PROBLEM SOLVING AND DATA ANALYSIS I
PUAD/GOVT 511, SPRING 2018

Place and time: Online
Instructor: Peter Balint
Contact info: pbalint@gmu.edu (I'll be responsive, but sometimes I might be away from email briefly. So please allow up to 24 hours for a reply)
Website: Blackboard: log in at https://mymasonportal.gmu.edu

Overview

This course introduces accepted methods for conducting research and analyzing data. These two components of the course—research methods and data analysis—are closely linked but require distinct skills.

Learning outcomes

Through our focus on research design, you will learn how to
• justify topics for study
• distinguish units of analysis, dependent variables, and independent variables
• construct testable hypotheses or other appropriate frameworks for research
• understand the strengths and weaknesses of qualitative and quantitative studies
• identify and respond to common problems of research design and data collection, including sampling bias, measurement error, and other issues that may limit validity or reliability.

Through our focus on quantitative analysis using SPSS software, you will learn how to
• use datasets
• summarize and illustrate data accurately and effectively
• compute, present, and interpret descriptive statistics for categorical and continuous variables
• prepare crosstabs and conduct bivariate hypothesis tests for categorical variables
• construct confidence intervals and conduct bivariate hypothesis tests in cases with one categorical and one continuous variable
• build simple bivariate and multivariate linear regression models and interpret the output
• draw appropriate inferences from the results of statistical analyses
• report findings clearly and effectively
• interpret the results of research as presented in journal articles and the popular press.

To balance the two components of the course, we’ll spend part of each class on approaches to research and part on quantitative and computer skills. During the course, we’ll work with the statistical software package IBM SPSS Statistics. For quantitative assignments and exams outside of class, you will need access to a recent version of SPSS (see below for options for getting access to SPSS). By the end of the semester, you’ll be comfortable with the statistical software and ready to take on the more advanced techniques covered in PUAD 612 or GOVT 712, if you plan to take either of those courses.
Books (optional) and statistical software (required)

- **Statistical software (required):** IBM SPSS Statistics Base GradPack or higher. See below for more details on getting access to the software.

Additional information about the texts and software:

The textbook and workbook are optional. I cover all the content you need in the recorded sessions and other material posted on the Blackboard site. However, the text and workbook can be helpful in providing support, deeper knowledge, and additional exercises. If you decide to get the textbook and/or workbook, you’ll see they’re available separately or as a package. You can choose whichever option is best for you. Used copies or older editions are fine. Used older versions of the workbook without the CD are also ok. All the datasets you need will be posted on the Blackboard site. To summarize, you can do fine in the course without the books, but they can provide additional knowledge and support if you feel more comfortable having a book in hand.

You must have reliable access to a recent version of SPSS to complete the homeworks, take-home exams, and data analysis project.

Here are options for getting access to SPSS:
- **Free option #1:** Use SPSS in the computer labs on campus (no cost; but may not be convenient for you).
- **Free option #2:** Use Mason’s Virtual Computing Lab for distance access on your own computer (no cost; works for PC and Mac, but you may find it awkward to use). See “Using the VCL” in the left-hand menu of the Blackboard site. Visit [https://itservices.gmu.edu/services/view-service.cfm?customel_dataPageID_4609=5689](https://itservices.gmu.edu/services/view-service.cfm?customel_dataPageID_4609=5689) for more details, including contact information for phone and email support.
- **Modest-cost option:** Download SPSS for your own computer (you may find this to be the easiest-to-use and most reliable option). The Base GradPack (PC or Mac) is available from [http://onthehub.com/spss/](http://onthehub.com/spss/) (6-month license ~$40).

**Grading**

Weekly homework assignments: 15%
Midterm exam: 20%
Data analysis project: 30%
Final exam: 35%

Letters: 98-100 A+; 93-97 A; 90-92 A-; 88-89 B+; 83-87 B; 80-82 B-; 70-79 C; <70 F.

**Comments about the course and main assignments**

The weekly homework assignments are self-graded. I’ll post homework assignments and suggested solutions in the weekly folders on Blackboard. The idea is that you should do the best you can on the assignment without looking at the solutions. Then open the solutions and score
your work. Then post the score in the assignment submission link. Also please post your completed homework document. That way I can confirm that your tables and charts and so forth look good so there’ll be no problem when it comes time to submit the exams and data analysis project. But don’t worry, I won’t second-guess your homework self-score.

The **midterm and final exams** are take-home and open-book. As we get close to the exam dates, I’ll post sample exams with suggested solutions, and details about the take-home exam process.

For the **data analysis project** you will complete an original analysis of a primary or secondary dataset. The project can address any issue you’re interested in. Click on “Project guidelines” on the left-hand menu in Blackboard to see what I expect for the project proposal and final report. Later on, I’ll also post sample project reports from previous semesters.

