Term Information

Effective Term	Summer 2022
Previous Value	*Summer 2012*

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

DL approval.

What is the rationale for the proposed change(s)?

Allow the flexibility to offer this course at a distance.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

None.

Is approval of the requrest contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Statistics
Fiscal Unit/Academic Org	Statistics - D0694
College/Academic Group	Arts and Sciences
Level/Career	Graduate
Course Number/Catalog	6610
Course Title	Applied Nonparametric Statistics
Transcript Abbreviation	Appl Nonparametric
Course Description	Noncalculus treatment of nonparametric tests, confidence intervals, estimation; topics include one- and two-sample problems, one- and two-way analysis of variance, multiple comparisons, correlation.
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week, 12 Week, 8 Week, 7 Week, 6 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	Yes
Is any section of the course offered	100% at a distance
Previous Value	*No*
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No
Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Prereq: 5301, 6201, or 6302, or equiv, or permission of instructor.
Previous Value	*Prereq: 5301 (529), 6201, or 6302 (623), or equiv, or permission of instructor.*
Exclusions	
Previous Value	Not open to students with credit for 661.
Electronically Enforced	No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	27.0501
Subsidy Level	Doctoral Course
Intended Rank	Masters, Doctoral

Requirement/Elective Designation

Required for this unit's degrees, majors, and/or minors
The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Understand difference between nonparametric and parametric statistical procedures, when nonparametric techniques are needed and useful.
- Grasp foundational concepts of statistical tests based on ranks, their associated confidence intervals, and point estimates.
- Identify appropriate statistical methods for a particular inference.
- Realize the importance of checking assumptions of the underlying probability models under which inferences are valid.
- Understand the concepts of asymptotic relative efficiency and large sample approximation.

Previous Value

Content Topic List

- Foundational comparison of parametric and nonparametric approaches
- Dichotomous data problem
- General connection between confidence sets and hypothesis tests
- General connection between confidence sets and hypothesis tests
- Sign test and associated interval and point estimates for one-sample data
- Signed rank test, interval and point estimates for one-sample data
- Asymptotic relative efficiency comparisons
- Rank sum test, interval and point estimates for two-sample data
- Kolmogorov-Smirnov two-sample test for general differences
- One-Way Layout: tests and multiple comparison procedures
- Two-Way Layout: tests and multiple comparison procedures
- Kendall's tau procedures for independence of two random variables

Sought Concurrence

No

Attachments

- Stat_6610_DL_syllabus_AT.docx: DL syllabus

  (Syllabus. Owner: Craigmile,Peter F)

- Stat_6610_DL_in_person.docx: In-person syllabus

  (Syllabus. Owner: Craigmile,Peter F)

- Stat_6610_distance_coversheet_AT.pdf: DL review from Prof. Jeremie Smith

  (Other Supporting Documentation. Owner: Craigmile,Peter F)

Comments

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Craigmile,Peter F	01/19/2022 03:19 PM	Submitted for Approval
Approved	Craigmile,Peter F	01/24/2022 09:51 AM	Unit Approval
Approved	Vankeerbergen,Bernadette Chantal	01/28/2022 05:13 PM	College Approval
Pending Approval	Cody,Emily Kathryn Jenkins,Mary Ellen Bigler Hanlin,Deborah Kay Hilty,Michael Vankeerbergen,Bernadette Chantal Steele,Rachel Lea	01/28/2022 05:13 PM	ASCCAO Approval

SYLLABUS
STAT 6610

APPLIED NONPARAMETRIC STATISTICS

Autumn 2022 (full term)
3 credit hours
Online

COURSE OVERVIEW

Instructor

Asuman Turkmen

Email address: turkmen@osu.edu

Phone number: (740) 366-9138

Office hours: Monday and Wednesday between 11:30 am to 12:30 pm, or by appointment. Office hours will be held on CarmenZoom.

Teaching Assistant

TBA

Prerequisites

STAT 5301, STAT 6201, or STAT 6302, or equivalent, or permission of instructor.

Course description

This course serves as an introduction to applied nonparametric statistics. The area of nonparametric statistics is vast, and the term "nonparametric" is used in many ways. The focus of this course will be on the use of rank-based procedures; these are non-parametric in the sense that they are distribution free and valid under weaker assumptions when compared to parametric procedures. Although this is an applied course, there will be some theory to help understand the core concepts behind rank-based procedures. Most of computations will be carried out using hand to illustrate the inner workings of the procedures. There will also be a computing component that will be done using the open-source statistical software R.

