 

COURSE SYLLABUS updated 8/29/2020

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| Course Number | DAC 205 (82065) |
| Course Name | Principles of Data and Modelling |
| Course Time | MW 11:00-12:50 pm |
| Classroom(s) | CPS 107,105 & 104 |
| Term | Fall 2020 |

# Course Information

## Instructor Information

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| **Instructor:** | Professor Pflughoeft (Floog’heft) |
| **Office:** | CPS 330 |
| **Physical or Virtual Office (Zoom) Hours:** | TW 2:00 – 3:00 PM and by Appt |
| **E-mail:** | [kpflugho@uwsp.edu](mailto:kpflugho@uwsp.edu) |
| **Expected Instructor Response Time:** | Next business day; please resend email if no response |

## Course Information

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| **Course Description:** | Introduction to the concept of data and the multiple perspectives of data. Analyze the data-life cycle from elicitation to disposal, including the steps of collection, processing, storage, use, and archiving. You’ll learn how to get your data into R, get it into the most useful structure, transform it, analyze it and visualize it. |
| **Credits:** | 4 |

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## Textbook & Course Materials

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| **Required Texts:** | The Art of R Programming (ISBN-13: 978-1786466457)  BIG DATA ANALYTICS WITH R (ISBN-13: 978-1593273842) |

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## Course Technology

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| **Course Website:** | [www.uwsp.edu](http://www.uwsp.edu) LOGIN to Canvas |
| **Course Delivery:** | In-person or Online or 100% online |
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| **Canvas Support:** | Click on the HELP button (  ) in the global (left) navigation menu and note the options that appear:   * Ask Your Instructor a Question *Submit a question to your instructor*   + Use Ask Your Instructor a Question sparingly; technical questions are best reserved for Canvas personnel and help as detailed below. * Chat with Canvas Support (Student) *Live Chat with Canvas Support 24x7!*   + Chatting with Canvas Support (Student) will initiate a *text chat* with Canvas support. Response can be qualified with severity level. * Contact Canvas Support via email *Canvas support will email a response*   + Contacting Canvas Support via email will allow you to explain in detail or even upload a screenshot to show your difficulty. * Contact Canvas Support via phone *Find the phone number for your institution*   + Calling the Canvas number will let Canvas know that you're from UWSP; phone option is available 24/7. * Search the Canvas Guides *Find answers to common questions*   + Searching the [Canvas guides](https://community.canvaslms.com/docs/DOC-10701) connects you to documents that are searchable by issue. You may also opt for [Canvas video guides](https://community.canvaslms.com/docs/DOC-3891). * Submit a Feature Idea *Have an idea to improve Canvas?*   + If you have an idea for Canvas that might make instructions or navigation easier, feel free to offer your thoughts through this Submit a Feature Idea avenue.   Self-train on Canvas through the Self-enrolling/paced Canvas training course: <https://uws.instructure.com/courses/45767> |
| **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](mailto:techhelp@uwsp.edu) or at (715) 346-4357 (HELP) or visit: [https://www.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx](https://www3.uwsp.edu/infotech/Pages/ServiceDesk/default.aspx)  For technology instruction sheets, online support videos, and other related resources, go to: [https://www.uwsp.edu/online/Pages/Student-Support.aspx](https://www3.uwsp.edu/online/Pages/Student-Support.aspx)  The university also provides a Technology Tutoring service in which tutors meet with students one-on-one to provide technology assistance. To receive help of this nature visit**:** [https://www.uwsp.edu/tlc/Pages/techTutoring.aspx](https://www3.uwsp.edu/tlc/Pages/techTutoring.aspx)  Additional tools designed to help students taking online or hybrid courses can be found at: [https://www.uwsp.edu/online/Pages/Online%20Student%20Orientation.aspx](https://www3.uwsp.edu/online/Pages/Online%20Student%20Orientation.aspx) |

