

## Application for Capstone Designation for an Existing Course

Course Subject and Number \_\_\_\_\_

Course Name \_\_\_\_\_

Contact Person \_\_\_\_\_

Program(s)/Major(s) for which this course will serve as capstone if approved:

\_\_\_\_\_

List the course currently fulfilling this capstone requirement: \_\_\_\_\_

If this application is approved, the capstone designation will be removed from the previous course and added to this new capstone course, beginning with the next catalog.

### **Include the following information in your application:**

Explain how your course or courses will meet the learning outcomes:

- Habits of mind that foster integrative thinking between the liberal arts core curriculum and their major field of study.
- Achievement and demonstration through advanced research and/or creative projects the ability to frame questions, carry out critical analysis, and produce work of substantial complexity and quality related to their chosen field of study.
- Reflect and demonstrate their ability to think critically, globally, and missionally about their discipline.

Explain how your course or courses will meet the required assignments:

- Research assignment
- Faith and vocation assignment
- Comprehensive skills and accomplishments inventory

Attachments:

- Attach a course syllabus
- If necessary, attach additional explanatory material that might be helpful to faculty reviewing this course for capstone and writing intensive status, such as assignments or grading rubrics.

**Core Curriculum Implementation Team (CCIT) Recommendation  
for the Senior-Year Integrative Capstone  
Approved by UGEC 11.14.2012, UUAC 12.5.2012**

“In addition to other discipline-related course goals, the senior-year integrative capstone experience will challenge the student to critically analyze, reflect, and write about the major discipline from the perspective of Christian Worldview” (Liberal Arts Core Curriculum at ACU, p. 6.).

While it is understood that the senior-year integrative capstone will vary widely across the disciplines including a specific course or cluster of courses, it is important that there be some common elements across major fields of study. Each department will submit to the UGEC its plan for implementing the senior-year integrative capstone.

Students who complete their senior-year integrative capstone should have demonstrated the following student learning outcomes:

- ☐ Habits of mind that foster integrative thinking between the liberal arts core curriculum and their major field of study.
- ☐ Achievement and demonstration through advanced research and/or creative projects the ability to frame questions, carry out critical analysis, and produce work of substantial complexity and quality related to their chosen field of study.
- ☐ Reflect and demonstrate their ability to think critically, globally, and missionally about their discipline.

The student learning outcomes for the senior-year integrative capstone may be accomplished using a wide variety of assignments, projects, internships, research, performances, presentations, or other products; however, the following products are required of each senior-year integrative capstone and will contribute to the calculation of grades:

- A required paper with a minimum length of 2000 words (approximately 7 pages) and worth a minimum of 10% of the assessment for the course in which it is included. This paper provides an opportunity for a summative assessment of the student’s information literacy skills, including the proper citation of a minimum of 5 appropriate sources that support their research. Options to satisfy this prompt include, but are not limited to, a traditional research paper; an evaluative/reflective essay that accompanies a creative or scholarly work (such as a senior art show or recital), describing elements of the creative process; or a business plan that incorporates market research and analysis with the proposal of a specific entrepreneurial venture.
- An assignment that demonstrates the student’s ability to think critically about faith and vocation as it is expressed in a particular discipline met by a course or experience in the students’ degree plan or major.
- A comprehensive skills and accomplishments inventory reflecting the student’s scholarship (research and creative activities), accomplishments, co-curricular activities, service, leadership, internships, integrative thinking, knowledge, etc.



Onstead College of Science and Engineering  
Department of Mathematics

SDS 496  
Statistics and Data Science Capstone  
Section 01  
Fall 2027

## Syllabus

### Contact Information

**Instructor:** Dr. John Ehrke, Associate Professor of Mathematics, Chair

**Email:** [john.ehrke@acu.edu](mailto:john.ehrke@acu.edu)

**Phone:** 325-513-4242 (cell), 325-674-2162 (office)

**Office:** Onstead Science Center 173

### Instructor Availability

It is my responsibility as the instructor to provide timely responses to all email or personal communications in a respectful and professional manner. In kind, the same applies to student communications with the instructor.