Course learning outcomes

By the end of this course, students should successfully be able to:

- Understand difference between nonparametric and parametric statistical procedures when nonparametric techniques are needed and useful.
- Grasp foundational concepts of statistical tests based on ranks, their associated confidence intervals, and point estimates.
- Identify appropriate statistical methods for a particular inference.
- Realize the importance of checking assumptions of the underlying probability models under which inferences are valid.
- Understand the concepts of asymptotic relative efficiency and large sample approximation.

HOW THIS ONLINE COURSE WORKS

Mode of delivery: The course will be delivered synchronously via CarmenZoom. The recorded videos of the synchronous classes, blank and annotated lecture notes will be available on Carmen. Bi-weekly homework assignments will be posted on the Carmen. Students will be given ample time to complete the assignments. **The instructor will hold weekly office hours via Zoom**. The dates and times are given on the first page. The instructor will also initiate and manage active discussion boards, also via Carmen.

Pace of online activities: This course is divided into **weekly modules** that are released beginning of each week. Students are expected to keep pace with live classes and weekly deadlines but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

Attendance and participation requirements: Students are expected to attend synchronous classes. The following is a summary of students' expected participation:

- **Participating in online activities for attendance**: **AT LEAST ONCE PER WEEK**
  You are expected to log in to the course in Carmen every week. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible.*
- **Office hours**: **OPTIONAL**
- **Participating in discussion forums**: **2+ TIMES PER WEEK**
  As part of your participation, each week you can expect to post at least twice as part of our substantive class discussion on the week's topics.

COURSE MATERIALS AND TECHNOLOGIES

Textbook

Hollander, M., Wolfe, D. A., & Chicken, E., Nonparametric Statistical Methods, Third Edition (2014), Wiley.

The electronic version of the textbook can be accessed via library.

Course technology

Technology support

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the Ohio State IT Service Desk. Standard support hours are available at ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** ocio.osu.edu/help
- **Phone:** 614-688-4357(HELP)
- **Email:** servicedesk@osu.edu
- **TDD:** 614-688-8743

Technology skills needed for this course

- Basic computer and web-browsing skills
- Navigating Carmen (go.osu.edu/canvasstudent)
- CarmenZoom virtual meetings (go.osu.edu/zoom-meetings)
- Recording a slide presentation with audio narration (go.osu.edu/video-assignment-guide)
- Recording, editing, and uploading video (go.osu.edu/video-assignment-guide)

Required equipment

- Computer: current Mac (MacOs) or PC (Windows 10) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone
- Other: a mobile device (smartphone or tablet) to use for BuckeyePass authentication

Required software

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Full instructions for downloading and installation can be found at go.osu.edu/office365help.
- This class requires you to use the statistical software package called R (The R Project for Statistical Computing; http://www.r-project.org/). This software package is available as a free software.

Carmen access

You will need to use BuckeyePass (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions (go.osu.edu/add-device).
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application (go.osu.edu/install-duo) to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357(HELP) and IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

Homework: There will be bi-weekly homework assignments which will be posted on Carmen based on the lectures covered during the week. Students are expected to return their homework as a pdf file via Carmen on or before the deadline. Late homework submissions will not be accepted. Each student must produce his/her own homework to be returned in.

Exams: The midterm and final will be delivered remotely via Carmen. All exams are closed book/closed notes. The final exam will take place at the time and date established by the University. Information regarding the exams will be posted well in advance through the course website. A basic calculator is allowed. You will be permitted to have one standard sized sheet of written notes to the midterm exam and the final. There will be no make-up exams.

Project: A project, either based on a research paper on a nonparametric statistical methodology or based on a real-data application related to your major, will be completed by each student. The topic selected by the student must be approved in advance by the instructor by the 6^{th} week of classes. Students need to

submit a short (up to 8 page) paper and deliver a presentation in the later part of the course. A more detailed rubric will be provided on the Carmen site.

The course grade will be based on the following weighting of assessment components: 30% of total homework assignment grades, 25% of midterm, 25% of final, and 20% of project each of which is over 100 points.