# Schedule

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| Week Nbr | Start Date Mo-Su | Topic | Readings | Assignments |
| 1 | \*9/02 - 9/06 | R & R Studio, Intro | ARP 1 &13 | Lab 1 |
| 2 | 9/07 - 9/13 | Data Categories, Vectors, Matrices | ARP 2 | Lab 2 HW 1 |
| 3 | 9/14 - 9/20 | Data Frames, Tibbles, Data Cat. | ARP 3&5 | Lab 3, Q1 |
| 4 | 9/21 - 9/27 | tidyVerse, Functions, VM | ARP4 | Lab 4, HW 2 |
| 5 | 9/28 - 10/04 | VM | ARP6 | Lab 5, Q2 |
| 6 | 10/05 - 10/11 | Relational Data, Linux | ARP 7 | Lab 6, HW 3 |
| 7 | 10/12 - 10/18 | ggPlot2 - Visualization | ARP12 | Lab 7, Q3 |
| 8 | 10/19 - 10/25\* | Review & Midterm |  |  |
| 9 | 10/26 - 11/01 | MetaData, Missing Values, Wgts | ARP 11, BDA 1 | Lab 8, HW 4 |
| 10 | 11/02 - 11/08 | Big Data, DPlyr, Sparklyr | ARP 10, BDA 3 | Lab 9, Q4 |
| 11 | 11/09 - 11/15 | Parallelism | BDA 4 (pp 127-191) | Lab 10. HW 5 |
| 12 | 11/16 - 11/22 | Hadoop | BDA 7 | Lab 11, Q5 |
| 13 | 11/23 - 11/29 | Spark with R | BDA 8 | Lab 12, HW 6 |
| 14 | 11/30 - 12/06 | More Spark | BDA 9 | Lab 13, Q6 |
| 15 | 12/07 - 12/11 | Catchup and Review |  |  |
| 16 | 12/15 | FINAL 10:15-12:15 PM |  |  |

**Schedule Footnotes:**

* This schedule is a guide to the coverage of topics. The instructor reserves the right to alter the presentation schedule as necessary to benefit the class.
* Number of labs, homeworks and quizzes may be adjusted as necessary.
* Labs may be splitted; e.g. Lab 1 -> Lab 1a & Lab 1b
* Assignment Due Dates will be listed on Canvas

# Learning Outcomes

## Course Goals

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| **Course Outcomes** - Given a successful conclusion of this course, students will be able to:   * Understand fundamental data types and structures * Be able to process data using appropriate structures * Understand the importance of metadata and data stewards * Prepare incomplete and/or big data for modeling * Know different approaches to handle structured versus unstructured data * Understand data life cycle issues including data security * Apply many of the above outcomes via working R programs * Learn about data and how to input, store, and output data in R * Know basic Linux commands * Operate between a host Windows machine and a Virtual Linux machine * Learn how to process big data via the VM * Examine Hadoop and related technologies |

## R programming

The open source R package provides a complete analytical environment and is justifiably viewed as the de facto language in the academic statistical community. Its popularity in the non-academic, business-orientated world is growing rapidly as well. It is in fact the fastest growing language on the StackOverflow developers site and is currently ranked in 5th place in IEEE language rankings. We will begin with R programming basics. The use of the R Integrated Development Environment (IDE), RStudio (Desktop Open Source License), will be emphasized throughout the semester.

## Academic Unit

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| **SBE Mission:** | The UW-Stevens Point School of Business and Economics creates career ready graduates and leaders through applied learning. We serve the businesses, economy, and people of the greater Central Wisconsin region. We specialize in preparing students for success by providing professional development experiences, access to employers, and in-demand skills.  The SBE achieves its mission by valuing:   * Talent development * Lifelong learning * Career preparation * On the job experiences * Community outreach * Regional partnerships * Continuous improvement |
| **Accreditation Commitment:** | SBE is accredited by the Association to Advance Collegiate Schools of Business (AACSB), a designation earned by only 5 percent of world business schools. Accreditation instills a culture of continuously improving our programs through connections with local business leaders, alumni and the community. |

# Grading

## Grading Scheme

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| **Letter  Grade** | **Percentage Range  ( x = your score )** | | | | |
| A | 93.0% | ≤ | X | ≤ | 100.0% |
| A- | 90.0% | ≤ | X | ≤ | 92.9% |
| B+ | 87.0% | ≤ | X | ≤ | 89.9% |
| B | 83.0% | ≤ | X | ≤ | 86.9% |
| B- | 80.0% | ≤ | X | ≤ | 82.9% |
| C+ | 77.0% | ≤ | X | ≤ | 79.9% |
| C | 73.0% | ≤ | X | ≤ | 76.9% |
| C- | 70.0% | ≤ | X | ≤ | 72.9% |
| D+ | 67.0% | ≤ | X | ≤ | 69.9% |
| D | 60.0% | ≤ | X | ≤ | 66.9% |
| F | 0.0% | ≤ | X | ≤ | 59.9% |

Instructor reserves the right to implement a curve which is beneficial to the students.

