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Department of Teaching and Learning
Inquire. Educate. Innovate.

Course Information

I.	**Prefix & Number**	CIE 633
II.	**Title**	Integrated STEM education methods
III.	**Credits**	3 Credit hours
IV.	**Semester**	
V.	**Instructor**	
VI.	**Office/Phone/Email**	
VII.	**Class Location**	
VIII.	**Office Hours**	
IX.	**Prerequisites**	--
X.	**Course Description (Course Introduction)**	Focuses on the methods of instruction for integrated STEM (Science, Technology, Engineering, and Mathematics) education at the K-8 level. This class will focus on essential elements/techniques of integrated STEM education in order to (a) deepen student understanding of each discipline by contextualizing concepts and (b) increase student interest in STEM disciplines through exposure to socially and culturally relevant STEM contexts.

XI. Knowledge Objectives

Upon completion of this course students will be able to meet the following objectives:

Objectives:
After completion of this course, the student should be able to:
- • Knowledge
Discuss **trends and issues** in integrated STEM education.

Create an integrated STEM lesson plan with a focus on **engineering design, mathematical modeling, and technology integration**.

- • Performance Skills
Demonstrate application of the **materials and resources** available for implementing an integrated STEM approach to the teaching and learning of STEM.

Create **effective integrated STEM lessons** that respect the diversity of backgrounds in a classroom.

- • Dispositions
Demonstrate a **positive and professional attitude** toward the teaching and learning of STEM education.

- • Results
Synthesize **theoretical research and application literature** into models of effective STEM education teaching.

XII. RESULTS

Course Objectives	Measurement/Evaluation
Discuss **trends and issues** in integrated STEM education.	Weekly readings, class discussion, topic paper, and reflection paper
Create an integrated STEM lesson plan with a focus on **engineering design, mathematical modeling, and technology integration**.	Integrated STEM lessons and peer feedback

Demonstrate application of the **materials and resources** available for implementing an integrated STEM approach to the teaching and learning of STEM.	Lesson plan presentation and Integrated STEM lessons and peer feedback
Create **effective integrated STEM lessons** that respect the diversity of backgrounds in a classroom.	Lesson plan presentation and Integrated STEM lessons and peer feedback
Demonstrate a **positive and professional attitude** toward the teaching and learning of STEM education.	All class activities
Synthesize **theoretical research and application literature** into models of effective STEM education teaching.	Annotated bibliography and topic paper and integrated STEM lessons and peer feedback

XIII.   COURSE RESOURCES

Required Materials: All readings will be provided.

XIV.   **ASSIGNMENTS**

1. **Integrated STEM lessons and peer feedback** (30 points)
Students will develop three lessons with a focus of mathematical modeling, engineering design, and technology integration. Students will be given and provide peer feedback for the lessons and then make revisions. If a lesson is an application of content knowledge, then the prior lessons to develop the content knowledge should be summarized. If a lesson is a formative assessment, then the subsequent lessons to build on the student understanding should be summarized.

2. Annotated Bibliography and topic paper (20 points)
Students will read 6 practitioner articles connected Integrated STEM education. (National Council of Teachers of Mathematics, Association of Science Teacher Education, or National Science Teacher Association articles) Students will create an annotated bibliography from the articles with a minimum two paragraph summaries of each article.
Students will then write a minimum 4 page paper with the following sections.

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--Introduction
--4 things I learned
--3 ideas that supported my teaching beliefs
--2 questions that I still have or want more information about
--1 idea that will directly affect my teaching in the future.
The paper should include a reference list, appropriate APA citations, and be free from grammar mistakes.

3. Reflection paper (10 points)
Drawing on class discussions, readings, and class assignments at the conclusion of the semester students will write a three page double-spaced reflection paper that demonstrates understanding of the following:
> This class will focus on essential elements/techniques of integrated STEM education in order to (a) deepen student understanding of each discipline by contextualizing concepts and (b) increase student interest in STEM disciplines through exposure to socially and culturally relevant STEM contexts.

4. **Lesson plan presentation** (20 points)
Students will develop an integrated STEM lesson that is aligned to mathematics and/or science standards. Each student will present the lesson to the class as if the class was the elementary/middle school class for which the lesson was designed. Each student will be expected to hand-in a word-processed lesson plan. A lesson plan format will be provided.

5. **Weekly Readings and Assignments** (20 points)
Complete all readings and weekly assignments for each week and participate in class activities.