**In-Person Office Hours:** Tuesday 9-11 am, 2-4 pm, Wednesday 3-4 pm, Thursday 9-11 am

**Zoom Office Hours:** By appointment only.

### Join Zoom Meeting

<https://acuonline.zoom.us/j/8095293581>

Meeting ID: 809 529 3581

## Mission Statements

This course supports ACU's mission statement of preparing students for Christian service and leadership throughout the world by providing students a foundational understanding of the mathematical principles such as problem solving and decision making, as well as exposing students to the role of mathematics in a Christian worldview.

The mission of the Onstead College of Science and Engineering is to explore and understand God's creation in the natural world and apply the acquired knowledge and principles to address its issues and challenges.

The mission of the Department of Mathematics is to educate students to be quantitative and analytical thinkers in preparation for Christian service and leadership throughout the world.

## Course Information

### Credit Meeting and Hours Information

This is a 2-credit hour course that meets on Monday, Wednesday each week.

**Room:** OSC 235

**Time:** 2:00 – 2:50 MW

### Course Description and Purpose

**SDS 496 - Statistics and Data Science Capstone (2-0-2), fall.** Students apply the knowledge and techniques of their statistics and data science coursework to projects involving real data from students' domains of interest. Projects reflect the entire data science workflow; developing and refining questions of interest, preparing data, applying suitable analysis techniques, visualizing data, and communicating results to potential stakeholders. *A capstone and writing intensive course.*

**Prerequisites:** SDS 396

### Course Goals

- Apply and solidify concepts learned throughout the program—such as statistics, machine learning, and programming—to solve complex, interdisciplinary problems.
- Practice essential workplace skills, including teamwork, project management, and leadership within a collaborative environment.
- Identify business or research objectives and translate them into data science goals.
- Demonstrate mastery of the entire data science pipeline.
- Present technical findings to both technical and non-technical stakeholders through written reports, oral presentations.

- Provide opportunities to collaborate with corporate partners or research groups, building a professional track record.

## Course Materials

**Course Text:** There is no assigned course text.

**Technology:** We will spend a significant portion of the semester writing and working on statistical analyses. Be prepared to use Overleaf, Python, R and other statistical analysis tools on a regular basis as you complete your consulting assignments.

**Learning Management System:** This course will make use of the Canvas learning management system (LMS). Canvas can be accessed through the myACU portal and will host assignments, discussions, and a variety of lecture resources including links to slides and videos. Canvas also features a course calendar with due dates for various assignments as well as class prep lists. We will reference Canvas early and often throughout the semester.

## Writing Intensive Courses

This class serves as the writing-intensive course for the Statistics and Data Science major. Writing-intensive courses emphasize writing as a primary mode of learning, and written assignments constitute much of the final grade. Adopting language from the ACU Catalog, writing-intensive courses contribute to students' "strong analytical, communication, quantitative and information skills - achieved and demonstrated through learning in a range of fields, settings and media, and through advanced studies in one or more areas of concentration."

The Writing Center at ACU, located in the Learning Commons, is a facility where any writer can come discuss writing tasks of any kind. Our tutors are experienced and trained writers, mostly graduate students from ACU's Language and Literature department, who will consult with you regarding any writing task, at any stage of the writing process. Call 674-4833 for more information. All of our services are free. The writing center is available online at [www.acu.edu/writingcenter/](http://www.acu.edu/writingcenter/).