Note: NO Smiley Professional Events (or Pro Events) are required for this course

## Distribution of Points

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| Midterm | 20% |
| Final | 25% |
| Labs | 20% |
| Quizzes | 15% |
| Homeworks | 20% |

## Late Assignments

## Electronic copies of the completed assignments must be uploaded to Canvas by the required date/time. Late homeworks and labs are discounted 20% EACH DAY. No late Midterm, Final or Quizzes are accepted. Contact professor concerning deadline complications beforehand.

## Canvas

It is your responsibility to check that your grades are posted correctly on Canvas. Questions about any posted grade must be raised within one week of posting. Beyond this time frame, all grade postings are considered correct and final. The Canvas site is NOT available after the final exam.

* USE the OneDrive to temporarily save your files – if need be.
* All assignments must be loaded in the appropriate Canvas folders.
* **Announcements on Canvas** are the main communication tool (not email!)
* Items which appear unformatted in browser should be downloaded.

# Course Policies

## Average Time Investment/Workload Policy Statement

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| DAC 205 is a 4 credit class. Besides lecture/lab time, a four credit class has an expectation of another 8 hours per week for assignments and readings. |

## Drop Policy

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| In accordance with the rules stated by the School of Business. I will **NOT** personally drop a student - you are responsible for filling out all the forms. Classroom conductPlease mute cell phones and any audible device during classes. Please do not hold private conversations or text while I am lecturing as it is a distraction.Email Policy  * I try to answer questions in a timely manner but if you haven’t received a response from me within 24 hour, please resend the email. * If your email is only informative in nature, such as you are missing a class, I usually don’t reply to those emails but rather just file them. If your email has a question or issue that needs to be addressed, I will reply to it. * If you receive an email from me that requires a response, please respond. * Please include “DAC 205” as part of your subject line. |

## Exam Policy

## Except for documented emergencies, no late or makeup in-class exercises, exams and quizzes will be given.

## Homework/Lab Assignment Format

For lab assignments, you should turn in a single Word document which lists your code, console output and all graphs. If you created or modified a file for use with your program/script, those files need to be turned in as well. If the program is an interactive one, where the user is prompted for input, one or more screen shots (or relevant copy/pastes) of the program’s output are needed to demonstrate the program works correctly. The homework policy is similar to the lab policy. There may be occasions where I ask for more items. If there is any doubt about whether an item should be turned in, err on the side of uploading it to Canvas. I will not allow missed items to be turned in after it is graded. Finally, when submitting multiple files, do not use zip formats as those files must be downloaded and can not be previewed in Canvas. Failure to abide by these requirements can result in a significant loss of points. Only the latest copy of the homework/lab is graded – in case you uploaded multiple copies.

## PC

## This class will make extensive use of Windows PCs. If you are not familiar with a desktop computer, you may need to practice a bit with File Explorer and other common utility programs. Note: there are Mac versions of R as well.

## PowerPoint Lectures

Lecture notes, if available, are posted up to 5 days after the associated lab is due – this is to avoid copy and pasting for lab assignments.

## Quizzes

Quizzes are meant to test your understanding about topics that were currently presented. Quizzes will be take-home but you are NOT allowed to collaborate with others. You may use other resources such as google. For open-ended questions, be careful not to plagiarize. Check Canvas for due dates; no late quizzes are accepted. For Quiz questions, make sure to place your answer directly below the question text. Quality of answers matters and is positively correlated with the length of the answer.

## Software

This course primarily uses RStudio. You have several options to run RStudio. 1) RStudio with R can be installed on your PC – either Windows or Macs. The Mac OS, which is a form of Linux, may require X11 to be separately installed for graphics. For your PC, 8 gig of RAM should be sufficient for this course but when buying a PC get 16 gig so you can run a virtual machine. 3) Access Rstudio remotely from a lab computer (less desirable.) 4) Access RStudio from UWSP’s Virtual Desktop 5) Utilize RstudioCloud.

