

**INTRODUCTION TO STATISTICS Fall 2022
(BIOL243/GPHY247/KNPE251/NURS323/PSYC202)**

Credits: 3.0

Modality: Blended (in person class and tutorial)

COURSE DESCRIPTION

Welcome to Introduction to Statistics - the purpose of this course is to improve your numeracy and critical thinking skills to help you make better decisions in your professional and personal life. To achieve this, you will learn how to make sense of raw data, how best to describe data to others, and how to test hypotheses using statistics. The components of this course have been designed with care to maximize your opportunities to learn in an engaging and supportive environment. We look forward to exploring the world of statistics with you!

Course Instructors

Dr. Sarah Yakimowski (Lecture Instructor, Department of Biology)

Dr. Randall Flanagan (Tutorial Instructor, Department of Psychology)

Course Program Assistant

Danielle D'Souza

Please contact in2stats@queensu.ca if you have questions about the course

STUDY HABITS FOR SUCCESS

Active learning requires a different set of study habits than passive learning—here are some study habits to help you succeed.

- **Preparation is key**

Make sure to devote enough time to master the weekly module material. Cramming at the last minute may work for passive learning, but gradual active learning will give you enough time to build connections across course material.

- **Seek help early**

The online e-book contains lessons, quizzes, and additional resources to introduce new material each week. Give yourself the time to work through the main material, and any of the additional resources when you find concepts more challenging.

- **Go beyond reading**

The key to active learning is that you are at the centre of your learning. Working through the online material gives you a foundation, and then you need to develop the connections that come from applying the material. Some good strategies are to write a brief set of paragraphs or infographics to summarize the material, discuss the ideas with classmates, go through the quiz questions, and come to student help sessions prepared with questions.

IMPORTANT UNIVERSITY DATES

| | |
|-----------------------|---|
| Sept. 6 | Classes start |
| Sept. 19 | Last day to add courses Last day to drop courses without financial penalty |
| Nov. 1 | Last day to drop courses without academic penalty |
| Dec. 5 | Classes end |
| Dec. 8- 22 | Fall Term Final Assessment period |

EQUITY, DIVERSITY & INCLUSIVITY STATEMENT

Queen's University recognizes that the values of equity and diversity are vital to and in harmony with its educational mission and standards of excellence. It acknowledges that direct, indirect and systemic discrimination exists within our institutional structures, policies and practices and in our community. These take many forms and work to differentially advantage and disadvantage persons across social identities such as race, ethnicity, disability, gender identity, sexual orientation, faith and socioeconomic status, among other examples. We are committed to continual examination of our practices and ongoing change to improve equity, diversity and inclusion in our community.

LAND ACKNOWLEDGEMENT

Let us acknowledge that Queen's is situated on traditional Anishinaabe and Haudenosaunee territory. We are grateful to be able to be live, learn and play on these lands. ([Four Directions Indigenous Student Centre, Queen's University](#))

EXPECTATIONS

For Instructors

As instructors we are committed to:

Engagement with the course material – we love finding ways to navigate the
Sometimes complex course material, and to share our love of data!

The student learning experience – we aim to create many, and varied,
opportunities for students' to interact with the course material.

The process of learning – mistakes and practice are an important part of learning
the material, and 'learning how to learn', more generally. We are here to

help you navigate this experience.

Respectful communication – we look forward to communicating with you in person (in lecture, in tutorial), in weekly student help sessions, online via discussion boards, and through the course email (in2stats@queensu.ca).

Differences in learning – We apply universal design to account for differences in learning where possible, and arrange additional accommodations in collaboration with the Queen’s Exam Office and QSAS. We are always open to discussion – we know that a complex set of factors affect your learning and will work to support your education.

Challenges – Please discuss your challenges with us during class, tutorial, help sessions and the Course Questions Forums. You can also always reach us at in2stats@queensu.ca.

For Students

To achieve teaching and learning success, our expectation of students includes:

Preparation for weekly class via online e-book modules

Preparation for tutorials via class and the Software Skills Guides (OnQ)

Preparation of necessary technology for participation in class, tutorial, and online activities (e.g. weekly quizzes, software skills development)

Attendance and participation in class and tutorial to the best of your ability

Respectful communication and interactions with all tutorial group members, teaching assistants and instructors – we know group work often comes with challenges, but there is also a lot of opportunity to learn from one another and to share your strengths.

Academic integrity with respect to all course assignments and examinations

LEARNING OUTCOMES

After completing this course, students should have the knowledge and skills to do the following:

1. Identify the features of a data set to determine how best to summarize and display it.
2. Choose the appropriate statistical test and provide the rationale for selection.
3. Compute basic parametric statistical tests to test hypotheses.
4. Interpret the results of statistical tests and data software output to draw valid conclusions.
5. Communicate results of statistical analyses with clear figures and text.
6. Apply knowledge of statistics and research design (e.g., sampling) to critically evaluate research findings.

