

# DATA 115: Introduction to Data Analytics

Fall 2023



WASHINGTON STATE UNIVERSITY  
Data Analytics

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## Course Logistics

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Prefix/Number: DATA 115.1 (WSU Global Campus)  
Credit Hours: 3  
Prerequisites: None  
Location: Global Campus

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## Instructor Information

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Instructor: Gani Nurmukhametov  
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Phone: (425) 405-1659  
Email: [gani.nurmukhametov@wsu.edu](mailto:gani.nurmukhametov@wsu.edu)  
Office Hours: typically<sup>1</sup>M/W 12:00-1:00 pm and Tu/Th 10:00-11:00 am or by appointment in [Zoom](#)

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## Introductory Note

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First of all, welcome to DATA 115! I hope I will get a chance to meet you in person sometime during your journey at Washington State University.

Secondly, sorry this is such a long document. Despite that, I hope you'll make time to read it through at least once during the first week of class as it contains a useful summary of the material we will be covering and will serve as a repository of important information and links.

Finally, definitely feel free to reach out if you have any questions or concerns about the course or material, I'm always happy to chat about data, statistics, or academic life and would welcome opportunities to offer my perspective or simply serve as a sounding board.

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## Course Description

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The course describes basic concepts, principles, and tools used in data analytics. More specifically, this course provides an introduction to the field of data analytics. We will draw on recent and relevant materials from statistics, mathematics, computer science, artificial intelligence, and machine learning, as well as many application domains.

Motivated by natural questions that arise in simple data examples, we will cover many of the basic techniques for working with data including sourcing raw data, cleaning and processing, exploring and analyzing, and finally presenting conclusions. In order to provide a foundation for later courses in the major, we will also explore initial examples of many of the core topics that will be encountered. You will have plenty of opportunities to work with real data and the R programming language.

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<sup>1</sup>I may occasionally change the time or cancel office hours on a given day. Please follow my announcements on Canvas.

In addition to familiarizing you with basic tools and methods, this course will provide a broad exposure to the diverse types of data analytics projects that are being conducted around the world. A key component of the course will be critically analyzing published data analytics works and discussing their strengths and shortcomings. Finally, as data-driven practices are becoming common in many career fields, we will focus on professional development topics such as presentation skills and examples of the ethical and legal issues that can arise in modern data analysis projects.

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## Remote Logistics

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Given the nature of the Global Campus course, all course materials will be presented entirely online, mostly over Canvas, with some videos displayed over the Panopto system. We will also use a variety of web collaboration tools, including the Canvas forums, and the RStudio Cloud platform for computational examples. Access to these services will be discussed during the first week of classes. Generally, each week will present you with pre-recorded videos covering some of the course content along with lecture slides, notes, and assignments.

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## Course Materials

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**There is no required textbook for this course**, as we will be making use of open source and online materials all semester. These three textbooks below are available as free .pdfs and will be referenced during lectures and assignments:

1. [An Introduction to Statistical Learning with Applications in R](#) by James, Witten, Hastie, and Tibshirani
2. [R for Data Science](#) by Wickham and Grolemund
3. [ggplot2: Elegant Graphs for Data Analysis](#) by Wickham

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## Software

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At the beginning of the course, we will focus on manipulating and extracting details from data using spreadsheet programs like Excel. Later segments of the course will provide training and examples using the R programming language, which you will install on your own computer or access through a cloud platform. R is an open-source language with a robust ecosystem of packages for data analytics that has become one of the most common languages for a broad range of data-related tasks.

**No previous programming experience or knowledge of statistical software tools will be assumed.** We will start with the basics of R in Week 3 and build up familiarity with standard data analytics libraries like dplyr, ggplot2, knitr, tibble, and tidyr.

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## Expectations for Student Effort

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You are expected to spend a minimum of 9 hours per week for an online three-credit course engaged in activities including, but not limited to: reading, listening to/viewing media, studying for and completing assignments and reviewing instructor feedback, contributing to discussions, conducting research etc.