## Course Competencies

The course competencies below describe the outcomes of the course in terms of specific measurable actions, capabilities, or skills students will be able to perform as a result of experiences in the course.

| Course Competencies                                                                                                                                          | Measurement Instrument                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Develop vocational skills related to professional conduct in a statistics and data science related field.                                                    | Mock Interview<br>Final Presentation and Technical Report<br>Client Satisfaction Questionnaire |
| Assess your personal journey in the study of mathematics and articulate how your values, philosophies and learning processes contribute to vocational goals. | Faith and Vocation Paper<br>ETS Major Field Exam                                               |
| Describe trends and anomalies in complex data sets and synthesize multiple data representations.                                                             | Final Presentation and Technical Report                                                        |
| Translate complex data into actionable insights for non-technical audiences.                                                                                 | Final Presentation and Technical Report                                                        |
| Synthesize teamwork, ethics, time management, and professional standards in a consultation experience.                                                       | Client Satisfaction Questionnaire                                                              |

## Course Outline

This is a seminar style course where most class meetings revolve around discussions. There may be times when lecture and group activities will be used though. All meeting dates, assignments, and due dates are listed in the table below. Meetings marked as consultation days refer to students having no assigned class meeting time and are expected to be meeting with their capstone project faculty mentors or working on their capstone presentations instead.

## Course Assessments and Grading

This course utilizes a standard points-based scheme allowing students to earn up to 1000 points from various assessments throughout the semester. Your grade in the course is based on the following point tiers at semester's end.

Since the grading scheme is point based - every point in the course is created equal. A point lost on a quiz is the same as a point lost on a test. *All assessments matter!*

| Point Total Earned | Letter Grade Received |
|--------------------|-----------------------|
| 1000 - 900         | A                     |
| 899 - 800          | B                     |
| 799 - 700          | C                     |
| 699 - 600          | D                     |
| < 600              | F                     |

There are many different assessment types that you will encounter in this course. A breakdown of these assessments is provided in the table below.

| Description                                  | Number | Points Available |
|----------------------------------------------|--------|------------------|
| Faith and Vocation Reflection                | 1      | 100              |
| Comprehensive Skills Inventory               | 1      | 30               |
| Resume, Cover Letter, Job Posting            | 1      | 60               |
| Mock Interview                               | 1      | 60               |
| Literature Review                            | 1      | 60               |
| Sponsor Meetings                             | 3      | 70               |
| Outline, Abstract and Introduction           | 1      | 30               |
| Capstone Paper and Presentation First Drafts | 1      | 30               |
| Capstone Project Poster                      | 1      | 90               |
| Capstone Project Presentation                | 1      | 150              |
| Capstone Project Paper                       | 1      | 220              |
| Final Exam - ETS Field Test                  | 1      | 100              |
| <b>Total Points</b>                          |        | <b>1000</b>      |

**Writing Assignments x 3 (190 points)** Students will be assigned to complete a few writing assignments apart from the Capstone paper.

FAITH AND VOCATION PAPER (100 points): You will be required to write a 750-1000 word essay on how your major area of study has influenced your faith and how your faith has influenced your study of mathematics. The purpose of this assignment is to have you reflect on your spiritual, personal and academic growth while at ACU. *This should focus solely on your growth and understanding during your time at ACU.* This assignment is to demonstrate your ability to think critically about faith and vocation as it is expressed in your discipline. (University Capstone Requirement)

COMPREHENSIVE SKILLS INVENTORY (30 points) - You will submit an updated inventory of all scholarship (research or creative activities), accomplishments, co-curricular activities, service, leadership, internships, etc. After each section, write a two or three sentence reflection on how each has prepared you to be a better student at ACU and/or to be successful after you graduate from ACU. (University Capstone Requirement)

RESUME, COVER LETTER, JOB POSTING (60 points): You will be required to locate a job posting in a field related to your major that you would like to apply and are qualified for. You will need to submit a resume tailored to the job posting and a cover letter that addresses how you are qualified and meet the requirements listed in the job posting. You are to submit three products: a resume, a cover letter, and the job posting. (University Capstone Requirement)

**Mock Interview, (60 points)** Students will be required to complete a mock interview process. The details of the mock interview will be outlined in Canvas. Suggestions for navigating the interview process will be provided. Expect to demonstrate your skills in coding and data analysis at this interview.

**Literature Review / Methodology, (60 points)** The student will prepare a 5-8 minute presentation that provides information concerning the relevant literature/methodology associated with their project, the history of the topic behind the project, and any background information that is pertinent to the project. Hopefully, this will be molded into the beginning of your final report presentation and at the same time, provide you with adequate references for your writing. The presentation should be submitted to Canvas before the start of class.