TOPICS

| Module | Topic |
|---------------|-----------------|
| 0 | Course Overview |

Anatomy of a Statistical Study

| | |
|-----|--------------------------------|
| 1 | Study Designs and Sampling |
| 2 | Descriptive Statistics |
| 3 | Visualizations |
| 4 | Probability |
| 5 | Sampling Distributions |
| 7/8 | Hypothesis Testing and T-tests |
| 9 | Chi-Square Test |
| 10 | Linear Regression |

| | |
|----|---------------------|
| 11 | Single-Factor ANOVA |
| 12 | Two-Factor ANOVA |

COURSE MATERIALS

There are three types of course materials (all required)

1. The first is an ebook entitled "Taking the Anxiety out of Statistics" by Nelson & Beyer (Kendall Hunt Publishing). Queen's students can purchase a special subscription. Note that no royalties are collected on this ebook.

Modules of the e-book must be completed before attending class. In class (lecture) we will spend more time with challenging topics, and use case studies to begin applying your knowledge.

2. The second is a Top Hat account for active learning during lectures. <https://tophat.com/> You will receive an email inviting you to join the Top Hat course.

Top Hat 'clicker' questions will be used during lectures to check in with your understanding of key concepts, and to navigate case studies as a class.

3. Software skills guides will be available in onQ. The course uses Microsoft Excel and RStudio, both of which are free for students.

Software skills guides will be assigned ahead of each tutorial, and this material is also assessed in a series of 3 online quizzes.

Arts and Science Calculator Policy

Calculators acceptable for use during quizzes, tests and examinations are intended to support the basic calculating functions required by most Arts and Science courses. For this purpose, the use of the **Casio 991** series calculator is permitted and is the **only approved calculator for Arts and Science students**.

This inexpensive calculator sells for around \$25 at the Queen's Campus Bookstore, Staples and other popular suppliers of school and office supplies.

SUGGESTED TIME COMMITMENT

Students can expect to spend approximately **9** hours a week in study/practice and online activity for this course.

- Online Lesson: 2-4.5 hours (as needed)
- Lecture: 1 hour
- Tutorials: 1.5 hours
- Software Guides: 1 hour
- Additional Practice: as needed

WEIGHTING OF ASSESSMENTS

| Assessment | Location | Weight | Learning Outcomes | Content Elements |
|-------------------------|--------------------|--------|-------------------|---|
| Top Hat (lectures) | In person lecture | 4% | 1-4 | e-book modules |
| Software Skills Quizzes | Online | 10% | 1-5 | Software Skills Guides |
| Weekly Quizzes | Online | 12% | 1-4 | e-book modules, Software Skills Guides |
| Tutorial Activities | In-person tutorial | 24% | 1-5 | Integrates all course material |
| Term test (x1) | TBD | 20% | 1-4 | e-book modules, practice problems, lectures |
| Final Exam | TBD | 30% | 1-5 | e-book modules, practice problems, lectures |

Location and Timing of Final Examinations

Fall 2022 Arts and Science final exams will be administered to students as follows:

“Students taking on-campus courses will write their proctored final exams in-person and on-campus.”

The exam period is listed in the key dates prior to the start of the academic year in the Faculty of Arts and Science Academic Calendar and on the Office of the University Registrar’s webpage. A detailed exam schedule for the Fall Term is posted before the Thanksgiving holiday; for the Winter Term it is posted the Friday before Reading Week, and for the Summer Term the window of dates is noted on the Arts and Science Online syllabus prior to the start of the course. Students should delay finalizing any travel plans until after the examination schedule has been posted. Exams will not be moved or deferred to accommodate employment, travel / holiday plans or flight reservations.

COURSE TIMELINE

A weekly timeline will be available in OnQ, detailing each required course component for students. For example:

Course Timeline ▾



The Course Timeline shows all relevant course dates, including assessments, as well as links to other important course information. As dates may change, you should consult the Timeline each time you log in to the course.

Please note, some students may see an onQ Calendar for their course. However, the onQ calendar does not display all dates associated with your course assignments. For complete information all of your assignments in this course and the start and close dates, please refer to the Course Timeline below.

If there are discrepancies between dates in the course onQ site, the Timeline will be considered accurate.

All times are in Kingston time (Eastern).

