

New Course Proposal

Submit completed form electronically

1. **Course prefix and course number:** MTH 343
2. **Course title:** Applied Statistics
3. **Abbreviated title for class schedule** (30 characters or less): Applied Statistics
4. **Credit hours:** 4
(note: if credits are variable, list range of credits (e.g. 1-8 credits))
5. **Catalog description:** The objective of this course is to acquaint students with assortment of intermediate statistical methods for data analysis and modeling to explain real-world problems. Topics include: Data Types, Numerical and Graphical Explorations of Data, One Factor and Two Factor Analysis of Variance, Chi-square test of goodness of fit, Chi-square test of independence, Multiple Linear Regression Analysis and F tests, and nonparametric statistics.
6. **Prerequisites (to add each additional prerequisite, start a new line):**

A. (course prefix, (space) and number) MTH 243	or	or	or	or
B. (course prefix, (space) and number)	or	or	or	or
C. (course prefix, (space) and number)	or	or	or	or
7. **Co-requisites (including labs, if any):**

A. (course prefix, (space) and number)	or	or	or	or
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8. **Major/Class restrictions:** Please indicate any class or major restrictions:
9. **Is course repeatable?** Yes ☐ No ☒ If Yes, list maximum credits:
10. **Labs requirements:** If course includes a lab: # of hours lecture: ; # of hours lab:
11. **Fees:** List any course fees:
12. **Grade Mode:** (Option)
13. **Course Type:** (Hard Numbered Course)

14. Banner Schedule Type: (L - Lecture/Seminar/Workshop - Attached to all courses where instruction is delivered or guided by faculty member, including in a classroom. May include a variety of formats, such as traditional lecture, seminar, or workshop.)

15. CIP Code: Six-digit CIP code (check with your Division Director): 270501

16. Special qualifications; Is course proposed for (yes/no):

A. University Studies? Yes ☒ No ☐ If yes, list Strand(s)

B. Honors? Yes ☐ No ☒

15. Cross-listing: List any cross-listing (and please complete the Cross-list proposal form at <https://inside.sou.edu/provost/curriculum.html>): and and and and

16. Strategic justification for proposed course:

A. **Rationale:** What is the overall strategic rationale for offering this course?

Statistics, an important branch of mathematics, is a language of science dealing with mathematical model and data. The applicability of statistical science keeps increasing without bounds. For example, facial and voice recognition systems are getting smarter by way of the machine learning statistical algorithms by training data. At the Southern Oregon University, the mathematics department has offered two upper division calculus-based statistics courses each year to those calculus-trained students. Because of this calculus (I and II) requirements, the courses have been limited to typically science majors such as mathematics, computer science, financial mathematics, biology, and chemistry. However, there has been a growing interest and demand for an upper division statistics course who completed MTH 243 but do not have calculus backgrounds. The proposed course does not require calculus and is expected to serve a broader range of students who would like to expand their statistics background above MTH 243. The proposed course is in line with the new Gen Ed model offering an optional upper division numerical literacy capacity.

B. **Alignment:**

1. How does this course align with the unit's mission plan?

The Mathematics Department is committed to providing excellent mathematical learning opportunities for students who would like to acquire essential language of science and research methods. The proposed course is well aligned with the mathematics department's mission.

2. How does the course fit into the rest of the unit's curriculum?

The proposed course will fit into the mathematics department's curriculum ideally because the department has wished to offer more applied mathematics courses to its upper division curriculum.

C. **Enrollment:** What is the new course's estimated enrollment each time it is offered over a three-year period? Year 1: 20; Year 2: 20-30; Year 3: 20-40

D. **Resource evaluation:** What resources – faculty, equipment, lab space, etc. -- will be needed to offer this course and how will those resources be obtained?