Students enrolled in online courses are subject to the same academic regulations as on-campus students. For the most accurate and up to date information go to [Academic Regulations](#).

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## Attendance and Participation

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Due to the online nature of the course and the wide range of topics that we will cover this term, frequent engagement will be essential for your success. Although it is not officially a part of the course grade, long gaps in participation could adversely affect your grade by impacting your understanding of the material. That said, I understand that you may occasionally have difficulties keeping up with the pace of the course. Please communicate with me in advance if possible, so I can help point you to useful resources. It can be tempting to view video lectures as a substitute for personally taking notes but a significant body of research suggests that taking notes by hand improves learning outcomes for students.

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## Class Communication and Instructor Interaction

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We will use the Canvas forums for course discussions. This is a great place to ask questions from your peers, as well as to get feedback on your ideas. Announcements and other official communications will be posted on Canvas as well as sent to your official WSU email accounts. You should check these messages regularly to stay informed about upcoming due dates and updates to the syllabus.

I am accessible by email at [gani.nurmukhametov@wsu.edu](mailto:gani.nurmukhametov@wsu.edu). I teach multiple courses, so please as a courtesy to me include “DATA 115(Global)” in the subject line for any messages concerning this course. Most likely I will read your email as soon as I receive it, but it still may take me a little while to respond. I will commit to responding within 48 hours (usually I will get back to you much faster) but this does mean that queries sent immediately before a deadline may not receive substantive responses in time to be directly helpful, so please plan ahead ☺

I strongly encourage you to utilize the resource that is freely available to you, that is my office hours! If you cannot attend my office hours during their regular time, do not hesitate to send me an email and we can schedule a short appointment in Zoom that fits both you and me.

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## Student Learning Outcomes

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Students who successfully complete the course will be able to:

- describe different types, uses, and structure of data sets;
- perform basic procedures to obtain, process (clean), and store data;
- understand and compute simple summary statistics and statistical models;
- construct simple scripts for processing, analyzing, and visualizing data;
- conduct exploratory data analysis;
- apply elementary (supervised and unsupervised) learning techniques;
- analyze published data analytics work across multiple application domains;
- increase the level of the professional preparation, namely:
  - work collaboratively on data analytics projects;
  - present data preparation processes and the results of analyses;
  - understand legal and ethical ramifications of data-driven projects;
  - curate and store data sets;
  - use common programming tools and computational platforms.

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## Assignments and Assessments

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There will be four main types of graded assignments in this course.

- **Participation / Reading and Discussion Assignments:** These involve completing one or more short readings on a relevant data analytics topic. A set of discussion questions related to the reading will be provided and you will be required to make a discussion post responding to those questions, as well as writing summaries of the group discussion. These are more subjectively graded and will receive a score - the main goal here is participation. There will be 6 participation/reading and discussion assignments in total. No late work will be accepted but at the end of the semester your lowest one score will be dropped.

- **Written Assignments:** These involve completing one or more short readings on a relevant data analytics topic. A set of discussion questions related to the reading will be provided and you will be required to make a discussion post responding to those questions, as well as writing summaries of the group discussion. These are more subjectively graded and will receive a score - the main goal here is participation. There will be 6 participation/reading and discussion assignments in total. No late work will be accepted but at the end of the semester your lowest one score will be dropped.
- **Midterm Exam:** There will be a single midterm exam during Week 8 of the class, covering the material from Weeks 1-7. This exam will be open notes and submitted online through Canvas. The exams are timed to be completed in 75 minutes or less.
- **Final Project:** The final assessment in the course will be a project, where you will complete a data analytics task from beginning to end. More details will be discussed later in the semester but this will provide you with flexibility to tackle a topic of broader depth than those encountered in the weekly assignments. You will be submitting a project report in Week 15. Project topics will be finalized during Week 12 of the course.

