COURSE SYLLABUS

DAB 370
Data Visualization and Communication

Fall 2019

1. COURSE INFORMATION

1.1. *Instructor Information*

Instructor:	Eduardo Rodriguez
Office:	CPS 416
Physical Office Hours:	Mo and We 11:00 -12:00 and 1:00 to 1:30 PM and by appointment
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1.2. *Course Information*

Course Description:	This class teaches the main approaches to understand data, create and transfer knowledge using the most valuable and powerful system to identify patterns, relationships, outliers, etc. in data: Eyes and Brain. Our challenge will be to use different tools and concepts to develop the capacity to describe and explore data, understand the use of visualization for evaluating analytics work and transferring our analytics knowledge to our stakeholders. See the description of the course in the UWSP Catalog.
Credits:	3
Prerequisites:	

1.3. *Textbook & Course Materials*

Required Text:	• Class notes and readings from the Library resources

1.4. *Master Course Table*

Week Session	Theory and problem in analytics to solve	Additional Activity	Data literacy	Data Preparation	Data analysis	Data Communication	Data Governance	Influence	Team Participation	Curiosity	Problem Solving
Using Excel and PowerBI CASE NATURAL RESOURCES AND ENERGY			x	x	x	x				x	x
Sept. 2	Analytics Process and Visualization Process	Explanation projects, reviews, work with data, tools and interpretation	x	x	x	x				x	x
	Historical Perspective		x	x	x	x				x	x
Using Excel and PowerBI CASE NATURAL RESOURCES AND ENERGY			x	x	x	x				x	x
Sept. 9	Visual analytics and Intuition	Readings Discussion - Tall D. 2014, Reading Rigour -Intuition Visualization	x	x	x	x				x	x
			x	x	x	x				x	x
Using Excel and PowerBI CASE STOCK MARKETS			x	x	x	x				x	x
Sept. 16	Static to Dynamic to Virtual reality visualization	Where visual analytics is going to?	x	x	x	x				x	x
	Assignment 1 Sept. 18		x	x	x	x				x	x
Using KNIME CASE STOCK MARKETS			x	x	x	x				x	x
Sept. 23	Representing Properties of Real World with Mathematics and Computation	Where visual Analytics is going to? Review Assignment 1	x	x	x	x				x	x
			x	x	x	x				x	x
Using KNIME CASE HEALTHCARE AND AIR POLLUTION			x	x	x	x				x	x
Sept. 30	Representing Properties of Real World with Mathematics and Computation	Thinking about visual data mining	x	x	x	x				x	x
			x	x	x	x				x	x
Using KNIME CASE HEALTH CARE			x	x	x	x				x	x
Oct. 7	Data, Knowledge Discovery, and Visualization	Defining and Using Metrics	x	x	x	x				x	x
	Assignment 2 Oct. 9		x	x	x	x				x	x
Using Tableau Review used data			x	x	x	x				x	x
Oct. 14	Studying Relationships Among Variables Using Graphics, Algebra, and Many Dimensions	From description to models Review Assignment 2	x	x	x	x				x	x
			x	x	x	x		x	x	x	x
Using Tableau Review and evaluation			x	x	x	x				x	x
Oct. 21	Studying Relationships Among Variables Using Graphics, Algebra, and Many Dimensions	From description to models	x	x	x	x				x	x
			x	x	x	x				x	x
Using Tableau CASE INSURANCE AND BANKING			x	x	x	x				x	x
Oct. 28	Analyzing more than three dimensions	Graphs and Graphics	x	x	x	x				x	x
	Assignment 3 Oct. 30		x	x	x	x				x	x
Using R CASE INSURANCE AND BANKING			x	x	x	x				x	x
Nov. 4	Analyzing more than three dimensions - Graphs and Graphics - Grammar	R code, R cmdr and R Rattle Review Assignment 3	x	x	x	x				x	x
			x	x	x	x				x	x
Using R CASE AIRLINES AND MARKETING			x	x	x	x				x	x
Nov. 11	From Frequencies to time	R code, R cmdr and R Rattle	x	x	x	x				x	x
			x	x	x	x				x	x
Using R CASE KPIs AND KRIs			x	x	x	x				x	x
Nov. 18	Developing Meaning Creating Dashboards - Communicating our results/discoveries	R code, R cmdr and R Rattle	x	x	x	x				x	x
	Assignment 4 Nov.20		x	x	x	x		x	x	x	x
Using R CASE TRANSPORTATION			x	x	x	x				x	x
Nov. 25	Big Data and visualization - Many records - Sensor data	SparklyR, Spark R - R Studio	x	x	x	x				x	x
			x	x	x	x				x	x
Using R CASE SOCIAL NETWORKS			x	x	x	x				x	x
Dec. 2	Big Data and visualization - Text and Social Media	**Q&A Review**	x	x	x	x				x	x
			x	x	x	x				x	x
Dec.9 and Final Exams week	Assignment 5 Course Review	Project presentation Assignment 5	x	x	x	x		x	x	x	x
			x	x	x	x		x	x	x	x