ASSIGNMENT CATEGORY	POINTS
Homework	**30**
Midterm	**25**
Final	**25**
Project	**20**
Total	**100**

See course schedule below for due dates.

Descriptions of major course assignments

- **Exams**: You must complete the midterm and final exams yourself, without any external help or communication. Biweekly homework is also expected to be completed on your own.
- **Written assignments**: Your written assignments, including discussion posts, project should be your own original work. In formal assignments, you should follow **[MLA/APA/Chicago etc.]** style to cite the ideas and words of your research sources.
- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on an exam or homework assignment is not permitted. If you're unsure about a particular situation, please ask ahead of time.

Late assignments

Late submissions will not be accepted. Please refer to Carmen for due dates.

Grading scale

The course grade will be assigned based on the following grading scale:

93-100: A
90-92: A-
87-89: B+
83-86: B
80-82: B-
77-79: C+
73-76: C
70-72: C-
67-69: D+
60-66: D
below 60: E

Instructor feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-4357(HELP)** at any time if you have a technical problem.)

- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days**.
- **Email:** I will reply to emails within **24 hours on days when class is in session at the university**. **(i.e.,** Monday – Friday, excluding university holidays; list of holidays at **http://registrar.osu.edu/staff/bigcal.asp**
- **Discussion board:** I will check and reply to messages in the discussion boards every **24 hours on school days**.

OTHER COURSE POLICIES

Discussion and communication guidelines

A significant component of our interactions in this class will occur through Zoom videoconferencing. Because this mode of discussion has benefits and challenges that differ from in-person class sessions, I want to share my expectations for how we will meet and communicate:

- **Technical Issues**: If you encounter a technical issue with Zoom during a session, first make sure you are using the latest version of Zoom. Next, contact the IT Service Desk at go.osu.edu/it or 614-688-4357(HELP). If issues continue, contact me after the session to learn how to make up for the missed content either via a recording or other means. I will not be able to address technical issues during a live session.

- **Preparation:** Come to the session having completed any readings or pre-work and be ready to have open, civil, and supportive discussions in video and chat spaces. I ask that you update your

Zoom profile with your preferred name, pronouns and add a picture with your face.

- **Participation:** At the start of our sessions, I will share specific expectations for how to use the chat, how to interact, and how to raise questions or concerns as we go. If you are unsure about expectations or are unsure about raising a question, please follow up with me afterward to make sure your questions are answered. Plan to be present during the entire class session as much as you are able. For some activities, I may ask you to share your faces on camera so that we can see each other and connect. Please feel encouraged to use a non-distracting virtual background. Many students and instructors prefer not to share their remote spaces for a variety of reasons. Mute your microphone when others are talking to minimize background noise in the meeting.

  If you have any concerns about participating in class over Zoom in this way, please let me know. My goal is to create a safe environment where we can benefit from seeing each other and connecting, but I want to prioritize your safety and well-being.

  Please remember to be respectful and thoughtful, and to maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.

- **Recordings:** This course uses video and audio recordings of class lectures, student presentations, and related materials. These recordings are available to all students presently enrolled in the course. Please note that you are not allowed to share these recordings. This is to protect your FERPA rights and those of your fellow students.

Academic integrity policy

See **Descriptions of major course assignments**, above, for my specific guidelines about collaboration and academic integrity in the context of this online class.

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct **http://studentlife.osu.edu/csc/**.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.
If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.
Other sources of information on academic misconduct (integrity) to which you can refer include:

- Committee on Academic Misconduct web page (go.osu.edu/coam)
- Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)

Student Services and Advising

University Student Services can be accessed through BuckeyeLink. More information is available here: **https://contactbuckeyelink.osu.edu/**

Current students in the MAS, MS and PhD in Statistics should consult the department's program guide for details on the requirements. Questions should be directed to the student's advisor, the Graduate Studies Chair, Dr. Xinyi Xu (**xu.214@osu.edu**).

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on Title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at **http://titleix.osu.edu** or by contacting the Ohio State Title IX Coordinator at **titleix@osu.edu**.

