3/3ES3	
Date(s) and Time(s) of lectures	2ES3 Lecture: Wednesday 11:30am - 1:20pm |Tutorials: Friday 12:30, 1:30 3ES3 Lecture: Wednesday 8:30am - 10:20am | Tutorials: Monday 9:30, 12:30, 1:30	
Program Name	Automotive and Vehicle Engineering Technology; Automation Engineering Technology; Biotechnology	
Calendar Description	An introductory statistics course covering the following topics with engineering applications: organization and description of data, probability and distributions, confidence intervals and hypothesis testing and bivariate data analysis using regression.	
Instructor(s)	Dr. Gaganpreet Sidhu	E-Mail: sidhug1@mcmaster.ca Office Hours & Location: By Appointment

2. COURSE SPECIFICS

Course Description	The course introduces statistical methods for estimation, inference (hypothesis testing) and regression analysis. The course integrates the concepts and theorems of probability, probability distributions and their mathematical functions, random variables (both continuous and discrete), random sampling and the distinctive nature of samples drawn from populations. The emphasis is on practical decision making.		
Instruction Type	**Code**	**Type**	**Hours per term**
	C	Classroom instruction	28
	L	Laboratory, workshop or fieldwork	
	T	Tutorial	14
	DE	Distance education	
		Total Hours	42
Resources	**ISBN**	**Textbook Title & Edition**	**Author & Publisher**
	9780134769165	Stats: Data and Models, 4th Canadian Edition	De Veaux et al, 2018 Pearson
	Other Supplies	**Source**	
Prerequisite(s)	ENG TECH 1MT3 and registration in Automotive and Vehicle Engineering Technology; Automation Engineering Technology; Biotechnology		
Corequisite(s)	-		
Antirequisite(s)	ENGTECH 3ES3, ENGTECH 2ES3 or ENGTECH 3ST3		
Course Specific Policies	Students who have access to authorized recorded lectures in a course may use these recordings only for personal or group study and should not reproduce, share or upload the recording to any publicly accessible web environment. Similarly, notes, slides, evaluations and tests are for personal use and should not be shared with others outside of a course.		

	Assignments will be submitted through Avenue as per posted due dates. A submission after the deadline or by e-mail will not be considered for marking or review. 1st MSAF will be accommodated by adding the weight to the Final examination. The midterm and Final exam will be proctored on camera and students will require to have their camera turned on during the entire examination.
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	Introduction, Organizing and presenting data Describing and Comparing Distributions	CH 1-4
Week 2	Normal Distribution	CH 5
Week 3	Correlation and Regression	CH 6-8
Week 4	Probability and probability distributions	CH 11-13
Week 5	Sampling Distributions	CH 9, 14
Week 6	Midterm Recess	
Week 7	**Midterm Exam (October 20, 2021, 6.30pm-8.30pm)**	CH 1-14
Week 8	Inference – One sample tests	CH 15-18
Week 9	Inference – Two sample tests	CH 19-21
Week 10	Inference – Two sample tests	CH 19-21
Week 11	Analysis of Variance and F-test	CH 24
Week 12	Regression Inference	CH 23
Week 13	Multiple Regression	CH 26, 27
Week 14	Review	

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.

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	20%
Minitab Labs	20%
Midterm	25%
Final examination (tests cumulative knowledge)	35%
TOTAL	**100%**

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

5. LEARNING OUTCOMES

Apply the concepts of probability and statistics to the following:

1. Produce graphical displays, numerical summary, and description of data
2. Analyze real world data and defining statistical parameters to establish statistical differences from a baseline
3. Build statistical models of real-world situations
4. Recognise the central limit theorem and its role of variability and randomness in designing studies and drawing conclusions of problem cases
5. Apply modern statistical tools and models for prediction, statistical inference (interval estimation and hypothesis testing) and distributional analysis for problem solving in a variety of real-world settings and designing data driven solutions
6. Use software applications to interpret, draw conclusions, and solving statistical problems from standard output generated by statistical software

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.

ENGINEERING
McMaster-Mohawk
Bachelor of Technology
Partnership

McMaster University

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.