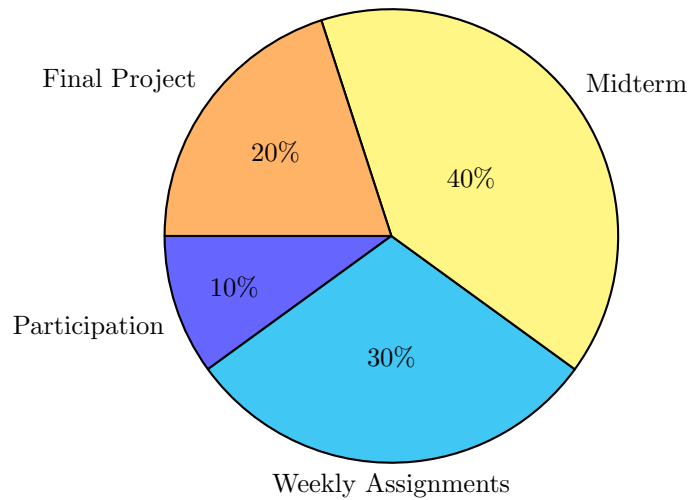
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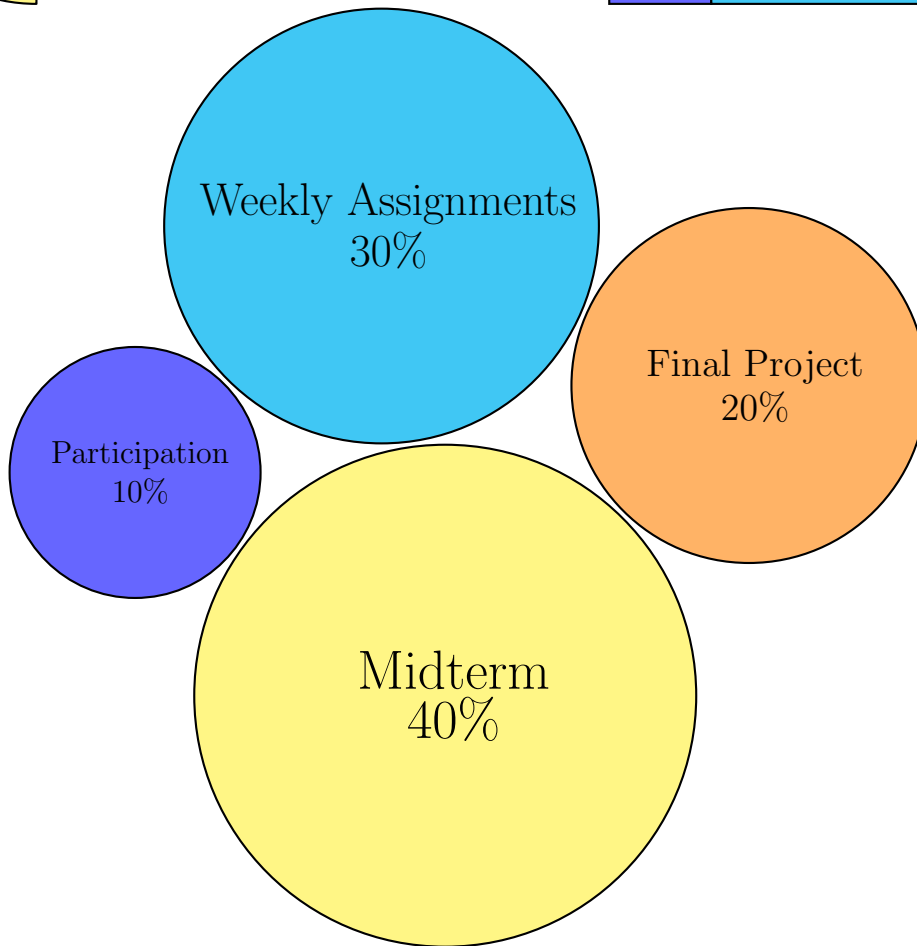
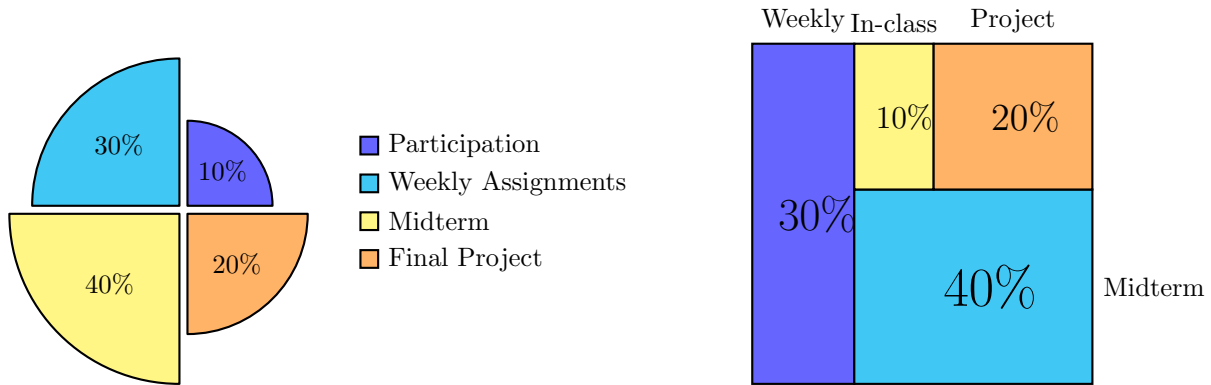
### Grading Policy

