Data Computing, Visualization and Communication
BUAN 5210-01: Thurs 6:00 – 8:40 PM, Pigott Hall 202

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Office Hours: Thurs, 4:30 – 5:30 PM or by appointment

DESCRIPTION: Data analytics is nearly useless if you are unable to clearly communicate what you have learned from the data. This course teaches the practical and technical skills necessary to communicate information about data clearly and effectively in written and visual form. Visualization is critical to both exploration and explanation, so the course will build both analytical and communication skills. Visualization promotes discovery, and what is discovered can be used for “storytelling” to effectively communicate, summarize, influence, explain, persuade and provide evidence to an audience. During the course students will learn conceptual, theoretical and technical skills that will enable them to learn from data, develop professional visualizations and empower them to communicate and share their findings.

PREREQUISITES: The general course prerequisites include computer programming, calculus and introductory level statistics—though most students will have had ECON 5100 which uses R. We will use a combination of computer programs including Excel, R and Power BI, all are available on the Albers computers.

LEARNING OBJECTIVES: The primary learning objective of BUAN 5210 is to provide students with practical and technical skills to visually learn from data and communicate findings. At the end of this course students will be able to:
1. Apply technical skills to explore and understand data
2. Understand and apply principles of data visualization
3. Be proficient using software to develop data visualizations
4. Design and implement standard visualization techniques for communication
5. Develop professional graphics to explain findings and solutions
6. Perform “storytelling” with data for effective communication

This course meets the following Seattle University’s graduate learning outcomes:
- Demonstrate mastery of competencies required in their profession or field
- Demonstrate effective communication in speech and in writing
- Exhibit effective collaboration skills

This course meets the following among the Albers School’s MSBA learning outcomes:
- Identify and describe complex business problems in terms of analytical models
- Communicate technical information to both technical and non-technical audiences in speech, in writing, and graphically
- Exhibit effective collaboration and leadership skills

EXPECTATIONS: Treat classmates with respect! We will spend a significant portion of each class meeting actively working on data visualization principles and techniques. One of your most valuable resources will be other students in the class, so it is paramount that we create an open, supportive and collaborative learning environment. If you have a question it is very likely that several of your classmates either have the same question or have dealt with a similar situation. So please ask questions so you can learn from each other.
**TEACHING APPROACH:** There will be a combination of lecture and in-class activity. There will be assigned reading and activities prior to class, then a portion of class will be spent applying techniques from the assigned readings and activities.

**REQUIRED TEXT:** These texts cover the technical skills that will be required to complete the course. All of the required and recommended texts can be found at [www.Amazon.com](http://www.Amazon.com). We will also use a variety of online texts and resources.


**RECOMMENDED:** There is simply too much material to cover in ten weeks, but I will be summarizing points from these texts in lecture. I recommend you purchase these texts to build your library—you will gain strong insights from reading these texts as you progress through your career.

- **R for Data Science.** Garret Grolemund and Hadley Wickham. O’Reily, 2016. A guide to all stages of data science using R, including visualization. Available at [http://r4ds.had.co.nz/](http://r4ds.had.co.nz/).

**COMPUTER:** We will use computers during each class meeting, make sure you have programs like Excel, R, and PowerBI installed, or can connect to the SU visual display infrastructure (VDI).

**MATERIALS:** Course materials including assignments and links will be made available at the course web page on Canvas, which can be found at: [http://seattleu.instructure.com](http://seattleu.instructure.com).

**IN-CLASS ACTIVITIES:** There will be 8+/- in-class assignments; each will contain basic analysis, graphing and writing worth 4 points each. These assignments are to be completed and submitted in class (unless you give prior notice that you cannot attend class). There will be significant discussion during these activities. You are encouraged work in small groups.

**QUIZZES:** There will be one in-class quizzes covering graphing design and communication practices.

**QUICK PROJECTS:** There will be two individual short projects worth 20 points each. Students will be given a data set and required to complete and submit a short project; each will contain analysis, graphing and writing. One will be on an individual project and the other will be groups of two.
MID/FINAL PROJECTS: There are two individual take-home project assignments that will be covered in separate handouts. The goal of these projects is to develop deeper understanding of the course material by applying them to detail oriented projects. One will be on an individual project and the other will be groups of two.