WEEK 1

ASSESSMENTS AND ACTIVITIES

Sept 7-12

1. Work through [Module 0 \(Course Overview\)](#), and [Case Study Video](#)
2. Work through [Week 2 Software Skill Guide](#)
3. Attend [Week 1 Help Session](#) (optional)

ASSESSMENTS AND ACTIVITIES DESCRIPTION

Software Skills Quizzes

Software Skills quizzes are timed quizzes designed to evaluate your skills in Microsoft Excel and RStudio based on what you've been taught in the preceding Software Skills Guides and tutorials. The quizzes start at a fixed time (see Timeline for dates and times) and are done online. It is the responsibility of the student to ensure that they are using a reliable computer and internet connection, and are working in a physical space that is amenable for the quiz.

Weekly Preparatory Quizzes

There are 11 quizzes, each open for a week (see Timeline for dates and times). The quizzes will consist of multiple-choice questions based on the weekly material from e-book modules, self-assessments and the software skills guide (when applicable). You can take the quiz up to 5 times. Your highest mark will be recorded as your mark for the quiz.

Tutorial Activities

There are 10 in-person tutorial activities in the course. Each of these are completed in a group of 3-4 students. The tutorials are performance-based activities designed to provide the opportunity for students to combine theoretical and skills-based concepts from modules and software skills guides. Statistical analyses are performed to test scientific hypotheses. A wide variety of datasets are used to help you see the utility of statistics.

Please note the following important policies related to group tutorials. You will be assigned to a tutorial group within your section for the semester. You must attend the tutorial that you signed up for and work with your group to receive a grade. If you attend a tutorial that you did not sign up for, you will receive a

grade of zero (even if you completed the tutorial activity).

Term Test

A term test will cover material for the first half of the course (weeks 1-6). The test will consist of multiple choice and short answer questions (the same format of the final exam). The term test will cover material from the e-book modules, lectures, module practice problems and elements of the tutorials.

Final Exam

The Final Exam is three hours in length and includes multiple-choice and short answer questions based on the material from the entire term, including all e-book modules, lectures, module practice problems and elements of the tutorials.

Exam Dates

The specific dates for each exam will be announced later in the term by the Registrar's office. Once the exam schedule has been finalized the exam date will be posted on your SOLUS account.

Please note that the Senate Policy on Academic Consideration for Students in Extenuating Circumstances is applicable during the final examination period. In the Faculty of Arts and Science, students who are too ill to write the examination or are experiencing extenuating circumstances are being directed to the Academic Consideration Request Portal (ACRP) to submit a request for consideration.

Assessment Accommodations

Queen's University supports Universal Instructional Design to create more accessible learning environments. In addition to incorporating a variety of delivery methods and learning materials, this course has several academic accommodations built directly into the assessments. For most students, the assessment design incorporates extra time on assignments/tests and computer-assisted examinations.

If you have a formal academic accommodation that goes beyond the accommodations described below, please see the course homepage and click the blue "Submit QSAS Accommodation Letter or STAA Form" button. You may read more about our approach to academic accommodations and considerations in the relevant sections of the course syllabus (see Policies below).

Weekly Quizzes are completed online, in a location of your choosing, and are open for one week. The quizzes take from 30-50 minutes to complete depending on the week. The 7-day window provides for any time accommodations, as well as enough time to attend the help sessions. If you cannot write one or more of the weekly quizzes and have an approved academic consideration, your total quiz grade will be evenly redistributed across the completed quizzes.

Tutorial Activities are completed during in-person tutorial times indicated on the Live Sessions page. Since the live tutorials include group work, students will need to work together during the scheduled time. It is not possible to have individual accommodations for these group activities. We open up the tutorial activity ahead of time so that you can prepare before coming to tutorial. You must have attended the tutorials to submit a report. If you are absent and have an approved academic consideration, your tutorial grades will be redistributed over the tutorials for which you were present.

Software Skills Quizzes are completed online at a scheduled time. These are timed quizzes and if you require extra time for an approved accommodation, we will gladly add that to your individual quiz once you submit your QSAS accommodation (see the course homepage). If you cannot write one or more of the software skills quizzes and have an approved academic consideration, your total software skills quiz grade will be evenly redistributed across the completed quizzes.

Term Test and Final Exam are written during scheduled times—please see the Course Timeline for details. We provide extra time (up to 20 min per 1 hour) in the design of the assessment. For example, most students take about 80 minutes to complete the term tests, but we schedule 2 hours. If you require extra time beyond 20min/hr for an approved accommodation, we will gladly add that to your test once you submit your QSAS accommodation (see Accommodations in the Policies section below, or click the blue Accommodations button on the course homepage).

If you cannot write the final exam and have an approved academic consideration, you will be required to write a deferred exam at some point during the following academic term.

