Department of Geography
GEO 3162c (section #2B31) / **GEO 6160** (section #2H02)
INTRODUCTION TO QUANTITATIVE METHODS, Fall 2018

Instructor: Dr. Timothy J. Fik, Associate Professor
Time: (W) Wednesdays, Periods 7-9 (1:55PM to 4:55PM)
Location: 3012 Turlington Hall
Instructor's Office: 3137 Turlington Hall, P.O. Box 117315; Geography Department
University of Florida, Gainesville, Florida 32611-7315
Office Hours (formal):
 Tuesdays 9:00AM–11:30AM; Thursdays 9:00AM-12:00PM; and
 Wednesday: 9:00-11:30AM
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Prerequisites: None. Although it is recommended that some students complete a Basic Introductory Statistics course prior to enrolling in GEO 3162 if they have no background in statistics.

Course Objectives

GEO 3162c/6938, "**Introduction to Quantitative Methods**", is designed to provide students with a working knowledge of various statistical techniques that are commonly used in social science research. The course also highlights various quantitative methods that are useful for socio-spatial data analysis.

Lectures and reading assignments cover such topics as data measurement and presentation, descriptive statistics, probability distributions, samples and populations, sampling and hypothesis testing, and statistical inference. This course is designed to ensure that students gain a fundamental understanding of basic statistical procedures and the scientific method by employing a structured approach to descriptive and inferential data analysis. It will emphasize the proper use of quantitative methods in applied research, and is useful before proceeding to study intermediate or advanced topics such as multivariate statistical modeling/methods, spatial statistics, and econometrics.

Course materials can be found on Canvas for students officially registered for this course. Note that there will be a lag between the presentation of material (in class) and the posting of material… approx. 3-4 days.

Department of Geography's Quant Sequence

GEO 3162c/GEO 6160 is the first in a sequence of four quantitative methods courses offered by the Department of Geography. After completing "Intro Quantitative Methods" students may choose to expand their knowledge of the subject by taking *Intermediate Quantitative Methods (GEO 4167c/GEO 6161)* during the Spring semester (a course that is highly recommended for graduate students at all levels). Intermediate Quant focuses on Regression Analysis for cross-sectional data, time-series modeling, and error and model diagnostics, and remedial methods/measures. Student's could then take Professor Bob Walker's *Spatial Econometrics* course, which emphasizes applied spatial regression techniques using various programmable software (Matlab, R, etc).

Students may wish to continue on to the *Advanced Quantitative Methods course (GEO 6166)* which focuses on selected multivariate methods, analysis of point patterns (in space and time), advanced spatial and econometric models, spatial statistics, and geo-statistics. Note that an *Advanced Multivariate Statistical Analysis* course will soon be added to the sequence.

Textbook/Reading Material for GEO 3162c/GEO 6160 (Intro Quant):

Elementary Statistics for Geographers, James E. Burt, Gerald M. Barber, & David L. Rigby, (3rd edition), 2009 Guilford Press.

Student Performance Evaluation and Grades…
A student's overall performance in the course will be determined by the total points earned out of a possible 500 points (see below), and based on the overall percentage:

91.0-100%	= A
90.0-90.9%	= A-
87.0-89.9%	= B+
80.0-86.9%	= B
78.0-79.9%	= B-
75.0-77.9%	= C+
65.0-74.9%	= C
60.0-64.9%	= C-
57.0-59.9%	= D+
50.0-56.9%	= D
45.0-49.9%	= D-
00.0-44.9%	= E

Note: A "curve" will not be applied to labs, exams, or final grades.

There is **No extra credit....**
No re-takes. No make-ups. No exceptions.