XV.   **SPECIAL NOTES**

Academic Misconduct

Academic integrity is a legitimate concern for every member of the Campus community; we all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility, and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy, and are encouraged to always take the ethical path whenever faced with choices. Students enrolling at UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's educational mission. An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another person, from the Internet or any other source without proper citation of the sources. See the [Student Conduct Code](https://www.unlv.edu/studentconduct/student-conduct), https://www.unlv.edu/studentconduct/student-conduct.

Auditing Classes

Auditing a course allows a student to continue attending the lectures and/or laboratories and discussion sessions associated with the course, but the student will not earn a grade for any component of the course. Students who audit a course receive the same educational experience as students taking the course for a grade, but will be excused from exams, assessments, and other evaluative measures that serve the primary purpose of assigning a grade.

Classroom Conduct

Students have a responsibility to conduct themselves in class and in the libraries in ways that do not interfere with the rights of other students to learn or of instructors to teach. Use of electronic devices such as pagers, cellular phones, or recording devices, or potentially disruptive devices or activities, are only permitted with the prior explicit consent of the instructor. The instructor may rescind permission at any time during the class. If a student does not comply with established requirements or obstructs the functioning of the class, the instructor may initiate an administrative drop of the student from the course.

Copyright

The University requires all members of the University Community to familiarize themselves with, and to follow copyright and fair use requirements. You are individually and solely responsible for violations of copyright and fair use laws. The University will neither protect nor defend you, nor assume any responsibility for employee or student violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional copyright policy information is available at http://www.unlv.edu/provost/copyright.

Disability Resource Center (DRC)

The UNLV Disability Resource Center (SSC-A, Room 143, https://www.unlv.edu/drc, 702-895-0866) provides resources for students with disabilities. Students who believe that they may need academic accommodations due to injury, disability, or due to pregnancy should contact the DRC as early as possible in the academic term. A Disabilities Specialist will discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours, so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Final Examination

The University requires that final exams given at the end of a course occur on the date and at the time specified in the Final Exam schedule. The general schedule is typically available at the start of the semester, and the classroom locations are available approximately one month before the end of the semester. See the Final Exam Schedule, https://www.unlv.edu/registrar/calendars.

Identity Verification in Online Courses

All UNLV students must use their Campus-issued ACE ID and password to log in to WebCampus.

UNLV students enrolled in online or hybrid courses are expected to read and adhere to the [Student Academic Misconduct Policy](#), https://www.unlv.edu/studentconduct/misconduct/policy, which defines, "acting or attempting to act as a substitute for another, or using or attempting to use a substitute, in any academic evaluation or assignment" as a form of academic misconduct. Intentionally sharing ACE login credentials with another person may be considered an attempt to use a substitute and could result in investigation and sanctions, as outlined in the Student Academic Misconduct Policy.

UNLV students enrolled in online courses are also expected to read and adhere to the [Acceptable Use of Computing and Information Technology Resources Policy](#), https://www.it.unlv.edu/policies/acceptable-use-computing-and-information-technology-resources-policy, which prohibits sharing university accounts with other persons without authorization.

To the greatest extent possible, all graded assignments and assessments in UNLV online courses should be hosted in WebCampus or another UNLV-managed platform that requires ACE login credentials for access.

Incomplete Grades

The grade of "I" (Incomplete) may be granted when a student has satisfactorily completed three-fourths of course work for that semester/session, but cannot complete the last part of the course for reason(s) beyond the student's control and acceptable to the instructor, and the instructor believes that the student can finish the course without repeating it. For undergraduate courses, the incomplete work must be made up before the end of the following regular semester. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the period indicated, a grade of "F" will be recorded, and the student's GPA will be adjusted accordingly. Students who are fulfilling an Incomplete grade do not register for the course, but make individual arrangements with the instructor who assigned the "I" grade.

Library Resources

Librarians are available to consult with students on research needs, including developing research topics, finding information, and evaluating sources. To make an appointment with a subject expert for this class, please visit the [Libraries' Research Consultation](#) website: http://guides.library.unlv.edu/appointments/librarian. You can also [ask the library staff](#) questions via chat and text message at: http://ask.library.unlv.edu/.

Missed Classwork

Any student missing class, quizzes, examinations, or any other class or laboratory work because of observance of religious holidays will be given an opportunity during that semester to make up the missed work. The make-up opportunity will apply to the religious holiday absence only. It is the responsibility of the student to notify the instructor within the first 14 calendar days of the course for Fall and Spring courses (except for modular courses), or within the first 7 calendar days of the course for Summer and modular courses, of their intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit the Policy for Missed Work, under Registration Policies, on the [Academic Policies](https://catalog.unlv.edu/content.php?catoid=6&navoid=531) webpage, https://catalog.unlv.edu/content.php?catoid=6&navoid=531.

