

IBEHS 3S03

Integrated Biomedical Engineering & Health Science

Winter Term (2025-26)

Course Outline

Calendar/Course Description

Probability theory, random variables, random processes, statistical inference, regression, correlation, error analysis, and experimental design.

Pre-Requisites and Anti-Requisites

Prerequisite(s): Registration in Level III or above of the Integrated Biomedical Engineering and Health Sciences (IBEHS) program

Antirequisite(s): IBEHS 4C03, STATS 3J04, STATS 3Y03, MATLS 3J03, HTHSCI 2GG3

Course Schedule

Per week: One 3-hour lecture, one tutorial (one hour)

Lectures: Lectures on Tues. 2:30 to 5:20PM

Tutorials: Tutorial on Weds. 9:30 to 10:20AM

Instructor Office Hours and Contact Information

Instructor	Office Hours:
Location	• TBD
bassimc@mcmaster.ca	

Instructional Team

Tutorial Support TAs: Each tutorial will have some of the following TA's

- **Name:** Jala Malcolm
- **Email:**
- **Office Hour:** TBD

Name: Imran Chowdhury
Email:
Office Hour: TBD

Course Delivery

In-person delivery.

[Avenue-to-Learn](#) will be the online management system for the course. Through **Avenue**, you will be able to:

- Find all course materials (lecture slides, lab materials, project documents, etc.)
- View course-related announcements

- Complete online quizzes and activities
- Submit course work (assignment, project deliverables) for grading
- View your gradebook

Course Teams (McMaster University Office 365) Site for Q&A and other on-line support, if needed; Office Hours Support.

Materials and Fees

Textbooks

There is no official course textbook. Optional textbooks that will be used to supplement the course material:

Applied Statistics and Probability for Engineers

ISBN: 978-1-119-40036-3

Authors: Montgomery and Rungger

Publisher: Wiley

Edition: 7th Edition

Online edition available through the McMaster bookstore.

Basic Engineering Data Collection and Analysis

ISBN: 978-1-958291-03-0

Authors: Stephen B. Vardeman & J. Marcus Jobe

Publisher: Iowa State University

© 2001 Stephen B. Vardeman and J. Marcus Jobe. Basic Engineering Data Collection and Analysis is available under a Creative Commons Attribution NonCommercial ShareAlike (CC BY-NC-SA) 4.0 International license. [Vardeman S. & Jobe J. 2023. Basic Engineering Data Collection and Analysis](#)

Software

Python will be used as the statistical computing software.

Hardware

Use of a computer is a requirement in the course.

Course Objectives and Learning Outcomes (LO)

Upon successful completion of the course, the student should be able to:

LO.01	Characterize and visualize univariate and bivariate data using descriptive statistics and graphics.
LO.02	Demonstrate an understanding of the basic concepts of random variables, probability distributions, and the sampling distribution of a statistic.
LO.03	Understand when to use and how to determine the appropriate statistical test.
LO.04	Compute and Interpret confidence intervals and significant differences using appropriate hypothesis testing.

LO.05	Fit and interpret a least squares linear regression model, and describe the model limitations.
LO.06	Design your own experiment and then interpret experimental data.
LO.07	Use statistical computing for the analysis of statistical tests, linear regression, and design of experiments.
LO.08	Demonstrate an understanding of engineering and equity principals in the collection of data and in the communication of data.

Assessments

The course is assessed as follows.

GRADING MODULE	WEIGHT
Class Activities (1%, best 9 of 11)	9%
Assignments (3 Assignments of 5% each)	15%
Tutorials (2%, best 8 of 9)	16%
Midterm 1	20%
Midterm 2	20%
Design of Experiments Project	20%

Completion and Submission of Work

It is the student's responsibility to ensure assessments are correctly submitted to the correct location, on time, and in the specified format. **Failure to correctly submit an assignment will result in a mark deduction** (see below).

Submission Penalties

Missed Work Policy

If you miss a submission deadline, lasting fewer than 3 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. Please note that the MSAF may not be used for the DOE project as this is in lieu of the final examination.

If your MSAF form for other assessments was received, then the note "MSAF" will be placed in the feedback area of the A2L dropbox for the missed work. This will show up within one week of you reporting the MSAF to the university and forwarding the confirmation to the instructor. If this note does not appear within one week, then contact Dr. Bassim; if it does appear then no follow-up is required. For assignments, the MSAF relief will be a penalty free extension of the submission deadline for up to 3 days. For midterms, the MSAF relief will be an alternative exam write-time within 10 days of the midterm exam. For all other assessments, the MSAF relief will be to re-weigh the missed marks to the other submissions of the same submission type..

Use of AI tools in the course.