**Capstone Project, (590 points)** The major component of your course grade is the capstone project. The capstone project has three parts: a required written report to the sponsor along with a reproducible code base, a required 18–23 minute presentation that summarizes and highlights the major results of your project, and a required poster that summarizes and highlights the major results of your project.

The Statistics and Data Science Consultation Capstone project is a high-level experiential project where students or professionals act as "unpaid consultants" to solve specific, strategic challenges for real-world clients. Unlike a standard independent project, this model focuses on delivering actionable



insights and practical tools to an external partner. Information for that semester's capstone project will be delivered to students at the beginning of the semester. Students are graded on the following areas.

**CLIENT SATISFACTION EVALUATION (30 points):** You work directly with a "sponsor"—which can be a corporation (e.g., IBM, HubSpot), a government agency, or a non-profit. Your sponsor will be given a form to evaluate your performance.

**ITERATIVE CHECK INS (70 points):** You will have biweekly (or at another timing specified by your sponsor) meetings with the sponsor and your consultation board to provide progress updates and gather feedback on your model's performance. Your consultation board will be chosen at the end of the seminar course. It includes your instructor and other faculty from campus that can help speak into your project.

**PRACTICE CAPSTONE PROJECT PRESENTATION (30 points):** You will have the opportunity to give a practice presentation prior to the actual presentation to the department. This will provide feedback that you can use to improve your presentation. All presentations should be submitted to Canvas before the start of class practice presentations take place regardless of order of presentation group. You will have the opportunity to submit a draft of your capstone project paper to get feedback and comments.

**CAPSTONE PROJECT POSTER (90 points):** You will be required to prepare a research poster that summarizes the results of your capstone project. The poster should include (at a minimum) the following sections: title, presenter's name and affiliation, introduction, methods, results, conclusion(s), references, acknowledgments (and Interlocking ACU academic logo). The research poster should be 40 inches wide by 32 in high. See Canvas for more information about the format of the poster. You will present your posters the Monday before Thanksgiving during class.

**CAPSTONE PROJECT PRESENTATION (150 points):** You will give a professional presentation designed for non-technical stakeholders to your sponsor and the class. You are expected to use technology for your presentation and to be professionally dressed.

Presentations will be graded by mathematics faculty who watch your presentation and by your sponsors using the Capstone Presentation Assessment Rubric. Your grade on the presentation will be calculated as follows: the scores from all the faculty and the sponsors will be combined (averaged) to get a score between 0 and 75. This score will then be multiplied by 2 so that it is a score between 0 and 150.

**CAPSTONE PROJECT DELIVERABLES (220 points):** Your capstone project is due on the final week of the semester. You will provide a final report and a reproducible code base for your work. More information about formatting specifications for the report will be posted on Canvas.

Reports will have two faculty graders: the instructor of the course and another faculty member in the Department of Mathematics who served on the consultation board. Papers will be graded using the Capstone Consultation Report Assessment Rubric. Your grade on the paper will be calculated as follows: the scores from the two readings will be averaged to get a score between 0 and 44. This score will then be multiplied by 5 so that it is a score between 0 and 220. This scaled score will then be multiplied by  $(1 - 0.05k)$  where  $k$  is the number of formatting requirements not followed. This will be your Capstone Project Deliverables grade.

**ETS Major Field Exam, (100 points)** The final exam will be given at the time scheduled by the university (Wednesday, December 10 from 2:00 - 3:45 PM ). I am prohibited from changing the time or date. Make your end-of-semester plans accordingly. The current plan is to give the ETS mathematics major field test. The final exam will be worth 10% (100 points) of your course grade.

A complete listing of assignments can be found in Canvas. Please keep in mind that all due dates in the syllabus are tentative and may be changed during the semester at the instructor's discretion. You will be given plenty of advance notice for due date changes and the most up to date information can be found in Canvas.