1. *Faculty:*

a. Who will teach the course? Dr. Daniel Kim and/or Mr. Larry Shrewsbury

b. Evaluate unit's faculty availability and/or needs and the impact on other teaching obligations. The two faculty members (Kim and Shrewsbury) are specialized in teaching statistics. There will be no significant impact on other teaching obligations.

c. If additional faculty members are needed, how will that need be met? With the recent downfall in enrollments at SOU, no additional faculty work force is expected.

2. *Facilities:* Cite any additional need for classrooms, equipment or lab space; explain how that need(s) will be met. There are no additional needs besides a regular classroom.

3. *Other:*

a. Are Hannon Library resources sufficient to meet the needs of this course?

Yes.

b. Are any other resources needed to support this course? No.
If so, please explain how they will be obtained.

E. **External impact:**

1. What is the expected effect of this course on existing programs elsewhere in the university? This course will not cause any issues or negative effects on other programs in the university.

NOTE: Please document your contact with other academic programs which may be affected by this new course and the response you received.

2. Will any of your prerequisites affect other academic programs? No.

NOTE: Please document your contact with other academic programs which may be affected by this new course and the response you received.

17. Syllabus (condensed)

*(Attach an accompanying, condensed syllabus, which should include the following items. Schedules and similar details are **not** required.)*

- A. Course description (same as Catalog description, above)
- B. Learning objectives of the course
- C. Required texts
- D. Course format
- E. Other – any other relevant materials needed to explain the goals and teaching methods of this course.

Approvals:

Signature of Division Director

Date



MATH 343

Applied Statistical Methods

Course Syllabus

Fall 2023

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Office: Central 236
Office Hours:
MWRF 11:30-12:15, T 12:30-1:15

I. Course Title

MATH 343, Applied Statistical Methods

II. Course Description

The objective of this course is to acquaint students with assortment of intermediate statistical methods for data analysis and modeling to explain real-world problems. Topics include: Data Types, Numerical and Graphical Explorations of Data, One Factor and Two Factor Analysis of Variance, Chi-square test of goodness of fit, Chi-square test of independence, Multiple Linear Regression Analysis and F tests, and Nonparametric Statistics. Prerequisite: MTH 243.

III. Purposeful Learning

This course aims at enabling students to have deeper statistical learning experiences beyond MTH 243 (Introduction to Statistical Methods). Proper interpretations of the data in our nature and society help us make informed decisions to sustain our world and build a better future. The complexity of the data types and analysis methods usually exceeds the contents introduced in MTH 243 curriculum. The purpose of this course is to provide students with opportunities to build greater statistical capacities on top of MTH 243. Computer software will be used as a main technology so that students have hands-on and practical data analysis experiences of big data.

IV. Developing Your Capacity for Numerical Capacity

A student's capacity for Numerical Literacy prepares them to reason well and solve quantitative problems situated within a variety of disciplinary and interdisciplinary contexts. Students learn to ask quantitative questions about their world, identify appropriate methods to interpret data, and clearly communicate their results in a variety of formats.

Students who have developed their capacity for Numerical Literacy will:

1. Evaluate data.
2. Apply mathematical operations accurately.
3. Express numerical data or quantitative information effectively.
4. Draw valid conclusions based on quantitative data and mathematical procedures.

V. Course Objectives

Learning Objectives (Capacity Objective #)	Means of Assessment
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A. Students will be able to use appropriate software tools to produce a variety of descriptive measures and graphic visualizations of both small and big data. (Capacity Objective #1,2,3)	In-class exercises, homework exercises, quizzes, midterm exam, and final exam.
B. Students will be able to summarize the information of multivariable-categorical data and draw valid conclusions about the variables. (Capacity Objective #1,2,3, 4)	In-class exercises, homework exercises, quizzes, midterm exam, and final exam.
C. Students will be able to summarize the information of quantitative data and draw valid conclusions in the context of the Analysis of Variance. (Capacity Objective #1,2,3, 4)	In-class exercises, homework exercises, quizzes, midterm exam, and final exam.
D. Students will be able to establish validated regression models on multiple number of variables. (Capacity Objective #1,2,3, 4)	In-class exercises, homework exercises, quizzes, midterm exam, and final exam.
E. Students will be able to conduct nonparametric statistical methods (Capacity Objective #1,2,3, 4)	In-class exercises, homework exercises, quizzes, midterm exam, and final exam.