Some use permitted. Students may use generative AI in this course in accordance with the guidelines outlined for each assessment, and so long as the use of generative AI is referenced and cited. Use of generative AI outside assessment guidelines or without citation will constitute academic dishonesty. It is the student's responsibility to be

clear on the limitations for use for each assessment and to be clear on the expectations for citation and reference and to do so appropriately.

Important Dates

Winter Term	
Monday January 5	Winter Classes Begin!
Tuesday, Feb 10	Midterm 1
Monday Feb 16 to Friday Feb 20	Fall Reading Week (no classes)
Tuesday, March 24	Midterm 2
Tuesday, April 7	End of Classes.
Tuesday, April 14	Design of Experiments Project Due.

Communication Policy

Electronic communication: If you have a question outside scheduled class hours, email is the best method to contact the instructor or the TAs. Please send all e-mails using your McMaster e-mail address and include "IBEHS 3S03" in the subject line. Every attempt will be made to reply within 24 hours (excluding weekends). There will also be a Q&A channel that will be monitored on the IBEHS 3S03 Teams Site.

Inclusive Environment Statement

We consider this classroom to be a place where you will be treated with respect, and we welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

We will gladly honour your request to address you by an alternate name or gender pronoun. Please advise of this preference early in the semester so that we may make appropriate changes to our records.

Accreditation

The Graduate Attributes defined in this section are measured for Accreditation purposes only and will not be directly taken into consideration in determining a student's actual grade in the course. For more information on Accreditation, please visit: <https://www.engineerscanada.ca>. Mapping of the course **Learning Outcomes (LO)** to the Canadian Engineering Accreditation Board (CEAB) **Graduate Attributes (GA)** are outlined in the table below:

GRADUATE ATTRIBUTE	LEARNING OUTCOME(S)
GA01 - Knowledge Base for Engineering	
1.1 – Competence in mathematics	LO.02, LO.05
1.3 – Competence in Engineering Fundamentals	LO.01, LO.03, LO.04
1.4 - Competence in Specialized Engineering knowledge	LO.06
5. USE of Engineering Tools	
5.1 - Evaluates engineering tools, identifies their limitations, and selects, adapts, or extends them appropriately.	LO.03, LO.05, LO.07
10. ETHICS & EQUITY	

10.2 - Applies the principles of equity and universal design to ensure equitable LO.08 treatment of all stakeholders..

For more information on Accreditation, please visit: <https://www.engineerscanada.ca>

McMaster Approved Policy Statements

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 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:

- Plagiarism, e.g., submission of work not one's own or which other credit been obtained.
- Improper collaboration in group work.
- Copying or using unauthorized aids in tests and examinations.

On all work submitted for credit by students at McMaster University, the following pledge is either required or implied: *"I understand and believe the main purpose of McMaster and of a university to be the pursuit of knowledge and scholarship. This pursuit requires my academic integrity; I do not take credit that I have not earned. I believe that academic dishonesty, in whatever form, is ultimately destructive to the values of McMaster, and unfair to those students who pursue their studies honestly. I pledge that I completed this assessment following the guidelines of McMaster's academic integrity policy."*

Authenticity / Plagiarism Detection

In this course we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. Students will be expected to submit their work electronically either directly to Turnitin.com or via Avenue to Learn (A2L) plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish to submit their work through A2L and/or Turnitin.com must still submit an electronic and/or hardcopy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com or A2L. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). To see the Turnitin.com Policy, please go to the following website: www.mcmaster.ca/academicintegrity.

Academic Accommodations for 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.

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 examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Academic Accommodations for Relief for Missed Academic 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](#)".

- All MSAFs are to be directed to prof1p10@mcmaster.ca. Sending to another email address will delay processing.
- It is the prerogative of the instructor of the course to determine the appropriate relief for missed term work in his/her course.
 - In the event an MSAF is applied to either the **Graphics Design Final Assessment** or **Computing Final Assessment**, they **will be rescheduled**.

Courses with an On-Line Element

In this course, we will be using **Avenue-to-Learn** and **Microsoft Teams**. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, usernames 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 this course 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.

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.

Reference to Research Ethics

The two principles underlying integrity in research in a university setting are these: a researcher must be honest in proposing, seeking support for, conducting, and reporting research; a researcher must respect the rights of others in these activities. Any departure from these principles will diminish the integrity of the research enterprise. This policy applies to all those conducting research at or under the aegis of McMaster University. It is incumbent upon all members of the university community to practice and to promote ethical behaviour. To see the Policy on Research Ethics at McMaster University, please go to <https://reo.mcmaster.ca/>.

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.

Notice Regarding Possible Course Modification

The instructor and 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. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.