Course Component Breakdown (500 total points):

Component   points

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4 Take-Home Labs/ (25 points each)   100   Distribution & due dates **TBA**
Mid-Term Examination (In-Class Exam) 100   TBA
Mid-Term Examination (Take-Home)   100   TBA
<u>**Comprehensive**</u> **Final Examination**   150   In-class exam & take-home component
 date/time: **TBA** *Note: I may consider giving only a Take-Home Final Exam (50-100%)*
Attendance   50   Based on 5-10 attendance sheets

Grade Values for Conversion													
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E	WF	I
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	.67	0	0	0

Course/Grading Policies

<u>Late</u> lab assignments or <u>late</u> take-home exams WILL NOT be accepted for any reason.
No exceptions. Any lab or take-home exam that is "passed due" will be assigned a
grade of zero (0/E).   Labs and Take-home exams <u>WILL NOT</u> be accepted in electronic
or digital formats – that is, labs and take-home exams <u>WILL NOT</u> be accepted on,
flash drives, mini (hard) disks, etc., nor will they be accepted via FAX, e-mail, or as a message
sent from a smart/cell phone, or as an e-mail file attachment. Hard copy only! points will be
deducted for sloppy work.

There are No Make-up exams. If you miss an exam you will receive a grade of 0/E
for that exam. Incompletes (i.e., grades of "I") will not be given out for any reason.
Note: A final letter grade of A, A-, B+, B, B-, C+, C, C-, D+, D, D-, or E will be assigned
at the end of the semester to each student registered for this course. *No exceptions.*

A Note on Collaboration: Collaboration between individuals or groups of students in a class
such as this is unavoidable. Hence, let us work together to make this a positive experience. I,
therefore, encourage you to find a partner or group with whom you can cooperate and work
productively on the labs and take-home components of the exams. Working in small groups can
be a valuable and rewarding experience (but be careful not to get stuck with someone who will
take advantage of you or the group). Do not abuse this privilege and insult our intelligence by
taking collaboration a step too far. Note that you may work together on the technical aspects of
the problems (assigned in the labs/take-home assignments), but retreat to individual work when
writing up the results and presenting discussions of those results. Evidence of cheating or
excessive collaboration will result in a grade of 0 (E) for all parties concerned (for the lab or
exam in question, and possibly for the course). Note that statistical results need to be thoroughly
discussed and explained. Inadequate explanation of results or empirical findings will result in a
loss of points… as statistics without proper interpretation are meaningless.

Required materials, notes, and miscellaneous information

As a requirement, each student should bring sharpened #2 pencils, a pen, and a working calculator to the in-class exams. Laptop computers, cell phones, smart phones, or i-pad devices may not be used during the in-class exams. I'd suggest completing questions for the in-class examinations in pencil (with final answers circled in ink, with all work shown) as it is common to go back and erase mistakes or miscalculations. Scratch paper will not be provided. Partial credit may be given if work is shown.

Note: In-class examinations are open-book / open-note format. In short, you will be allowed to bring in textbooks and course notes (hardcopy only) and use them as references.

Although it is not required...It is highly recommended that you adopt a computer software package during the middle or later segments of the course...so that you can check your calculations on labs and take-home exams for the more involved procedures. Suggested computer software: *NCSS Number Crunching Statistical Software,* **Systat**, or **SPSS** (all highly recommended). Note: You may use <u>any</u> statistics software package to assist you in this course. Other good packages include Minitab, SAS, Stata, and **MyStat***)*. Note that student versions of many of the packages listed above are available at a reduced cost (i.e., an educational discount). Trial versions (typically 30-day versions) are also available to let you check out a package before you buy. FYI: A bare-bones version **Systat** – called **Mystat** is available as a free download from the **Systat website**. **SPSS** is available from UF's technology hub at a reasonable price… I believe it is less than $40 for a full-blown working student copy.

Note: This is not a course on how to use computers or computer aided statistical software. You must pick up computer software or programming skills on your own time. Again, this is a course in introducing you to quantitative methods and how to think in the ways of the scientific method. The computer software programs and languages are tools that help us with calculations…they are not the focus of this course. All calculations and labs for this course can be done without the use of a computer. At the very minimum, I recommend having a good calculator!

