



NORTHWEST
MISSOURI STATE UNIVERSITY
MARYVILLE | KANSAS CITY

School of Computer Science and Information Systems

44-413/613-01 Data Visualization Fall 2021

Instructor: Dr. Ratan Lal

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Office hrs: MWF 12:00pm – 12:40pm and 3:00pm-4:00pm

TR: 12:30pm-1:30pm

Office: CH 2930

Phone: 660-562-1549

Prerequisites: There is no prerequisite for this course.

Textbook and supplementary materials: No textbook is required; all the materials will be posted in Northwest Online.

Course description: This course covers the design and development of exploratory diagrams and graphics for various data sets. The course may include concepts such as chart and graph design, networks, topological graphs, display of multi-dimensional data, effective use of space and color, animations, interactive visualizations, mapping, cartography, web data acquisition, and advanced visualization tools.

Learning Outcomes: Upon completion of the course, students will be able to:

- Recognize the business needs to recommend data-driven solutions
- Analyze the data sets to generate various diagrams, charts, or graphs
- Apply appropriate data visualization techniques, skills, and tools necessary for different data domains
- Design interactive dashboards & storyboards using Tableau for decision making
- Communicate results to the stakeholders with a cohesive data story
- Identify the most appropriate visualization method for a given type of data and task
- Develop skills to both design and critique visualizations

Student learning outcomes assessment methods: Assignments, quizzes, exams.

Instructional methods: Instructional methods include lectures, practical demonstration, classroom practice, individual/class projects, and interactive question and answer sessions.

Graded course requirements: (Points are estimates and may vary slightly)

| Components | Points |
|---|--------|
| Exam 1 – location: CH1200, date: September 16, time: 11:10am to 12:00pm | 150 |

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|---|-------------|
| Exam 2 – location: CH1200, date: October 28, time: 11:10am to 12:00pm | 150 |
| Exam 3 – location:TBD, date: December 7, time: 10:00am to 11:30am | 200 |
| Quizzes – Approximately weekly at 10 points each | 150 |
| Final Project | 200 |
| Assignments – 12 @ 50 points each | 600 |
| Classwork participation | 50 |
| Discussion participation (these are extra credit points and not counted in the total) | 50 |
| Total Points | 1500 |

Your score on each component will be posted in the online gradebook as soon as that component has been graded. You are responsible for checking the gradebook at least once a week to ensure that your grades are properly posted. ***If there is an error in grading, you must bring it to the attention of the class assistant or instructor within two weeks of the time the grade is posted.***

Grading scale:

| Undergraduate Credit (44-413) | |
|--------------------------------------|--------------|
| Percent Range | Grade |
| 88-100% | A |
| >= 78% and < 88% | B |
| >= 68% and < 78% | C |
| >= 58% and < 68% | D |
| below 58% | F |

| Graduate Credit (44-613) | |
|---------------------------------|--------------|
| Percent Range | Grade |
| 90-100% | A |
| >= 80% and < 90% | B |
| >= 70% and < 80% | C |
| >= 60% and < 70% | D |
| below 60% | F |

Course outline/major topics studied:

| Unit | Topics |
|------|--|
| 1 | Introduction to data science, visualization, and business intelligence framework |
| 2 | Introduction to Tableau, difference between Tableau and Excel, visualizing data using charts |
| 3 | Data extraction and cleaning |
| 4 | Data science lifecycle and ethics |
| 5 | Data visualization tools |
| 6 | Charts |
| 7 | Chart-I (Lollipop, Benchmark, Combo, Indicator, Divergent) |
| 8 | Chart-II (Bump, Histogram, Area, Tree map, Sunburst) |
| 9 | Maps, Sets, Group, Filters & Parameters |
| 10 | Conditional formatting, Trend lines, Reference lines, and forecast |
| 11 | Dashboard |
| 12 | Storyboard |
| 13 | Dashboard & Storyboard |
| 14 | Other topics Review |

Note: The course schedule is subject to change with instructor notification and students will be responsible for abiding by these changes.

Attendance: Students are expected to attend all classes and labs. Some in-class and lab exercises may have points associated with them and may not be announced in advance. A student who misses such an exercise due to an unexcused absence will not be allowed to make it up and will receive a zero. Excused absences include attendance at a university sponsored event (documented with an excuse signed by the university sponsor prior to the event) or by circumstances considered adequately extenuating by the course instructor. It is the responsibility of the student to promptly notify his or her instructor when unable to attend class. Please refer to the university policy on attendance at

<https://www.nwmissouri.edu/policies/academics/Attendance.pdf>

Exam Policies: Exact dates and other details will appear on the course website. If you must miss an exam, it is your responsibility to notify the instructor prior to the exam. Make-ups for written exams will be given only for valid and verifiable reasons. Valid reasons include illness, family emergencies, and university-sponsored trips. *Written documentation with suitable verification* must be supplied before a make-up will be allowed. **All exams are closed book, closed notes, unless explicitly noted in writing by the instructor. No calculators, cell phones, or other electronic devices can be used during exams unless explicitly allowed by the instructor.**

Due Dates: Each assigned, graded activity will have a due date posted. Late assignments will not be accepted except in cases of *documented* illness or family emergencies.

Final exams:

If an emergency occurs that prevents the administration of a course scheduled final examination, the final course grades will be calculated based on the work in the course completed to that point in time and the faculty member's considered judgment. Final exams will not be rescheduled, and a grade of "I" will not be given as a result of an institutional cancellation of a final examination. This final exam policy does not apply to online courses.

Administrative drop: An instructor may request the Office of the Registrar delete a student from a course roster if the student has not met the prerequisite for the course as stated in the catalog, or as a result of non-attendance in the course.