VI. Meet Your Professor

My name is Daniel Kim, a professor of Mathematics at Southern Oregon University. I have taught mathematics and statistics at SOU since 1999. I have received a master's degree in Mathematics from Indiana University and a Ph.D. degree specialized in Statistics from University of Oregon. My research activities include building statistical test algorithms and analyzing their efficiencies, Bayesian Statistics and machine learning theories, data science and computational statistics, and signal processing.

VII. Materials

- Textbook: OpenIntro Statistics, 4th edition, Diez, Rundel, & Barr (2020). This open-source textbook is freely available at <https://leanpub.com/os>.
- Course Packet: This will be supplemented through our course Moodle site.

VIII. Technology Requirements

Computer/Technology

- Minitab/Excel/R

Required Technical Skills

In this course, you will need to be able to:

- Navigate in Moodle and participate in Moodle activities.
- Email your instructor and attach files to messages.
- Verify that your browser is the most current version and your privacy settings are correct. Be sure to check that popups and cookies are allowed from moodle.sou.edu.
- Create files using MS Word, MS Excel, MS PowerPoint, and upload these files to your assignment submissions. (Learn about [downloading Office 365](#) if you do not have Microsoft Office on your computer.)
- Save files in PDF format and manage your files.
- Research information in the Library or use the Library databases and include citations in [APA format](#) in your work to avoid plagiarism.
- Copy and paste (Ctrl + C for copying and Ctrl + V for pasting on a PC, Command + C for copying and Command + V for pasting on a Mac) into a file or textbox.
- Download and install software and applications.

Moodle Learning Management System

This course will be supported by [Moodle](#), SOU's online learning platform. You'll find helpful articles on our [Moodle How-to's](#) page, but if you have any trouble working in Moodle, submit a ticket at <https://support.sou.edu> and select Moodle from the *Department* pull-down menu, or call the Help Desk at (541) 552-6900 for assistance. Moodle.org provides this information about [Moodle's accessibility standards](#).

IX. Course Outline and Expectations

Course Outline

This course introduces some fundamental concepts and practical skills of contemporary data analysis. Topics include the descriptive and inferential statistics, probability distributions, and regression analysis. The details are the following:

- Chapter 1: Introduction to Technology
- Chapter 2: Exploratory Data Analysis
- Chapter 3: One-Factor Analysis of Variance
- Chapter 4: Two-Factor Analysis of Variance
- Chapter 5: Chi-Square Goodness of Fit Test and Test of Independence
- Chapter 6: Multiple Linear Regression Analysis
- Chapter 7: Nonparametric Statistics
- Chapter 8: Special Topic – if time permits.

Attendance and Participation

Active class attendance and participation are very important and essential for successful

learning experiences. There will be lots of class activities towards problem solving and data analysis numerically and graphically. Attendance is mandatory and will account for 5 percent of your term grade.

Late/Missing Work

In case you miss an assignment deadline, you will have another 24 hours to submit with 20% penalty. After this extended period is expired, there will be no more submission opportunities. However, if your missing work is associated with urgent matters, communicate with me over email ASAP, and we will go from there.

Writing Standards

You are expected to use Standard English grammar and conventions (punctuation, capitalization, spelling, etc.) in all your writing. All citations of work created by other individuals should be made in APA format.

Course Communication Policy

Please contact me through email. For general questions about course activities and resources, use the “Course Q & A” forum, found at the top of your course page. For questions regarding late assignments, grades or other personal matters, email me through Moodle’s Quickmail or SOU email. You may expect a response to any inquiries by the end of the following business day. You may expect feedback on routine course assignments within 72 hours and major projects within one week. Office hours by phone or Zoom are by appointment at our mutual convenience.

