San José State University
Science Education Program
SCED 255, Advanced Natural Science, Fall 2020

Course and Contact Information

Instructor(s):	Dr. Jennifer Avena (Preferred pronouns: she/her)
Email:	jennifer.avena@sjsu.edu (Preferred mode of contact)
Office Hours:	Wednesdays, 3-4 PM or email me to set up an appointment at Zoom Link: https://sjsu.zoom.us/j/95003770530 (must be logged in to Zoom with your SJSU credentials, and you will first enter a waiting room)
Class Days/Time:	Thursdays, 4-6:30 PM (Synchronous component is 4-6 PM with the remaining time consisting of asynchronous components, including discussions; certain days may end as early as 5:30 PM, depending on asynchronous assignments for the week)
Classroom:	Virtual at Zoom Link: https://sjsu.zoom.us/j/95327120784 (must be logged in to Zoom with your SJSU credentials, and you will first enter a waiting room)

Course Description

Selected topics in natural science or science education. Specifically, the course will focus on data analysis methods and techniques. Students will engage in data analysis methods that are directly applicable to their own master's projects and the projects of their classmates when possible as well as general techniques for both quantitative and qualitative data analysis.

Respect for Diversity

My goal is that this course will respect and value the diversity of students from all backgrounds and experiences. This diversity is a resource for all aspects of our class, including as we engage in discussions as a whole class as well as in groups. This course is fully online, so we want to keep in mind appropriate netiquette (see details in Canvas) to maintain a professional, respectful, and cooperative online environment. In accordance with San José State University's Policies, the Student Code of Conduct, and applicable state and federal laws, discrimination based on gender, gender identity, gender expression, race, nationality, ethnicity, religion, sexual orientation, or disability is prohibited in any form. Your feedback and suggestions to improve the course are greatly appreciated, so feel free to reach out to me.

Course Format

Online Course

This class will be held entirely online via synchronous Zoom sessions and the Canvas learning management system. You will need access to a computer with Internet to complete assignments and attend Zoom classes. All out-of-class communication with you will be through Canvas. Course materials can be found on the Canvas website: sjsu.instructure.com. If you are an Open University student, see us for access to the site. During class,

you are expected to participate in activities and discussions. This includes being prepared for class by completing assignments prior to attending as well as contributing to the classroom discourse. The course is a graduate level course; therefore, the expectation is that you are motivated to learn and apply what you learn to the best of your ability.

Access to technology: Some internet providers are offering free or low cost internet and opening hotspots free to students: Internet Essentials, Digital You, Xfinity, Comcast. Student Computing Services has information on how to request a laptop available for loan. If you have any issues accessing online course materials, please contact the IT Service Desk at (408) 924-1530 or itservicedesk@sjsu.edu. Additional information also available at Learn Everywhere.

Canvas Learning Management System and Student Email/ MYSJSU Messaging

Course materials can be found on the Canvas Learning Management System at http://sjsu.instructure.com. You are responsible for regularly checking your SJSU email/mysjsu messaging and Canvas Announcements page to learn of any updates. I suggest that you check your Canvas Notification Settings to ensure Canvas Announcements will be sent to your SJSU email account. For help with using Canvas see Canvas Student Resources page (http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources)

Course Goals and Learning Outcomes

Program Learning Outcomes (PLO)

This course can be taken to fulfill some of the credit hours required for a master's degree in Science Education. Therefore, this course (in addition to others) will help students make progress towards the following program learning outcomes:

- PLO 1 Students will be able to synthesize primary literature from science education research and apply how it fits to their project.
- PLO 2 Students will demonstrate knowledge of at least two areas (e.g. inquiry based instruction, learning theory, assessment) that are related to, or supportive of research for their project.
- These PLOs are heavily featured in the required core courses, so while students will inevitably make progress here, there are more specific course goals listed below.