1.5. *Course Technology*

Course Website:	The course is on Canvas using R, Tableau, PowerBI, KNIME
Other Websites:	
Course Delivery:	Face to face

UWSP Technology Support:	The Office of Information Technology (IT) provides a Service Desk to assist students with connecting to the Campus Network, virus and spyware removal, file recovery, equipment loan, and computer repair. You can contact the Service Desk via email at techhelp@uwsp.edu or at (715) 346-4357 (HELP) or visit: https://www.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx

2. LEARNING OUTCOMES

2.1. *Course Goals*

The objective of this course is to study the methods used in data visualization to create knowledge usable to make decisions in a company's pursuit of its strategic goals and objectives. This course exposes students to several problems in the real world and the way to tackle them using data and its visualization. The outcome of visualization will be to support problem-solving (design and innovation) and decision-making processes leveraging analytics tools and our human senses.

The course aim is to provide students with an integrated study of the data and visualization techniques, and storytelling development in the context of a blend of business processes, analytics tools and practical applications to the business continuous improvement.

In this course, the students will be able to design a data visualization roadmap. This roadmap will allow the understanding and use of visualization methods to add value to today's organizations.

2.2. *Course Learning Objectives*

The Data Visualization course transports you to the world of the data representation, human comprehension and visual data discovery for creating value in organizations. Keep in mind the search for the answers to questions: What are the relationships among variables? What is a trend, gap, changes, etc., that we can observe from our data? How do we need to think about aesthetics, analytics models and communication at the same time for creating and using knowledge?

You will understand the use of analytics techniques to help people to connect their world perception and what data shows regarding several today's organizational/society problems. I recommend you spend some spare time to watch some videos at http://www.teradatauniversitynetwork.com/

At the end of the course, you will	• Improve the capacity to identify patterns, relationships, outliers, and specific attributes of the data for a better use of analytics in organizations • Understand, Apply and Integrate Core Management concepts to visual analytics and visual analytics to core management concepts.

- Demonstrate Creativity, Problem-solving, and Decision-Making Skills for using appropriate tools and concepts for data visualization
- Demonstrate the ability to perform different type of analysis under various business processes using data visualization
- Explore the use of data visualization methodologies for different problems: description, exploration, evaluation, classification, etc.
- Provide value to the business through the guide of visual analytics work according to the area of specialization and data available
- Develop a working knowledge base of terminology within the fields of data visualization and data modeling
- Explain the role of data visualization plays in efficiency and effectiveness of the whole analytics process
- Conduct and interpret visual analyses to support the business processes understanding and roads to actions
- Identify security, privacy, and ethical issues associated with operations management visual analytics
- Evaluate different tools, methodologies, and opportunities to use data visualization
- Develop the capacity to create, present and communicate a business story that includes results to several stakeholders in a simple, complete and clear way

2.3. *Methodology*

This course has as methodology aspects the following:

- The course will be taught with a combination of lectures and class discussions based on assigned readings, skill building exercises, application assignments, and group or individual case studies/company research. Students are encouraged to actively participate in class, ask questions, and stimulate the thinking of all those in the classroom. Oral presentations and written reports will also be required. Quizzes and Exams will be used to evaluate students' understanding of the course content.
- It is necessary for students to complete the assigned readings and/or other required tasks no later than the beginning of class on the corresponding due dates (see "Course Calendar"). Doing so is key to synthesizing the concepts from the lectures and the readings, performing well on the exams/quizzes, and participating meaningfully in class.

2.4. *Academic Unit*

SBE Mission: The UWSP School of Business and Economics educates and inspires students and prepares graduates for success in positions of leadership and responsibility. We serve the students, businesses, economy, and people of the greater central Wisconsin region. Our students achieve an understanding of regional opportunities that exist within the global economy. Evidence of our graduates' level of preparation will be found in their ability to:

- Analyze and solve business and economics problems
- Understand the opportunities and consequences associated with globalization

- Appreciate the importance of behaving professionally and ethically
- Communicate effectively

3. COURSE POLICIES

3.1. *Attendance*

You will be responsible for anything that goes on in class.

3.2. *Late Work*

Late work may not be accepted. If accepted, late work will lose 25% per calendar day

3.3. *Etiquette/Netiquette*

POSITIVE LEARNING ENVIRONMENT. It is my goal to provide a safe and nurturing learning environment for all students. Therefore, breaches of classroom courtesy are defined as any behaviors that are disruptive to the learning environment. The following examples provide a foundational description of classroom courtesy:

•　　Displaying respect for others is required at all times. It is not required that you share the perspectives of your classmates, but rather that you do not discredit their right to have their own opinion. Expressing alternate viewpoints is important, but this should be done in a collegial manner.