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The "weights" of course assignments towards the overall course grade is as follows:

Assignment	Percentage
Participation	10%
Weekly Assignments	30%
Midterm	40%
Final Project	20%





I will determine your letter grade using the following grade scheme:

Grade	Percentage	Grade	Percentage
A	95-100	C	73-76.99
A-	90-94.99	C-	70-72.99
B+	87-89.99	D+	67-69.99
B	83-86.99	D	60-66.99
B-	80-82.99	F	0-59.99
C+	77-79.99		

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## Late Work Policy

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Late submissions are not normally allowed. However, earlier submissions are allowed at any time before due date. Extensions *may be* allowed by contacting me well in advance. If asking for an extension, do so on real emergencies—not as a habit. After “answer keys” have been posted to the class, that assignment or exam cannot be made up, so please reach out to me early if needed and don’t get too far behind.

It is better to turn in a partial homework than no homework. The phrase “little is little but nothing is nothing” fully applies here.

For an excused missed midterm exam, the accommodation is at the sole discretion of the instructor and may include a reweighting of the remaining components making up the student’s grade or taking a makeup exam. Again, please reach out to me well in advance.

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## Collaboration Policy

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You are encouraged (and sometimes required) to work with other students for the assignments in the class. However, the work that you submit should be your own and in particular should be written in your own words and communicate your own understanding of the solution. If you do collaborate, please list the names of the other students you worked with on your submission. You may be asked to explain your work in person to obtain full credit. Obtaining solutions for course problems from external sources will be considered a violation of the academic integrity policy with consequences described below.

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## Online Discussion Policy

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The essence of education is exposure to diverse viewpoints. In your discussion posts you’ll meet students with vastly different opinions and backgrounds. You’re encouraged to disagree with the substance of others’ ideas and opinions but do so with an active sense of respect for one another, and without losing focus on the topic at hand. Personal attacks, inflammatory statements, flaming, trolling, and disruption of the discussion do not have a place in academic discourse. Postings must comply with University policy on use of computing resources, including those regarding harassment and discrimination, as well as conform to the [WSU Community Standards](#).

I will aim to promote high-quality academic discussions by removing any posts I view as disruptive of the educational process and alerting students whose posts have been removed that they have violated course expectations. Students who continue to misuse the discussion boards after a warning may be subject to removal of access rights, course failure, and referral to the Office of Community Standards. [Visit WSU Netiquette Guidelines](#).

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## WSU Academic Calendar

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Please refer to the [WSU academic calendar](#) to be aware of university holidays and important deadlines throughout the semester.

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## University Syllabus

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Students are responsible for reading and understanding all university-wide policies and resources pertaining to all courses (for instance: accommodations, care resources, policies on discrimination or harassment), which can be found in the [University Syllabus](#).