## Course Policies

### Assignment Policies

During the semester, many assignments will have due dates posted on Canvas and announced in class. The purpose of a due date is to give you a timeline within which to work and allow for formative assessment of your work. An assignment, once due, will not be accepted under any circumstance if any of the following have occurred:

- The assignment is not submitted before an answer key is posted.
- The assignment is not submitted before being closed. This applies to Canvas discussions and any assignments completed in Learning Catalytics or in an online homework portal. These have rigid closure times and once closed will not be reopened.
- The assignment is not submitted before all submitted assignments are graded.

In addition, assignments will incur a 10% penalty for each of the following infractions that occur. This includes all assignments in the course - including major assignments - so be careful to follow all given instructions precisely.

- Assignments not turned in on time will receive a 10% penalty for each day it is late.
- Assignments turned in where instructions are not followed will receive a 10% penalty for each infraction.

Penalties are additive, rather than multiplicative, so if an assignment is turned in 2 days late and an instruction was not correctly followed, then there are three infractions for a total penalty of 30%,

meaning the highest grade the assignment could receive is a 70%. (Effectively, I will multiply whatever grade you earn by 0.7 to determine the adjusted grade in this case.)

Please note that you are responsible for working with your group on collaborative assignments -- like the modeling projects -- even if you are not in class on the day groups are assigned. Failure to work with your group in a good faith manner will render you ineligible for credit with the rest of your group. Any group wishing to dismiss a member of the group for inaction must inform the instructor at least three days before the due date. You may opt to complete the assignment on your own for credit if you are dismissed from a group.

In the case of extenuating circumstances, such as illness, injury or other personal emergency you can request an extension for assignments. Any such requests must be made in advance of the due date or class date; requests made after the due date or the start of class where a quiz is taken will not be honored. This means that if you have a conflict that prevents you from attending class to complete an assignment you must notify the instructor before class begins and arrange a time/date to make up the assignment. This policy applies to all assignments including exams/projects. Please note that some assignments cannot have extended due dates and will require you to complete the assignment early if there is a conflict.

Finally, you are ultimately responsible for ensuring that your grade in the course is being calculated correctly according to this syllabus and that there are no missing or incomplete grades in the Canvas gradebook. The instructor will make every effort to keep the gradebook up-to-date and accurate but mistakes can sometimes be made. Please be diligent in taking ownership of your grade and performance in this course.

### **Attendance and Drop Policy**

Your regular attendance is both necessary and expected. You are responsible for all material covered while absent and will be expected to take all scheduled assessments even if you are absent for the associated lectures. Only university approved absences can exempt you from being counted absent. Per university policy, university approved absences must be cleared with the instructor one week in advance. Make your coaches and sponsors aware that failure to comply with this policy may affect your ability to make up missed assignments. If you feel like you need to drop this class, please discuss it with your instructor first. It is your responsibility to make an informed decision when it comes to dropping or not dropping a class.

**Collaboration policy:** For preparing each presentation, you share work with your assigned teammates and no other students. In particular, when your paper is also being presented by a different team(s) in the same or different section of this course, you may not collaborate or share work with students in this other team(s). Similarly, all other deliverables in the course are individual

assignments. You are required to synthesize, research literature, and produce the document by yourself without working with your classmates. This course is intended to give you experience in autonomous research, so trying to delegate or shortcut preparation is a wasted learning opportunity. Acting against this rule will be considered an academic integrity violation and lead to reprimands. For your paper summaries and comparative analyses, you must produce your own work. You may discuss the papers with classmates, but the submissions must be your own work. Do not use the internet or other sources to find prior analyses to complete your assignments.

***Plagiarism and AI policy:*** The presentation and related work survey emphasize a literature search and compare/contrast to other material. All material you find and use in any of the course deliverables must be explicitly and correctly referenced/cited. Notes:

- Directly copying text from the paper being summarized, and/or from author websites or other sources, without using “quotation marks” around everything that is a direct quote, followed by a reference to the source being quoted, is plagiarism.
- Text and/or slides copied directly from other sources without attribution in presentations is also considered plagiarism.