In accordance with the policy approved by the Faculty Senate regarding missed class time and assignments, students who represent UNLV in any official extracurricular activity will also have the opportunity to make up assignments, provided that the student provides official written notification to the instructor no less than one week prior to the missed class(es).

The spirit and intent of the policy for missed classwork is to offer fair and equitable assessment opportunities to all students, including those representing the University in extracurricular activities. Instructors should consider, for example, that in courses which offer a "Drop one" option for the lowest assignment, quiz, or exam, assigning the student a grade of zero for an excused absence for extracurricular activity is both contrary to the intent of the Faculty Senate's policy, and an infringement on the student's right to complete all work for the course.

This policy will not apply in the event that completing the assignment or administering the examination at an alternate time would impose an undue hardship on the instructor or the University that could reasonably have been avoided. There should be a good faith effort by both the instructor and the student to agree to a reasonable resolution. When disagreements regarding this policy arise, decisions can be appealed to the Department Chair/Unit Director, College/School Dean, and/or the Faculty Senate Academic Standards Committee.

For purposes of definition, extracurricular activities may include, but are not limited to: fine arts activities, competitive intercollegiate athletics, science and engineering competitions, liberal arts competitions, academic recruitment activities, and any other event or activity sanctioned by a College/School Dean, and/or by the Executive Vice President and Provost.

Rebelmail

Rebelmail is UNLV's official email system for students, and by University policy, instructors and staff should only send emails to students' Rebelmail accounts. Rebelmail is one of the primary ways students receive official University communications, information about deadlines, major Campus events, and announcements. All UNLV

students receive a Rebelmail account after they have been admitted to the University. Emailing within WebCampus is also acceptable.

Tutoring and Coaching

The Academic Success Center (ASC) provides tutoring, academic success coaching, and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, please visit the ASC website, https://www.unlv.edu/asc, or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of SSC A, Room 254. Drop-in tutoring is located on the second floor of the Lied Library, and on the second floor of the College of Engineering building (TBE A 207).

UNLV Writing Center

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, https://writingcenter.unlv.edu/, located in the Central Desert Complex, Building 3, Room 301 (CDC 3–301). Walk-in consultations are sometimes available, but students with appointments receive priority assistance. Students may make appointments in person or by calling the Center, 702-895-3908. Students are requested to bring to their appointments their Rebel ID Card, a copy of the instructions for their assignment, and two copies of any writing they have completed on their assignment.

XVI. GRADING POLICY

Integrated STEM lessons and peer feedback	30
Annotated bibliography and topic paper	20
Reflection paper	10
Lesson plan presentation	20
Weekly readings and assignments	20
	100

The Final Grade will be determined thusly: **No late work is accepted**

Points Earned	Grade
96-100	A
91-95	A-
87-90	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
67-69	D+
63-66	D

60-62	D-
<60	F

Attendance Policy

Attendance is required and affects the final grade. For the purposes of this class, attendance is defined as **presence and participation** in class discussions and activities. Lack of participation may be considered as absence from class. Sharing with colleagues is an integral part of the course. Your attendance pattern (absences, late arrivals, early departures, and participation) will influence your final grade as follows:

Absences	Effect on grade
0 – 2	no change
3	grade drops 1/3 (e.g., B+ will drop to B)
4	grade drops 2/3 (e.g., B+ will drop to B-)
5 or more	F

Note: 3 tardies (late arrivals and early departures) equals one absence.

XVII. TENTATIVE CLASS SCHEDULE

Week	Lesson Topic	Assignment Due
1	Class introduction/Integrated STEM overview	
2	Frameworks for Integrated STEM instruction	Weekly 1
3	Engineering design	Weekly 2
4	Engineering design	Weekly 3
5	Engineering design	Engineering design lesson draft and peer feedback
6	Engineering design	Engineering design lesson
7	Mathematical modeling	Weekly 4
8	Mathematical Modeling	Weekly 5
9	Mathematical modeling	Mathematical modeling lesson draft and peer

		feedback
10	Mathematical modeling	Mathematical modeling lesson
11	Technology integration	Weekly 6
12	Technology integration	Annotated Bibliography
13	Technology integration	Technology integration lesson draft and peer feedback
14	Topic paper sharing/Technology integration	Technology integration lesson Topic paper
15	Lesson plan presentation	Lesson plan presentation
16	Lesson plan presentation	Lesson plan presentation Reflection paper