### **Lauren's Promise: WSU's Commitment to Address Discrimination and Harassment**

On October 22, 2018, Lauren McCluskey, 21 years old, was murdered by a man she briefly dated on the University of Utah campus, where she was a student. Lauren was raised in Pullman, Washington. Together with her parents, who are professors at WSU, this university community stands firmly behind Lauren's Promise: **WSU will listen and facilitate support and reporting options if someone is threatening you.**

WSU prohibits discrimination and sexual misbehavior. Discrimination includes discriminatory harassment, sexual harassment, and sexual misbehavior. Sexual misbehavior includes stalking, violence between intimate partners, and all types of sexual violence. If you are in immediate danger, call 911.

If you have experienced or have witnessed discriminatory behavior, you can contact the WSU Office of Civil Rights Compliance Investigation (CRCI) and/or the [WSU Title IX Coordinator](#) at 509-335-8288. These offices can give you confidential resources and explain your choices to report the behavior. (Go to [crcli.wsu.edu](http://crcli.wsu.edu) for more information).

See Policy Prohibiting Discrimination, Discriminatory Harassment, Sexual Harassment, and Sex and Gender Based Violence ([Executive Policy 15](#)) and WSU Standards of Conduct for Students ([Chapter 504-26 WAC](#)).

### **Reasonable Accommodations**

Students with disabilities or chronic medical or psychological conditions can request reasonable accommodations. If you need reasonable accommodations to fully participate in your courses, please go to your campus' Access Center/Services website (see links below). Follow the procedures to request accommodations. You may also contact your campus office to schedule an appointment with an Access Advisor.

The Access Center/Services will notify your instructors of your requested accommodations, but you may need to communicate with your instructors about how some of your accommodations will work (by email, Zoom, or in person).

Contact an Access Advisor on your campus:

- [Central Support](#) (for Pullman, Global, Everett, Bremerton, and Puyallup campuses).  
Phone: 509-335-3417 or email: [access.center@wsu.edu](mailto:access.center@wsu.edu).
- [Spokane Campus](#). Phone: 509-358-7816 or email: [spokane.access@wsu.edu](mailto:spokane.access@wsu.edu).
- [Tri-Cities Campus](#). Phone: 509-372-7352 or email: [tricity.accessservices@wsu.edu](mailto:tricity.accessservices@wsu.edu).
- [Vancouver Campus](#). Phone: 360-546-9238 or email: [van.access.center@wsu.edu](mailto:van.access.center@wsu.edu).

### **Arrangements for Religious Reasons**

Washington State University tries to accommodate students for religious reasons. Please reach out to me within the first two weeks of the semester to schedule examinations or other required course activities during the absence. You should include the specific dates of the religious activity. If I approve the absence, then your grade is not affected. However, you are still responsible for any course work required during the absence.

If you disagree with my response/decision, check [Academic Regulation 104](#) - Academic Complaint Procedures. If you think your request was treated unfairly, contact the [Office of Compliance and Civil Rights](#).

## Emergencies on Campus

To receive emergency alerts on your phone or by email, click on the link to the page of your campus below. These alerts may include information about active shooter situations and severe weather.

In case of an active shooter, follow these ideas: “Run, Hide, Fight” .

In any emergency, remain ALERT by observing and paying attention to WSU emergency alerts. ASSESS your specific situation, and ACT to ensure your own safety and the safety of others if you are able.

- [Bremerton Campus](#)
- [Everett Campus](#)
- [Pullman Campus](#)
- [Spokane Campus](#)
- [Tri-Cities Campus](#)
- [Vancouver Campus](#)

## Student Support Resources

WSU wants you to succeed. When problems happen, it is important to get help early. The [Student Care Network](#) has links to resources for each campus. For more resources for physical and emotional health, financial, legal, academic, and other support, visit [Campus Resources and Support](#). Each WSU location also has a Student Care Team. The team includes professionals who can recommend resources and services to help you succeed.

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## Other Relevant University Policies and Statements

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### Academic Integrity

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course.