•　　Side discussions, listening to head phones, sleeping in class, and abusive language is considered disruptive behavior.

•　　No shouting, no profane language, no verbal or physical threats, no intimidation of any kind.

•　　Not arriving to class under the influence of any alcohol or drugs

Should you disagree with anything that occurs during class or feel uncomfortable with anything related to the course please discuss the matter with the instructor as soon as possible. If the source of unease or perceived injustice occurs during a particular class session, please speak with the instructor immediately after class. If you are unable to see the instructor after class, make an appointment to do so as soon as possible. The chain of command for addressing any grievances must be followed in order as follows: The Instructor > The School of Business & Economics Chairperson > The Dean of College of Professional Studies > The Associate Vice Chancellor for Teaching & Learning.

4. GRADING

4.1. *Grading Scheme*

Grading will start with a traditional 90, 80, 70 scale. Grades may be curved from there at the discretion of the professor. If curved, they generally place roughly the top 25% of the students with a A or A- and roughly 75% of students with a A, A-, B+, B or B-. I will use whichever system gives students the higher grade.

5. COURSEWORK

5.1. *Assignments*

Five Assignments: each one 15 %

5.2. *Class participation and quizzes*

Use of tools, data, and work of the computer in class for practice = 10%

5.3. *Project*

Preparation of a topic and final assignment summary = 15%

6. SCHEDULE

6.1. *Dates and Deadlines*

The instructor will provide a tentative course schedule in a supplementary file. All provided course schedules are organized by week number in accordance with the official UWSP Academic calendar. A direct link to the UWSP Academic calendar can be found here:
https://www.uwsp.edu/acadaff/Pages/AcademicCalendar.aspx

7. OTHER ADMINISTRATIVE DETAILS

7.1. *ADA / Equal Access for Students with Disabilities*

The American Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. For more information about UWSP's policies, see: https://www.uwsp.edu/datc/Pages/uw-legal-policy-info.aspx

UW-Stevens Point will modify academic program requirements as necessary to ensure that they do not discriminate against qualified applicants or students with disabilities. The modifications should not affect the substance of educational programs or compromise academic standards; nor should they intrude upon academic freedom. Examinations or other procedures used for evaluating students' academic achievements may be adapted. The results of such evaluation must demonstrate the student's achievement in the academic activity, rather than describe his/her disability.

If modifications are required due to a disability, please inform the instructor and contact the Disability and Assistive Technology Center to complete an Accommodations Request form. The

Disability and Assistive Technology Center is located on the 6th Floor of Albertson Hall. For more information, call 715-346-3365 or visit: https://www.uwsp.edu/datc/Pages/default.aspx

7.2. *Inclusivity/Nondiscrimination Statement*

It is the responsibility of the instructor to present materials and activities that are respectful of diversity, such that students from all diverse backgrounds and perspectives be well-served by this course. No person shall be discriminated against because of race, ethnicity, color, age, religion, creed, gender, gender identity, sexuality, disability, nationality, culture, genetic information, socioeconomic status, marital status, veteran's status, or political belief or affiliation and equal opportunity and access to facilities shall be available to all. To address concerns regarding any of these issues please call 715-346-2606 or visit:
http://www.uwsp.edu/hr/Pages/Affirmative%20Action/About-EAA.aspx

7.3. *Religious Beliefs Accommodation*

It is UW System policy (UWS 22) to reasonably accommodate your sincerely held religious beliefs with respect to all examinations and other academic requirements. A direct link to this policy can be found here: https://docs.legis.wisconsin.gov/code/admin_code/uws/22

7.4. *Help Resources*

The Tutoring and Learning Center helps with Study Skills, Writing, Technology, Math, & Science. The Tutoring and Learning Center is located at 018 Albertson Hall. For more information, call 715-346-3568 or visit: https://www.uwsp.edu/tlc/Pages/default.aspx

If you need healthcare, UWSP Student Health Service provides student-centered healthcare that empowers and promotes wellness for all UWSP students. Student Health Service is located on the 1st floor of Delzell Hall. For more information, call 715-346-4646 or visit:
http://www.uwsp.edu/stuhealth/Pages/default.aspx

The UWSP Counseling Center is staffed with licensed mental health professionals dedicated to assisting students as they navigate difficult circumstances or resolve personal concerns. Therapy and consultation services are free of charge for registered students. The UWSP Counseling Center is located on the 3rd Floor of Delzell Hall. For more information, call 715-346-3553 or visit:
http://www.uwsp.edu/counseling/Pages/default.aspx

