The George Washington University
Department of Statistics

STAT 4158-10

Spring 2015

Days: MW
Meeting Time: 2:20 a.m.-3:35 p.m.
Classroom: 2020 K Street, Room 27

Instructor:
Hosam M. Mahmoud, Professor

Office address: 801 22nd Street, Room 562
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Office hours: 4:00-5:00 Wednesday, also available by appointment

Textbooks:

Mathematical Statistics with Applications,

By W. Mendenhall, D. Wackerly and R. Scheaffer

Scope:

Having finished Stat-4157 (or equivalent), a course in foundations of probability and basic statistical concepts, you are now ready to move on to applications of these concepts in the data-driven world. The construction of good statistical procedures, testing their degree of goodness and passing to inference about populations from samples are primary topics.
Prerequisites:

An introductory course in probability at the level of GWU Stat 4157 (or equivalent) is required. Familiarity with all the basic discrete distributions (Bernoulli, binomial, geometric, Poisson, etc.) and all basic continuous distributions (uniform, exponential, normal, gamma, beta, etc.) is assumed. Also, familiarity with integral and differential calculus is assumed. For example, I expect everyone in the class to know $\int x^6 \, dx$, $\int e^{-x} \, dx$, $\int \ln x \, dx$. Competence in basic algebra is expected, for example extraction of roots of equations of the second and third degree and accurate manipulation of algebraic expressions are assumed to be in your background.

Topics:

WEEK 1: Review of probability, moment generating functions
WEEK 2: Sampling distributions
WEEK 3: Quiz 1, Estimation
WEEK 4: Properties of a good estimator
WEEK 5: Quiz 2, Confidence intervals
WEEK 6: Midterm
WEEK 7: Maximum likelihood estimators
WEEK 8: Method of moments
WEEK 9: Quiz 3, Hypothesis testing
WEEK 10: Hypothesis testing
WEEK 11: Quiz 4, Regression
WEEK 12: Regression
WEEK 13: Non-parametric statistics
WEEK 14: Review

Learning outcomes

As a result of completing this course, students will be able to:
1. Make inference from real data.

2. Construct good estimators for unknown (and possibly unknowable) parameters in business, engineering, social sciences and physical phenomena.

3. Have a global look on the interplay between probability and statistics.

4. Design realistic statistical procedures.

**Grading Policy**

1 Midterm (25%)

1 Final (35%)

4 Quizzes (5% each)

about 6 homeworks (25%)

Note that these add up to a total of 105 percentage points!

Here is an example of what constitutes an A grade in this class. You score 95% or above: all homeworks and tests are solid and well done. You can miss a couple of problems here and there and still get an A.

**Class Policy**

Late work: Will not be accepted.

Make-up exams: Except for medical cases (with proper documentation), there will absolutely be no make-ups, you missed an exam, you failed it.

**Blackboard**

Please check Blackboard frequently, as there may be assignments, announcements, and material passed to the class via this electronic medium during the week. You can find it at

[http://blackboard.gwu.edu/webapps/portal/frameset.jsp](http://blackboard.gwu.edu/webapps/portal/frameset.jsp)
You need to login, using your GW user ID and password.

For university policies on teaching, see

http://www.gwu.edu/~academic/Teaching/main.htm

**Academic Integrity**

I support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see:

http://www.gwu.edu/~ntegrity/code.html

Any case of the slightest hint of cheating will be prosecuted to the fullest extent of the university Academic Integrity Policy. You will receive an automatic F, and the case will be taken to the proper administrative channels.

**Support for students outside the classroom**

**DISABILITY SUPPORT SERVICES (DSS)**

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to:

http://gwired.gwu.edu/dss/

**UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300**

The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:

- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals
See

http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices

Security

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.