You are responsible for reading WSU’s [Academic Integrity Policy](#), which is based on [Washington State law](#). Students who violate the Academic Integrity Policy will fail the assignment, will not have the option to withdraw from the course pending an appeal, and will be reported to the Center for Community Standards. Multiple violations of the policy will cause you to fail the course.

Cheating includes, but is not limited to, plagiarism and unauthorized collaboration as defined in the Standards of Conduct for Students (identified in [Washington Administrative Code \(WAC\) 504-26-010\(2\)](#)). You need to read and understand all of the definitions of cheating. If you have any questions about what is and is not allowed in this course, please reach out to me before proceeding.

If you wish to appeal my decision relating to academic integrity, please use [the form](#) at the [Center for Community Standards](#) website. You must submit this request within 21 calendar days of the decision.

### Incomplete Grade Policy ([Academic Rule 90h](#))

Incompletes are granted only with my permission and are subject to the following guidelines:

1. You must request an incomplete in writing or by e-mail to me before the end of the semester. This request must be signed and dated by you (or identified by your WSU e-mail address) and must explain the reasons behind the request for the incomplete.
2. In order to be considered for an incomplete grade, these two conditions should be met:
  - You must complete a minimum of 75 percent of the assigned course work.
  - You must have a mathematical possibility of scoring a 60 percent or above for the entire course.
3. If extraordinary circumstances (e.g., family emergency, serious illness) are involved, I retain the discretion to grant an incomplete even if the minimum conditions outlined in item 2 above are not met.

If an incomplete grade is granted, the standard WSU policy applies (i.e., ALL work must be completed within one full year from the end of the enrollment semester at issue, unless a shorter time is specified by the instructor. Otherwise, an automatic grade of “F,” or failing, will be entered on your transcript).



## Technical Support

The [WSU Global Campus Current Student](#) website has all the administrative and contact-related information you need to be a successful online learner as well as [study tips and skills for success](#).

Before contacting Technical Support please visit our [Equipment Requirements](#) to ensure your system meets our computer requirements and test your connection.

Technical support is available 24/7. A member of our technical support team will assist you or direct your request to the appropriate group. The technical support team is NOT able to answer questions about course content or procedures (e.g., assignments, grades).

Please visit our [Tech Support website](#) for hours of operation and contact information.

## Library Support

All students enrolled in Washington State University online courses can use the WSU Libraries online databases and receive reference and research assistance from their home campus. Students can also borrow books and other circulating material as well as access full-text journal articles.

General Library Support Links:

- [Global Campus](#)
- [Pullman Campus](#)
- [Spokane Campus](#)
- [Tri-Cities Campus](#)
- [Vancouver Campus](#)
- [College of Nursing](#)

## Online Tutoring

As a WSU student enrolled in an undergraduate course, you have FREE unlimited access to Online Tutoring. This is not a course requirement, but a resource for you to utilize as needed.

With three ways to access a tutor you can choose the one that best fits your needs:

- Submit a paper: Writing Lab tutors will respond to papers in ANY academic subject. Just submit your paper, ask specific questions on the submission form, and a tutor will respond within 24-48 hours.
- Live tutoring: eChat rooms allow students to meet with tutors in one-on-one tutoring sessions via a fully interactive, virtual online environment.
- Leave a question: Students can leave specific questions for a tutor in any of our subjects by taking advantage of our eQuestions option. Our tutors will respond to your question within 24-48 hours.

More details and the list of available tutoring subjects can be found at [www.eTutoringOnline.org](http://www.eTutoringOnline.org)

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## Copyright

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Any course-related materials, presentations, lectures, etc. are the instructor's intellectual property and may be protected by copyright. The use of University electronic resources for commercial purposes, including advertising to other students to buy notes, is a violation of WSU's computer abuses and theft policy ([WAC 504-26-218](#)). Selling class notes through commercial note taking services without written advance permission from the faculty, could be viewed as be as copyright infringement and/or academic integrity violation([WAC 504-26-010 \(3\)\(a,b,c,i\)](#)).