Commitment to a diverse and inclusive learning environment

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Land Acknowledgement

We would like to acknowledge the land that The Ohio State University occupies is the ancestral and contemporary territory of the Shawnee, Potawatomi, Delaware, Miami, Peoria, Seneca, Wyandotte, Ojibwe and Cherokee peoples. Specifically, the university resides on land ceded in the 1795 Treaty of Greeneville and the forced removal of tribes through the Indian Removal Act of 1830. I/We want to honor the resiliency of these tribal nations and recognize the historical contexts that has and continues to affect the Indigenous peoples of this land.

More information on OSU's land acknowledgement can be found here: **https://mcc.osu.edu/about-us/land-acknowledgement**

Your mental health

As a student you may experience a range of issues that can cause barriers to learn, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, on-demand resources are available at **go.osu.edu/ccsondemand**. You can reach an on-call counselor when CCS is closed at 614- 292-5766, and 24-hour emergency help is also available through the 24/7 National Prevention Hotline at 1-800-273-TALK or at **suicidepreventionlifeline.org**. The Ohio State Wellness app is also a great resource available at **go.osu.edu/wellnessapp**.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information: slds@osu.edu**; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This online course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Canvas accessibility (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- CarmenZoom accessibility (go.osu.edu/zoom-accessibility)
- Collaborative course tools

COURSE SCHEDULE

Refer to the Carmen course for up-to-date assignment due dates.

Week	Dates	Topics, Readings, Assignments, Deadlines
1	8/24 & 8/26	Review of Basic Concepts from Classical (Parametric) Statistics, and Comparison with the Nonparametric Approach (1.1 - 1.8)
2	8/29, 8/31, & 9/2	The Dichotomous Data Problem (2.1 - 2.3) **HW1 is due on 9/3**
3	9/7 and 9/9	Sign Test Procedures for the One-Sample Location Problem and for Paired Replicates Data; Asymptotic Relative Efficiency (3.4, 3.5, 3.6, 3.8, 3.11)
4	9/12, 9/14 & 9/16	Signed Rank Procedures for the One-Sample Location Problem and for Paired Replicates Data (3.1, 3.2, 3.3, 3.7, 3.11) **HW2 is due on 9/17**
5	9/19, 9/21, & 9/23	The Two-Sample Location Problem (4.1, 4.2, 4.3, 4.5)
6	9/26, 9/28, & 9/30	Two-Sample Test for General Differences (5.1, 5.2, 5.4) Project topic selection deadline (9/30) & **HW3 is due (10/1)**
7	10/3, 10/5, & 10/7	Midterm Review and **Midterm (10/7)**
8	10/10 & 10/13	The One-Way Layout; Multiple Comparisons Procedures (6.1, 6.2, 6.5, 6.7) & **HW4 is due on 9/17**
9	10/17, 10/19, & 10/21	The Two-Way Layout (7.1, 7.2, 7.3, 7.4)
10	10/24, 10/26, & 10/28	Kendall's Tau Procedures for the Independence Problem (8.1, 8.2) & **HW5 is due 10/28**

Week	Dates	Topics, Readings, Assignments, Deadlines
11	10/31, 11/2, & 11/4	An asymptotically distribution–free Confidence interval based on the Kendall Statistic, an asymptotically distribution-free confidence interval based on Efron's Bootstrap and ranks (8.3, 8.4, 8.5)
12	11/7, 11/9	A Distribution-Free Test for the Slope of the Regression Line (Theil) (9.1, 9.2, 9.3) & **HW5 is due 11/9**
13	11/14, 11/16, & 11/18	Asymptotically Distribution-Free Rank-Based Tests for General Multiple Linear Regression Nonparametric Regression Analysis & Efficiencies of Regression Procedure (9.4, 9.6, 9.8) & **Project submission is due (11/18) -presentation times will be communicated this week**
14	11/21	Project Presentations
15	1/28, 11/30, 12/2	Project Presentations & **HW6 is due 12/2**
16	12/5, 12/7	Final Review

*No class on 9/5 (Labor Day), 10/14 (Fall Break), 11/11 (Veterans Day), 11/23-11/25 (Thanksgiving Break); 12/5 is the last day of the classes. Final date is TBA.

Disclaimer

This syllabus should be taken as a reliable guide for the course content. However, you cannot claim any rights from it, and I reserve the right to change due dates or the methods of assessment. Official announcements will always be those made in lectures.