**Suggested free on-line references for SPSS, and for statistics more generally:**

YouTube: search for “SPSS” for video how-to’s

SPSS tutorials from UCLA: [https://stats.idre.ucla.edu/spss/](https://stats.idre.ucla.edu/spss/)


**Notes on policies, processes, and resources**

- I use Mason email to communicate with students. To set up and manage your account (e.g., to have “gmu.edu” messages forwarded to another account), go to [http://masonlive.gmu.edu](http://masonlive.gmu.edu).
- Please contact me if personal circumstances arise that may interfere with class participation.
- If you are a student with a disability and you need academic accommodations, please notify me and contact the Office of Disability Services (ODS) at 703-993-2474, [http://ds.gmu.edu/](http://ds.gmu.edu/). All academic accommodations must be arranged through that office.
- Mason’s Honor Code requires all members of Mason community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are prohibited. All violations of the Honor Code will be reported to the Honor Committee. For details, please see: [https://oai.gmu.edu/mason-honor-code/](https://oai.gmu.edu/mason-honor-code/).
- For the class project (or any other assignment), do not cut and paste language off the web without correct attribution. Taking even two or three words in a row directly from a source without giving a citation AND using quotation marks can be plagiarism.
- For emergency information, sign up for the Mason Alert system, [https://alert.gmu.edu](https://alert.gmu.edu).
- Students are responsible for verifying enrollment. Please see add and drop deadlines for the semester: [http://registrar.gmu.edu/calendars/](http://registrar.gmu.edu/calendars/). After the last drop date, withdrawing from this class requires the approval of the dean and is only allowed for nonacademic reasons.
- University Policies: The University Catalog, [http://catalog.gmu.edu](http://catalog.gmu.edu), is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at [http://universitypolicy.gmu.edu](http://universitypolicy.gmu.edu). All members of the university community are responsible for knowing and following established policies.
Course outline
The numbers following “V” are the recorded videos for the week. The numbers following “B” are the relevant chapters for the week from the optional Berman & Wang text. The material for each week will be available in the Weekly Folders.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/22-1/28</td>
<td>Introduction to course; email or discussion board available for questions</td>
<td>V 1-2; article in Week 1 folder</td>
</tr>
<tr>
<td>2</td>
<td>1/28-2/4</td>
<td>Working with SPSS; UoA, DVs, IVs; correlation vs. causation; categorical &amp; continuous variables</td>
<td>V 3-6; B 1-4 HW#1</td>
</tr>
<tr>
<td>3</td>
<td>2/4-2/11</td>
<td>Descriptive statistics for categorical &amp; continuous variables; bar charts &amp; histograms</td>
<td>V 7-12; B 5-7 HW#2</td>
</tr>
<tr>
<td>4</td>
<td>2/11-2/18</td>
<td>Normal distribution; z scores; random sampling error; confidence intervals; outliers; comparing groups</td>
<td>V 13-18; B 7 HW#3</td>
</tr>
<tr>
<td>5</td>
<td>2/18-2/25</td>
<td>Bivariate hypothesis testing with categorical variables: crosstabs &amp; chi-square test of association</td>
<td>V 19-23; B 8-11 HW#4</td>
</tr>
<tr>
<td>6</td>
<td>2/25-3/4</td>
<td>Bivariate h-testing with 1 categorical &amp; 1 continuous variable: 2-sample t-test; type 1/type 2 errors</td>
<td>V 24-29; B 12 HW#5</td>
</tr>
<tr>
<td>7</td>
<td>3/4-3/11</td>
<td>Midterm exam review; email or discussion board available for questions</td>
<td>V 30; review sample exams</td>
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<tr>
<td>8</td>
<td>3/11-3/18</td>
<td>Spring break</td>
<td></td>
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<tr>
<td>9</td>
<td>3/18-3/25</td>
<td>Complete and submit midterm exam</td>
<td>Midterm due 3/21, 11:59 pm</td>
</tr>
<tr>
<td>10</td>
<td>3/25-4/1</td>
<td>Introduction to regression; bivariate regression, interpreting output</td>
<td>V 31-37; B 14 HW#6</td>
</tr>
<tr>
<td>11</td>
<td>4/1-4/8</td>
<td>Multivariate regression, including with categorical IVs; interpreting output; regression assumptions</td>
<td>V 38-45; B 15 HW#7</td>
</tr>
<tr>
<td>13</td>
<td>4/15-4/22</td>
<td>Develop hypotheses and collect data for project; review how to present findings; work on analysis/interpretation</td>
<td>V 46</td>
</tr>
<tr>
<td>15</td>
<td>4/29-5/6</td>
<td>Final exam review; email or discussion board available for questions</td>
<td>Review HWs &amp; sample exams</td>
</tr>
<tr>
<td>16</td>
<td>5/6-5/13</td>
<td>Complete and submit final exam</td>
<td>Final exam due 5/13, 11:59 pm</td>
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**Academic Integrity**
Mason is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else’s work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

**Diversity**
George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason’s commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

Acknowledge that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.