PRESENTATIONS and REVIEWS: There will be two presentations, one associated with the midterm project and the other associated with Quick Project 2. Students will record presentations that will be instructor and peer reviewed according to a provided rubric. Details provided in separate handouts.

GRADING: Points will be assigned to individual assignments, not letter grades. A final grade will be assigned at the end of the term based on the student's total points and relative standing in class. A tentative grading schedule is:

- A range: 90-100% of total points
- B range: 80-89% of total points
- C range: 70-79% of total points
- D range: 60-69% of total points
- F range: less than 59% of total points

This grading schedule is subject to change during the course of the quarter based on the overall performance of the class, but it will NOT be made more difficult.

Grades will be based on the following assignment points:

- 8+/− Participation Activities (2 or 3 points each, 20+/− points total)
- 1 Quiz (10 points)
- 2 Quick Projects (20 points each, 40 points total)
- 2 Presentations (10 points each, 20 points total)
- 2 Sets of presentation reviews (5 points each, 10 points total)
- 1 Mid-term Project (40 points)
- 1 Final Project (60 points)
- 200+/− Total assigned points

OUTLINE: A detailed schedule will be provided on a separate handout

**Section I: Introduction**
- 1. Base R
- 2. Exploratory data analysis (EDA)
- 3. RMarkdown

**Section II: Data wrangling and visualization**
- 1. Grammar of graphics (ggplot2)
- 2. Tidyverse
- 3. Programming

**Section III: Beyond basics**
- 1. Statistics and models
- 2. Specialty visuals
- 3. Interactive and automated visuals
- 4. Dashboards
- 5. Power BI
- 6. Storytelling with Data
ELECTRONIC DEVICES: The use of laptops, netbooks or PDAs in class to take class-notes, view PowerPoints or work on class projects is encouraged. However, please do not use laptops, netbooks or PDAs (cellphones, hand-helds) in class for any non-class related activity (including instant messaging, web-browsing, etc.) unless specifically suggested by the instructor.

ACADEMIC RESOURCES:
- Library and Learning Commons (http://www.seattleu.edu/learningcommons/)
  (This includes: Learning Assistance Programs, Research [Library] Services, Writing Center, Math Lab)
- Academic Integrity Tutorial (found on Canvas and SU Online)

ACADEMIC POLICIES ON REGISTRAR WEBSITE:
- https://www.seattleu.edu/redhawk-axis/academic-policies/
- Academic Integrity Policy
- Academic Grading Grievance Policy
- Professional Conduct Policy (only for those professional programs to which it applies)

NOTICE FOR STUDENTS CONCERNING DISABILITIES: If you have, or think you may have, a disability (including an ‘invisible disability’ such as a learning disability, a chronic health problem, or a mental health condition) that interferes with your performance as a student in this class, you are encouraged to arrange support services and/or accommodations through Disabilities Services staff located in Loyola 100, (206) 296-5740. Disability-based adjustments to course expectations can be arranged only through this process.

OFFICE OF INSTITUTIONAL EQUITY: Title IX of the Education Amendments of 1972 (Title IX) prohibits discrimination based on sex in educational programs or activities that receive Federal financial assistance. This prohibition includes sexual misconduct, which encompasses sexual harassment and sexual violence. Seattle U remains committed to providing a safe and equitable learning, living, and working environment. Seattle U offers emergency, medical, and other support resources, as well as assistance with safety and support measures, to community members who have experienced or been impacted by sexual misconduct.

Seattle U requires all faculty and staff to notify the University’s Title IX Coordinator if they become aware of any incident of sexual misconduct experienced by a student.

For more information, please visit https://www.seattleu.edu/equity/. If you have any questions or concerns, you may also directly contact the Title IX Coordinator in the Office of Institutional Equity (email: oie@seattleu.edu; phone: 206.296.2824) University Resources and Policies