SYLLABUS
STAT 6610

APPLIED NONPARAMETRIC STATISTICS

Autumn 2022 (full term)
3 credit hours
In person

COURSE OVERVIEW

Instructor

Asuman Turkmen

Email address: turkmen@osu.edu

Phone number: (740) 366-9138

Office hours: Monday and Wednesday between 11:30 am to 12:30 pm, or by appointment.

Teaching Assistant

TBA

Prerequisites

STAT 5301, STAT 6201, or STAT 6302, or equivalent, or permission of instructor.

Course description

This course serves as an introduction to applied nonparametric statistics. The area of nonparametric statistics is vast, and the term "nonparametric" is used in many ways. The focus of this course will be on the use of rank-based procedures; these are non-parametric in the sense that they are distribution free and valid under weaker assumptions when compared to parametric procedures. Although this is an applied course, there will be some theory to help understand the core concepts behind rank-based procedures. Most of computations will be carried out using hand to illustrate the inner workings of the procedures. There will also be a computing component that will be done using the open-source statistical software R.

Course learning outcomes

By the end of this course, students should successfully be able to:

- Understand difference between nonparametric and parametric statistical procedures when nonparametric techniques are needed and useful.
- Grasp foundational concepts of statistical tests based on ranks, their associated confidence intervals, and point estimates.
- Identify appropriate statistical methods for a particular inference.
- Realize the importance of checking assumptions of the underlying probability models under which inferences are valid.
- Understand the concepts of asymptotic relative efficiency and large sample approximation.

HOW THIS COURSE WORKS

Mode of delivery: The course will be delivered synchronously in person. Bi-weekly homework assignments will be posted on the Carmen. Students will be given ample time to complete the assignments. **The instructor will hold weekly office hours**. The dates and times are given on the first page. The instructor will also initiate and manage active discussion boards, also via Carmen.

Pace of activities: This course is divided into **weekly modules** that are released beginning of each week. Students are expected to keep pace with live lectures and weekly deadlines but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a **3-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average.

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Course technology

Technology support

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How your grade is calculated

Homework: There will be bi-weekly homework assignments which will be posted on Carmen based on the lectures covered during the week. Students are expected to return their homework on or before the deadline. Late homework submissions will not be accepted. Each student must produce his/her own homework to be returned in.

Exams: The midterm and final will be delivered in class. All exams are closed book/closed notes. The final exam will take place at the time and date established by the University. Information regarding the exams will be posted well in advance through the course website. A basic calculator is allowed. You will be permitted to have one standard sized sheet of written notes to the midterm exam and the final. There will be no make-up exams.

Project: A project, either based on a research paper on a nonparametric statistical methodology or based on a real-data application related to your major, will be completed by each student. The topic selected by the student must be approved in advance by the instructor by the 6^{th} week of classes. Students need to submit a short (up to 8 page) paper and deliver a presentation in the later part of the course. A more detailed rubric will be provided on the Carmen site.

The course grade will be based on the following weighting of assessment components: 30% of total homework assignment grades, 25% of midterm, 25% of final, and 20% of project each of which is over 100 points.

ASSIGNMENT CATEGORY	POINTS
Homework	**30**
Midterm	**25**
Final	**25**
Project	**20**
Total	**100**

See course schedule below for due dates.

Descriptions of major course assignments

- **Exams**: You must complete the midterm and final exams yourself, without any external help or communication. Biweekly homework is also expected to be completed on your own.
- **Written assignments**: Your written assignments, including discussion posts, project should be your own original work. In formal assignments, you should follow **[MLA/APA/Chicago etc.]** style to cite the ideas and words of your research sources.
- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on an exam or homework assignment is not permitted. If you're unsure about a particular situation, please ask ahead of time.

Late assignments

Late submissions will not be accepted. Please refer to Carmen for due dates.

Grading scale

The course grade will be assigned based on the following grading scale:

93-100: A
90-92: A-
87-89: B+
83-86: B
80-82: B-
77-79: C+

73-76: C
70-72: C-
67-69: D+
60-66: D
below 60: E

Instructor feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-4357(HELP)** at any time if you have a technical problem.)

- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days**.
- **Email:** I will reply to emails within **24 hours on days when class is in session at the university**. **(i.e.,** Monday – Friday, excluding university holidays; list of holidays at **http://registrar.osu.edu/staff/bigcal.asp**
- **Discussion board:** I will check and reply to messages in the discussion boards every **24 hours on school days**.