While the uses of generative AI in industry and society are rapidly expanding, as a tool in academia the use of AI is fraught with potential pitfalls. As a mathematics student, using generative AI to solve any mathematics problem, and submit the work as your own, is strictly prohibited. The purpose of a mathematics course is to develop reasoning skills and problem-solving expertise that can only be properly developed by working through steps thoughtfully and rigorously. AI shortcuts this process and devalues the learning outcomes of the course. Additionally, generative AI is notoriously prone to making mistakes on mathematical calculations.

Generative AI is also strictly prohibited from use in any writing or reflection assignment. You may use AI to help you edit your writing or give feedback on your writing, but it cannot be used to wholly generate your submission or replace your own thoughts. For any other uses of AI please consult your instructor before use as the use of AI may qualify as an academic integrity violation.

### **Academic Integrity Policy**

The most powerful motive for integrity and truthfulness comes from one's desire to imitate God's nature in our lives. As a community of Christian students and scholars, we are each responsible to expect behaviors from each other consistent with the nature of God, to respect the community, and to respect ourselves.

Expectations of academic honesty and integrity extend to both university employees and students. Every member of the community is responsible for protecting the integrity of learning, scholarship,

and research. Being responsible requires action against violations in spite of peer pressure, loyalty, or compassion. Individuals must take responsibility for their own conduct and discourage misconduct by others.

### **Definition of Academic Integrity**

Academic integrity is defined as academic work completed as assigned for each class by the individual or group responsible for the work. Academic work includes but is not limited to reading assignments, homework assignments, assessments, examinations and tests, attendance at required out-of-class activities, written or oral presentations, and laboratory experiments and research.

Violations of academic integrity and other forms of cheating involve the intention to deceive or mislead or misrepresent and therefore, are a form of lying. Specific examples of violations of academic integrity in this course include, but are not limited to, the following:

1. Submitting for credit, in whole or in part, the work of others.
2. Receiving, giving, or using unauthorized aid on an examination, test, quiz, or assignment (e.g., texting).
3. Viewing the answers of a nearby classmate during an examination, test, quiz, or assignment.
4. Having inappropriate notes/practice work available during an examination, test, quiz, or assignment.
5. Obtaining examination, test, or quiz questions before the examination, test, or quiz is given.
6. Accessing printed copies or electronic copies of formulas and/or notes during an examination, test, quiz, or assignment without instructor approval.
7. Failure to give credit to sources used in a work in an attempt to present the work as one's own.
8. Submission of paper(s), project(s), or assignment(s), in whole or in part, obtained from any source, such as a friend, research service, or club paper file, as one's own.
9. Allowing other members of a group to provide a disproportionate fraction of a required group project or activity.
10. Claiming credit for an attendance or service activity without attending or performing the activity.
11. Written or oral presentation of falsified materials and facts, including but not limited to the results of interviews, laboratory experiments, and field-based research.

### **Consequences of Breach**

Violations of academic integrity may result in, but are not limited to, the following consequences:

- A first offense will result in a grade of 0 on the assignment in which the violation of academic integrity occurred.
- You will be permitted to remain in the class after the first offense of being found in violation of the academic integrity policy.

- A second violation in a class will result in an automatic grade of F in the course.
- All violations of academic integrity will be reported to the Dean of the College of Arts and Sciences and the Dean of Students in the Student Life Office.

### **Appeal Process**

If you would like to appeal a decision, then please follow this link to file an appeal:

<https://acu.edu/office-of-the-provost/academic-integrity-process/>.

### **Disability Accommodations**

Abilene Christian University is dedicated to removing barriers and opening access for students with disabilities in compliance with ADA and Section 504 of the Rehabilitation Act. The Alpha Scholars Program facilitates disability accommodations in cooperation with instructors. In order to receive accommodation, you must be registered with the Alpha Scholars Program, and you must complete a specific request for each class in which you need accommodations. If you have a documented disability and wish to discuss academic accommodations, please call our office directly at 325-674-2667.