Note: Having knowledge of computer packages such as SPSS, NCSS, Minitab, or SAS will be necessary if you plan to continue on toward applications involving more advanced quantitative methods. For instance, statistics software will be used quite extensively in the multivariate regression and diagnostic components of the Intermediate Quantitative Methods course (typically offered in the Spring). So, it would be a good idea to familiarize yourself with a statistical software package such as SPSS if you are considering taking Intermediate Quant (GEO 4167c/GEO 6161). FYI: Students opting to use Excel as a stand-alone, one-size-fits-all, package find that it is largely inadequate; especially when it comes to dealing with more complex methods and statistical procedures. Another option is to compute all stats using the programming language "R", something that is becoming more commonplace. Note, however, that this is not a course in R programming for statistical analyses. Learn R on your own time.

A Note on Lectures

Be prepared to keep up during lecture… and we will move quickly! The lectures are designed to cover a fair amount of material over the course of the semester, and the pace will be fast and furious at times. NOTE: The **instructor's lecture notes (i.e., power-point presentations) WILL be available as .pdf files for downloading and viewing at a later time**. The power-point slides are typically posted a few days after the lecture or when a major section is completed.

But there is a catch: (a) each set of Power-point slides (in pdf format) will only be available to view/download for a short time – approximately 1-2 weeks from the posted date; and (b) the number of slides will be directly proportional to class attendance (if class attendance drops off… so will the number of slides). Note that if more than 25% of the class is absent on a given day, then NO Power-point slides will be posted from that lecture. You will be on your own in terms of getting the notes and finding out what material was covered.

If you miss class, or fall behind, it is up to you to get the notes from one of your classmates… as there is no assurance of how long the Power-point slides will be posted. It is highly recommended that you adopt the buddy system and help each other out… one of the reasons why I recommend working together in "study groups".

Note: Copies of this syllabus, as well as labs and take-home exams will be accessible on-line in an attempt to save on paper (due to limited and scarce department resources, tight photocopying budgets, environmental impact concerns, etc.). **I anticipate course materials (in .pdf format) will be made available on Canvas starting sometime around the second or third week of classes. The folders will contain information and presentations.. and are required reading material. The same Power-points shown in class will be available for you to review and download.**

Please read this syllabus carefully before e-mailing questions to the instructor. The syllabus will remain on-line throughout the entire semester. It is your responsibility to read the syllabus and understand course policies. Continuing on in this course... means that you have knowingly agreed to the policies outlined within this syllabus. Note: If you have a problem with the course policies, the lecture material, and/or topics to be covered, the instructor's style, or the pace at which material is presented during the lectures, by all means feel free to drop the course.

Finally, there will be NO REVIEWS before the Examinations! Organizing study groups is a good plan of action as far as preparing for the exams. Working as part of a study group will be beneficial… especially when it comes time to work on the Take-Home component of the exam(s)... or in preparation for the in-class exam(s).

FYI: I will consider giving a "Take-Home" Final Exam" with no in-class component… should attendance be strong throughout the semester… and if students remain engaged, focused, and productive. Whether we have a Take-home or In-class final (or combination thereof) is all up to YOU. The better the class does in terms of attendance, labs, and the Midterm Exam as a whole...the more likely I am to give a Take-Home Final Exam.

For those of you with math phobias... please note that I assume that students have not had a course in "math stats" prior to enrolling in this course.

List of Topics to be covered (subject to change)

Terminology and Notation: Statistics & Quantitative Methods
The Scientific Method: Deductive Approach vs. Inductive Approach
Data and Levels of Data Measurement
Classification Methods
Samples, Populations, and Sampling
Classic Descriptive Statistics
Descriptive Statistics for Spatial Distributions
Graphical Tools/Techniques for Descriptive Statistics
Introduction to Probability Theory
Selected Theoretical Probability Distributions: Discrete and Continuous
Statistical Inference
Sample Size Determination
Simple and Complex Hypothesis Testing
Confidence Intervals
Testing Equality of Means
Testing Equality of Variance
Analysis of Variance – ANOVA and the F-statistic
Kruskal-Wallis (KW) ANOVA
Goodness-of-Fit Measures
Chi-square Statistics and Applications
Measures of Correlation and Statistical Association
 Pearson's r, Spearman's Rank Correlation, Point Bi-serial Correlation, etc.
Selected Non-Parametric Methods (Kendall's Tau, Rank Sum test, Mann-Whitney U)
Networks and Connectivity Analysis
Measures of Inequality, Concentration, Dispersion
Tests of Independence
Basic Descriptive Shape Indices
Tests of Normality or Distribution Conformity

Reading Assignments:

Weeks 1-3: Chapters 1, 2, 3, 4 (pp.156-164 only), and Chapter 5
 4-5: Chapters 6 and 7
 6-15: Chapters 8, 9, 10 (pp.376-408 only), 11 and Chapter 4 (pp.164-174).