Course Communication Guidelines (Netiquette)

Netiquette is a set of rules for behaving well online. Much of our communication in this course will take place in forums and through email. Here are some guidelines for online communication in this course:

- Be sensitive to different cultural and linguistic backgrounds, as well as different political and religious beliefs.
- Use good judgment when composing your responses. Swearing and profanity should be avoided. Also consider that slang terms can be misunderstood or misinterpreted.
- Don’t use all capital letters when composing your responses. This is considered “shouting” on the Internet and is regarded as impolite or aggressive. It can also be stressful on the eye when trying to read your message.
- Be respectful of others’ views and opinions. Avoid publicly attacking or insulting others.
- Be careful when using acronyms. If you use an acronym, it is best to spell out its meaning first, then put the acronym in parentheses afterward, for example: Frequently Asked Questions (FAQs). After that you can use the acronym freely

throughout your message. Be aware that terms that are familiar in your workplace may be incomprehensible jargon to others.

- Use good grammar and spelling, and avoid using text messaging shortcuts.
- In emails, always identify yourself and what class and section you are in. It is a good practice to put your course and section in the subject line. This helps the recipient identify course-related emails.

Other Academic Policies

The institutional statements posted in Moodle are considered a formal component of this syllabus. Be sure to review the statements regarding academic integrity and the Student Code of Conduct.

X. Grading and Evaluation

Assessments	Percent
7 Homework Assignments and Class Activities	35%
Midterm Exam	30%
Final Exam	30%
Attendance and Participation	5%

Grading: In determining the final course grade, the following scale is used:

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

Assignments

There will be nigh assignments. So, expect one assignment each week. The details of these assignments are written in the course packet and available at our course Moodle site. While you are encouraged to share your ideas and answers with your other classmates, you will have to write your own solutions and provide works. Evidence of plagiarism will result in a score of zero for the assignment and referral to Student Support and Intervention.

Exams

There will be one midterm and a final exam. The midterm exam will test on chapters of 1 through 3, and the final exam will test on chapters of 4 through 7.

Signature Assignment/Final Project

There will be at least two comprehensive computer lab activities and their associated

assignments. The detail of this activity and assignment will be provided in the form of a worksheet through our course Moodle site. The learning objective of this activity and assignment are the following:

- Establish a research objective
- Identify a resource providing a real data on Internet – potentially a big data.
- Import the data into the software and clean the data.
- Identify the definitions of the variables of the data.
- Narrow down what aspect of the data students would like to research on.
- Use a computer technology to extract the information in the data
- Present the information numerically and graphically.

Citation Standards

As described in the SOU [Student Code of Conduct](#), proper attribution of the thoughts and words of others is a hallmark of academic integrity. This course will require the use of [APA citation format](#) in all writing.

XI. Course Topics

Week	Topics
Week 1	Chapter 1: Introduction to Technology
Week 2	Chapter 2A: Exploratory Data Analysis
Week 3	Chapter 2B: Exploratory Data Analysis
Week 4	Chapter 3: One-Factor Analysis of Variance
Week 5	Review and Midterm Exam
Week 6	Chapter 4: Two-Factor Analysis of Variance
Week 7	Chapter 5: Chi-Square Goodness of Fit Test and Test of Independence
Week 8	Chapter 6: Multiple Linear Regression Analysis
Week 9	Chapter 7: Nonparametric Statistics
Week 10	Chapter 8: Special Topic/Computer Lab and Review

XII. Student Learning Experience Survey

At the conclusion of this course, you are encouraged to complete a survey about your learning experience in this course. Look for a link in your email.

XIII. Additional Course Information

Syllabus subject to change. While information and assurances are provided in this course syllabus, be aware that content may change in keeping with new research and literature, and

that events beyond my control could occur. You will be informed of any substantive events that result in changes to the syllabus.