### **Medical and Mental Care**

ACU is committed to making the return to campus as safe as possible by providing students, faculty and staff with resources to promote their health. We will continue working tirelessly to fine-tune our cleanliness and hygiene protocols. The ACU Medical and Counseling Care Center, along with Wildcat Care, are available to assist you with medical and mental health needs. Now more than ever, telehealth is an excellent resource, allowing you to stay healthy, talk with a provider 24/7 and greatly limit your exposure to illness. Many medical concerns, such as a cold, sinus infection, rash, nausea, etc., can be discussed via telehealth. In addition to providing in-person care for your medical needs, the ACU Medical Clinic can provide COVID-19 testing with same-day results.

### **Anti-Harassment Policy**

As a professor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a professor. It is my goal that you feel able to share information related to life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep the information you share private to the greatest extent possible. When I am not able to keep your information confidential, I will only share it with responsible administrators on campus who can provide you with services and resources. I am required to share with the Title IX Coordinator information regarding sexual misconduct or harassment, dating or domestic violence or stalking that you report to me. If you would prefer to share information in a confidential setting, I encourage you to speak with someone in the [ACU](#)

[Counseling Center](#). All of your options are available for review by clicking on the link to ACU's [policy](#).

**Title IX Policy:** At ACU, we strive to comply with all applicable legal requirements prohibiting, preventing and responding to sexual misconduct against any member of the ACU community. The full Title IX policy and process can be found at <https://acu.edu/human-resources/title-ix-and-sexual-misconduct-information/>.



To: UGEC

From: John Ehrke, Chair of the Department of Mathematics

Greetings,

Enclosed you will find an application for designating SDS 496 – Statistics and Data Science Capstone as the Capstone experience for students in the new Statistics and Data Science program, housed within the mathematics department. The purpose of such a course is as follows:

**1. Encountering Real-World Problems**

- a. Students work with messy data sets that require significant cleaning and wrangling.
- b. Students partner with external stakeholders to solve active business, finance, and/or scientific problems.
- c. Students execute the entirety of the data science pipeline, from initial problem statement to dashboard deployment.

**2. Career Preparation and Vocational Skill Training**

- a. Students explain technical statistical results to non-experts or clients through a formal report and presentation.
- b. Students collaborate in small groups (2-4 students) as a professional team.
- c. Students plan timelines, manage deadlines, and use professional tools to control versioning and gather feedback.
- d. Students deliver a tangible work product that can be showcased in resumes and interviews.

**3. Foster Integrative and Critical Thinking**

- a. Capstone experiences require students to think critically because the type of problems encountered do not have “right” answers. Students critique their own mathematical models and make simplifying assumptions during the process.
- b. Students evaluate different analytical approaches, deciding which methods are most appropriate for a given situation.
- c. Students are required to analyze projects for their benefit to society (often times referred to as “data for good”), focusing on ethics and morality as frameworks for evaluating their work.





- d. The liberal arts approach trains students to see problems from multiple angles and teaches them to appreciate a diversity of thought. These skills are essential for accurately interpreting complex data.

#### **4. Thinking Globally and Missionally**

- a. Students are encouraged to merge data tools and analytics with fields like history, biology, public health, business, etc... Data science is highly interdisciplinary and the capstone experience showcases that.
- b. Students review case studies which address issues of global significance, such as climate change, food insecurity, global supply chains, or disease outbreak. Working on projects like these forces students to account for international standards and diverse populations.
- c. By delivering actionable insights to consultation partners, students see themselves as able to affect change and believe their work has a direct mission to improve lives. This is consistent with the University's mission to educate students for Christian service and leadership throughout the world.

Also attached you will find a syllabus for the course. In the syllabus the following assignments are documented:

The Statistics and Data Science Consultation Capstone project is a high-level experiential project where students or professionals act as "unpaid consultants" to solve specific, strategic challenges for real-world clients. Unlike a standard independent project, this model focuses on delivering actionable insights and practical tools to an external partner. Information for that semester's capstone project will be delivered to students at the beginning of the semester. Students are graded on the following areas.