OTHER COURSE POLICIES

Academic integrity policy

See **Descriptions of major course assignments**, above, for my specific guidelines about collaboration and academic integrity in the context of this class.

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct **http://studentlife.osu.edu/csc/**.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.
If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.
Other sources of information on academic misconduct (integrity) to which you can refer include:

- Committee on Academic Misconduct web page (go.osu.edu/coam)
- Ten Suggestions for Preserving Academic Integrity (go.osu.edu/ten-suggestions)

Student Services and Advising

University Student Services can be accessed through BuckeyeLink. More information is available here: **https://contactbuckeyelink.osu.edu/**

Current students in the MAS, MS and PhD in Statistics should consult the department's program guide for details on the requirements. Questions should be directed to the student's advisor, the Graduate Studies Chair, Dr. Xinyi Xu (**xu.214@osu.edu**).

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on Title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at **http://titleix.osu.edu** or by contacting the Ohio State Title IX Coordinator at **titleix@osu.edu**.

Commitment to a diverse and inclusive learning environment

The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Land Acknowledgement

We would like to acknowledge the land that The Ohio State University occupies is the ancestral and contemporary territory of the Shawnee, Potawatomi, Delaware, Miami, Peoria, Seneca, Wyandotte, Ojibwe and Cherokee peoples. Specifically, the university resides on land ceded in the 1795 Treaty of Greeneville and the forced removal of tribes through the Indian Removal Act of 1830. I/We want to honor the resiliency of these tribal nations and recognize the historical contexts that has and continues to affect the Indigenous peoples of this land.

More information on OSU's land acknowledgement can be found here: **https://mcc.osu.edu/about-us/land-acknowledgement**

Your mental health

As a student you may experience a range of issues that can cause barriers to learn, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. No matter where you are engaged in distance learning, The Ohio State University's Student Life Counseling and Consultation Service (CCS) is here to support you. If you find yourself feeling isolated, anxious or overwhelmed, on-demand resources are available at **go.osu.edu/ccsondemand**. You can reach an on-call counselor when CCS is closed at 614- 292-5766, and 24-hour emergency help is also available through the 24/7 National Prevention Hotline at 1-800-273-TALK or at **suicidepreventionlifeline.org**. The Ohio State Wellness app is also a great resource available at **go.osu.edu/wellnessapp**.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information: slds@osu.edu**; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue.

Accessibility of course technology

This course requires use of CarmenCanvas (Ohio State's learning management system). If you need additional services to use these technologies, please request accommodations with your instructor.

- Canvas accessibility (go.osu.edu/canvas-accessibility)
- Collaborative course tools

COURSE SCHEDULE

Refer to the Carmen course for up-to-date assignment due dates.

Week	Dates	Topics, Readings, Assignments, Deadlines
1	8/24 & 8/26	Review of Basic Concepts from Classical (Parametric) Statistics, and Comparison with the Nonparametric Approach (1.1 - 1.8)
2	8/29, 8/31, & 9/2	The Dichotomous Data Problem (2.1 - 2.3) **HW1 is due on 9/3**
3	9/7 and 9/9	Sign Test Procedures for the One-Sample Location Problem and for Paired Replicates Data; Asymptotic Relative Efficiency (3.4, 3.5, 3.6, 3.8, 3.11)
4	9/12, 9/14 & 9/16	Signed Rank Procedures for the One-Sample Location Problem and for Paired Replicates Data (3.1, 3.2, 3.3, 3.7, 3.11) **HW2 is due on 9/17**
5	9/19, 9/21, & 9/23	The Two-Sample Location Problem (4.1, 4.2, 4.3, 4.5)
6	9/26, 9/28, & 9/30	Two-Sample Test for General Differences (5.1, 5.2, 5.4) Project topic selection deadline (9/30) & **HW3 is due (10/1)**
7	10/3, 10/5, & 10/7	Midterm Review and **Midterm (10/7)**
8	10/10 & 10/13	The One-Way Layout; Multiple Comparisons Procedures (6.1, 6.2, 6.5, 6.7) & **HW4 is due on 9/17**
9	10/17, 10/19, & 10/21	The Two-Way Layout (7.1, 7.2, 7.3, 7.4)
10	10/24, 10/26, & 10/28	Kendall's Tau Procedures for the Independence Problem (8.1, 8.2) & **HW5 is due 10/28**
11	10/31, 11/2, & 11/4	An asymptotically distribution–free Confidence interval based on the Kendall Statistic, an asymptotically distribution-free confidence interval based on Efron's Bootstrap and ranks (8.3, 8.4, 8.5)