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

- CLO 1 Critically read peer-reviewed articles in science education
- CLO 2 Engage in authentic discussions on educational research with researchers
- CLO 3 Create and begin to enact a plan to collect and analyze data (depending on where students are at course entry)
- CLO 4 Perform both quantitative and qualitative data analysis on their own data sets, and/or those of their classmates
- CLO 5 Articulate the relationship between research questions, data analysis techniques, and data representations like plots, graphs, tables, transcripts and figures.

Required Texts/Readings

Textbook

There is no required text to purchase. Assigned readings will be provided in the corresponding topic's module in Canvas.

Other Readings (Optional)

If you would like additional resources, you are welcome to purchase or borrow general quantitative or qualitative data analysis books that will help you make sense of your data. A few recommendations: Qualitative Data Analysis (Miles, Huberman, & Saldaña) and Research in Education (MacMillan & Schumacher). Additionally, Sage Research Methods database is an online database to which the Dr. Martin Luther King, Jr. Library subscribes (https://libguides.sjsu.edu/az.php?a=s). The database has several options of "Little Blue Books" that provide short and accessible texts, which you can access using your SJSU account.

Library Liaison

Ngoc-Yen Tran (yen.tran@sjsu.edu) for Sciences and/or DeeAnn Herrera Tran (deeann.tran@sjsu.edu) for Education

Course Requirements and Assignments

Weekly assignments will allow students to:
1) Make measurable progress on their own MA project
2) Assist classmates in making progress on their projects
3) Learn analysis techniques that will help them better critically analyze published research

In-class (synchronous) participation. During the synchronous class, I expect that you will be prepared to actively participate in our class discussions and activities. See Canvas Rubrics for grading details. You may miss one class period without your participation grade being affected.

Weekly assignments. *Since the assignments depend on the needs and discussions in class, these will be assigned by Friday at 5 PM in Canvas Modules.*

> *Canvas discussion board.* Online discussions will be used to build a collaborative learning community, this on-going assignment involves posting and responding to comments, thoughts, insights or reflections online with respect to the weekly readings and your own related educational experiences. Use this virtual space to connect with other classmates to help you think through the concepts we are learning in the course. As everyone's continuous participation is essential in creating this virtual community, a minimum of 3 posts per week is required—you must create an initial, original post in response to the discussion prompt and two responses to peer posts. **All discussion board assignments are due the Wednesday before class by 12:00 PM (80% of points), and response posts are due by 12:00 PM on the Thursday of Class (20% of points).** Note: The discussion board in Canvas will indicate a deadline of Thursday when both your initial and responding prompts are due, but please remember to post your initial response by Wednesday. Additional prompt and grading details will be provided in the Discussion Board and Canvas Rubrics. These will be assigned each week unless otherwise indicated.
>
> *Homework.* Assignments are due by 12:00 PM on the day of class unless otherwise noted on the Canvas site—*make sure to check due dates for all assignments!* The content will depend on the needs of the class, but may contain opportunities to reflect, plan, analyze data, etc.

Student presentation on specific data analysis/collection method or technique. The Presentation schedule be determined during the first two weeks of class. Schedule is dependent on interests/needs of the class, and I will assign useful topics accordingly. At least one week before your presentation, you will meet with me virtually regarding what your plan is. Please ensure you coordinate with me to set up this meeting. You don't need to have it completed by then, but you should have an outline, this will help me plan an activity that coordinates. A rubric will be provided in Canvas for grading details.

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus." Students are expected to spend 6 hours per week outside of class on course-related work.

Final Examination or Evaluation

As your culminating activity for this course, you will create and present a ***Scientific Research Poster***. Posters of this type are often presented at research conferences as works in progress. This poster is a representation of the current state of your work. If you have collected data and completed some analysis, you will present that in the poster. If you have not yet had an opportunity to collect data or have a project that does not require data analysis (e.g., a literature review), your poster should present a plan of how data related to your project will/can be analyzed. More details will be provided over the semester. A rubric will be provided in Canvas for grading details. Per SJSU guidelines, "Faculty members are required to have a culminating activity for their courses, which can include a final examination, a final research paper or project, a final creative work or performance, a final portfolio of work, or other appropriate assignment."

