كلية الهندسة
College of Engineering
جامعة قطر QATAR UNIVERSITY

COLLEGE OF ENGINEERING
General Engineering

GENG 200 / Probability and Statistics for Engineers

Fall 2022

Instructor Information

Name:
Academic Title:
Office:
Phone:
E-mail:
Online-Office Hours:

TA Information

Name:
Office:
Phone:
E-mail:

Class/Laboratory Schedule

Coordinator Information

Name: Dr. Ridha Hamila
Office: BCR-H225
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Course Information

Catalog Description:
Classification of Data. Graphical representation. Arithmetical description. Probability theory, probability of an event, and composite events. Addition rule and multiplication rule, independent events. Counting techniques. Random variables and probability distributions. Expected values. Continuous and discrete random variables. Normal distribution. Binomial distribution. Poisson distribution. Joint and marginal probability distributions. Independence of random variables. Covariance and correlation. Random sampling. Unbiased estimates. Statistical intervals and test of hypothesis for a single sample.

Credits:
3 credit hours.

Contact Hours:
3 lecture hours.

Prerequisites:
MATH102 Calculus II.

Textbook(s):
Applied Statistics and Probability for Engineers by Montgomery, D. C. and Runger, G. C., 6th ed., Wiley, 2011. ISBN-13: 978-0470-50578-6.

References:
Probability and Statistics for Engineering and the Sciences by Jay Devore. Sixth Edition, Thomson Publishing, 2004.

Course Objectives:
The course aims to:
1. Provide students with statistical methods, both descriptive and analytical, for dealing with the variability in observed data.
2. Provide students with fundamental concepts of probability and random variables.
3. Introduce concepts of Statistical Inference and Hypothesis testing and confidence intervals of parameters.
4. Emphasize practical engineering-based applications and the use of real data examples.

Analysis of CENG Course Outcome and Mapping to Student Outcome

Course Outcomes	(SO)
1. Model, describe and communicate solutions and results for problems and experiments involving randomness.	1
2. Distinguish between discrete and continuous random variables, and identify when and how to use their corresponding distributions.	1
3. Analyze sampled data using statistical measures and graphics using statistical software.	1,6
4. Design good estimators for various parameters of different populations.	1
5. Judge statistical hypotheses by carrying statistical tests using different significance levels.	1

Student Outcomes (SOs)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topics Covered:

Topics	Weeks
Introduction.	1
Probability: Addition rule, conditional probability, multiplication rule and Bayes Theorem.	1,2
Discrete random variables. Probability mass function. Mean and variance of discrete random variables.	2
Probability Distribution functions: Uniform, Binomial, Geometric and Poisson Distribution.	3
Continuous random variables. Probability Density functions.	3
Normal Distribution. Exponential distribution. Uniform Distribution	3,4
Joint probability function. Multiple discrete random variables.	4
Covariance and correlation. Linear combination of random variables.	4
Midterm Exam	TBA
Descriptive Statistics: Data Summary, Presentation: Stem-Leaf Diagrams, Frequency Distributions, Histograms, Boxplots.	5
Parameter estimation. Properties of estimators. Method of Moments.	6
Interval estimation. Inference on the mean of a population: variance known or unknown. Inference on the variance of a normal population.	7
Hypothesis testing about the mean: Small and Large Sample	8
Final Exam	TBA

Method of Instruction

- Online lectures using QU-Black board and interactive student activities
-Reading Materials\ Class Discussion
-One hr online-office hours for student inquiries and support
-Tutorial session (online)

Assessment Methods and Grading Policy

Homeworks:	**10% (Average of 4-6 HWs)**
Quizzes:	**15% (Average of 4-6 Quizzes)**
Computer Based Projects:	**10% (Average of 2-4 projects)**
Midterm:	**30% (Best of the 2 Midterms)**
Final Exam:	**35%**

Quizzes: Most of the quizzes will be announced during class hours. You have to expect some pop-up (unannounced) quizzes as well. <u>There will be no make-up for missed quizzes.</u>

Homework: You will be given some homework assignments, which will be announced in class and posted on the course website on The Blackboard. No late submissions are accepted.

Computer-Based Project (CBP): You will be given some (CBP) projects to work on in groups of no more than 3 students, which will be announced in class and posted on the course website on The Blackboard. No late submissions are accepted. Late submissions are accepted up to 3 days after the submission deadline with a penalty of 10% deduction per each day lost.

Examination: There will be one mid-off-line Midterm Exam and one Off-Line Final Exam.

ABET Contribution of Course to Professional Component

Math & Basic Science : 90%
Engineering   : 10%
Engineering Design   : 0%
General Education   : 0%

Computer/Software Usage

MS Excel, Minitab and/or Matlab

Laboratory Projects

N/A

Course Ground Rules

Attendance: Class attendance is mandatory, according to the Qatar university regulation. It is the student`s responsibility to keep track of his attendance and follow up on the class notes, assignments, and announcements in a missed session.

A reiteration and emphasis of certain rules and course expectations:
- Delayed homework (only three days are allowed with 10% off per day then ZERO)
- Zero tolerance for cheating & plagiarism (Refer to University Rules)
- Missed exams without prior proper excuse will get Zero (Refer to University Rules)
- Shouldn`t be late more than 5 minutes to lectures
- Switch off mobiles during the lecture time and remove from your desk
- Effective participation required in the class
- Students are expected to communicate with other students in team projects
- Collaboration but not copying of homework, lab reports and projects is encouraged □ Learn how to use blackboard
- Keep abreast of course announcements
- Students must the assigned university e-mail address rather than a personal e-mail address
- Use the course discussion groups and e-mail communication with each other and with instructor
- Answer to your emails\course web questions will be within 24 hours on working days (no answer on weekends\ holidays)
- Students should address the technical problem immediately.

Classroom Behavior: My preferred classroom behavior is that all students actively participate in class.

Support for Students with Special Needs

It is Qatar University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their instructor to ensure that their individual needs are met. The University, through its Special Needs Section, will exert all efforts to accommodate individuals' needs.

Contact Information for Special Needs Section:
Tel-Female: (00974) 4403 3843
Tel-Male: (00974) 4403 3854
Location: Student Activities Building
E-mail: specialneeds@qu.edu.qa

Academic Support and Learning Resources

The University Student Learning Support Center (SLSC) provides academic support services to male and female students at QU. The SLSC is a supportive environment where students can seek assistance with academic coursework, writing assignments, transitioning to college academic life, and other academic issues. SLSC programs include: Peer Tutoring, the Writing Lab, Writing Workshops, and Academic Success Workshops. Students may also seek confidential academic counseling from the professional staff at the Center.

Contact Information for Students Support and Learning Resources:
Tel: (00974) 4403 3876
Fax: (00974) 4403 3871
Location: Female Student Activities Building
E-mail: learningcenter@qu.edu.qa

Student Complaints Policy

Students at Qatar University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

Declaration

This syllabus and contents are subject to changes in the event of extenuating circumstances. The instructor (with approval of the Head of Department) reserves the right to make changes as necessary. If changes are necessitated during the course, the students will be notified by e-mail communication and posting the notification on the online teaching tool Blackboard. It is the student's responsibility to check on announcements made while they were absent.

Faculty Name: Ridha Hamila
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