- Literature Review / Methodology
- Client Satisfaction Evaluation
- Monthly Client Check-in and Monthly Project Committee Check-In
- Capstone Poster Presentation
- Capstone Project Oral Presentation
- Capstone Final Project Deliverables Technical Report presented to Client

In addition to this major project there are three other assignments which fulfill Capstone requirements:

- A 1000-word paper on faith and vocation in which students reflect on their spiritual, personal and academic growth while at ACU and how that experience shapes their understanding of their discipline.



- Students will submit an updated inventory of all scholarship (research or creative activities) accomplishments, co-curricular activities, service, leaderships, internships etc... with brief reflections on each.
- Students will be required to find a job in their chosen field that they could reasonably apply to upon graduation. They will submit a resume, cover letter and complete any other requirements of the application process. The instructor and one other faculty member will hold a mock interview which will ask students to demonstrate practical skills in their field along with answering questions that are relevant to that field. Students will be asked to reflect on this experience during class in a class-wide discussion once all mock interviews have been completed.

Finally, I would like to add that SDS 496 is very similar to our course MATH 496. The main difference is the nature of the final project being a consultation project rather than a thesis. We felt this was a significant enough difference to separate them as courses. This will also allow us flexibility in the future to grow the courses further apart if needed. For now both MATH 496 and SDS 496 meet in the same room and have the same instructor, though the nature of a Capstone course means many mentors will be involved.

I appreciate your review of our proposed course. If you have any questions, do not hesitate to ask.

Blessings,

John Ehrke

# Capstone Consultation Report Assessment Rubric

| Category             | Pts       | 4 - Excellent                                                         | 3 - Proficient                                                | 2 - Developing                                             | 1 - Beginning                                        |
|----------------------|-----------|-----------------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------|
| Statistical Depth    | 8         | Advanced techniques applied with rigorous mathematical justification. | Standard methods used correctly and appropriate for the data. | Analysis is basic; fails to explore complex relationships. | Major errors or inappropriate choice of methods.     |
| Methodology          | 8         | Process is fully reproducible; clear feature engineering/selection.   | Logical workflow; most steps documented and justified.        | Workflow is disjointed; reasoning for steps is unclear.    | Methodology is missing or fundamentally flawed.      |
| Accuracy             | 8         | High performance metrics validated against robust testing sets.       | Findings are mostly accurate with minor edge-case errors.     | Significant errors in processing affect reliability.       | Findings are incorrect or based on data leaks.       |
| Report Clarity       | 6         | Complex findings distilled into actionable insights; pro visuals.     | Report is easy to follow with a logical flow.                 | Technical jargon or poor structure hinders flow.           | Disorganized; fails to communicate primary findings. |
| Responsible Use      | 4         | Exceptional ethics handling; full citation of all external sources.   | Proper citations; data used ethically with no obvious bias.   | Missing citations; minor ethical oversights present.       | Plagiarism or unethical use of sensitive data.       |
| Org. & Style         | 4         | Professional formatting; consistent headers and high-quality charts.  | Well-organized with a consistent style throughout.            | Inconsistent formatting; layout distracts from content.    | Unformatted or unprofessional styles/colors.         |
| Grammar & Polish     | 4         | Error-free writing; sophisticated, professional tone/vocabulary.      | Clear writing with only minor, infrequent errors.             | Frequent errors in grammar distract the reader.            | Pervasive errors significantly hinder readability.   |
| Follows Instructions | 2         | Strictly adheres to word limits, file formats, and submission rules.  | Minor deviation from one non-critical instruction.            | Fails word limits or uses incorrect file formatting.       | Ignores multiple core submission instructions.       |
| <b>TOTAL</b>         | <b>44</b> | <b>Scoring:</b> 40-44 (A), 34-39 (B), 28-33 (C), <28 (Unsatisfactory) |                                                               |                                                            |                                                      |