**University of Massachusetts Boston**

**Graduate College of Education**

**Department of Counseling and School Psychology**

# Instructor Information

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# Course Information

**Course Title:** CSP 708 Intermediate Statistics

**Prerequisites:** Matriculation in Counseling and School Psychology Ph.D. Program and Permission of Instructor.

**Prerequisite**

**Skills:** Students taking this course should have already had an undergraduate course in statistics. Previous knowledge of conventional statistical methods is assumed. If students need a refresher course, they are advised to take Counseling 601.

**Course**

**Description:** This course instructs students in advanced data analysis topics and provides training in the use of the corresponding computer methods. The course emphasizes modern statistical methods for social and behavioral sciences.

**Technical**

**Requirements:** We will be using Taskstream to upload materials and to administer the course.

Students will be required to have access to a computer with data analysis software. The recommended analysis package is ‘R’ and ‘RStudio’, both freely available for Microsoft Windows, Apple OSX, and all flavors of Unix/Linux. Demonstrations in class will be done in ‘R’. However, there are many adequate packages and students are free to utilize the package of their choice (e.g. SPSS, MatLab, Stata, SAS).

**Required**

**Text(s):**

There is no required text for this course. Students are encouraged to seek out resources to refine and reinforce material presented in class. In today’s world, there are a multitude of high quality and easily accessible printed and more importantly digital resources for learning to conduct data analyses, including [www.youtube.com](http://www.youtube.com), [www.crossvalidated.com](http://www.crossvalidated.com), [www.stackoverflow.com](http://www.stackoverflow.com), etc.

Some recommended texts include:

Wilcox, R. R. (2012). Modern Statistics for the Social and Behavioral Sciences. A practical

introduction*.* CRC press, Chapman and Hall, Taylor and Francis group. NY

Field, A. (2013). Discovering Statistics Using SPSS. Sage Publications.

**Course**

**Objectives:** Data analysis is a process and a skill. All counseling psychologists are consumers of data analysis and at least within the process of obtaining a PhD, are producers of data analyses. Quantitative data analysis requires a host of skills. This course will focus on developing analytic skills related to the most common forms of analysis found within our field.

This course focuses on the practical aspects of modern data analysis. Students will:

1. Learn the fundamentals of preparing data for the analytic process, including producing descriptive statistics, visualizing data, identifying outliers, and determining appropriate properties for analytic assumptions;
2. Learn the conceptual frameworks of variance, covariance, and modeling of data;
3. Learn techniques for comparing “groups” based on mean statistics while controlling for covariates (e.g. “t tests”, “ANOVA”, “ANCOVA”, “Multiple Linear Regression”;
4. Learn to interpret and critique statistical reports as presented in research journals.
5. Be familiar with the limitations of the techniques learned in this course and to know when to seek statistical/analytic consultation;

**Core Competencies Addressed:** This course will focus on the following core competency benchmarks (American Psychological Association, 2012):

**1. Professionalism:** Professional values and attitudes: as evidenced in behavior and comportment that reflect the values and attitudes of psychology.

**3.Ethical legal standards and policy:** Application of ethical concepts and awareness of legal issues regarding professional activities with individuals, groups, and organizations.

**6. Scientific knowledge and methods:** Understanding of research, research methodology, techniques of data collection and analysis, biological bases of behavior, cognitive-affective bases of behavior, and development across the lifespan. Respect for scientifically derived knowledge.

**71. Research/Evaluation:** Generating research that contributes to the professional knowledge base and/or evaluated the effectiveness of various professional activities.

**Requirements:**

**Exams:**

1. Two in-class exams will allow students to demonstrate proficiency with learning objectives. Exams will require the use of a computer with adequate data analysis and visualization software (E.G. SPSS, R, SAS Python, MatLab). (15% each for total of 30%)

**Homework:**

1. Each week students will review the results section of 3 research articles (of their choice) and will provide brief commentary on the results. Students will be guided to focus on results related to current topics in the class (e.g. a typical ‘Table 1’ providing descriptive statistics for a sample, or a table providing results of an ANOVA analysis). Grading does not rely on ability to fully interpret these examples, the goal is to practice interpretation and to solicit feedback in class and through correspondence with the instructor. This homework will be addressed during class time. Points awarded for submitting 3 articles and associated comments/questions/commentary (which should be 2 to 3 sentences per article). (12%)
2. Each week students will repeat analyses explored during class on a data set supplied by the instructor. Analyses must be presented in ‘manuscript’ style according to APA guidelines for reporting statistical analyses. Raw output from an analysis package is not acceptable. Students will include one paragraph of narrative description of the results (a brief interpretation). (12%)

**Course Project:**

1. Students will complete a course project focused on a data analysis of real data.
   1. The project will involve identifying a data source (e.g. publically available health survey data, or data obtained from a mentor)
   2. Producing descriptive statistics for the sample
   3. Visualizing key variables and potential relationships
   4. Producing a correlation matrix (if appropriate)
   5. Conducting statistical tests to detect group differences within the sample
   6. Interpreting the results
2. The completed report will conform to APA guidelines for reporting of statistical analyses and thus suitable for inclusion in a published manuscript. (25%)

**In-Class Participation:**

1. Students will spend a substantial amount of time in the classroom working with data in small groups. Students will be expected to share their experiences in these exercises with their classmates and to engage in discussion regarding their learning successes and challenges (21%)

**Course**

**Policies:** It is essential that you attend every class prepared to make a thoughtful contribution to the discussions. If you miss a class, you are responsible for obtaining lecture material, course information, handouts, or course updates from a classmates. Grades may be lowered for failure to attend class, showing up later for class, or failing to meet assignment guidelines and dates.