The **In-Class Midterm Exam** is scheduled for sometime mid-October; the exact date TBS. Note that the **Take-Home Component of the Midterm Exam** will be distributed on that same day, and will be due back the following week at the start of class. No late take-homes will be accept.

The **Final Exam –TBA (possible dates are as follows: (a) during finals week – consult UF course schedule for time/date, or (b) Wednesday Dec. 5th (periods 7-9); or as a third option (Instructor's call): A Take-Home Final exam distributed on Wednesday Dec. 5th (due back Wednesday, Dec. 12th (my office 3137 TUR before 12:00 noon).**

The Final Exam for this course is <u>cumulative</u>!

A Note on Courtesy-- Please refrain from engaging in the following activities while the class is in session: texting, tweeting, cell-phone conversations, checking voice-mails, social networking, on-line surfing, website browsing, checking your e-mail, sending Instagrams, Facebooking, Pinterest posts, etc, etc. Do the social media thing on your own time! Moreover, I DO NOT tolerate students starring into their laptops and surfing the web while I am lecturing. In addition, talking or conversing with other students while the instructor is speaking and presenting lecture material is rude and unacceptable. Students engaged in any of these activities will be asked to leave the room/lecture hall, and will be marked as "absent" for that day. Bottom line here: Let's respect one another… and let's show respect for your fellow classmates.

Students with Disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Medical and Family Emergencies: Note that valid Medical or Family Emergency excuses are accepted, and students will not be marked absent for classes missed or late assignments associated with those events. The instructor will work with students to extend due dates accordingly.

Student Responsibility

Students are responsible for all assigned material covered in both the lectures and the assigned readings from the text. *Just because a topic or technique introduced in the reading was not covered in lecture does not mean that it will not show up on a lab or an exam.* Supplemental reading materials may be distributed periodically (and posted on-line in a reading assignment folder). It is the student's responsibility to acquire and assimilate these materials. Furthermore, it is your responsibility to obtain copies (hard copies or pdf files) of all handouts, labs, and/or take-home exam(s) from lectures and/or on-line course folders.

Attendance

While class roll will not be formally called on a regular basis, the instructor does reserve the option to call class roll if attendance is down on any given day. It is highly recommended that you attend class on a regular basis so you are not marked absent or fall behind in your studies. Good attendance is a way to keep up with course material, due dates, announcements, schedule changes, etc. NOTE: Attendance sheets will be circulated intermittently to document those who are attending class on a regular basis… there will be approximately 5-10 sheets distributed throughout the semester. These sheets are typically circulated on days when attendance is "sparse" ...so you have been forewarned! Note that medical excuses must be validated (in writing) no later than the next class meeting (upon your return).

Perfect Attendance will earn you a total of 50 points. A penalty of -5 or -10 points will be assessed for each missed class/lecture (depending on the day and the number of class periods missed). Note that it is your responsibility to make sure you sign the attendance sheets when they are circulated, prior to the dismissal of the class. Signing the attendance sheet and leaving before the start or end of the lecture will result in being marked absent for the day (and a loss of -10 points), unless there is a valid excuse. Please feel free to present an excuse before the start of class. Come exam time…be sure to have your UF ID with you as proof of identification should I request verification.

On a final note, it is my hope that you will come to appreciate Quantitative Methods for what they are and what they do. I trust you will see these methods as indispensable research tools. I feel that this course is an important one as it provides a solid foundation and a working mindset for those of you planning to move on to do research.

Work hard… and the rewards will be yours.

→ Good Luck and Good Journey…

Go Gators!!!