Week	Dates	Topics, Readings, Assignments, Deadlines
12	11/7, 11/9	A Distribution-Free Test for the Slope of the Regression Line (Theil) (9.1, 9.2, 9.3) & **HW5 is due 11/9**
13	11/14, 11/16, & 11/18	Asymptotically Distribution-Free Rank-Based Tests for General Multiple Linear Regression Nonparametric Regression Analysis & Efficiencies of Regression Procedure (9.4, 9.6, 9.8) & **Project submission is due (11/18) -presentation times will be communicated this week**
14	11/21	Project Presentations
15	1/28, 11/30, 12/2	Project Presentations & **HW6 is due 12/2**
16	12/5, 12/7	Final Review

*No class on 9/5 (Labor Day), 10/14 (Fall Break), 11/11 (Veterans Day), 11/23-11/25 (Thanksgiving Break); 12/5 is the last day of the classes. Final date is TBA.

Disclaimer

This syllabus should be taken as a reliable guide for the course content. However, you cannot claim any rights from it, and I reserve the right to change due dates or the methods of assessment. Official announcements will always be those made in lectures.

Distance Approval Cover Sheet

For Permanent DL/DH Approval | College of Arts and Sciences

Course Number and Title: STAT 6610: Applied Nonparametric Statistics

Carmen Use

When building your course, we recommend using the ASC Distance Learning Course Template for CarmenCanvas. For more on use of Carmen: Common Sense Best Practices.

☑ A Carmen site will be created for the course, including a syllabus and gradebook at minimum.

If no, why not?

Syllabus

☑ Proposed syllabus uses the ASC distance learning syllabus template, includes boilerplate language where required, as well as a clear description of the technical and academic support services offered, and how learners can obtain them.

☑ Syllabus is consistent and is easy to understand from the student perspective.

☑ Syllabus includes a schedule with dates and/or a description of what constitutes the beginning an end of a week or module.

☑ If there are required synchronous sessions, the syllabus clearly states when they will happen and how to access them.

Additional comments (optional):

This 3 credit hour-class is taught sychronously three-times (55 minutes) a week during the semester. All synchronous sessions are recorded and made available to students on the Carmen site.

Instructor Presence

For more on instructor presence: About Online Instructor Presence.

Students should have opportunities for regular and substantive academic interactions with the course instructor. Some ways to achieve this objective:

☑ Regular instructor communications with the class via announcements or weekly check-ins.

☑ Instructional content, such as video, audio, or interactive lessons, that is visibly created or mediated by the instructor.

☑ Regular participation in class discussion, such as in Carmen discussions or synchronous sessions.

☑ Regular opportunities for students to receive personal instructor feedback on assignments.

Please comment on this dimension of the proposed course (or select/explain methods above):

Students receive an email from the instructor in the beginning of each week about topics to be covered during the week and assignments to complete with deadlines. In addition to live classes, students have access to the instructor during the online office hours, discussion board or email. The assignments and exams will be graded using speed grader in Carmen Teaching Application with provided feedback.

Delivery Well-Suited to DL/DH Environment

Technology questions adapted from the Quality Matters rubric. For information about Ohio State learning technologies: Toolsets.

☑ The tools used in the course support the learning outcomes and competencies.

☑ Course tools promote learner engagement and active learning.

☑ Technologies required in the course are current and readily obtainable.

☑ Links are provided to privacy policies for all external tools required in the course.

Additional technology comments (optional):

Course requires the statistical software package R that is freely available.

Which components of this course are planned for synchronous delivery and which for asynchronous delivery? (For DH, address what is planned for in-person meetings as well.)

All lectures are delivered synchronously during the semester.

If you believe further explanation would be helpful, please comment on how course activities have been adjusted for distance learning (optional):

Workload Estimation

For more information about calculating online instruction time: ODEE Credit Hour Estimation.