# Grading

**Grading:** Grade type for the course is a whole or partial letter grade. (Please see table below)

Note: the lowest passing grade for a graduate student is a “C”. Grades lower than a “C” that are submitted by faculty will automatically be recorded as an “F”.

Please see the Graduate Bulletin for more detailed information on the University’s grading policy.

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| --- | --- | --- | --- |
| **UMass Boston Graduate Grading Policy** | | | |
|  | **Letter Grade** | **Percentage** | **Quality Points** |
|  | A | 93-100% | 4.0 |
|  | A- | 90-92% | 3.7 |
|  | B+ | 87-89% | 3.3 |
|  | B | 83-86% | 3.0 |
|  | B- | 80-82% | 2.7 |
|  | C+ | 77-79% | 2.3 |
|  | C | 73-76% | 2.0 |
|  | F | 0-72% | 0.0 |
|  | **INC** | **Given under very restricted terms and only when satisfactory work has been accomplished in majority of coursework. Contract of completion terms is required.** | N/A |
|  | INC/F | Received for failure to comply with contracted completion terms. | N/A |
|  | W | Received if withdrawal occurs before the withdrawal deadline. | N/A |
|  | AU | Audit (only permitted on space-available basis) | N/A |
|  | NA | Not Attending (student appeared on roster, but never attended class. Student is still responsible for tuition and fee charges unless withdrawal form is submitted before deadline. NA has no effect on cumulative GPA.) | N/A |

# Methods of Instruction

**Methods:** This course will employ lectures, discussion, and lab based approaches. Since students are expected to have completed the assigned readings and assignments prior to class, your time in class will focus on clarifying concepts, applying information to practice, and relating material to case examples in a way that expands knowledge and practice. It is essential that all students will be expected to actively participate in class discussions and will be expected to stay current with course readings; therefore, it is expected that students will be prepared to actively address the topics for each course period.

# Accommodations

The University of Massachusetts Boston is committed to providing reasonable academic accommodations for all students with disabilities. This syllabus is available in alternate format upon request. If you have a disability and feel you will need accommodations in this course, please contact the Ross Center for Disability Services, Campus Center, Upper Level, Room 211 at 617.287.7430. <http://www.umb.edu/academics/vpass/disability/> After registration with the Ross Center, a student should present and discuss the accommodations with the professor. Although a student can request accommodations at any time, we recommend that students inform the professor of the need for accommodations by the end of the Drop/Add period to ensure that accommodations are available for the entirety of the course.

# Code of Student Conduct

It is the expressed policy of the University that every aspect of academic life--not only formal coursework situations, but all relationships and interactions connected to the educational process--shall be conducted in an absolutely and uncompromisingly honest manner. The University presupposes that any submission of work for academic credit is the student’s own and is in compliance with University policies, including its policies on appropriate citation and plagiarism. These policies are spelled out in the Code of Student Conduct. Students are required to adhere to the Code of Student Conduct, including requirements for academic honesty, as delineated in the University of Massachusetts Boston Graduate Catalogue and relevant program student handbook(s) <http://www.umb.edu/life_on_campus/policies/code>.

You are encouraged to visit and review the UMass website on *Correct Citation and Avoiding Plagiarism:*

<http://umb.libguides.com/GradStudiesCitations>

# Course Schedule

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| **Date** | **Topic** | **Readings/Assignments Due** |
| Session 1  01/25/16 | Introduction:  Review of syllabus and course goals  Overview of data analysis procedures  In-class exercise: Loading data  Introduction to Git  Key statistical concepts |  |
| Session 2  02/01/16 | Distributions, probability, descriptive statistics.  Review of homework |  |
| Session 3  02/08/16 | Visualizing data – part 1  Review of homework  Discuss Course Project |  |
| 02/15/16 | President Day | Holiday |
| Session 4  02/22/16 | Visualizing data – part 2  Review of homework |  |
| Session 5  02/29/16 | Central limit theorem  CIs and sampling distributions of robust measure of locations.  Review of Homework |  |
| Session 6  03/07/16 | In Class Mid Term Exam |  |
| 03/14/2016 | Spring Vacation: observe with sanctity. |  |
| Session 7  03/21/16 | Correlation  Review of Homework |  |
| Session 8  03/28/16 | Hypothesis Testing  Type-I & II Error  Confidence Intervals  Review of Homework |  |
| Session 09  04/04/16 | ANOVA/ANCOVA  Review of Homework |  |
| Session 10  04/11/16 | Regression  Review of Homework |  |
| 04/18/15 | Patriots’ Day | Holiday |
| Session 11  04/25/16 | Multiple Regression  Review of Homework |  |
| Session 12  05/02/15 | Regression  Review of Homework |  |
| Session 13  05/09/15 | Class Project Due  Exam 2 |  |
| Exam Period |  |  |