Academic Administrative withdrawal: When it is in the best interest of Northwest Missouri State University for a student to withdraw, a student will be given a W, put on administrative hold, and given notice that they are about to be withdrawn. This action will result in removal of all credits associated with courses that have yet to be completed in the semester in question and the student will be administratively withdrawn from the University. An Administrative Withdrawal does not affect the student's grade point average. Please refer to Northwest Missouri State University's Academic Administrative Withdrawal Policy at: <https://www.nwmissouri.edu/policies/academics/Adding-Dropping-Withdrawals.pdf>

University communications: Students are expected to use their Northwest student email account for any electronic correspondence within the university. Students are also strongly advised to check their email and CatPAWS accounts on a regular basis.

Professionalism: Students are expected to behave in a professional manner in their dealings with each other, the class assistant, and the instructor. E-mails and other electronic communications should be politely written, use proper grammar, and follow the rules of capitalization.

Academic integrity policy: The students, faculty, and staff at Northwest endeavor to sustain an environment that values honesty in academic work, that acknowledges the authorized aid provided by and intellectual contributions of others, and that enables equitable student evaluation. Please refer to Northwest Missouri State University's Academic Integrity Policy at <http://www.nwmissouri.edu/policies/academics/Academic-Integrity.pdf>

Learning or Living Accommodations Request Process: Northwest Missouri State University complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 [ADA] and the ADA Amendments Act of 2008 [ADAAA]. If a student has a documented disability that qualifies under the ADA/ADAAA and requests accommodations, they should review the Accessibility and Accommodations webpage at <https://www.nwmissouri.edu/titleixequity/accessibility/index.htm> for guidance, including the accommodations application and supporting documentation requirements. Contact ada@nwmissouri.edu or 660.562.1873 for further assistance. For the university policy on disability accommodation refer to <http://www.nwmissouri.edu/policies/student/Disability-Accommodation.pdf>

Non-discrimination and anti-harassment policy: Northwest Missouri State University is committed to maintaining an environment for all faculty, staff, students, and third parties that is free of illegal discrimination and harassment. Please refer to the Non-Discrimination and Anti-Harassment Policy at <https://www.nwmissouri.edu/TitleIXEquity/titleix/>

Family Education Rights and Privacy Act (FERPA) policy: Family Educational Rights and Privacy Act of 1974, as amended (commonly known as the Buckley Amendment), is a federal law which provides that colleges and universities will maintain the confidentiality of student education records. Please refer to the Family Educational Rights and Privacy Act (FERPA) Policy at <http://www.nwmissouri.edu/policies/academics/Family-Educational-Rights-and-Privacy-Act.pdf>

COVID-19 Classroom Mitigation: Northwest is committed to the health and safety of the University community. Face coverings are required for non-vaccinated students and faculty and are optional for those who are fully vaccinated. Should a non-vaccinated faculty member or student make close contact with a symptomatic, COVID-19 positive student, they will be asked to quarantine and not enter University facilities (unless otherwise instructed by University Wellness) or attend class until that quarantine period is over. Faculty will provide means for students missing class because of COVID-19 quarantine or isolation to keep up with course work, but students must communicate with faculty and adhere to the quarantine/isolation start

and end dates. All other illnesses or absences for personal reasons will be handled as they were before the pandemic. Northwest further asks all students and faculty to practice good hygiene and not enter University facilities or attend face-to-face classes when they feel sick. Students who do not comply with these requirements will be subject to standard disciplinary procedures according to the Northwest Student Code of Conduct (i.e. verbal and written warnings followed by a hearing, if necessary). We thank you for doing your part to maintain our learning environment and to protect the health of fellow Bearcats.

Change in Course Delivery:

It is our goal as a University to continue all courses as planned on campus. However, due to unforeseeable impacts of COVID-19 and its variants, faculty and students must be prepared to adjust course formats or mitigation strategies anytime during the semester, either permanently or for a short term. The University and faculty will communicate with students in the event such action is deemed necessary to preserve the health and safety of students and employees.

Quarantine checklist:

YOUR to do List:

- Call 911 if you experience difficulty breathing or a change in your level of consciousness.
- Contact Wellness Services at 660.215.8573 with questions. You may text or call between 7 a.m. and 7 p.m. If you have an emergency outside of these hours, contact UPD at 660.562.1254.
- Notify all of your instructors of your absence and predicted date of return. They will assist you in your coursework by providing information on their strategies for distance learning. Please ensure that you have your laptop, notes, textbooks, and other necessary course materials when you enter into quarantine. Lack of engagement in your coursework during quarantine will likely result in lower grades or failure. When communicating with your instructors, you may provide them with the reason you cannot be in the classroom, but you are not required to do so.
- Stay away from all people.
- You must talk with a Wellness Services staff member every few days, either by phone, text, Zoom or Skype. If you develop COVID-19 symptoms, you MUST notify Wellness Services immediately. It is important for your wellbeing that Northwest maintains contact with you. We want to know you are doing okay, answer any questions you have, check for symptoms and assist with your needs.

Behavior and Wellness: Northwest focuses on student success—every student, every day.

The Wellness Center, 660.562.1348, offers free counseling for students coping with depression, anxiety, alcohol or drug misuse, relationships, and other emotional, social, and academic stressors. In addition, faculty, staff, and students who are concerned with student wellbeing can report their concerns, including anonymously, to the Behavioral Intervention Team, so that the student can be offered relevant support, at this link: [Concerning Behavior Reporting Form](#). If you are concerned about the immediate safety of a student, please call the University Police, who have specialized training in intervention, at 660.562.1254.

Disclaimer: Course schedule is subject to change and you will be responsible for abiding by any such changes. Your instructor will notify you of any changes.