In addition to the support services provided by Student Health Service and the UWSP Counseling, there are also professional support services available to students through the Dean of Students. The Office of the Dean of Students supports the campus community by reaching out and providing resources in areas where a student may be struggling or experiencing barriers to their success. Faculty and staff are asked to be proactive, supportive, and involved in facilitating the success of our students through early detection, reporting, and intervention. As such, an instructor may contact the Office of the Dean of Students if he or she senses that a student is in

need of additional support beyond what the instructor is able to provide. For more additional information, please go to http://www.uwsp.edu/dos/Pages/default.aspx

UWSP students may also share a concern directly if they or another member of our campus community needs support, is distressed, or exhibits concerning behavior that is interfering with the academic or personal success and/or the safety of others. Please report any concerns of this nature at https://www.uwsp.edu/dos/Pages/Anonymous-Report.aspx

7.5. *Emergency Response Guide*

In the event of an emergency, follow UWSP's emergency response procedures. For details on all emergency response procedures, please go to http://www.uwsp.edu/rmgt/Pages/em/procedures

7.6. *UWSP Community Bill of Rights and Responsibilities*

UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, a set of expectations has been developed for all students, staff, and faculty. This set of expectations is known as the Rights and Responsibilities document, and it is intended to help establish a positive living and learning environment at UWSP. For more information, go to: https://catalog.uwsp.edu/content.php?catoid=10&navoid=422#section-1-communal-bill-of-rights-and-responsibilities

7.7. *University Attendance Policy*

In addition to the course attendance policies determined by the instructor (noted above if applicable), the university provide standard guidelines by which students are to abide. All exceptions to the course attendance policy or the university guidelines should be documented in writing. A link to the university's attendance guidelines can be found at: https://www.uwsp.edu/regrec/Pages/Attendance-Policy.aspx

7.8. *University Drop Policy*

You are expected to complete the courses for which you register. If you decide you do not want to take a course, you must follow the procedures established by the university to officially drop the course. If you never attend or stop attending a course and fail to officially drop, you will receive an F in the course at end of the semester. A link to the university's drop policy can be found at: https://catalog.uwsp.edu/content.php?catoid=11&navoid=431&hl=add%2Fdrop&returnto=search#Drop/Add/Withdrawal_Procedures

7.9. *Academic Honesty*

UW System policy (UWS 14) states that students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others' academic endeavors. Students suspected of academic misconduct will be asked to meet with the instructor to discuss the concerns. If academic misconduct is evident, procedures for determining disciplinary sanctions will be followed as outlined in UWS 14. A direct link to this policy can be found here: https://docs.legis.wisconsin.gov/code/admin_code/uws/14

7.10.   *Grade Reviews/Appeals*

A formal grade appeal, also known as a Grade Review, can be requested in instances when the student feels that he or she was not provided a syllabus with a grading scale in a timely manner (i.e., the end of the second week of classes) and/or the instructor did not stick with the grading scale published in the syllabus. Questions of whether or not the instructor appropriately graded one or more of the course assignments, quizzes, exams, etc. are not matters to be decided by a formal grade appeal, but rather should be taken up with the instructor directly. Information on grade reviews can be found in the University Handbook, Chapter 7, Section 5. A link to the university's policies on non-academic misconduct can be found at https://www.uwsp.edu/acadaff/Pages/gradeReview.aspx

7.11.   *Non-Academic Misconduct*

Information on non-academic misconduct can be found in Chapters 17 and 18 of the Student Rights and Responsibilities Document. A link to the university's policies on non-academic misconduct can be found at https://www.uwsp.edu/dos/Pages/stu-conduct.aspx.

7.12.   *Confidentiality*

Learning requires risk-taking and sharing ideas. Please keep your classmates' ideas and experiences confidential outside the classroom unless permission has been granted to share them.

It is important for students to understand that faculty are required to report any incidents of maltreatment, discrimination, self-harm, or sexual violence they become aware of, even if those incidents occurred in the past, off campus, or are disclosed as part of a class assignment. This does not mean an investigation will occur if the student does not want that, but it does allow the university to provide resources to help the student continue to be successful.

7.13.   *Sample Coursework Permission*

The instructor may wish to use a sample of your work or some of the feedback you provide on the course in future teaching or research activities. Examples: showing students an example of a well-done assignment; analyzing student responses on a particular question; discussing teaching techniques at a conference. If your coursework or feedback is used, your identity will be concealed. If you prefer not to have your work included in any future projects, please send the instructor an e-mail indicating that you are opting out of this course feature. Otherwise, your participation in the class will be taken as consent to have portions of your coursework or feedback used for teaching or research purposes.

7.14.   *Revision Clause*

This syllabus, the provided schedule, and all aforementioned coursework, are subject to change. It is the student's responsibility to check the course website for corrections or updates to the syllabus. Any changes will be clearly noted in a course announcement or through email.