## Smiley Professional Events (or Pro Events)

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| No events are required for this course. |

# Other Administrative Details

## ADA / Equal Access for Students with Disabilities

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| The American Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. Links to UWSP’s policies regarding ADA, nondiscrimination, and Online Accessibility (IT & Communication Accessibility) can be found at: [https://www.uwsp.edu/datc/Pages/uw-legal-policy-info.aspx](https://www3.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, email [datctr@uwsp.edu](mailto:datctr@uwsp.edu) or visit: [https://www.uwsp.edu/datc/Pages/default.aspx](https://www3.uwsp.edu/datc/Pages/default.aspx) |

## Inclusivity/Nondiscrimination Statement

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| 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> |

## Religious Beliefs Accommodation

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| 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> |

## Help Resources

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| This section offers help resources relating to academic tutoring, healthcare, counseling, and other matter of student wellbeing. For help recourse related to technology use, please see section 1.4 above.  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](https://www3.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](https://www3.uwsp.edu/dos/Pages/Anonymous-Report.aspx) |

## Emergency Response Guide

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| 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> |

## UWSP Community Bill of Rights and Responsibilities

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| 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> |

## University Drop Policy

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| 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> |

## Academic Honesty

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| 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> |

## Non-Academic Misconduct

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| 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](https://www3.uwsp.edu/dos/Pages/stu-conduct.aspx). |

## Confidentiality

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| Under FERPA, students cannot remain anonymous in a class. Students are permitted to know who else is in their class.  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.  The instructor of this course will not share your academic records (grades, student IDs). Confidentiality of student work is imperative, so you should not share the work of your peers publicly without their permission. By participating in these assignments, you are giving consent to sharing of your work with others in this class and you recognize there is a small risk of your work being shared online beyond the purposes of this course.  UW-System approved tools meet security, privacy, and data protection standards. For a list of approved tools, go to: <https://www.wisconsin.edu/dle/external-application-integration-requests/>. Tools not listed on the website linked above may not meet security, privacy, and data protection standards. If you have questions about tools, contact the UWSP IT Service Desk at 715-346-4357. Links to the Terms of Use and Privacy Polices for tool used at UWSP be found at: [https://www.uwsp.edu/online/Pages/Privacy-and-Accessibility-Links.aspx](https://www3.uwsp.edu/online/Pages/Privacy-and-Accessibility-Links.aspx)  Here are steps you can take to protect your data and privacy:   * Use different usernames and passwords for each service you use * Do not use your UWSP username and password for any other services * Use secure versions of websites whenever possible (HTTPS instead of HTTP) * Have updated antivirus software installed on your devices   Additional resources regarding information security at UWSP can be found at: [https://www.uwsp.edu/infosecurity/Pages/default.aspx](https://www3.uwsp.edu/infosecurity/Pages/default.aspx).  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. |

## Intellectual Property - A Guide to Student Recording & Sharing Class Content

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| Lecture materials and recordings for this class are protected intellectual property at UW-Stevens Point. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or share lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor’s express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct. |

## Sample Coursework Permission

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| 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. |

## Revision Clause

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| 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. |

## COVID-19

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| ***Face Coverings:***   * At all UW-Stevens Point campus locations, the wearing of face coverings is mandatory in all buildings, including classrooms, laboratories, studios, and other instructional spaces. Any student with a condition that impacts their use of a face covering should contact the [Disability and Assistive Technology Center](https://www3.uwsp.edu/datc/Pages/default.aspx) to discuss accommodations in classes. Please note that unless everyone is wearing a face covering, in-person classes cannot take place. This is university policy and not up to the discretion of individual instructors. Failure to adhere to this requirement could result in formal withdrawal from the course.   ***Other Guidance:***   * Please monitor your own health each day using [this screening tool](https://www3.uwsp.edu/C19DailyScreening). If you are not feeling well or believe you have been exposed to COVID-19, do not come to class; email your instructor and contact Student Health Service (715-346-4646).   + As with any type of absence, students are expected to communicate their need to be absent and complete the course requirements as outlined in the syllabus. * Maintain a minimum of 6 feet of physical distance from others whenever possible. * Do not congregate in groups before or after class; stagger your arrival and departure from the classroom, lab, or meeting room. * Wash your hands or use appropriate hand sanitizer regularly and avoid touching your face. * Please maintain these same healthy practices outside the classroom. |