Deferred Final Exam - Students receiving permission to write a deferred final exam will be expected to write their exam during the Faculty of Arts and Science deferred exam period with exact time, date, and location TBA. Requests for individualized deferred exam dates will not be accommodated. The deferred exam is considered an official exam to which all the exam regulations apply.

LATE POLICY

Tutorial activities are due at the end of your scheduled tutorial. The late penalty is 10% per day and this is first applied 30 mins after a tutorial session ends.

GRADING

All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

| Grade | Numerical Course Average (Range) |
|-------|----------------------------------|
| A+ | 90-100 |
| A | 85-89 |
| A- | 80-84 |
| B+ | 77-79 |
| B | 73-76 |
| B- | 70-72 |
| C+ | 67-69 |
| C | 63-66 |
| C- | 60-62 |
| D+ | 57-59 |

| | |
|----|--------------|
| D | 53-56 |
| D- | 50-52 |
| F | 49 and below |

CONTACTING THE TEACHING TEAM

The teaching team contact information is located on the Homepage of the course (see Teaching Team).

For general questions about the course and content, please post to the weekly Course Questions Forums (OnQ). Feel free to help answer your peers' questions on this forum. Most questions are answered within 24 hours.

Please use the course email for inquiries that are about the logistics of the course and a team member will typically respond within 24 hours. **Note:** If you have questions about course material you should bring those to a student help session or post them to the online forum.

Course email: in2stats@queensu.ca

COURSE FEEDBACK

At various points during the course, students may be asked to take part in a variety of feedback activities (such as questionnaires and exit tickets). This feedback enables the team to make any adjustments necessary to improve the learning environment. All surveys are anonymous, and directly related to activities, assessments, and other course material.

N/ETIQUETTE

In any course you often communicate with your peers and teaching team through electronic communication. You are expected to use the utmost respect

in your dealings with your colleagues or when participating in activities, discussions and online communication.

Here is a list of netiquette guidelines. Please read them carefully and use them to guide your communication in this course and beyond.

1. Make a personal commitment to learn about, understand, and support your peers.
2. Give others the benefit of the doubt.
3. Ensure your writing is respectful and inclusive.
4. Recognize and value the experiences, abilities, and knowledge that each person brings.
5. Recognize and value the diversity of learning and communication styles.
6. Carefully re-read your writing before posting or sending to others.
7. It is okay to disagree with ideas, but personal attacks will not be tolerated.

QUEEN'S EMAIL

The University communicates with students via Queen's email. Please check your email regularly to ensure you do not miss important information related to your course.

COURSE ANNOUNCEMENTS

Throughout the course, we will routinely post course news in the Announcements section of the course homepage. We encourage you to actively check the course onQ main page for course announcements throughout the semester for reminders and additional course information or learning opportunities.

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ACCESSIBILITY/ACCOMMODATIONS

Queen's University is committed to achieving full accessibility for all students. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. The Senate Policy for Accommodations for Students with Disabilities was approved at Senate in November 2016.

If you are a student with a disability and think you may need academic accommodations, you are strongly encouraged to contact the Queen's Student Accessibility Services (QSAS) and register as early as possible. For more

information, including important deadlines, [please visit the QSAS website \(click here\)](#).

To register your academic accommodation for this course, please select the Accommodations button on the course homepage and follow the instructions.

ACADEMIC CONSIDERATIONS FOR STUDENTS IN EXTENUATING CIRCUMSTANCES

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time. [Click here to view the Senate Policy on Academic Consideration for Students in Extenuating Circumstances](#).

Please see the Academic Consideration Requests button on the course homepage to apply for an academic consideration in this course. Note that you will be taken to the student request portal where you will be required to provide the name and email address of the instructor/coordinator. For this course, please be sure to use the following email address: in2stats@queensu.ca.

COMPUTER REQUIREMENTS

Microsoft Windows Client

Vista/Windows 7/Windows 8

Intel Core 2 Duo processor

4 GB RAM

Soundcard with speakers and microphone or preferably a headset

Webcam

Mac Client

OS X 10.8 or higher

Intel i5 processor

4 GB RAM

Internal, USB or external iSight microphone or preferably a headset

Webcam

Supported Browsers

Chrome (latest version)

Firefox (latest version)

Safari (latest version on 64-bit Intel processors only)

Introduction to Statistics

Syllabus

Fall 2022

Internet Connection

Wired high speed access: Cable or better
(wifi is not recommended) A minimum download speed of 10 Mbps and up to 20 Mbps for multimedia is recommended. Click here for an [Internet speed test](#).

Java

Latest version

Media Player

Flash (latest version)

Adobe Reader (Latest Version)

For technology support ranging from setting up your device, issues with onQ to installing software, contact ITS Support Centre.

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