☑ Course credit hours align with estimated average weekly time to complete the course successfully.

☑ Course includes direct (equivalent of "in-class") and indirect (equivalent of "out-of-class)" instruction at a ratio of about 1:2.

Provide a brief outline of a typical course week, categorizing course activities and estimating the approximate time to complete them or participate:

Homework is assigned every other week covering data analysis applications for the nonparametric statistical methods introduced in live classes.

☑ In the case of course delivery change requests, the course demonstrates comparable rigor in meeting course learning outcomes.

Accessibility

For more information or a further conversation, contact the accessibility coordinator for the College of Arts and Sciences. For tools and training on accessibility: Digital Accessibility Services.

☑ Instructor(s) teaching the course will have taken Digital Accessibility training (starting in 2022) and will ensure all course materials and activities meet requirements for diverse learners, including alternate means of accessing course materials when appropriate.

☑ Information is provided about the accessibility of all technologies required in the course. All third-party tools (tools without campus-wide license agreements) have their accessibility statements included.

Description of any anticipated accommodation requests and how they have been/will be addressed.

Additional comments (optional):

Academic Integrity

For more information: Academic Integrity.

☑ The course syllabus includes online-specific policies about academic integrity, including specific parameters for each major assignment:

☑ Assignments are designed to deter cheating and plagiarism and/or course technologies such as online proctoring or plagiarism check or other strategies are in place to deter cheating.

Additional comments (optional):

Frequent, Varied Assignments/Assessments

For more information: *Designing Assessments for Students*.

Student success in online courses is maximized when there are frequent, varied learning activities. Possible approaches:

☑ Opportunities for students to receive course information through a variety of different sources, including indirect sources, such as textbooks and lectures, and direct sources, such as scholarly resources and field observation.

☑ Variety of assignment formats to provide students with multiple means of demonstrating learning.

☑ Opportunities for students to apply course knowledge and skills to authentic, real-world tasks in assignments.

Comment briefly on the frequency and variety of assignment types and assessment approaches used in this course (or select methods above):

Assignments cover both applied and theoratical aspects of the nonparametric statistical methods. Students have also a project assignment by which they can independently study on a topic of interest in the nonparametric setting.

Community Building

For more information: Student Interaction Online.

Students engage more fully in courses when they have an opportunity to interact with their peers and feel they are part of a community of learners. Possible approaches:

- [x] Opportunities for students to interact academically with classmates through regular class discussion or group assignments.
- [x] Opportunities for students to interact socially with classmates, such as through video conference sessions or a course Q&A forum.
- [x] Attention is paid to other ways to minimize transactional distance (psychological and communicative gaps between students and their peers, instructor, course content, and institution).

Please comment on this dimension of the proposed course (or select methods above):

Students have a chance to ask questions to the instructor and answer questions posed by the instructor during live classes. Online discussion form is another platform that students can communicate with their classmates.

Transparency and Metacognitive Explanations

For more information: *Supporting Student Learning*.

Students have successful, meaningful experiences when they understand how the components of a course connect together, when they have guidance on how to study, and when they are encouraged to take ownership of their learning. Possible approaches:

- [x] Instructor explanations about the learning goals and overall design or organization of the course.
- [x] Context or rationale to explain the purpose and relevance of major tasks and assignments.

- [x] Guidance or resources for ancillary skills necessary to complete assignments, such as conducting library research or using technology tools.
- [x] Opportunities for students to take ownership or leadership in their learning, such as by choosing topics of interest for an assignment or leading a group discussion or meeting.
- [x] Opportunities for students to reflect on their learning process, including their goals, study strategies, and progress.
- [x] Opportunities for students to provide feedback on the course.

Please comment on this dimension of the proposed course (or select methods above):

Student feedback is collected via an anonymous online survey during the 5th week of the semester. Motivational real data examples coming from different diciplines, assignments, and solutions to exams provide details about relevance. In addition to synchronous classes, students need to learn from assignments and textbook reading.

Additional Considerations

Comment on any other aspects of the online delivery not addressed above (optional):

Syllabus and cover sheet reviewed by Jeremie Smith on 01/24/2022

Reviewer Comments:

Additional resources and examples can be found on ASC's Office of Distance Education website.