Grading Information

Students will be graded on the quality of their written assignments, the extent of their participation, and the thoughtfulness, effort and coherence of their final project. Points will be allocated as such:

In-class participation 20%
Weekly assignments (includes discussion board and homework) 40%
Student presentation on specific data analysis/collection method or technique 20%
Scientific Research Poster (Final Evaluation) 20%

Due to the nature of the format of the course, it will be difficult to make up work. If you anticipate falling behind, or have an emergency, see me as soon as possible to make a plan. Late work will *be accepted up to one week after the due date*, with a deduction of 5% per day, unless otherwise specified in Canvas rubrics, except in the case of a medical emergency, *with advance notice* if possible. This policy is to promote student success and prevent you from falling behind in assigned work. There is no extra credit for this course.

The following grading scale will be used:

Grade	*Percentage*
A plus	*98 to 100%*
A	*93 to 97%*
A minus	*90 to 92%*
B plus	*88 to 89 %*
B	*83 to 87%*
B minus	*80 to 82%*

C plus	*78 to 79%*
C	*73 to 77%*
C minus	*70 to 72%*
D plus	*68 to 69%*
D	*63 to 67%*
D minus	*60 to 62%*

Classroom Protocol

Our class will engage in a variety of small group experiences and large group discussions. A successful class will depend on every member of the group actively collaborating as both learners and teachers. It is my assumption that each of us has valuable perspectives and experiences that will inform our collective, developing knowledge. It is important that you come to class on time. I expect that you will have read the texts carefully and will be prepared to actively participate in our class discussions both during synchronous Zoom sessions and on Canvas. Attendance is essential in order for your success in this course. Often times the success of a classroom activity will depend on the attendance of the entire class. Therefore, it is essential that you notify me if you are going to miss class for any reason, as soon as you are able.

University Policies

Per University Policy S16-9 *(http://www.sjsu.edu/senate/docs/S16-9.pdf)*, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

Intellectual Property

Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

SCED 255/Advanced Natural Science, Fall 2020, Course Schedule

Note: This schedule is subject to change with reasonable notice. ***Topics discussed over the semester will be determined based on student needs and interest, so this schedule will be filled in as we proceed through the semester. Please review Canvas Modules and the Canvas syllabus (web version) for the most up-to-date information.***

Course Schedule

Week	Date	Topic	Post-class Assignments
0			Pre-class survey Pre-class introductory discussion board
1	8/20	Course Goals and Structure	"Research board": Introduction Reading Discussion Board: Butin, Ch. 2
2	8/27	Library visit Data Analysis Prior Knowledge	"Research board": Creating a productive space Presentation Readings Reading Discussion Board: Guest et al., 2017 (Data management), p.1-9, 17-22
3	9/3	Data Collection and Organization	Software spreadsheet Presentation topic communication assignment Reading Discussion Board: TBA SPSS – Download and Install
4	9/10	Quantitative Analysis – Studies and Descriptive Statistics	Descriptive Statistics Assignment Presentation Readings Reading Discussion Board: TBA
5	9/17	Quantitative Analysis – Hypothesis Testing	Quantitative Analysis Assignment MA Project Peer Review Assignment
6	9/24	MA Project Peer Reviews	TBA
7	10/1	Quantitative Analysis, continued – Inferential Statistics	TBA
8	10/8	Qualitative Analysis: Coding	TBA
9	10/15	Collecting and Analyzing Interview Data	TBA
10	10/22	Ethnographic Research	TBA
11	10/29	Episode Selection for Video Analysis of Observations	TBA
12	11/5	Making Sense of Qualitative Data	TBA

13	11/12	TBA	TBA
14	11/19	Mixed Methodology	TBA
15	11/26	*No class – Thanksgiving Holiday – Campus closed*	
16	12/3	Reflection and Poster Preparation	
Final Evaluation Date	Th 12/10 5:15-7:30 PM	Culminating Scientific Research Poster	